THERMACTOR EXHAUST EMISSION SYSTEM TORQUE LIMITS

Check Valve to Air Manifold	16 - 19
Air Manifold to Cylinder Head	14 - 16
Air Pump Drive Pulley to Pump Hub	7 - 11
Air Pump Mounting Bolts	23 - 28

NEW SPECIAL TOOLS – ENGINE

Description	Ford Tool No.	Application
Front cover oil seal replacer	T68P-6700-A	429 V-8 engine
Front cover alignment tool	T68P-6019-A	429 V-8 engine
Piston pin remover/replacer	T68P-6135-A	All 6-cylinder engines; 289, 302, 429 V-8 engines
Crankshaft rear oil seal replacer	T68P-6701-A	429 V-8 engine
Cylinder block core plug replacer	T68P-6266-A	All engines
Engine lifting bracket	T68P-6000-A	429 V-8 engine

THERMACTOR DRIVE BELT TENSION

New	140 Lbs
Used (and belt-operated over 10 minutes)	110 Lbs

LUBRICANTS

Exhaust Control Valve Lubricant	Ford Port No. C0AZ-19A501-A, R-149-A

SEALERS

Loctite (thread locking compound)	Ford Part No. C3AZ-19554-A

FUEL TANK CAPACITIES

Car Model	Gallons	
	U.S. Measure	Imperial Measure
Ford – exc. Station Wagons	25	21
Ford Station Wagons	20	16-3/4
Falcon – exc. Station Wagon	16	13-1/4
Falcon Station Wagon	20	16-3/4
Fairlane	20	16-3/4
Mustang	16	13-1/4
Thunderbird	22	18-1/2

TRUCK

ENGINE IDENTIFICATION AND APPLICATION – GASOLINE

Engines	Rating Plate Identification	Application	Engines	Rating Plate Identification	Application
Light Duty Trucks					
240 Six	A		300 LD Six	B	F-100, -250 and -350; P-350, -400 and -500; F-100 and -250 (4 x 4)
			360 V-8	Y	F-100, -250 (4 x 2), and -350
			390 V-8	H	F-100, -250 (4 x 2), and -350
Medium Duty Trucks					
240 Six	A	F-, N- and B-500 and -600	330 HD V-8 2V	D	F-, C-, N-, and B-600 and -700; T-700
300 LD Six	B	F-, N- and B-500			
300 HD Six	B	F-, N- and B-600; C-500 and -600	361 HD V-8 2V	E	F-, N-, B-750; C-, CT-, and T-750, and -800; F-800
330 MD V-8	C	F-, N- and B-500 and -600; C-550 and -600; B-700	391 HD V-8	F	F-, N-, C- and CT-750; F-, C- and CT-800
Heavy Duty Trucks					
401 V-8 4V	H	F-, N-, C-, T-, NT- and CT-850 and -900	534 V-8 4V	L	T- and CT-850 and -950; F-, N-, NT- and C-1000, -1100
477 V-8 4V	K	F-, N-, C-, T-, NT- and -850 and -950; F-, N- and C-1000, -1100			

GENERAL SPECIFICATIONS

Engine	Compression Ratio	Bore and Stroke	Taxable Horsepower	Brake Horsepower at Specified RPM (Gross)	Torque – Ft-Lbs at Specified RPM (Gross)	Compression Pressure – PSI (2) (Sea Level at Cranking Speed)
240 Six	9.2:1	4.000 x 3.180	38.40	150 at 4000	234 at 2200	150-200
300 LD Six	8.8:1	4.000 x 3.980	38.40	165 at 3600	294 at 2000	150-200
300 HD Six	8.8:1	4.000 x 3.980	38.40	170 at 3600	283 at 14-2400	150-200
330 MD V-8	7.4:1	3.875 x 3.500	48.05	190 at 4000	305 at 2000	120-160
330 HD V-8	7.4:1	3.875 x 3.500	48.05	190 at 4000	306 at 2000	120-160
360	8.4:1	4.050 x 3.500	52.49	215 at 4400	327 at 2600	120-160
361 V-8	7.4:1	4.050 x 3.500	52.49	210 at 4000	345 at 2000	120-160
390	8.6:1	4.050 x 3.786	52.49	255 at 4400	376 at 2600	120-160
391 V-8	7.4:1	4.050 x 3.786	52.49	235 at 4000	372 at 2000	120-160
401 V-8 (4-V)	7.5:1	4.125 x 3.750	54.00	226 at 3600	343 at 20-2600	130-170
477 V-8 (4-V)	7.5:1	4.500 x 3.750	65.00	253 at 3400	415 at 20-2600	130-170
534 V-8	7.5:1	4.500 x 4.200	65.00	266 at 3200	481 at 16-1800	130-170

(1) Engine No. shown is the piston displacement in cubic inches.
(2) Allowable variation between cylinders: 330, 361 and 391 (30 psi). All other engines (20 psi).

GENERAL SPECIFICATIONS – Continued

Engine*	Engine Idle RPM (1)				Engine Governed Speed – RPM				Oil Pressure Hot at 2000 RPM	Firing Order
	Without Exhaust Emission Control		IMCO Thermactor		Manual Trans.		Auto. Trans.			
	Man.	Auto.(2)	Auto.(2)	Man.	Load	No Load	Load	No Load		
240	525	500	500	600	3800	4000	3800	4000	35-60 psi	1-5-3-6-2-4
300	525	500	500	600	3600	3800	3600	3800	35-60 psi	
330 MD	525				3600	3900	3600	3900	35-60 psi	
330 HD	525	500			3600	3800	3600	3800	35-60 psi	
360	525	500	550	625	3600	3800	3600	3800	35-60 psi	1-5-4-2-6-3-7-8
361	525	500			3600	3800	3600	3800	35-60 psi	
390	525	500	550	625	3600	3800	3600	3800	35-60 psi	
391	525	500			3600	3800	3600	3800	35-60 psi	
401	525	500			3400	2500-3600	3600	3800	35-60 psi	
477	525	500			3200	2500-3400	3400	3600	35-60 psi	1-5-4-8-6-3-7-2
534	525	500			3000	2500-3200	3200	3400	35-60 psi	

(1) With headlights on. If unit is equipped with air conditioner, it should be operated at least 20 minutes before setting engine idle speed. Refer to Group 10 for proper procedures in setting idle speed.
(2) In drive minimum inches of Mercury specifed engine rpm (Sea Level). This includes automatic transmission in Neutral.
* Engine idle manifold vacuum 17" Hg all engines.

IGNITION TIMING

Engine	Non-Thermactor, Non-IMCO (BTDC)		Thermactor (BTDC)	IMCO (BTDC)
	Standard Transmission	Automatic Transmission	Standard Transmission	Automatic Transmission
240 LD	6° (1)	10° (1)	6° (1)	6° (1)
240 MD	6° (1)	10° (1)	6° (1)	6° (1)
300	6° (1) (2)	10° (1) (2)	6° (1)	6° (1)
330 MD	12° (1) (2)			
330 HD and 361	10° (1) (2)	10° (1) (2)		
360	10° (1) (2)	10° (1) (2)	6° (1)	6° (1)
390	10° (1) (2)	10° (1) (2)	6° (1)	6° (1)
391	8° (1) (2)	8° (1) (2)		
401, 477 and 534	8° (1)	8° (1)		

(1) If the individual requirements of the vehicle and/or the use of sub-standard fuels dictate, the initial timing may have to be retarded from the recommended setting to eliminate detonation (spark knock). If retarding is necessary, it should be done progressively and not to exceed 2° BTDC.

(2) For altitude operation, and/or in order to obtain optimum engine performance and fuel economy, vehicles sold and/or operating outside of the United States using engines coded (**), the initial ignition timing may be advanced to a maximum of 5° in excess of the "normal" setting. No further improvement in engine performance or fuel economy will be achieved by advancing beyond this point. Advance the timing progressively until engine detonation (spark knock) is evident under actual road test acceleration. Retard the timing until the detonation (spark knock) is eliminated.

CYLINDER HEAD

Engine	Combustion Chamber Volume CC	Valve Guide Bore Diameter Standard Int. and Exh.	Valve Seat Width	Valve Seat Angle	Valve Seat Runout (Max.)	Valve Arrangement Front to Rear	Valve Seat Insert Bore Diameter Standard (3)	Rocker Arm Stud Bore Dia.—Std.	Gasket Surface Flatness (4)
240, 300 LD	66.0-69.0	0.3433-0.3443	Int. 0.060-0.080 Exh. 0.070-0.090	Int. and Exh. 45°	0.0015	E-I-E-I-		0.3685-0.3695	0.003 inch in any 6 inches or an overall of 0.007
300 HD	75.0-78.0	0.3433-0.3443	Int. 0.060-0.080 Exh. 0.088-0.102			E-I-E-I-E-I-E-I			
360, 390	67.1-70.1	0.3728-0.3738	Int. 0.060-0.080 Exh. 0.070-0.090		0.0020	E-I-E-I-I-E-I-E			
330 MD	78.5-81.5	0.3728-0.3738	Int. 0.070-0.090 Exh. 0.090-0.0110						
330 HD, 361, 391	78.5-81.5	(2)	Int. 0.070-0.090 Exh. 0.095-0.110				Int. 1.8120-1.8130 Exh. 1.6260-1.6270		
401	109.5-114.0(1)	0.4368-0.4375	0.090-0.110				Int. 2.2165-2.2175 Exh. 1.7405-1.7415		
477	138.0-143.5(1)								
534	155.5-161.0(1)								

(1) In cylinder block. (2) Intake 0.3728-0.3738 — Exhaust 0.4368-0.4378.
(3) Valve seat insert to bore interference fit-standard (intake and exhaust 0.002-0.004). The valve insert diameter — standard minimum and standard maximum is 0.003 larger than the insert bore diameter.
(4) Head gasket surface finish RMS 90 - 150.

VALVE ROCKER ARMS, ROCKER ARM SHAFT, PUSHRODS AND TAPPETS

Engine	Rocker Arm Shaft O.D.	Rocker Arm to Rocker Shaft Clearance	Rocker Arm Bore Diameter	Rocker Arm Lift Ratio	Valve Push Rod (Max. Runout)	Valve Tappet or Lifter		
						Standard Diameter	Clearance to Bore (3)	Hydraulic Lifter Leakdown Rate
240, 300	—	—	—	1.61:1	0.025	0.8740-0.8745	0.0005-0.0020	5 - 50 seconds max. — measured at 1/16 inch plunger travel
360, 390	0.839-0.840	0.0035-0.0055(1)	0.8430-0.8440	1.73:1				
330, 361, 391	0.839-0.840	0.0030-0.0055(1)	0.8425-0.8440	1.73:1				
401, 477, 534	0.781-0.782	0.0010-0.0030(2)	0.7830-0.7840	1.58:1				

(1) Wear limit — 0.0065 (2) Wear limit — 0.0070 (3) Wear limit — 0.005

VALVE SPRINGS

Engine	Valve Spring Pressure – Lbs at Length		Free Length (Approx.)	Assembled Height (Pad to Retainer)	Out of Square (Max.)
240	76 - 84 at 1.700 Wear Limit 68 at 1.700	187 - 207 at 1.300 Wear Limit 166 at 1.300	1.99	1 - 43/64 – 1 - 47/64	5/64 (.078)
300 HD	Intake 76 - 84 at 1.700 Wear Limit 68 at 1.700	Intake 187 - 207 at 1.300 Wear Limit 166 at 1.300	Intake 1.99	Intake 1 - 43/64 – 1 - 47/64	
	Exhaust 77 - 85 at 1.580 Wear Limit 69 at 1.300	Exhaust 182 - 202 at 1.180 Wear Limit 162 at 1.180	Exhaust 1.87	Exhaust 1 - 35/64 – 1 - 39/64	
300 LD	77 - 85 at 1.580 Wear Limit 69 at 1.580	183 - 202 at 1.180 Wear Limit 165 at 1.180	1.87	1 - 35/64 – 1 - 39/64	
330 MD	94 - 104 at 1.820 Wear Limit 85 at 1.820	180 - 198 at 1.420 Wear Limit 162 at 1.420	2.26	1 - 13/16 – 1 - 27/32	
330 HD, 361, 391	76 - 84 at 1.670 Wear Limit 69 at 1.670	175 - 194 at 1.240 Wear Limit 163 at 1.240	2.00	1 - 41/64 – 1 - 11/16	
360, 390	85 - 95 at 1.820 Wear Limit 77 at 1.820	209 - 231 at 1.380 Wear Limit 186 at 1.380	2.12	1 - 13/16 – 1 - 27/32	
401, 477, 534	73 - 81 at 1.700 Wear Limit 65 at 1.700	171 - 189 at 1.280	2.02	1 - 11/16 – 1 - 23/32	

VALVES – Continued

Engine	Valve Stem Diameter							
	Standard		0.003 Oversize		0.015 Oversize		0.030 Oversize	
	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust	Intake	Exhaust
240, 300	0.3416 - 0.3423	0.3416 - 0.3423	0.3446 - 0.3453	0.3446 - 0.3453	0.3566 - 0.3573	0.3566 - 0.3573	0.3716 - 0.3723	0.3716 - 0.3723
330 MD	0.3711 - 0.3718	0.3701 - 0.3708	0.3741 - 0.3748	0.3731 - 0.3738	0.3861 - 0.3868	0.3851 - 0.3858	0.4011 - 0.4018	0.4001 - 0.4008
330 HD, 361, 391	0.3711 - 0.3718	0.4338 - 0.4348	0.3741 - 0.3748	0.4368 - 0.4378	0.3861 - 0.3868	0.4488 - 0.4498	0.4011 - 0.4018	0.4638 - 0.4648
360, 390	0.3711 - 0.3718	0.3711 - 0.3718	0.3741 - 0.3748	0.3741 - 0.3748	0.3861 - 0.3868	0.3861 - 0.3868	0.4011 - 0.4018	0.4011 - 0.4018
401, 477, 534	0.4349 - 0.4358	0.4335 - 0.4344	0.4379 - 0.4388	0.4365 - 0.4374	0.4499 - 0.4508	0.4485 - 0.4494	0.4649 - 0.4685	0.4635 - 0.4644

VALVES

Engine	Valve Stem to Valve Guide Clearance		Valve Lash (Cold or Hot) or Clearance (Hot)	Valve Head Diameter		Valve Face Angle	Valve Face Runout (Maximum)	Minimum Allowable Valve Stem Tip Length
	Intake	Exhaust		Intake	Exhaust			
240(5) and 300 LD	0.0010 - 0.0027(2)	0.0010 - 0.0027(2)	0.082 - 0.152(4)	1.772 - 1.787	1.552 - 1.567		0.0020	0.210
300 HD	0.0010 - 0.0027(2)	0.0010 - 0.0027(2)				Seat	0.0015	
330 MD	0.0010 - 0.0024(1)	0.0028 - 0.0042(3)		1.745 - 1.760	1.500 - 1.510	45°	0.0015	
330 HD	0.0010 - 0.0024(1)	0.0020 - 0.0037(3)					0.0015	
360, 390	0.0010 - 0.0024(1)	0.0020 - 0.0034(3)	0.100 - 0.200	2.022 - 2.037	1.551 - 1.566	Face	0.0020	
361, 391	0.0010 - 0.0024(1)	0.0020 - 0.0037(3)	(4)	1.745 - 1.760	1.500 - 1.510	44°	0.0015	
401, 477, 534	0.0010 - 0.0026(1)	0.0024 - 0.0040(3)	0.020	2.015 - 2.025	1.630 - 1.640		0.0015	

(1) Wear limit 0.0045 (2) Wear limit 0.0047 (3) Wear limit 0.0055
(4) Clearance specified is obtained at the valve stem tip with the tappet collapsed.
(5) Hydraulic valve lifter adjustment turns down after contact – 240 Six

CAMSHAFT

Engine	Lobe Lift (1)		Theoretical Valve Lift		Camshaft End Play		Camshaft Journal to Bearing Clearance
	Intake	Exhaust	Intake	Exhaust	End Play	Wear Limit	
240	0.2330	0.2490	0.376	0.400	0.003-0.007	0.012	0.001-0.003 Wear Limit – 0.006
300	0.2490	0.2490	0.400	0.400	0.003-0.007		
330	0.2446	0.2329	0.423	0.403	0.001-0.007		
360, 390	0.247	0.249	0.427	0.430	0.001-0.007		
361, 391	0.2448	0.2448	0.423	0.423	0.001-0.007		
401, 477 and 534	0.2780	0.2780	0.439	0.439	0.001-0.007		

(1) Maximum allowable lobe lift loss (All Engines) 0.005

CAMSHAFT – Continued

Item	Bearing	Engine			
		240, 300	360, 390	330, 361, 391	401, 477, 534
Camshaft Journal Diameter – Standard (1)	Front	2.0170-2.0180	2.1238-2.1248	2.1238-2.1248	2.4740-2.4750
	Others				2.3700-2.3710
Camshaft Bearings Inside Diameter	Front	2.0190-2.0200	2.1258-2.1268	2.1258-2.1268	2.4760-2.4770
	Others				2.3720-2.3730
Camshaft Bearings Location (2)	(No. 1)	0.020-0.035	0.005-0.020	0.005-0.020	0.310-0.330

(1) Camshaft Journal maximum runout
All engines 0.005
Camshaft Journal maximum out-of-round
240, 300 . . . . . 0.0010
All others 0.0005

(2) Distance in inches that the front edge of the bearing is installed toward the rear from the front face of the cylinder block.

CAMSHAFT VALVE TIMING

Engine	Intake Valve		Exhaust Valve	
	Opens	Closes	Opens	Closes
240	0.004 in. at 12° BTDC	0.006 in. at 62° ABDC	0.004 in. at 60° BBDC	0.006 in. at 28° ATDC
300	0.004 in. at 18° BTDC	0.006 in. at 70° ABDC	0.004 in. at 58° BBDC	0.006 in. at 30° ATDC
330	0.002 in. at 27° BTDC	0.005 in. at 55° ABDC	0.002 in. at 61° BBDC	0.005 in. at 21° ATDC
360, 390	0.004 in. at 13° BTDC	0.006 in. at 63° ABDC	0.004 in. at 3° BBDC	0.006 in. at 23° ATDC
361	0.002 in. at 28° BTDC	0.005 in. at 60° ABDC	0.002 in. at 68° BBDC	0.005 in. at 20° ATDC
391	0.003 in. at 24° BTDC	0.005 in. at 64° ABDC	0.002 in. at 64° BBDC	0.005 in. at 24° ATDC
401, 477, 534	0.0159 in. at 20° BTDC	0.0159 in. at 56° ABDC	0.0159 in. at 59° BBDC	0.0159 in. at 17° ATDC

CAMSHAFT DRIVE MECHANISM

Engine	Camshaft Gear to Crankshaft Gear Backlash	Camshaft Gear or Sprocket		Crankshaft Gear or Sprocket		Timing Chain Deflection (Maximum)
		Face Runout T.I.R. Max.	Assembled Face Runout T.I.R. Max.	Face Runout T.I.R. Max.	Assembled Face Runout T.I.R. Max.	
240	0.002-0.004	0.002	0.006	0.003	0.006	–
300	0.002-0.004	0.002	0.006	0.003	0.006	–
330	–	0.003	0.007	0.001	0.002	0.680
360, 390	–	0.002	0.006	0.001	0.006	0.500
361, 391	–	0.003	0.007	0.001	0.002	0.680
401, 477, 534	0.002-0.004	0.001	–	0.001	–	–

CYLINDER BLOCK

Engine	Cylinder Bore Diameter (1)	Cylinder Bore Diameter 0.003 O.S.	Tappet Bore Diameter	Main Bearing Bore Diameter	Distributor Shaft Bearing Bore Diameter	Head Gasket Surface Flatness (2)
240 and 300	4.0000-4.0024	4.0024-4.0036	0.875-0.876	2.5902-2.5910	–	Overall – 0.003 inch in any 6 inches or, 0.007 inch for 170, and 0.006 inch for all others.
330 MD	3.8750-3.8774	3.8774-3.8786	0.875-0.876	2.9412-2.9420	0.4525-0.4535	
330 HD	3.8750-3.8774	3.8774-3.8736	0.875-0.876	2.9412-2.9420	0.5155-0.5165	
360, 390	4.0500-4.0524	4.0524-4.0536	0.875-0.876	2.9412-2.9420	0.4525-0.4535	
361 and 391	4.0500-4.0524	4.0524-4.0536	0.875-0.876	2.9412-2.9420	0.5155-0.5165	
401	4.1250-4.1274	4.1274-4.1286	0.875-0.876	3.3176-3.3184	0.4525-0.4535	
477 and 534	4.5000-4.6024	4.5024-4.5036	0.875-0.876	3.3176-3.3184	0.4525-0.4535	

(1) Maximum out-of-round 0.001
Wear Limit – All except 330, 361 and 391 . . . . . 0.005
– 330, 361 and 391 . . . . . 0.003
Maximum taper 0.010
Wear Limit – All except 330, 361 and 391 . . . . . 0.010
– 330, 361 and 391 . . . . . 0.005
Cylinder bore surface finish RMS
All except 401, 477 and 534 15-35
401, 477 and 534 20-35

(2) Head gasket surface finish RMS
All except 340, 401, 477 and 534 . . . 90-150
401, 477 and 534 60-110
240 60-150

CRANKSHAFT AND FLYWHEEL

Engine	Main Bearing Journal Diameter (1)	Main Bearing Journal Runout Maximum	Main Bearing Journal Thrust Face Runout	Main Bearing Journal Max. Taper	Thrust Bearing Journal Length	Main and Rod Bearing Journal Finish RMS Max.	Main and Rod Bearing Journal Thrust Face Finish RMS
240	2.3982-2.3990	0.002 Wear Limit 0.003	0.001	0.0003 Per Inch	1.1990-1.2010	12	35 Front 25 Rear
300	2.3982-2.3990				1.1990-1.2010		
330 MD	2.7484-2.7492				1.1240-1.1265		20
360, 390	2.7484-2.7492				1.1240-1.1260		
330 HD, 361	2.7479-2.7487				1.1240-1.1265		20
391	2.7472-2.7480				1.1240-1.1265		
401, 477, 534	3.1246-3.1254				1.2790-1.2810		

(1) Maximum out-of-round 0.0004 (2) Wear limit 0.0035

Engine	Connecting Rod Journal Diameter (1)	Connecting Rod Bearing Journal Maximum Taper	Crankshaft Free End Play	Crankshaft to Rear Face of Block Runout T.I.R. Maximum	Flywheel Clutch Face Runout	Flywheel O.D. Runout Transmission	
						Standard	Automatic
240	2.1228-2.1236	0.0003 Per Inch	0.004-0.008 Wear Limit 0.012	0.010		0.018	0.020
300	2.1228-2.1236						
330 MD	2.4380-2.4388			0.005		0.030	0.030
360,390	2.4380-2.4388	0.0003 Per Inch	0.004-0.010	0.010	0.010	0.018	0.020
330 HD,361	2.4377-2.4385		Wear Limit				
391	2.4377-2.4385	0.0004 Per Inch	0.014	0.005		0.030	0.030
401,477,534	2.7092-2.7100		0.004-0.008 (2)	0.010		0.018	0.020

(1) Maximum Out-of-round 330 HD, 361 and 391 . . . . 0.0005
All Others 0.0004

(2) Wear Limit 0.012

CRANKSHAFT BEARINGS

Engine	Connecting Rod Bearings			Main Bearings		
	To Crankshaft Clearance		Wall Thickness	To Crankshaft Clearance		Wall Thickenss
	Desired	Allowable	– Standard (1)	Desired	Allowable	– Standard (2)
240	0.0008-0.0015	0.0008-0.0024	0.0754-0.0757	0.0005-0.0015	0.0005-0.0022	0.0954-0.0957
300 LD	0.0008-0.0015	0.0008-0.0024	0.0754-0.0757	0.0009-0.0015	0.0009-0.0026	0.0950-0.0955
300 HD	0.0009-0.0015	0.0009-0.0027	0.0752-0.0757	0.0009-0.0015	0.0009-0.0028	0.0950-0.0955
330 MD	0.0008-0.0020	0.0008-0.0025	0.0755-0.0758	0.0011-0.0020	0.0011-0.0029	0.0954-0.0957
330 HD	0.0011-0.0020	0.0011-0.0029	0.0755-0.0760	0.0010-0.0020	0.0010-0.0030	0.0956-0.0961
360, 390	0.0008-0.0015	0.0008-0.0026	0.0755-0.0760	0.0005-0.0015	0.0005-0.0024	0.0956-0.0961
361	0.0011-0.0020	0.0011-0.0029	0.0755-0.0760	0.0010-0.0020	0.0010-0.0030	0.0956-0.0961
391	0.0011-0.0020	0.0011-0.0029	0.0755-0.0760	0.0010-0.0020	0.0010-0.0030	0.0956-0.0961
401	0.0017-0.0025	0.0017-0.0035	0.0957-0.0962	0.0018-0.0025	0.0018-0.0036	0.0951-0.0956 (3)
477	0.0017-0.0025	0.0017-0.0035	0.0957-0.0962	0.0018-0.0025	0.0018-0.0036	0.0951-0.0956 (3)
534	0.0017-0.0025	0.0017-0.0035	0.957-0.0962	0.0018-0.0025	0.0018-0.0036	0.0951-0.0956 (3)

(1) 0.002 U.S. Clearance

(240, 300) 0.0762-0.0767
(Others) . . . . . Add 0.0010 to standard clearance

(2) 0.002 U.S. Clearance
(All) . . . . . Add 0.0010 to standard clearance

(3) Thrust Bearing Wall Thickness. 0.0949-0.0954

CONNECTING ROD

Engine	Piston Pin Bore or Bushing I.D. (1)	Connecting (2) Rod Bearing Bore Diameter	Connecting Rod Length Center to Center	Connecting Rod (3) Alignment Max. Tot. Difference		Connecting Rod Assy. (Assembled to Crankshaft)	
				Twist	Bend	Side Clearance	Wear Limit
240	0.9104-0.9112	2.2750-2.2758	6.7932-6.7962			0.006-0.013	0.018
300			6.2082-6.2112				
330 MD, 360	0.9752-0.9755	2.5907-2.5915	6.5380-6.5420	0.012	0.004	0.010-0.020	0.023
330 HD, 361, 390, 391			6.4860-6.4900				
401, 477, 534	1.2201-1.2204	2.9032-2.9040	7.7390-7.7410			0.006-0.014	0.017

(1) Piston pin bushing or bore
Maximum out-of-round
360, 390 . . . . . 0.0004
330, 361, 391 . . . . . 0.0003
401, 477, 534. . . . . 0.0002
Maximum taper
330 MD 0.0004
360, 390, 330HD, 361, 391 . . . . . 0.0003
401, 477, 534. . . . . 0.0002

(2) Connecting rod bearing bore maximum out-of-round and taper (all engines). 0.0004

(3) Pin bushing and crankshaft bearing bore must be parallel and in the same vertical plane within the specified total difference at ends of 8-inch long bar measured 4-inches on each side of rod.

PISTON PIN

Engine	Length	Diameter			To Piston Clearance	To Connecting Rod Bushing Clearance
		Standard	0.001 Oversize	0.002 Oversize		
240,300	3.010-3.040	0.9119-0.9124	0.9130-0.9133	–	0.0002-0.0004 (2)	(1)
330,361,391	3.150-3.170	0.9750-0.9753	0.9760-0.9763	0.9770-0.9773	0.0003-0.0005	0.0001-0.0003 (3)
360,390	3.156-3.170	0.9750-0.9753	0.9760-0.9763	0.9770-0.9773	0.0001-0.0003	0.0001-0.0005 (3)
401	3.335-3.350	1.2198-1.2201	1.2208-1.2211	1.2218-1.2221	0.0003-0.0005	0.0001-0.0006 (3)
477,534	3.840-3.855	1.2198-1.2201	1.2208-1.2211	1.2218-1.2221	0.0003-0.0005	0.0001-0.0006 (3)

(1) Interference Fit. (2) 0.0003-0.0005 for 300 engines (3) Wear Limit 0.0010

PISTON PINS

Engine	Diameter			Piston (2) to Cylinder Bore Clearance	Piston Pin Bore Diameter	Ring Groove Width
	Coded Red	Coded Blue	0.003 Oversize			
240	3.9984-3.9990	3.9996-4.0002	4.0008-4.0014	0.0014-0.0022	0.9123-0.9126	Top (240, 300) 0.0800-0.0810 (330,352,361,391) 0.0805-0.0815) (401,477,534) 0.0965-0.0975 Intermed. (401,477,534) 0.0965-0.0975 Bottom (240,300) 0.0800-0.0810 (330,361,391) 0.0805-0.0815 (352) 0.0960-0.0970 (401,477,534) 0.0965-0.0975 Oil (330HD,361,391) 0.1885-0.1895 (Others) 0.1880-0.1890
300	3.9984-3.9990	3.9996-4.0002	4.0008-4.0014	0.0014-0.0022	0.9124-0.9127	
330 MD	3.8725-3.8731	3.8737-3.8743	3.8749-3.8755	0.0017-0.0025	0.9754-0.9757	
330 HD	3.8724-3.8730	3.8736-3.8742	3.8748-3.8754	0.0025-0.0033	0.9754-0.9757	
360,390	4.0484-4.0490	4.0496-4.0502	4.0508-4.0514	0.0015-0.0023	0.9752-0.9755	
361 HD	4.0474-4.0480	4.0486-4.0492	4.0498-4.0504	0.0025-0.0033	0.9754-0.9757	
391 HD	4.0474-4.0480	4.0486-4.0492	4.0498-4.0504	0.0025-0.0033	0.9754-0.9757	
401	4.1233-4.1239	4.1245-4.1251	4.1257-4.1263	0.0028-0.0034	1.2202-1.2205	
477	4.4983-4.4989	4.4995-4.5001	4.5007-4.5013	0.0028-0.0034	1.2202-1.2205	
534	4.4983-4.4989	4.4995-4.5001	4.5007-4.5013	0.0028-0.0034	1.2202-1.2205	

(1) Measured 90° to pin centerline and at pin centerline height.
(2) Refer to Part 8-1 for the proper procedures for measuring piston to bore clearance. Wear limit (all engines) 0.008.

PISTON RINGS

Engine	Ring Width			Side Clearance			Ring Gap Width		
	Compression Ring(1)		Oil Ring	Compression Ring(1)		Oil Ring	Compression Ring		Oil Ring
	Top	Bottom		Top	Bottom		Top	Bottom	
240	0.0774-0.0781	0.0770-0.0780		0.0019-0.0036(3)	0.0020-0.0040(3)	Snug	0.010-0.020	0.010-0.020	0.015-0.055(5)
300	0.0774-0.0781	0.0770-0.0780		0.0019-0.0036(3)	0.0025-0.0045(3)	Snug	0.010-0.020	0.010-0.020	0.015-0.055(5)
330 MD	0.0774-0.0781	0.0930-0.0940		0.0024-0.0041(3)	0.0024-0.0041(3)	0.0190-0.0360	0.010-0.031	0.010-0.031	0.015-0.038(5)
330 HD (6)(7)(8)	0.0774-0.0781	0.0770-0.0780	0.1859-0.1866	0.0024-0.0041(4)	0.0030-0.0050(4)	0.0190-0.0360	0.010-0.031	0.010-0.031	0.015-0.038(5)
360, 390	0.0774-0.0781	0.0770-0.0780	0.1815-0.1875	0.0019-0.0036(3)	0.0020-0.0040(3)	0.0005-0.0075	0.015-0.023	0.010-0.020	0.015-0.055(5)
361,391 (6)(7)(8)	0.0774-0.0781	0.0770-0.0780	0.1859-0.1866	0.0024-0.0041(4)	0.0024-0.0041(4)	0.0190-0.0360	0.015-0.036	0.015-0.036	0.015-0.038(5)
401,477, 534	0.0929-0.0936	0.0930-0.0940	0.1859-0.1866	0.0029-0.0046(3)	0.0025-0.0045(3)	0.0014-0.0031(4)	0.018-0.039	0.015-0.036(2)	0.013-0.039

(1) Intermediate ring width and clearance on 401, 477 and 534 are same as top compression ring for these engines.
(2) Intermediate ring gap width on 401, 477 and 534 is same as bottom compression ring for these engines.
(3) Wear limit 0.0060 (4) Wear limit 0.0070 (5) Steel rail
(6) Intermediate ring width 330-361-391 — 0.0774-0.0781 (7) Intermediate ring gap width 330-361-391 — 0.015-0.036
(8) Intermediate ring side clearance 330-361-391 — 0.0024-0.0041

WATER PUMP

Engine and Model	Water Pump Pulley to Engine Ratio	Water Pump Assembly Dimensions	
		Front Face of Pulley Hub to Pump Housing Face	Impeller to Housing Cover Mounting Surface Clearance
240 All	0.96:1	3.60	0.010-0.050
300 All	0.96:1	4.10	0.010-0.050
330 MD All	0.97:1	7.569	0.070-0.080
330 HD All	0.95:1	4.825-4.855	0.006-0.032
360, 390	0.94:1	7.569	0.070-0.080
361, 391 All	0.95:1	4.825-4.855	0.008-0.032
401, 477, 534 Conventional Cab	0.90:1	5.48	0.005-0.025
401, 477, 534 Tilt Cab	0.90:1	5.40	0.005-0.025

OIL PUMP

Engine	Relief Valve Spring Tension — Lbs Specified Length	Drive Shaft to Housing Bearing Clearance	Relief Valve Clearance	Rotor Assembly End Clearance (Pump Assembled)	Outer Race to Housing (Radial Clearance)
240 and 330	20.6-22.6 at 2.490	All Engines 0.0015-0.0029	All Engines 0.0015-0.0029	0.0011-0.0041	0.006-0.012
330 MD	9.0- 9.6 at 1.530				
330 HD	11.1-11.8 at 1.560				
360, 390	9.0- 9.6 at 1.530				
361 and 391	11.1-11.8 at 1.560				
401	10.7-11.9 at 1.07			0.0010-0.0035	0.006-0.011
477 and 534					

APPROXIMATE OIL PAN CAPACITIES

Crankcase Capacity (Quarts)	Engine				
	240 (F-100/250 4x2)	240 (Except F-100-250 4x2), 300 (F-100/250 4x4, F-B-N-500/550, F-350 4x2, P-350/500) and 360, 390	300 HD (F-B-N-600, C-550/600)	330, 361 and 391	401, 477 and 534
U. S. Measure	4.00 (1)	5.00 (1)	6.00 (1)	8.00 (1)	9.00 (2)
Imperial Measure	3.33 (1)	4.25 (1)	5.00 (1)	6.75 (1)	7.20 (2)

(1) Add one quart extra when changing oil filter.

(2) Add two quarts extra when changing oil filter.

TORQUE LIMITS

NOTE: All values given are in Ft-Lbs unless otherwise stated. Oil threads with lightweight engine oil unless the threads require oil-resistant or water-resistant sealer.

Item	Engines Applicable	Torque
Cylinder Head Bolts Step 1	240, 300	50-55
	330,360,390,361,391	70
	401,477,534	130-140
Cylinder Head Bolts Step 2	240,300	60-65
	330,360,390,361,391	80
	401,477,534	150-160
Cylinder Head Bolts Step 3	240,300	70-75
	330,360,390,361,391	80-90
	401,477,534	170-180
Main Bearing Cap Bolts	240,300	60-70
	330,360,390,361,391	95-105
	401,477,534	130-150
Oil Pan to Cylinder Block	240,300,360,390	10-12
	330,361,391	9-11
	401,477,534	10-13
Oil Pan Drain Plug	401,477,534	25-35
	All Other Engines	15-20
Intake Manifold to Cylinder Head	300	20-25
	330,360,390,361,391	32-35
	240,401,477,534	23-28
Exhaust Manifold to Cylinder Head	300	20-25
	330,361,391	18-24
	360,390	12-18
	240,401,477,534	23-28
Intake to Exhaust Manifold	240	28-33
Oil Pump to Cylinder Block	240,300	12-15
	330,360,390,361,391	20-25
	401,477,534	23-28
Oil Pump Cover Plate	330,361,391	7-9
	All Other Engines	6-9
Oil Filter Center Bolt	300	20-25
	330 HD, 361, 391	20-25
	401,477,534	45-50

TORQUE LIMITS – Continued

NOTE: All values given are in Ft-Lbs unless otherwise stated. Oil threads with lightweight engine oil unless the threads require oil-resistant or water-resistant sealer.

Item	Engines Applicable	Torque
Flywheel to Crankshaft	401,477,534	100-110
	All Other Engines	75-85
Exhaust Manifold to Muffler Inlet Pipe	Light Trucks	25-35
	Medium and Heavy Duty Trucks	25-30
Engine Governor to Cylinder Block	401,477,534	23-28
Valve Rocker Arm Adjustment Screw-Locknut	401,477,534	30-35
Valve Rocker Arm Stud Adjusting Nut (with Tappet on Camshaft Base Circle, Turn Adjusting Nut Counterclockwise)	240,300	4.5-15
Thermactor Ajusting Arm to Air Pump	240,300	15-20
Thermactor Check Valve to Air Manifold	240,300	16-19
Thermactor Air Manifold to Cylinder Head	240,300	5-7
Oil Filter Adapter to Cylinder Block	300 LD	15-20
	240,300 HD	38-42
	330,360,390,361,391, 401,477,534	14-19
Damper or Pulley to Crankshaft	240	130-150
	300,401,477,534	130-145
	330 MD, 360,390	70-90
	330 HD, 361,391	150-175
Valve Rocker Shaft Support to Cylinder Head	330,360,390,361,391	40-45
Water Pump to Cylinder Block or Front Cover	240,300	12-15
	360,390	20-25
	330,361,391,401, 477,534	23-28

TORQUE LIMITS – Continued

NOTE: All values given are in Ft-Lbs unless otherwise stated. Oil threads with lightweight engine oil unless the threads require oil-resistant or water-resistant sealer.

Item	Engines Applicable	Torque
Oil Pick-Up Tube to Oil Pump	330,361,391	9-13
	All Other Engines	12-15
Valve Rocker Arm Cover	240,300	7-9
	330,360,390,361,391	10-12
	401,477,534	5-7
Valve Push Rod Chamber Cover	240,300	1.0-1.5
	401,477,534 Center End Bolts	10
	Side Bolts	7
Fuel Pump to Cylinder Block or Cylinder Front Cover	240,300	
	All Other Engines	20-25
Oil Cooler to Cylinder Block	401,477,534	20-25
Connecting Rod Nuts	240,300,330,360, 390,361,391	40-45
	401,477,534	60-65
Cylinder Front Cover	240	15-20
	300,360,390	12-15
	330,361,391	
	3/8-16	23-28
	5/16-18	12-15
	401,477,534	35-40
Water Outlet Housing	240,300,360,390	12-15
	All Other Engines	23-28
Camshaft Sprocket or Gear to Camshaft	330,360,390,361,391	34-45
	401,477,534	20-24
Oil Filter Insert to Adapter	330 HD, 361,391	50-60
Camshaft Thrust Plate to Block	240,300,360,390	19-21
	All Other Engines	12-15
Fuel Filter Center Bolt	401,477,534	18-22

LIGHT TRUCK ENGINE SUPPORT TORQUE LIMITS

Truck	Application	Engine	Thread Size	Torque Ft-Lbs
Front Supports				
F-100, 250, 350	Engine Insulator to Support Bracket	240, 300 LD Six	3/8-16	18-24
F-100 4x4	Front Engine Mount Bracket to Frame		7/16-14	50-70
F-250 4x4				30-40
P-350, 400, 500	Insulator to Engine Bracket & Crossmember	240, 300 LD Six	9/16-18	70-90
P-350, 400, 500	Front Insulator Support Bracket to Block	240, 300 LD Six	7/16-14	45-55
F-100, 250, 350	Engine Front Bracket to Frame Assembly	240, 300 LD Six 360, 390 V-8	3/8-16	30-35
F-100, 250, 350	Front Insulator Stud to Frame Bracket		7/16-14	40-60
F-100, 250, 350	Front Engine Insulator to Engine Block	240, 300 Six 360, 390 V-8	7/16-14	45-55
F-100-250	#2 Crossmember to Frame		7/16-14	35-45
Rear Supports				
F-100, 250, 350	Engine Rear Support to Frame Assembly or Bracket	240, 300 LD Six	1/2-13	40-60
F-250 4x4 F-350	Engine Rear Support Bracket to Frame	240, 300 LD Six 360, 390 V-8	7/16-14	30-40
P-350, 400, 500	Engine Insulator to Frame & Clutch Housing	240, 300 LD Six	9/16-12	90-110
F-100, 250, 350	Rear Engine Insulator to Transmission Extension		1/2-13	55-65

MEDIUM AND HEAVY TRUCK ENGINE SUPPORT TORQUE LIMITS

Supports	Engine	Application	Thread Size	Torque Ft-Lbs
Front	240, 300 LD and HD Six	Insulator to Front Engine Mount or Support	9/16-18	70-90
		Engine Front Support Bracket to Engine	7/16-14	60-65
	330, 361 and 391 V-8	Insulator to Front Engine Mount or Support	9/16-18	70-90
		Engine Front Mounting Bracket to Engine Cover	3/8-16	40-45
	401, 477 and 534 V-8	Front Engine Bracket to Front Engine Support	5/8-18	145-165 (1)
		Engine Front Mounting Bracket to Engine Cover	3/8-16	40-45
		Insulator to Engine Front Support Bracket	1/2-20	85-105
		Engine Front Support Bracket to Front Support	1/2-20	45-55
Rear	240, 300 LD and HD Six	Crossmember to Clutch Housing	9/16-18	70-90
	330, 361 and 391 V-8	Crossmember to Clutch Housing	9/16-18	70-90
	401, 477 and 534 V-8	Rear Engine Support to Clutch Housing Bracket	5/8-18	145-165 (1)
		Engine Rear Mounting Bracket to Clutch Housing	1/2-13	85-105
		Flywheel Housing Bracket to Crossmember	5/8-18	145-165 (1)
		Rear Engine Support Bracket to Flywheel Housing	1/2-13 5/8-18	70-90 120-150

(1) Torque to specification and advance to permit installation of cotter pin.

GENERAL TORQUE LIMITS

TORQUE LIMITS FOR VARIOUS SIZE BOLTS.

CAUTION: In case any of the limits below disagree with those above, the above limits prevails.

Size (Inches)	1/4 - 20	1/4 - 28	5/16 - 18	5/16 - 24	3/8 - 16	3/8 - 24
Torque (Ft-Lbs)	6 - 9	6 - 9	12 - 15	15 - 18	23 - 28	30 - 35
Size (Inches)	7/16 - 14	7/16 - 20	1/2 - 13	1/2 - 20	9/16 - 18	5/8 - 18
Torque (Ft-Lbs)	45 - 50	40 - 60	60 - 70	70 - 80	85 - 95	130 - 145

ENGINE APPLICATIONS – DIESEL

Engine	Make	Rating Plate Identification	Engine Usage
242	Ford	J	P-3500, 4000 and 5000
363		W	F-, N-, B- and C-6000 and 7000
CF-160	Cummins	X	F-, T- and C-8000
C-160		Z	
C-180		Y	
V6E-195		B	F-950-D, and 1000-D T-850-D, and 950-D
NHE-195		D	N-1000-D, NT-850-D and 950-D
NH-220		E	and W- and WT-1000-D
NHC-250		A, H, or J	N-1000-D, NT-850-D and 950-D and W- and WT-1000-D
NTC-335	Cummins	M, N, P, Q, or R.	W-1000-D WT-1000-D
V8E-235		F	
V8-265		G	
1673	Caterpillar	K	
1673-B		L	
6-71NE-N55	Detroit Diesel	9	
6-71N-N60		S	
6-71N-N65		2	
8V-71NE-N55		7	
8V-71N-N60		6	
8V-71N-N65		T	

FUEL PUMPS

Mechanical Fuel Pumps	Electric Fuel Pumps
Fuel Pump Static Pressure – psi at 500 Engine rpm 240 and 300 Six . . . . . 4.0 - 6.0 330, 360, 361, 390 and 391 V-8 . . . . . 4.5 - 6.5	Minimum Volume (Flow) at 11.8 - 12.3 volts and 3 psi
Minimum Fuel Pump Volume – Flow at 500 Engine rpm All 6-Cyl. Engines . . . . . 1 pint in 30 seconds All 8-Cyl. Engines . . . . . 1 pint in 20 seconds	330 . . . . . 1 quart within 40 seconds 361 . . . . . 1 quart within 37 seconds 391 . . . . . 1 quart within 34 seconds
Minimum Intake Static Vacuum – Inches of Mercury at 500 Engine rpm All Engines 6	401 . . . . . 1 quart within 36 seconds 477 . . . . . 1 quart within 33 seconds
Eccentric Total Lift – Inches 170, 240 and 300 Six . . . . . 0.290 - 0.310 330, 360, 361, 390 and 391 V-8 . . . . . 0.690 - 0.710	534 . . . . . 1 quart within 30 seconds

AIR CLEANERS

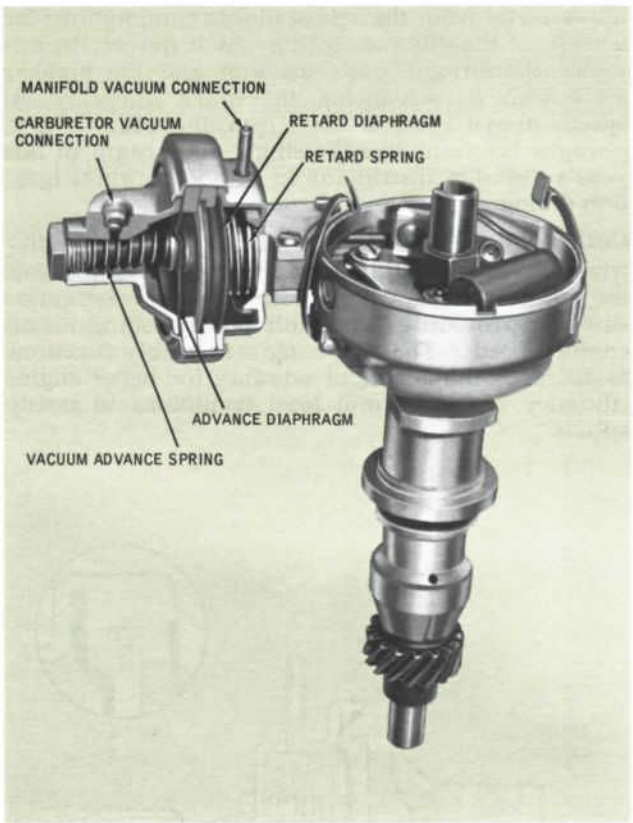
Type		
Standard – All Engines . . . . . Oil Bath Extra Capacity (D.S.O.) – 401 and 477 V-8 . . . . . Dry		
Oil Viscosity		
Engine	Above 32°F	Below 32°F
All Engines	SAE 30	SAE 20

Oil Capacity		
Engine	U.S. Measure	Imperial Measure
170, 240 and 300 Six	1 Pint	0.8 Pint
330, 361 and 391 V-8	1 Quart	0.8 Quart
401, 477 and 534 V-8	3-1/4 Pints	2-3/4 Pints

CAR

DUAL DIAPHRAGM DISTRIBUTOR

1968 exhaust emission control systems require a specially retarded spark for more complete combustion at idle and low engine speeds, combined with the usual spark advance at normal road speeds. To provide this extended range of spark control, many 1968 engines are equipped with a dual diaphragm distributor.

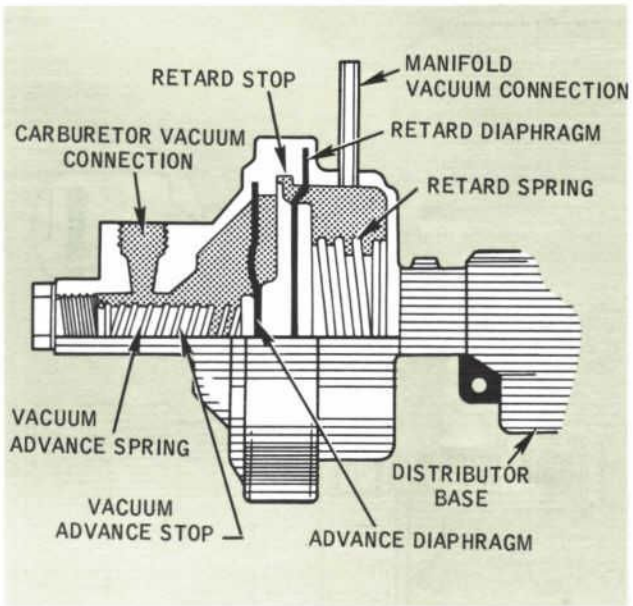


Dual Diaphragm Distributor

Construction Details

With the exception of the diaphragm assembly, this new distributor design is similar to the Autolite dual advance units used on some '67 engines. However, there are two diaphragms instead of one contained in the diaphragm assembly housing. One diaphragm — the outer one — controls spark advance in the same manner as the single diaphragm of last year's unit. The other diaphragm works in the opposite direction to retard the spark at low engine speeds and during deceleration.

Calibrated coil springs bear on the vacuum sides of both diaphragms to supply resistance to the actuating force of the vacuum. Only the outer diaphragm is linked to the distributor breaker plate. The link passes through the center of the inner diaphragm without contacting it. The inner diaphragm serves to position a return stop for the outer diaphragm to govern the amount of spark retard when spark advance vacuum is reduced.



Diaphragm Assembly

Operation

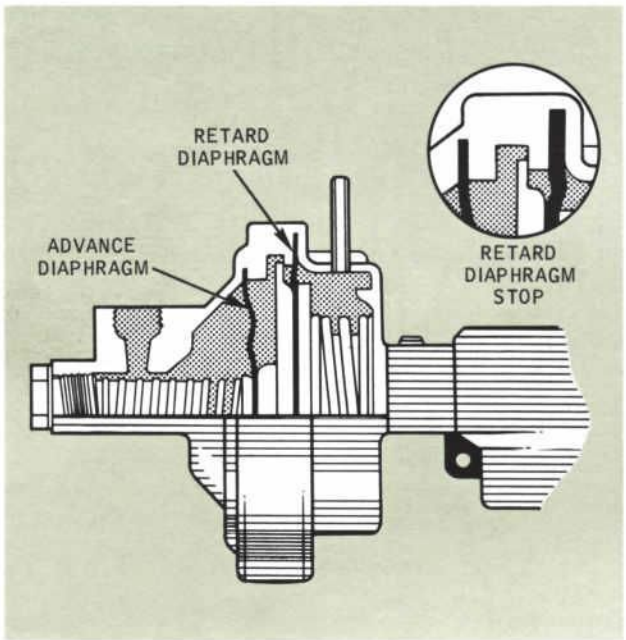
The dual diaphragm assembly is designed to provide the distributor with two distinct spark retard stops — a normal retard of 6° before top dead center, and an additional twelve degrees of retard to 6° after top dead center. The normal retard gives the desired spark timing for starting, while the additional retard position provides a setting that's best for more complete combustion and minimum contaminant emission after starting.

The vacuum sides of the two diaphragms are at either extreme of the diaphragm housing, so they provide opposing operating forces. Carburetor vacuum from a port above the throttle plate is supplied to the outer diaphragm, called the advance diaphragm. Vacuum from the intake manifold or below the carburetor throttle plate is supplied to the inner diaphragm — the retard diaphragm.

Q 1-1 b) That's it! The trim identifies the pictured car as one of the Fairlane Torino series . . . and that distinctive roofline ties it down to the 42 — 63D Torino GT fastback, doesn't it?

Starting: When the engine is being cranked by the starter, neither carburetor vacuum nor intake manifold vacuum is strong enough to actuate the diaphragms. Consequently, both remain at rest and the diaphragm link holds the breaker plate in the normal retard position until the engine starts.

Idle and Low Speeds: As the engine starts and begins to run at idle or fast idle rpm, the vacuum from the carburetor is weak because of the closed or nearly closed throttle plates. For the same reason, intake manifold vacuum is strong. The resulting high vacuum against the retard diaphragm moves the diaphragm assembly toward the distributor housing against the resistance of the retard spring until the rim of the diaphragm plate contacts the edge of the retard stop groove around the interior of the diaphragm housing.

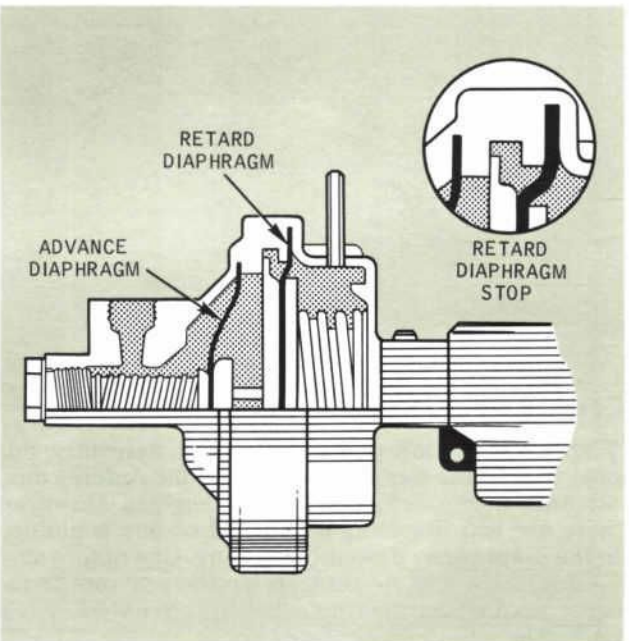


Diaphragm Assembly — Full Retard Position

Carburetor vacuum isn't strong enough to overcome the tension of the vacuum advance spring at the other end of the housing. Consequently, this spring expands to move the advance diaphragm until the small plate at its center is stopped by the retard diaphragm plate. In this position, the diaphragm link turns the breaker plate in the direction of distributor cam rotation to retard the ignition timing another twelve degrees.

Medium and High Speeds: As the carburetor throttle plates are opened to increase engine speed and power output, carburetor vacuum gets stronger. This increased vacuum causes the advance diaphragm to move away from the retard diaphragm, against the tension of the advance spring. As it moves, the advance diaphragm pulls the link and the breaker plate with it, advancing the spark smoothly. At speeds above 1400 to 1600 rpm, the advance diaphragm functions like the single diaphragm of last year's Autolite distributor to provide normal ignition timing.

Centrifugal Advance: As in the earlier Autolite distributor, the centrifugal advance mechanism controls the position of the cam in relation to the distributor shaft to provide a basic full power setting for all engine speeds. The diaphragm assembly functions to increase the degree of advance for better engine efficiency under normal load conditions at steady speeds.



Diaphragm Assembly — Full Advance Position

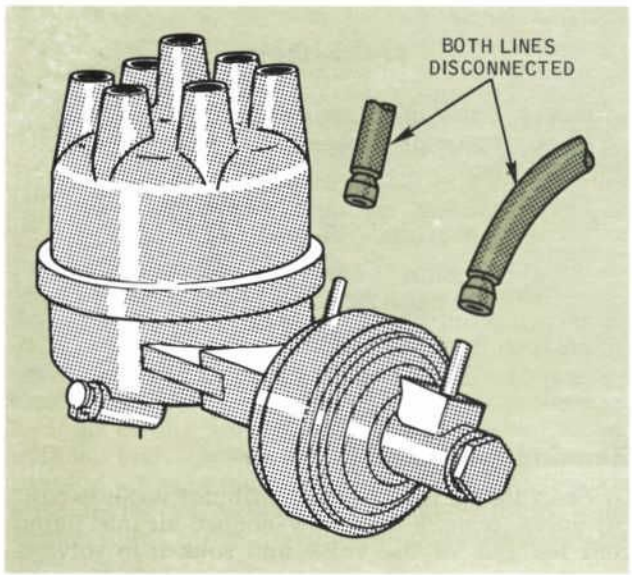
Quick-Quiz

Q 9-1 In an Autolite dual diaphragm distributor, the two diaphragms:

a) are the only distributor components affecting spark advance or retard. (See page 137)

b) work with the centrifugal advance mechanism to control spark advance. (See page 182)

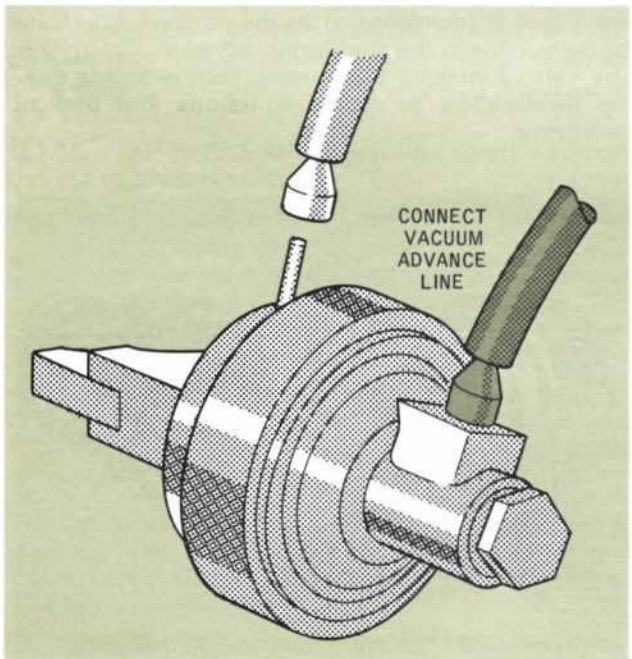
Q 8-1 a) Whoa, there! Only *one* of the two procedures given for the 289 V-8 engine in the '67 Shop Manual should be used to adjust the valve clearance in the Thunderjet 429. Check the text again, then take another crack at the question!



Disconnect Both Vacuum Lines to Begin Test

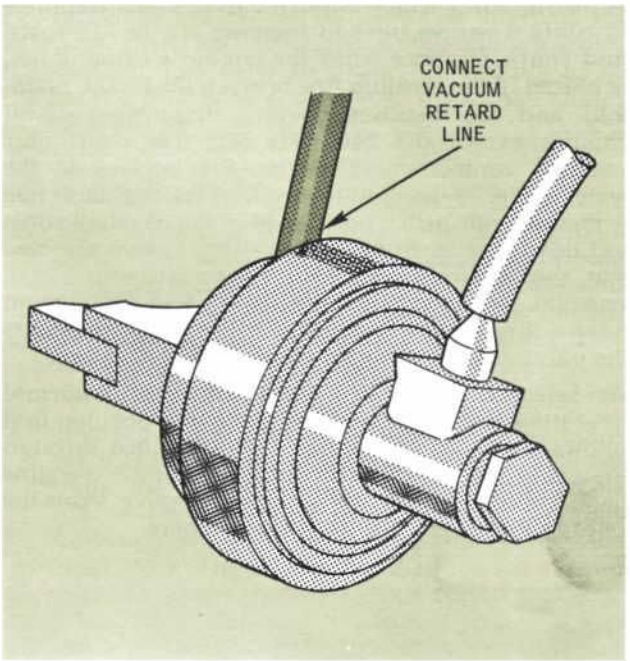
Distributor Service Suggestions

Initial Timing and Spark Advance Tests: Remove both vacuum lines from the distributor and plug the manifold vacuum line. Attach your timing light to the engine, then start the engine and set the idle to 550-600 rpm. Use the timing light to check initial timing, and make any needed adjustments.



Test Vacuum Advance

To quickly check the centrifugal advance mechanism, "rev up" the engine to about 2000 rpm and see if the timing has advanced as it should. Then check the vacuum advance by dropping engine speed to 1500 rpm and noting the degree of spark advance. Install the carburetor vacuum line and fitting in the end of the diaphragm housing and take another look at the timing marks. You should get a further advance with the hose connected if the vacuum advance diaphragm is functioning.



Test Vacuum Retard

Finally, check the vacuum retard. Return engine speed to 550-600 rpm. Unplug the manifold vacuum line and slip the end in position on the tube leading to the retard diaphragm, checking the ignition timing both before and after doing this. If the retard diaphragm is functioning, the spark timing should retard after the vacuum hose is connected.

Overhaul Tips: Service dual diaphragm distributors in the same way you'd handle a similar job on '67 Autolite dual advance units. If your tests prove the diaphragm assembly is defective, install a new assembly — you can't repair the old one!

If there's no visible breakage, points should *not* be replaced unless the voltage drop across the contacts is over 0.25 volt or metal transfer is estimated to be greater than the specified gap — 0.017-inch on V-8 points or 0.025-inch for sixes. Use only a dwell meter to set point gap if you aren't replacing points. Normal metal transfer on used points often makes a feeler gauge check worthless.

Q 6-5 c) That's not the way! Since the RT-510 countershafts are stepped with the larger diameters toward the rear, all of the gears must be removed and installed from the front of the shaft.

Don't replace a condenser unless it tests defective on an approved tester. If a used condenser checks out okay, chances are that it will hold up in service as long as a new one would . . . and maybe longer, because you can be reasonably sure it's matched to the kind of driving the owner does!

DISTRIBUTOR VACUUM CONTROL VALVE – ALL ENGINES EXCEPT 240 SIX

A distributor vacuum control valve, which responds to coolant temperature to increase engine idle speed and spark advance when the engine is running hot, is placed in the vacuum line between the intake manifold and the distributor retard diaphragm of all engines except the 240 CID Six. The distributor vacuum control valve assembly is located in the water outlet housing at the front of the engine. It has a thermostatic pellet, positioned in the constant coolant flow area in front of the cooling system thermostat, that controls a vent valve for distributor retard vacuum. All outside air used for venting the vacuum passes through a sintered iron filter before it enters the valve and the retard diaphragm vacuum line.

As long as engine temperature is within normal operating limits, the valve remains in a position that allows manifold vacuum to be transmitted through the valve to the retard diaphragm. But when engine heat rises above a set value, the valve vents the retard diaphragm line to the atmosphere.

Distributor Vacuum Control Valve

With normal atmospheric pressure reaching the distributor retard diaphragm, the distributor will revert to the normal retard position — not the extended amount of retard it's designed to provide at idle. This results in a higher idle rpm which increases engine cooling.

Quick-Quiz

Q 9-2 The distributor vacuum control valve prevents a fully retarded spark to:

a) counter engine overheating tendencies at idle. (See page 141)

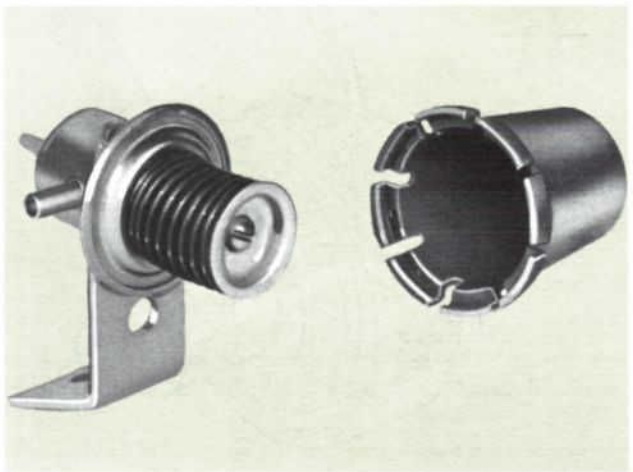
b) minimize backfiring on decleration. (See page 129)

Cleaning the Valve Air Filter

To clean the air filter of the distributor vacuum control valve, remove the elbow-shaped air inlet fitting from the side of the valve and soak it in solvent. Then blow it out with clean compressed air from the valve side of the fitting. *Don't attempt to remove the sintered iron filter from the fitting to clean it.*

DISTRIBUTOR VACUUM ADVANCE CONTROL VALVE – 170 AND 240 CID SIXES WITH MANUAL-SHIFT TRANSMISSION

On the 170 and 240 CID sixes with manual-shift transmissions, a distributor vacuum advance control valve is incorporated in the vacuum line from the carburetor to the distributor advance diaphragm. The valve functions to advance ignition timing during deceleration to reduce emissions and prevent backfiring.



Distributor Vacuum Advance Control Valve

Q 1-3 a) Sure! And this is worth remembering, because the Truck Specification List tells a lot about that individual truck. Requests should be sent to the address in the lower right corner of the form.

The valve has three ports. To one, the vacuum hose from the carburetor is attached. The second port is connected to the hose leading to the distributor advance diaphragm. These two ports are interconnected through the valve, except during deceleration. The third port, which is normally closed off by the spring-loaded valve, is connected to a hose leading to the intake manifold.

During periods of closed-throttle deceleration, intake manifold vacuum is very strong — even stronger than at idle. This high vacuum, transmitted to the vacuum advance control valve by the hose from the manifold, is sufficient to move the valve against the tension of the valve spring. When the valve moves, it closes off the port to the carburetor hose and admits the high vacuum to the port leading to the distributor advance diaphragm. This holds the breaker plate in the fully advanced position and gives an earlier spark for more complete combustion during deceleration.

Vacuum Advance Control Valve Functional Tests

Diaphragm Leak Test: To determine if the distributor vacuum advance control valve is functioning properly, you should make the following tests in the order given. Begin with the diaphragm leak test:

1. Using a 1/4-inch diameter T-fitting, connect a vacuum gauge into the hose from the intake manifold to the valve.
2. Clamp close the vacuum hose between the valve and the distributor, and also clamp close the vacuum hose between the valve and the carburetor.
3. Run the engine at normal idle speed and note the vacuum reading.
4. Then clamp close the hose between the vacuum gauge T-fitting and the valve, and compare the gauge reading with the first reading. If the second reading indicates a stronger vacuum than the first reading, the diaphragm is leaking and you must replace the distributor vacuum advance control valve assembly.
5. Remove the vacuum gauge and clamps, and connect the hose between the valve and intake manifold.

Normal Setting and Deceleration Tests: After you're sure the diaphragm is satisfactory, check for proper valve functioning at idle and during deceleration. Use this procedure:

1. Connect a tachometer to the engine. If the carburetor is equipped with a dashpot, adjust it so that it does not contact the throttle lever at idle speed.
2. Using a 3/16-inch diameter T-fitting, connect a vacuum gauge into the vacuum hose between the valve and the distributor.
3. Run the engine at idle speed with the parking brake on and the transmission in Neutral.
4. Clamp close the hose between the vacuum advance control valve and the intake manifold. Remove the distributor vacuum hose at the distributor and clamp it closed or plug it.
5. With the engine idling, vacuum in the distributor line must not exceed six inches of mercury. If it does, check and adjust idle speed, ignition timing and air-fuel ratio to bring the vacuum to six inches of mercury or below before continuing the test.
6. Stop the engine, then remove the clamps and connect the vacuum hose to the distributor.
7. Start the engine and run it up to 2000 rpm for about five seconds. Then release the throttle, watching the vacuum gauge as you do. Distributor vacuum should increase to over sixteen inches of mercury for at least one second. Then within three seconds after the throttle is released, distributor vacuum must fall to six inches or less.
8. If the vacuum rises to sixteen inches or above for less than one second or more than three seconds, the valve should be adjusted. Remove the plastic dust cover from the valve. Turn the adjusting screw at the spring end of the valve shaft clockwise to decrease the time the vacuum remains above six inches, or counterclockwise to increase the time it remains above sixteen seconds. Install the plastic dust cover before testing your adjustment. If you can't adjust the valve to specifications, it should be replaced.
9. If the carburetor is equipped with a dashpot, set it to specifications. Then repeat the test given in step 7. If the distributor vacuum does not fall below six inches of mercury within four seconds after the throttle is released, the dashpot requires further adjustment or replacement.

IGNITION SWITCH – ALL CARS

All 1968 cars have a new ignition switch. It is removed and installed in the same manner as last year's switch, but testing procedures are different. If you encounter electrical circuit problems which you have reason to believe are caused by a faulty ignition switch, here's how to test switch continuity with a self-powered test light or an ohmmeter.

1. Remove the ignition switch from the panel and install a lock cylinder and key in the switch. *Don't attempt to use a screwdriver or any other device to actuate the switch during the tests that follow* or you may damage the switch.

Q 17-1 a) You're right! Not only that . . . you can also adjust the upper stops (small adjustments only for the front stop) without removing the door trim panel of Torino GT and other Fairlane hardtops and convertibles.

2. *With the switch in the "Off" position,* there should be no continuity between any two switch terminals.
3. *With the switch in the "Accessory" position,* there should be continuity only between the "Battery" terminal and the "Accessory" terminal.
4. *With the switch in the "On" position,* there should be continuity between the "Battery" and "Ignition" terminals, between the "Battery" and "Accessory" terminals, and between the "Ignition" and "Accessory" terminals.
5. *With the switch in a position past the "On" position but before the "Start" position,* there should be continuity between each "Prove-Out" terminal and ground, between the "Battery" and "Ignition" terminals, and between both "Prove-Out" terminals. Continuity between the "Prove-Out" terminals should be maintained through the "Start" position, with no continuity in the "On" position.
6. *With the switch in the "Start" position,* there should be continuity between the "Battery" and "Start" terminals, between the "Battery" and "Ignition" terminals, between the "Ignition" and "Start" terminals, between the two "Prove-Out" terminals and between each "Prove-Out" terminal and ground.

An ignition switch that meets all of these continuity requirements is not defective.

Quick-Quiz

Q 9-3 To set the 1968 ignition switch in the various positions for continuity tests, use:

a) a tool from the 1968 Special Tool Package. (See page 79)

b) a lock cylinder and key. (See page 24)

c) a screwdriver. (See page 178)

TRUCK

DUAL DIAPHRAGM DISTRIBUTORS — LIGHT-DUTY TRUCKS, BRONCO

The new 360 and 390 V-8 truck engines used with manual-shift transmissions and all 240 and 300 six-cylinder truck engines used on light-duty trucks have a new dual diaphragm distributor. This type of distributor is also used on Bronco six-cylinder and V-8 engines.

Distributor Vacuum Advance Control Valve: The distributor vacuum advance control valve is used in conjunction with the dual diaphragm distributor on the 170 and 240 six-cylinder Bronco and light truck engines with manual-shift transmissions.

Description, Operation and Service

Construction and operation of the truck engine dual diaphragm distributor and vacuum advance control valve are similar to those described for the car ignition system components. The service information given in the car portion of this group will also apply to truck equipment. But be sure you use the *truck* ignition system specifications for distributor service!

FORD CAR AND TRUCK

CAR

EMISSION CONTROL MEASURES AFFECT CARBURETOR DESIGN AND SERVICE

All 1968 carburetors have been recalibrated to conform to the requirements of Ford Motor Company's vehicle emission control system program. Devices to prevent overly rich air-fuel mixtures during low engine rpm conditions have been built into the idle systems. Plastic limiter caps have been fitted to the knurled ends of the idle mixture adjusting screws of Autolite carburetors to prevent enrichening the idle mixture beyond precise factory settings. Holley and single-venturi Carter carburetors contain preset, fixed restrictions in idle fuel passages that accomplish the same purpose.

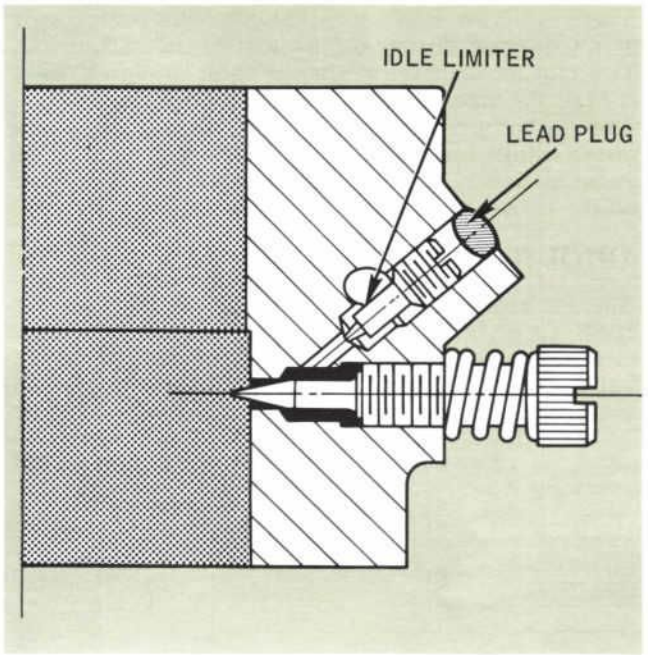
Carburetion, however, is but one portion of an entire emission control system. Either of two exhaust emission control systems is used on every 1968 Ford Motor Company car engine built for use in the United States. Generally, engines with automatic transmissions use the IMCO (Improved Combustion) system, while engines with manual-shift transmissions use the Thermactor system discussed in Group 8 — Engine. *However, there are exceptions to this rule!* The 289-4V high performance engine, and the 390 GT and 427 V-8 engines use the Thermactor system for all applications.

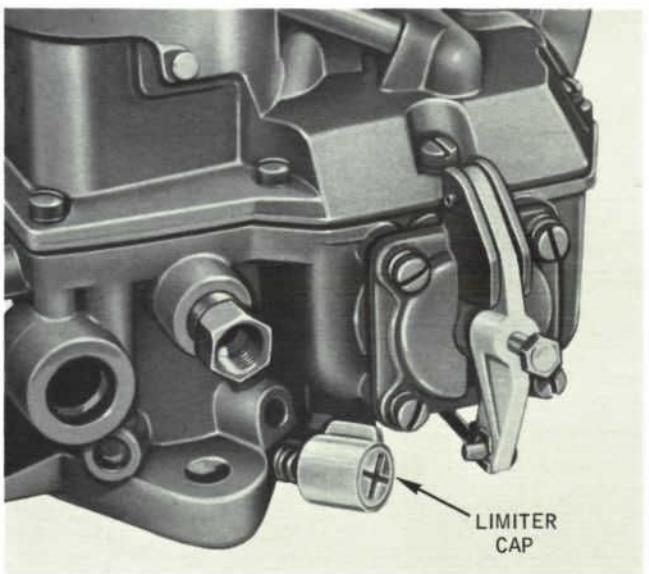
Hot-and-cold-type air intake systems are used on all engines except the 427-4V and 289-4V high performance engines and the 428 Police Interceptor V-8 to provide better warm-up performance in cold weather.

NEW IDLE ADJUSTING PROCEDURE — ALL ENGINES

One important aspect of Ford Motor Company's exhaust emission control program is the use of leaner air-fuel mixtures at idle and low speeds. In conjunction with a retarded spark at slow engine speeds and a number of engine modifications, a level of hydrocarbon and carbon monoxide emissions below the Federally-established legal limit has been achieved. In order to retain this essential control over air-fuel mixtures during carburetor service, limiter devices have been incorporated in the idle systems of the carburetors.

However, these limiting devices don't relieve the Service Technician of the responsibility for properly adjusting engine idle speed and mixture. If performed in accordance with the procedures outlined in the service training handbook entitled "Vehicle Emission Control Systems," it should be no problem to make these adjustments to the satisfaction of the customer and remain within the legal limits for hydrocarbon and carbon monoxide emissions.





Idle Mixture Limiters

Q 3-2 b) No. With those symptoms, there's a good chance that one of the lines that convey compressed air between the two air cylinders and the height control valve might be leaking. And don't forget to check the fittings, too!

Idle Adjustment Precaution for Ford with Automatic Load Leveler Option: The automatic load leveler system for Ford cars described in Group 3 of this book utilizes engine intake manifold vacuum for operation. Because of the possibility that operation of the vacuum-operated compressor in the load leveler system might affect engine idling conditions, *it is essential that the compressor be inactive during all idle speed and mixture adjustments to the carburetor.*

There are two ways to make sure the compressor won't operate during adjustment of the carburetor. You can let the engine operate long enough to fully charge the automatic load leveler reservoir, at which time the compressor will stop operating. This should occur within two minutes. Or you can disconnect the vacuum line to the compressor and temporarily cap off the vacuum take-off source.

Quick-Quiz

Q 10-1 Emission control measures affecting carburetion include:

a) much leaner air-fuel mixtures at high speeds. (See page 128)

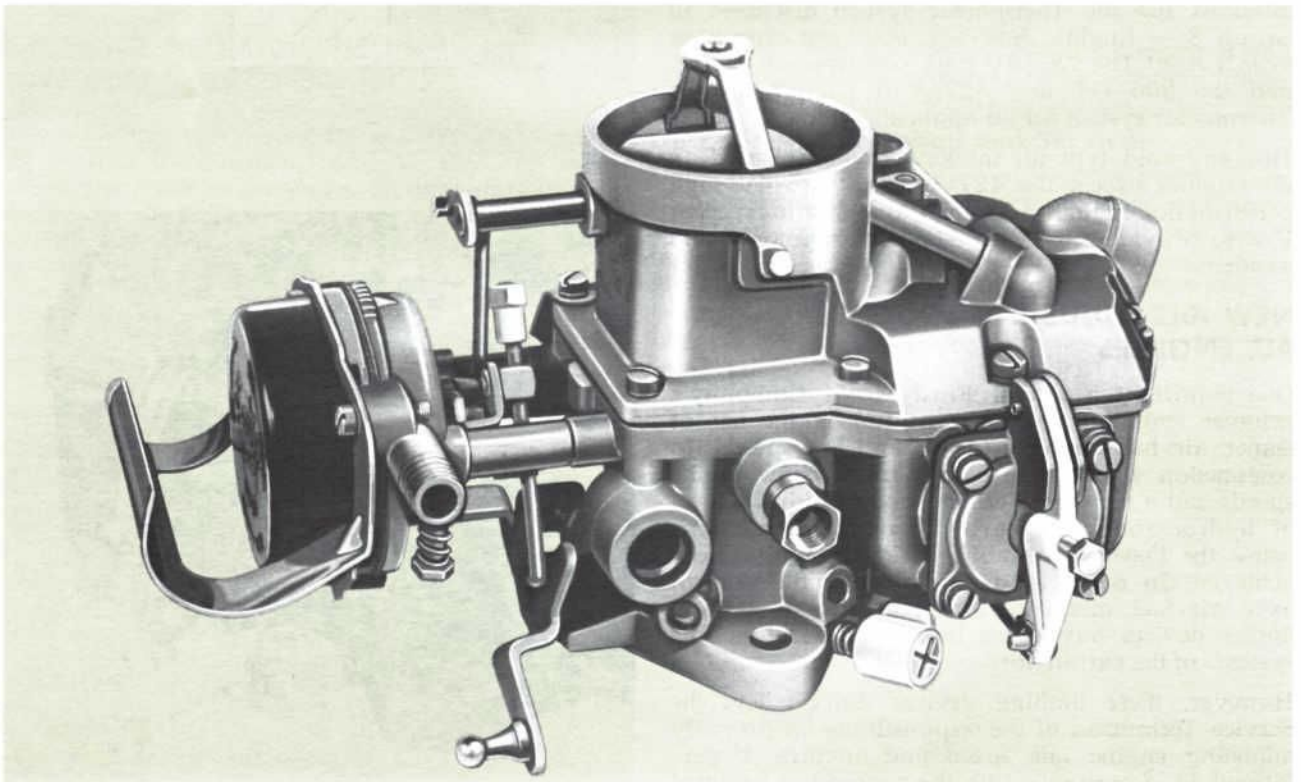
b) devices to prevent overly-rich idle system mixtures. (See page 148)

c) plastic limiter caps on all accelerating pumps. (See page 153)

AUTOLITE MODEL 1100 1-V CARBURETORS

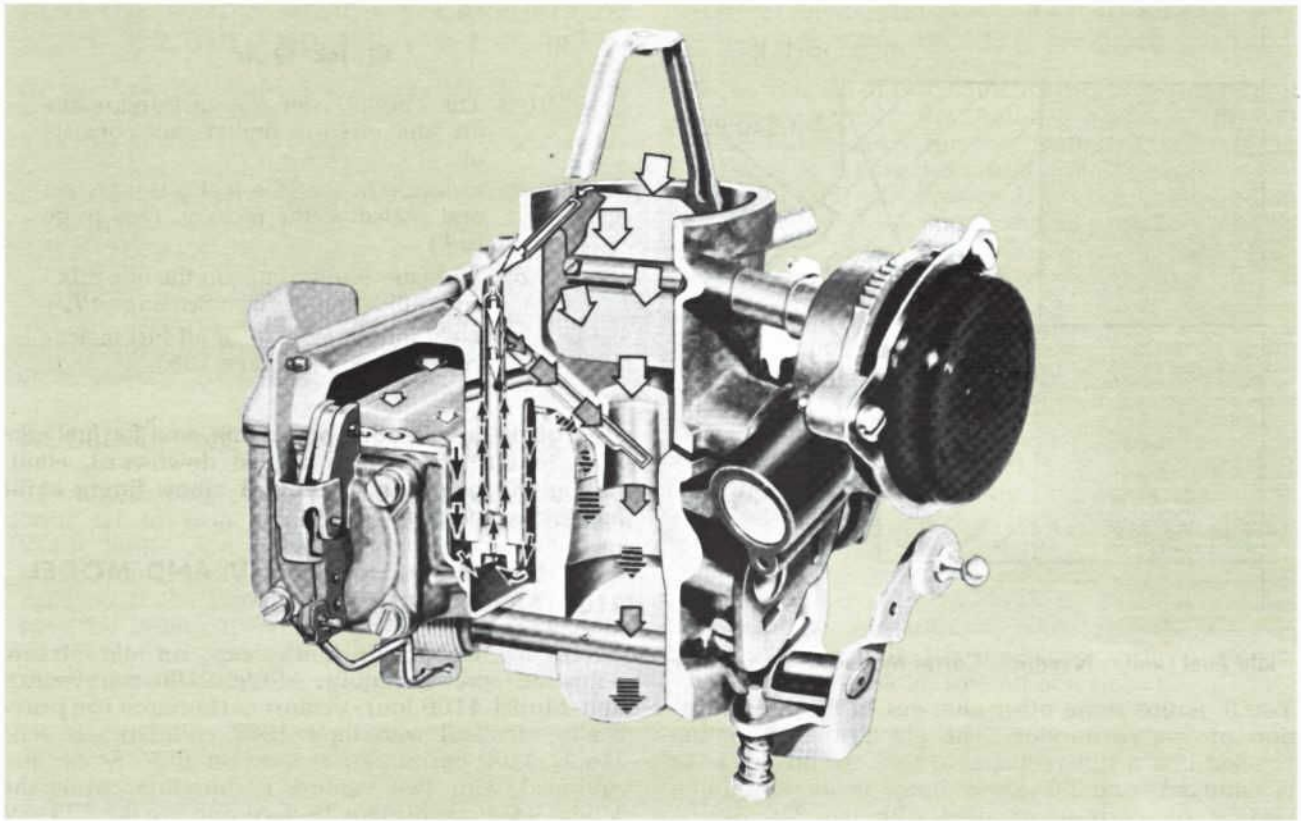
Autolite Model 1100 single-venturi carburetors for 1968 six-cylinder engines have a number of fuel metering modifications. A new gradient-type power valve gives a regulated, variable power enrichment that matches the actual mixture needs of the engine for any power increase more closely than the "on-off" type of power valve. The calibration shims at the bottom of the power valve piston stem have been replaced by an adjusting nut which should not be disturbed during service.

The idle mixture adjusting screw is fittled with a plastic limiter cap that will prevent excessive enrichment of the idle mixture beyond the limits established for legal emission control.



Autolite Model 1100 Carburetor

Q 8-3 c) Right! The pressure setting plug in the relief valve of the 1968 Thermactor air pump is color-coded to indicate its setting. When you replace one of these plugs, check the "specs" to be sure you install the correct color.

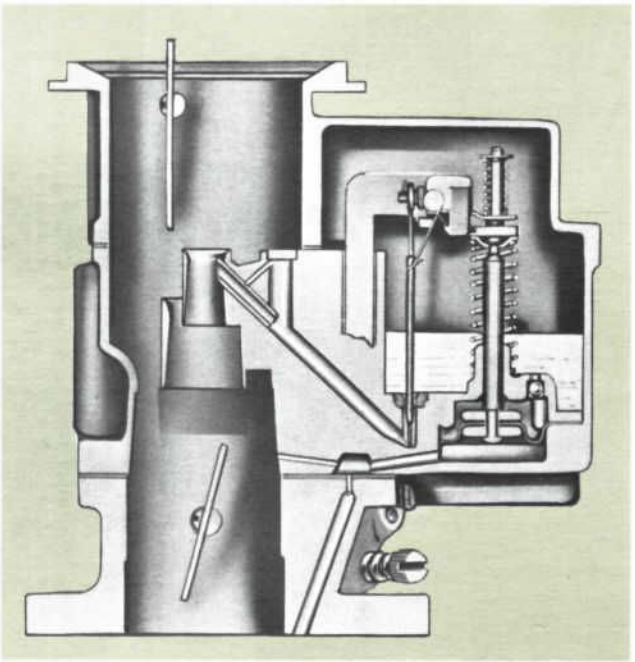


High-Low Lift Main Metering System — Autolite Model 1101 Carburetor

Model 1101 Variations: Certain versions of the basic Autolite Model 1100 carburetor, designated as Model 1101, contain a new high-low lift main metering system that includes a smaller diameter crossover passage from the main well to the main discharge tube. Accelerating pump discharge passages are routed directly up from the diaphragm chamber to the air horn and then cross over to the discharge nozzle, instead of passing through the bottom of the fuel bowl and then up to the nozzle.

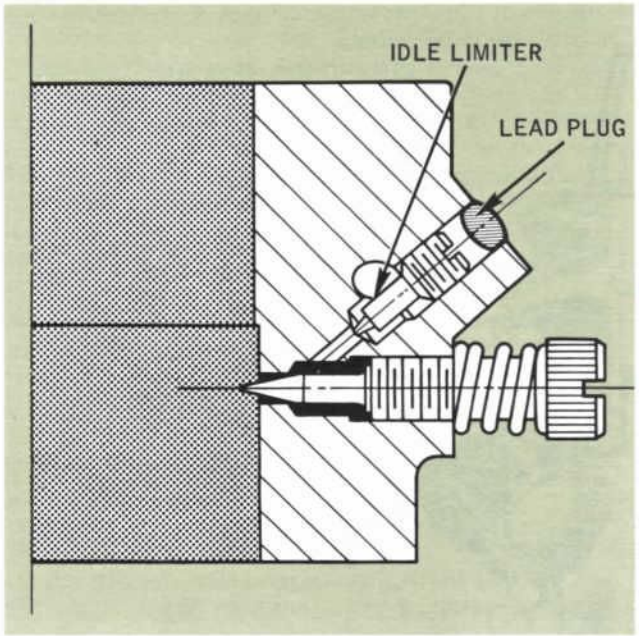
CARTER MODEL YF 1-V CARBURETOR

The Carter YF single-venturi carburetor used on some 170-cubic-inch and 240-cubic-inch Sixes has a lower silhouette for 1968. This has been accomplished primarily by lowering the height of the air horn. With the exception of the idle system, fuel metering systems are virtually identical to those of the 1967 unit. You won't find a plastic limiter cap on the idle mixture adjusting screw of this carburetor, but an internal limiter in the idle channel accomplishes the same purpose of preventing an overly-rich idle mixture. This limiter is an adjustable needle in the passage just above the idle mixture screw that has been set at the factory and sealed with a lead ball.



Carter Model YF Carburetor

Q 2-2 a) Nope! You missed the second point listed under "caliper repair." Oil or any other conventional lubricant could soon make quite a mess out of those brand new rubber insulators, you know!



Idle Fuel Limiter Needle — Carter Model YF Carburetor

You'll notice some other changes in the configuration of this carburetor. The air cleaner mounting bracket has a different appearance, the throttle lever is changed, and the lower body is an aluminum casting on carburetors used with the 240 Six. A throttle shaft return spring has been added in the area of the accelerating pump link, and the fuel inlet boss in the air horn is angled downward, eliminating the need for an angled elbow fitting at the fuel line connection.

Quick-Quiz

Q 10-2 The 1968 Carter YF carburetor has an idle mixture limiter that consists of:

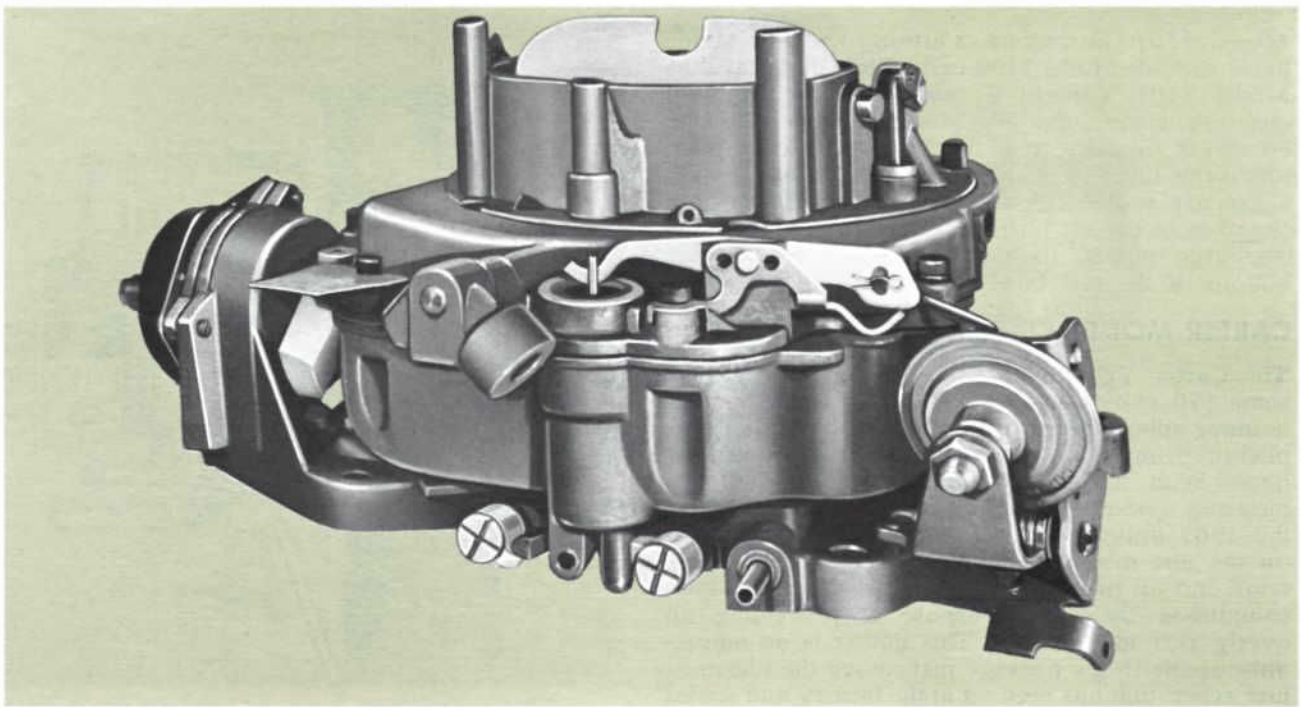
a) a needle in the idle fuel passage, set and sealed at the factory. (See page 134)

b) a plastic limiter cap on the idle mixture adjusting screw. (See page 172)

c) a complete revision of all fuel metering systems. (See page 135)

AUTOLITE MODEL 2100 2-V AND MODEL 4100 4-V CARBURETORS

Except for the plastic limiter caps on idle mixture adjusting screws, Autolite Model 2100 two-venturi and Model 4100 four-venturi carburetors are practically identical with their 1967 counterparts. The Model 2100 carburetor is used on all V-8s that are equipped with two-venturi carburetors, while the Model 4100 carburetor is used only on the 428-4V Police Interceptor engine.



Autolite Model 4300 Carburetor

Q 1-1 c) Chalk up a near-miss! You picked the code for another car in the Fairlane Torino GT series — the convertible! Check the roofline of the car in the picture and see if you can pick the correct codes next time.

AUTOLITE MODEL 4300 4-V CARBURETOR – 289, 302, 390 AND 428 V-8 ENGINES

In the Autolite Model 4300 four-barrel carburetor for all engines except Thunderbird's new optional Thunderjet 429 V-8, the air bypass idle system has been replaced with the "cracked throttle plate" type of idle system used in the Model 4100 and other carburetors. Consequently, you'll find no idle air bypass screws in the 1968 version of this carburetor.

An idle speed adjustment screw has been added to this carburetor. Plastic limiter caps are installed on the idle mixture screws and the throttle linkage has been revised.

ACCELERATING PUMP – ALL CARBURETORS

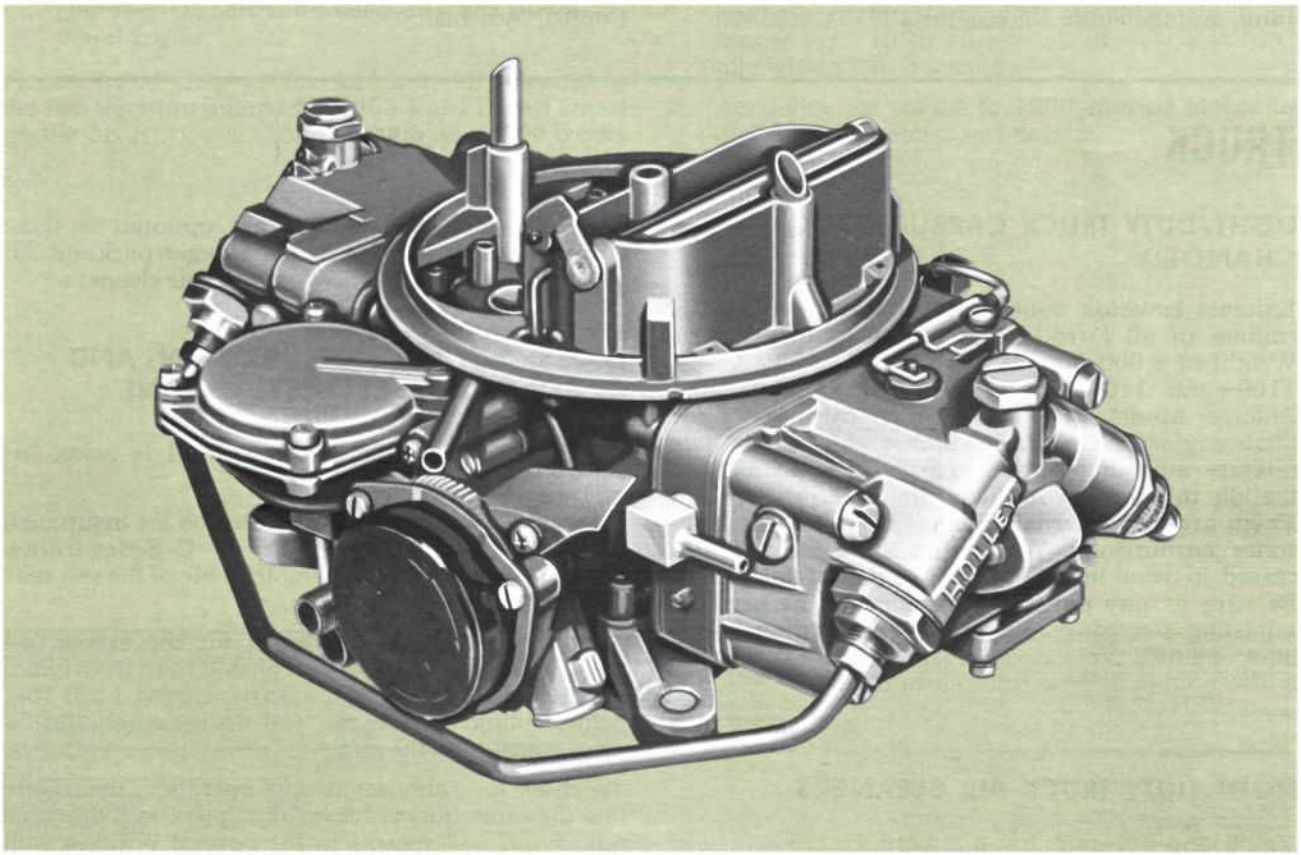
The accelerating pump stroke of all carburetors has been set to help keep the exhaust emission level within limits, *and should not be changed.* The other pump adjustment holes are for specific engine applications. If the stroke has been changed from the specified setting, it should be returned to the specified position. Then the fuel bowl vent valve clearance should be adjusted, if so equipped.

AUTOLITE MODEL 4300 4-V CARBURETOR – THUNDERJET 429 V-8 ENGINE

Except for the plastic limiter caps on the idle mixture adjusting screws, the Autolite Model 4300 four-venturi carburetor for the Thunderjet 429 V-8 is identical in appearance and operation to the 1967 Autolite 4300 carburetors. However, be sure to refer to the proper 1968 specifications when servicing this carburetor, since some adjustment dimensions and metering specifications may differ from the '67 carburetors.

HOLLEY MODEL 4150 4-V CARBURETOR

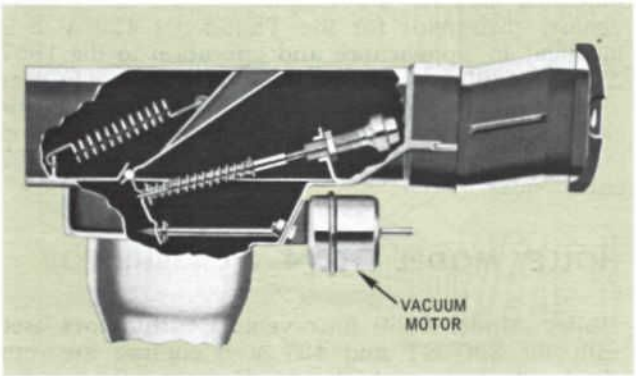
Holley Model 4150 four-venturi carburetors used with the 390 GT and 427 V-8 engines are quite similar to last year's design. However, there are a few notable changes for 1968. There's an integral screen-type fuel filter in the new fuel inlet fitting. A dashpot is used for all transmission applications. Idle system fuel passages have internal idle flow limiters to maintain low emission levels in service. And a single gasket is used between the carburetor and intake manifold, instead of a spacer.



Holley Model 4150 Carburetor

Q 3-1 b) No — there's a more obvious item to check, first! You may *eventually* have to check compressor output . . . but you can't do it until you're sure this item is as it should be, anyway! Pick another answer.

HOT AND COLD AIR CLEANERS – ALL ENGINES EXCEPT HIGH PERFORMANCE AND POLICE INTERCEPTOR



Hot and Cold Air Cleaner Vacuum Control

Hot and cold air cleaners have been used on 289-V-8's for the past few years. For 1968, their use has been extended to all engines except Mustang's optional High Performance 289-4V, the optional High Performance 427-4V for Ford, Fairlane and Mustang, and the Police Interceptor 428-4V engines.

Quick-Quiz

Q 10-3 The vacuum motor on the hot and cold air cleaner has an effect on air cleaner operation when the engine is:

a) fully warmed up. (See page 15)

b) cold. (See page 155)

New Vacuum-Modified Thermostatic Valve

The action of the thermostatic valve in the hot and cold air cleaner has been modified by the addition of a vacuum motor that will open the valve halfway when intake manifold vacuum drops at high engine speeds with a cold engine. This serves to provide the engine with a sufficient supply of cooler, more dense air that prevents any starving of the induction system under conditions when a high rate of airflow is demanded. For service instructions, refer to the service training handbook entitled "Vehicle Emission Control Systems."

TRUCK

LIGHT-DUTY TRUCK CARBURETORS CHANGED

Exhaust emission control systems are used for the engines of all Ford trucks having a Gross Vehicle Weight of 6,000 pounds or less. The Autolite Model 1100 and 1101 single-venturi carburetors and Autolite Model 2100 two-venturi carburetors for these engines have plastic limiter caps on the idle mixture adjusting screws to prevent enrichment of the idle mixture beyond legal limits during service. There are also internal changes in the Model 1100 series carburetors. You'll find these features discussed in detail in the Ford car section of this group. Be sure to pay particular attention to the new idle adjusting procedure outlined in the training handbook entitled, "Vehicle Emission Control Systems" — it also applies to these truck carburetors.

LIGHT-DUTY TRUCK AIR CLEANERS

You'll find dry-type hot and cold air cleaners used on Bronco and F-100 through F-350 trucks for 1968. Oil bath air cleaners are optional on these models and standard with the Ranger package. All parcel delivery trucks have oil bath air cleaners.

EXCESS FUEL DEVICE – B-, F-, N- AND C- SERIES DORSET DIESEL ENGINE

An excess fuel device remote control is being installed in production.

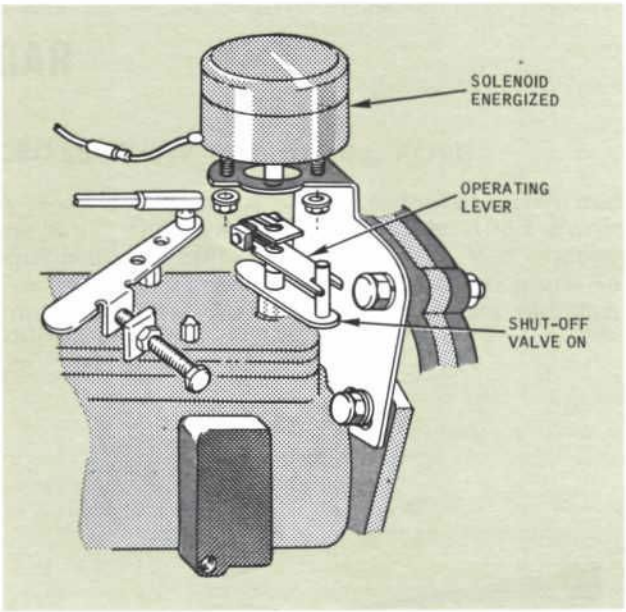
The remote control knob is located on the instrument panel except on C-Series. On the C-Series trucks, the control is located on the left side of the cab rear support.

To operate the remote control for the excess fuel device pull the knob out and push it in to its original position. When the engine starts, exceed 1200 rpm before idling. The excess fuel device automatically disengaged at 1200 rpm.

To check the cable for proper operation, make sure that the excess fuel valve is fully tipped with the cable pulled out and returns to the normal position with the cable pushed in.

Q 10-1 a) No, *not at high speeds.* Although carburetor calibrations have changed, the emphasis is mainly on preventing overly-rich mixtures at or near closed-throttle operation, where undesirable emissions are usually greatest.

FUEL SHUT-OFF SOLENOID INSTALLATION – 363 DORSET DIESEL



Fuel Shut-Off Solenoid Installation – 363 Dorset Diesel Engine

Proper installation of the fuel shut-off solenoid to the fuel injection pump of the 363 Ford Dorset Diesel engine on B-, C-, F- and N-6000 and 7000 trucks is essential to good starting performance. The operating lever should be clamped to the solenoid shaft with the solenoid energized and the shut-off valve lever in the "on" position.

If the solenoid is improperly installed (with the shut-off valve lever in the "Off" position and the solenoid not energized), it is possible that the valve will not open fully when the solenoid is energized. This has been found to be the cause of numerous hard starting complaints. If the solenoid is properly installed, the following procedure will be effective in starting the Dorset engine, regardless of outside temperature.

Starting Procedure

1. Regardless of the outside temperature, engage the excess fuel device before the initial start of the day or any time the engine has cooled to outside temperature.

   Caution: Indiscriminate use of ether for starting must be avoided at temperatures above freezing. Use no more than a 1/2-second squirt from an aerosol can. (With a properly adjusted fuel shut-off solenoid, even this much is generally not needed.)

2. Hold the accelerator pedal fully open and crank until the engine starts. This should occur in no longer than 10 to 15 seconds at most, and usually within 2 to 3 seconds.

3. Accelerate the engine to 1200 rpm or higher to disengage the excess fuel device.

FUEL TANK CAPACITIES

Car Model	Gallons	
	U.S. Measure	Imperial Measure
Ford – exc. Station Wagons	25	21
Ford Station Wagons	20	16-3/4
Falcon – exc. Station Wagon	16	13-1/4
Falcon Station Wagon	20	16-3/4
Fairlane	20	16-3/4
Mustang	16	13-1/4
Thunderbird	22	18-1/2

FUEL PUMP

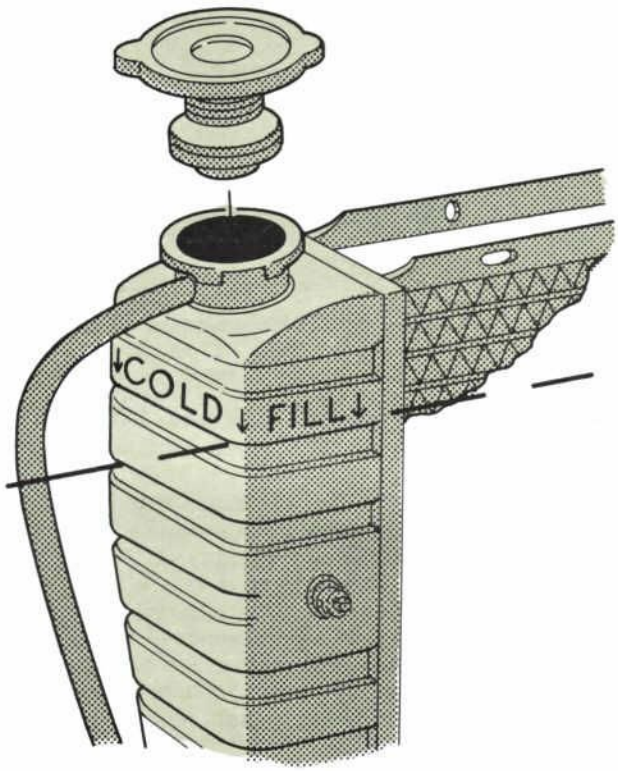
Engine Application	Min. Volume Flow at 500 Eng. RPM	Static Pressure PSI at 500 Eng. RPM	Intake Static Vacuum (Min.) In. Hg at 500 Eng. RPM	Eccentric Total Lift – Inches	Booster Pump Static Vacuum (Min.) In. Hg at 500 Eng. RPM
170 Six	1 pint/30 seconds	4.0 - 6.0	6.0	0.290-0.310	10.00
200 and 240 Six					Not Applicable
289 and 302	1 pint/20 seconds				10.00
390, 427 and 428 V-8		4.5-6.5		0.690-0.710	Not Applicable
429				0.340-0.360	

Q 9-2 b) No . . . but you're close! You probably confused the distributor vacuum control valve with the distributor vacuum advance control valve which prevents (rather than "minimizes") backfiring on deceleration.

CAR

CROSS-FLOW RADIATOR – FORD

A cross-flow radiator, similar to that of current and previous Thunderbirds, is used in 1968 Fords equipped with 390, 427 or 428 CID V-8 engines. For servicing instructions, follow those given in your 1967 Shop Manual for the Mercury radiator, which is also a cross-flow design.



Cross-Flow Radiator Fill Level – Ford

Filling Precaution

In this cross-flow radiator, check coolant level only while the engine is cold and not running. Fill only to the cold fill reference mark stamped in the left side tank about two inches below the fill cap seat.

CAM LOCK THERMOSTAT – ALL ENGINES

As a running change in the 1967 model year, the use of the cam lock design thermostat had been extended to other engines besides the sixes and the 289 V-8. For '68, it's used on all Ford passenger car engines. To lock this type of thermostat in position upon installation, turn it clockwise after placing it in the water outlet housing.

DISTRIBUTOR VACUUM CONTROL VALVE IN OUTLET HOUSING – ALL ENGINES EXCEPT 240 CID SIXES

A distributor vacuum control valve is located in the cooling system outlet housing of all 1968 engines except the 240 CID six-cylinder engine. The function of this thermostatic valve, which senses coolant temperature, is explained in Group 9. This location places the thermostatic capsule of the valve in a constant coolant flow area, isolated from other influencing components, to provide a rapid and accurate response to engine temperature changes.

Installation Tips

Apply water-resistant sealer to the valve body threads and torque the valve to 15-18 ft-lbs in the outlet housing. Then continue to turn it in as necessary — but no more than a full turn — until the vacuum hose fittings are in their original positions. *Use only the hexagonal portion of the valve body to screw the valve in or out.*

FLEXIBLE BLADE FAN USAGE EXPANDED

Last year, Fords with the 289 V-8 and factory-installed air conditioning were equipped with a unique Flex Blade cooling system fan. This fan design provides its maximum pitch for increased air flow at slow engine speeds. As the fan rotates faster with higher engine speeds, its pitch decreases to reduce the drag on the engine.

Usage of the Flex Blade fan is increased for 1968. On Thunderbird, a 17-1/2-inch 5-blade fan is used on the 429 V-8 with standard cooling. All 1968 Fords with 302 V-8 engines and factory-installed air conditioning have a 18-inch 5-blade fan. Ford Police Interceptor 390 and 428 V-8s have a 19-1/2-inch 7-blade fan with either standard cooling or air conditioning. When a 289 or 302 V-8 is used with air conditioning in Fairlane, Falcon or Mustang, a 17-1/2-inch 5-blade fan is used.

Q 3-4 a) No — not according to the procedures given in this handbook. If you'll examine them, step by step, you'll find that removal of spacers invariably comes after everything's tightened up.

TRUCK

CAM LOCK THERMOSTAT — 360 AND 390 V-8 ENGINES

The 360 and 390 V-8 engines available in the F-100 through F-350 4x2 trucks use a cooling system thermostat that incorporates the cam lock feature to prevent improper installation. Although the application is new for '68, the idea is not. This thermostat design feature was introduced in last year's six-cylinder engines, so you should be familiar with it.

Quick-Quiz

Q 11-1 When installing the distributor vacuum control valve in an outlet housing, remember to:

a) tighten it only to the specified torque, regardless of which direction the vacuum hose fittings point. (See page 12)

b) use water-resistant sealer on the threads. (See page 19)

c) turn the valve with pliers on the vacuum hose fittings (See page 45)

FORD CAR AND TRUCK CAR

Spherical Exhaust Manifold Flange Joint – 390 & 428 V-8s

SPHERICAL EXHAUST MANIFOLD FLANGE JOINTS – 390 AND 428 V-8 ENGINES

At the exhaust manifold to muffler inlet pipe flange joint of all Thunderbird engines and the Ford 390 and 428 V-8 engines (except Police Interceptor), you'll find a new type of connection — one that will make your job of aligning the exhaust system easier! On exhaust systems used with these engines, the forward end of the muffler inlet pipe is now smoothly rounded, instead of being tapered. And the exhaust manifold flange has a matching concave countersunk seating area for this ball joint end of the pipe.

Incidentally, you'll no longer find a manifold heat control valve at the flange, except on the special 428 police engine. This valve isn't needed with the hot and cold type air cleaner that's used on '68 engines.

Installation Tips

With the spherical flange joint, you don't need to use a flange gasket. Just fit the end of the pipe into the seat in the manifold flange and install the retaining nuts loosely. Draw the two nuts up evenly until you have 13/16 inch clearance from the bottom of the inlet pipe flange to the tips of the studs, but *don't tighten them to the specified torque* until after you've gone through the rest of the system to be sure it's properly aligned.

Then turn the two retaining nuts up alternately, a little at a time, until they are properly torqued. This is important, since it is essential to keep the two flanges parallel as they are drawn closer together. By following this method, you'll install the pipe without any undue stresses and the ball and socket will seal effectively.

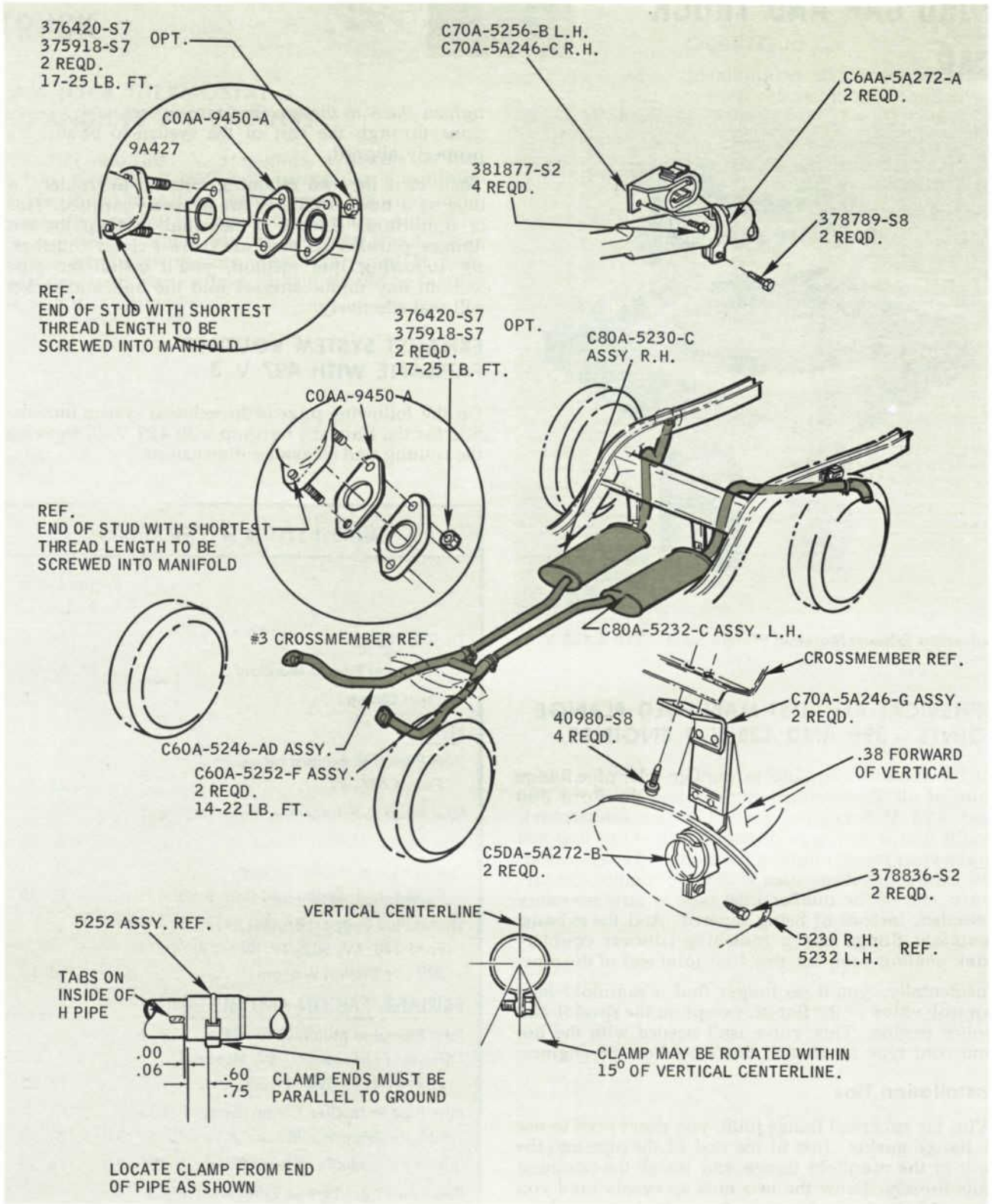
EXHAUST SYSTEM ROUTING – FAIRLANE WITH 427 V-8

On the following page is the exhaust system illustration for the Fairlane hardtop with 427 V-8, showing the routing and clearance dimensions.

EXHAUST SYSTEM SPECIFICATIONS

	Torque Limits (Ft-Lbs)
THUNDERBIRD	
Muffler Inlet Pipe to Manifold	17-25
Support Clamp	20-28
FORD	
Inlet Pipe(s) to Exhaust Manifold(s) (Except 427-4V)	25-35
Inlet Pipes to Exhaust Manifolds (427-4V)	40-53
Inlet Pipe to Muffler Clamp	20-28
Outlet Pipe to Muffler Clamp (Ford 6-Cyl. Sedan and Convertible)	20-28
Outlet Pipe Support Bracket to Frame – Nut (Ford 240-1V, 302-2V, 390-2V, 390-4V Station Wagon)	10-15
FAIRLANE, FALCON AND MUSTANG	
Inlet Pipe(s) to Manifold(s) – Nuts (Except Fairlane 427-4V, Mustang 289-4V H.P., 390-4V GT)	17-25
Inlet Pipe to Muffler Clamp (Except Fairlane 427-4V, Mustang 289-4V H.P., 390-4V GT)	20-28
Inlet Pipe to Muffler Clamp (Fairlane 427-4V)	14-22
Resonator Inlet Pipe to Exhaust Manifold (Mustang 289-4V H.P., 390-4V GT)	17-25

Q 7-2 a) No point for you on this one! To bring the clutch pack clearance down to the specified dimension, the only friction plate you should exchange for a thicker one is the *top plate* of the pack — not *all* of them!



Fairlane Hardtop Exhaust System — 427 V-8

Q 10-2 a) Good . . . you're correct! The setting of that adjustable needle in the idle fuel passage has been precisely checked at the factory before it was sealed in place. It won't allow mixtures richer than the legal limit.

EXHAUST SYSTEM SPECIFICATIONS (Cont'd)	Torque Limits (Ft-Lbs)
Resonator or Support Bracket to Mounting Plate and Resonator (Mustang 289-4V H.P., 390-4V GT)	14-22
Resonator Inlet Pipe Flanges (Mustang 289-4V H.P., 390-4V GT)	20-28
Muffler Insulator Bracket to Outlet Pipe Bracket and Mounting Pipe	20-28
Muffler to Inlet and Outlet Pipe – Clamp (Mustang 289-4V H.P., 390-4V GT)	20-28
Outlet Pipe and Crossover Pipe Clamps (Mustang 289-4V H.P., 390-4V GT)	20-28
Outlet Pipe Support Bracket to Frame (Falcon 289-2V, 302-4V Sedan and Convertible)	14-22

TRUCK

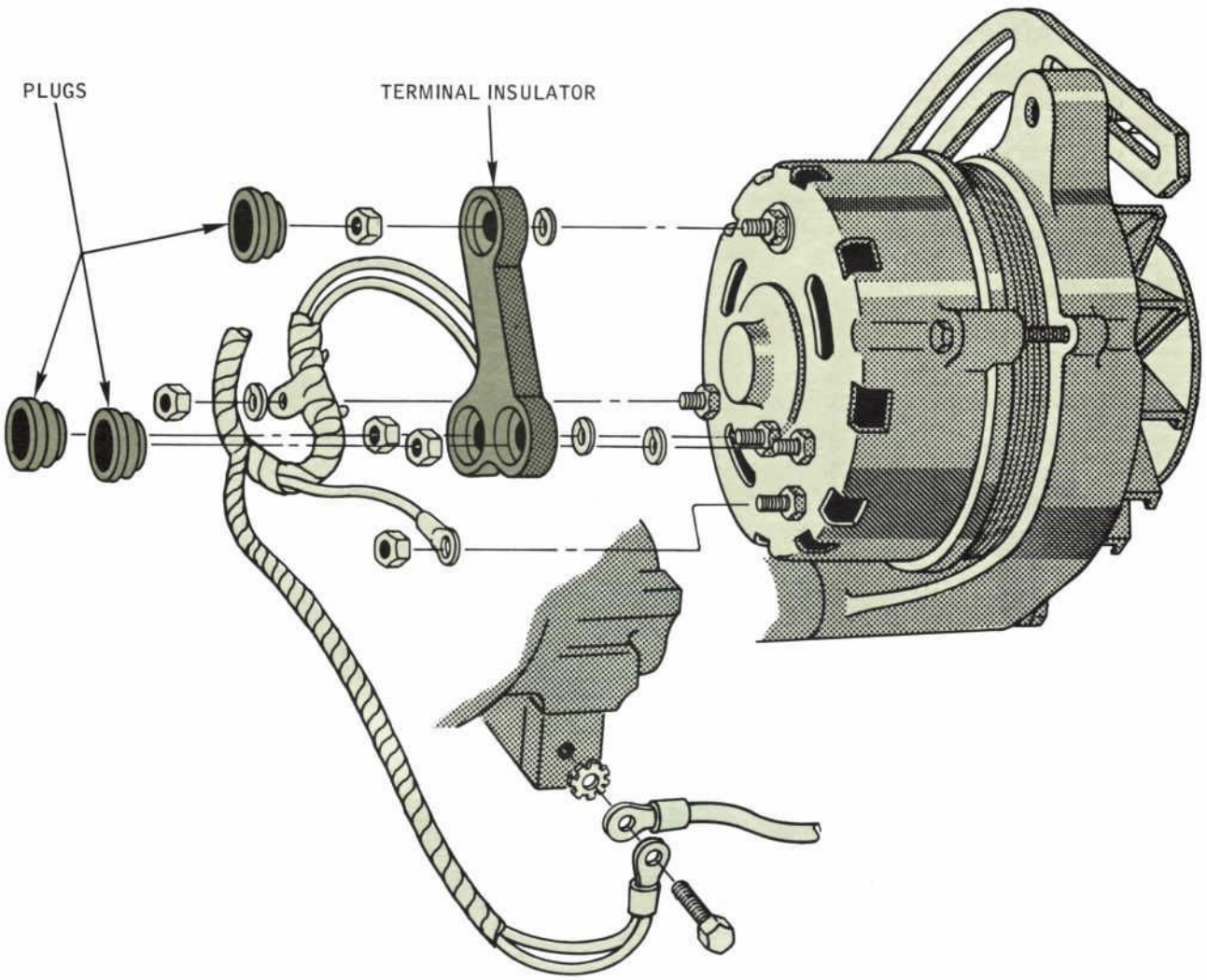
TUNED MUFFLER – F-100 AND F-250 RANGER PACKAGE

Included in the Ranger package option for 1968 Ford F-100 and F-250 Pickup trucks is a new tuned muffler, similar in design to those used on passenger cars. In addition, the muffler outlet pipe is longer. When replacing exhaust system components in any Ranger Pickup, be sure you use the Ranger parts listed in your parts book, not the conventional Pickup parts.

EXHAUST SYSTEM SPECIFICATIONS	Torque Limits (Ft-Lbs)
Inlet Pipe to Exhaust Manifold – Ranchero	17-25
Light Trucks	
Gasoline	25-35
Diesel	25-30
Heavy Truck	
Diesel (1/2-13)	60-70
(3/8-24)	25-35
Gasoline	
6 Cylinder (7/16-14)	25-30
(3/8-16)	25-30
8 Cylinder (3/8-24)	25-30
(7/16-14)	25-35
Inlet Pipe Clamps – Nuts	
(3/8-16)	12-15
(5/16-18)	10-14
Diesel (3/8-24)	12-15

EXHAUST SYSTEM SPECIFICATIONS (Cont'd)	Torque Limits (Ft-Lbs)
Inlet Pipe Clamps – Bolts (5/16-18)	10-14
Muffler Clamp – Ranchero	20-28
Inlet and Outlet Pipe Supports to Frame – Light Trucks	
Inlet to Engine (170 only, 3/8-16)	18-25
Diesel (5/16-18)	10-14
(3/8-24)	12-15
Outlet Pipe to Side Rail (F-100 4x2, F-100 4x4, F-250, 3/8-16)	18-25
Outlet Pipe to Side Rail (F-100 4x2, F-100 4x4, F-250, 5/16-18)	10-14
Outlet Pipe to Side Rail (F-250 4x4, F-350, 3/8-16)	18-25
Exhaust System Mounting to Side Rail (All P Series, 5/16-18)	10-14
Heavy Trucks	
(5/16-24)	10-14
(5/16-18)	10-14
(3/8-24)	25-30
(5/8-11)	120-150

Q 10-2 c) That's not so! Fuel metering systems are the same as in last year's carburetor, except for the internal limiter needle in the idle system that prevents an overly-rich idle mixture.



Alternator Terminal Connections

ONE-PIECE ALTERNATOR TERMINAL CONNECTOR

A one-piece moulded rubber insulator is now provided in the charging system wiring harness for added protection of the alternator field, battery and stator terminal connections. The connectors are attached to the terminal posts in the same manner as last year — a lockwasher is first placed on the terminal post between the terminal base nut and the connector, and then the terminal nut is tightened down against the connector to compress the lockwasher. But in addition, you now must cover the terminal nut with a snap-in plug. And when you remove any one alternator lead, you must remove all three.

Service Precaution

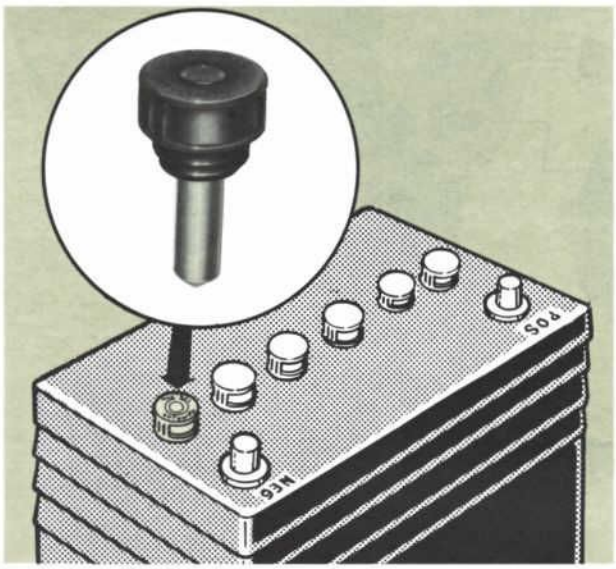
The moulded-in connectors provide added protection against accidentally shorting the battery connector to a ground when the connector assembly is

Q 9-1 a) No sir! Those two diaphragms do a lot of things to give the proper spark advance or retard, but they don't do it all! As in earlier units, a centrifugal advance mechanism is used to give a basic advance in proportion to engine speed.

removed. But don't trust to this feature to provide complete protection when removing the alternator — play it safe by *always disconnecting a battery cable.* The consequences of failing to do this could be serious!

LOW ELECTROLYTE LEVEL WARNING — AUTOLITE BATTERY

When you raise the hood of any 1968 car, glance at the cap nearest the grounded negative terminal of the battery. If you see a definite glow in the center of the cap, that's your cue to reach for the battery filler container and add water to the cells! The center of the cap contains a rod of refractive plastic that remains dark as long as the electrolyte level is high enough to cover its lower end, but glows when the level drops below that point.



Autolite Battery Low Electrolyte Indicator

Additional New Features

Tops of all original equipment batteries are painted, not only for appearance but also to show up more clearly any dirt and acid deposits that could lead to self-discharge if the battery remains idle for an extended period. All battery caps are now red, instead of being color-coded to indicate battery capacity. And the polarity caution note is now incorporated in a decal on the warranty pad, right on the battery.

Quick-Quiz

Q 13-1 Autolite alternator regulators with blue covers should *not* be adjusted because:

a) they are an all-new design that requires no adjustment, even during manufacture. (See page 29)

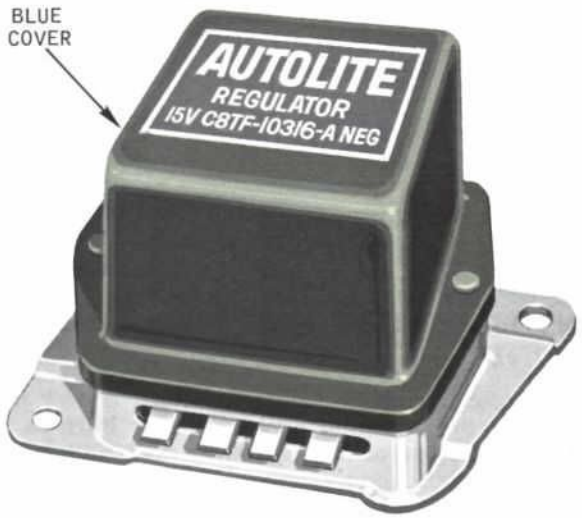
b) the adjustments are now made at the alternator. (See page 20)

c) the original setting is best for any operating condition. (See page 60)

AUTOLITE ALTERNATOR REGULATOR NOT ADJUSTABLE

1968 Autolite alternator regulators have permanently attached covers, painted blue for identification. *These regulators are not to be adjusted.* If electrical tests prove one of these alternator regulators to be faulty, it should be replaced.

Two factors have influenced this change in policy. Because of the alternator's inherently superior charging characteristics at low engine speeds, it's not necessary to "tailor" the alternator regulator setting to match certain owners' operating habits. And field experience has proved the Autolite alternator regulator to be a consistently durable, trouble-free unit. Consequently, the original factory adjustment should be the best obtainable for all ranges of operating conditions.



Don't Adjust Blue Cover Regulators!

Q 1-2 c) Nope! It's the axle ratio codes for cars that have changed completely for '68 — not the codes for truck transmission. That leaves two other possible answers to the question. Try again!

TRUCK

TRUCK CHARGING SYSTEM CHANGES SAME AS FOR CARS

Changes for 1968 to truck alternators and alternator regulators are the same ones described for Ford cars in this publication. These changes include the one-piece terminal connector for Autolite alternators, the non-adjustable Autolite alternator regulator and the new Autolite battery with the low electrolyte level warning. Details are given in the car section.

SPECIFICATIONS

ALTERNATOR SPECIFICATIONS

Engine Model	Part Number	ALTERNATOR Field Current Draw at 12 Volts	Output (Amps) Cut-In RPM	Output (Amps) RPM	Engine Model	Part Number	ALTERNATOR Field Current Draw at 12 Volts	Output (Amps) Cut-In RPM	Output (Amps) RPM
170 CID	C6DF-10300-A	2.4	840	38-4520	390 CID	C6AF-10300-A	2.8-3.3	840	42-4200
	C6AF-10300-A	2.8-3.3	840	42-4200		C6AF-10300-C	2.8-3.3	840	42-4200
	C6TF-10300-F	2.8-3.3	940	55-4200		C6AF-10300-F	2.8-3.3	940	55-4200
200 CID	C6AF-10300-G	2.8-3.3	940	55-4200		C6AF-10300-G	2.8-3.3	940	55-4200
	C6AF-10300-B	2.8-3.3	840	42-4200	(Leece-Neville)	C5TF-10300-K	3	700	60-2400
	C6DF-10300-A	2.4	840	38-4520		C6AF-10300-G	2.8-3.3	940	55-4200
	C6AF-10300-G	2.8-3.3	940	55-4200		C7AF-10300-A	2.9	720	65-3280
240 CID	C6AF-10300-A	2.8-3.3	840	42-4200		C6AF-10300-A	2.8-3.3	840	42-4200
	C6AF-10300-C	2.8-3.3	840	42-4200		C6TF-10300-F	2.8-3.3	940	55-4200
	C6AF-10300-G	2.8-3.3	940	55-4200	427 CID	C6AF-10300-C	2.8-3.3	840	42-4200
	C6TF-10300-E	2.8-3.3	940	55-4200	428 CID	C6AF-10300-C	2.8-3.3	840	42-4200
	C6TF-10300-F	2.8-3.3	940	55-4200		C6TF-10300-E	2.8-3.3	940	55-4200
	C7TF-10300-C	2.8-3.3	840	42-4200		C6TF-10300-F	2.8-3.3	940	55-4200
289 CID	C6DF-10300-A	2.4	840	38-4520		C6AF-10300-G	2.8-3.3	940	55-4200
	C6DF-10300-B	2.4	840	38-4520	(Leece-Neville)	C5TF-10300-K	3	720	60-2400
	C6AF-10300-F	2.8-3.3	940	55-4200		C7AF-10300-A	2.9	720	65-3280
	C6AF-10300-G	2.8-3.3	940	55-4200	429 CID	C6AF-10300-G	2.8-3.3	940	55-4200
	C6AF-10300-D	2.8-3.3	840	42-4200					
302 CID	C6AF-10300-B	2.8-3.3	840	42-4200					
	C6AF-10300-C	2.8-3.3	840	42-4200					
	C6AF-10300-F	2.8-3.3	940	55-4200					
	C6AF-10300-G	2.8-3.3	940	55-4200					
	C7AF-10300-A	2.9	720	65-3280					

REGULATOR SPECIFICATIONS

Part Number	Regulator: Field Relay Air Gap	Field Relay Point Gap	Field Relay Volts to Close	Regulator Air Gap	Regulator Point Gap	Regulator Volts at 50° to 120°F	Current Control (Amps)
C8AF-10316-A	*	*	2.3 to 4.2	*	*	13.5 to 15.3	**
C8TF-10316-A	*	*	2.3 to 4.2	*	*	13.5 to 15.3	**
C5TF-10316-B	.015	.025	3 to 4	.045 .052	.010 .015	14.3 15.1	**

* These clearances are to be set only at the manufacturing plant and the regulator cover is then riveted in place. Data not available for service.

** Not related to Autolite (GPD) or Leece-Neville systems.

Q 1-2 b) No. The Ford-built 3.03 three-speed transmission has been carried over for the '68 Bronco and some light trucks with no change in the code designation, but there are no Ford-built five-speed units listed in this handbook. Try again!

BATTERY SPECIFICATIONS

Engine Model	Vendor Make and Number	Amp. Hr. Capacity	Volts	Terminal Grounded	Dimensions		
					Length	Width	Height
200, 170, 240, 289, 302	C5AF-10655-A	45	12	Negative	9-27/64	6-13/16	8-61/64
200, 302, 390	C5AF-10655-B	55	12		10-3/4	6-13/16	8-61/64
390, 427, 428, 429	C5VF-10655-A	80	12		12-1/2	6-13/16	9-9/64
240, 302, 390	C7AF-10655-E	70	12		12-1/2	6-13/16	9-9/64
240, 289, 302, 390	C5AF-10655-C	70	12		12-1/2	6-13/16	9-9/64

STARTER SPECIFICATIONS

Engine Model and Starter Part No.	Lock Test			No-Load Test			Brush Spring Tension
	Amps	Volts	Torque	Amps	Volts	RPM	
170 & 200 CID							
C7ZF-11001-A	460	6	9	70	12	8,500	40 ounces
C7OF-11001-A	670	5	15.5	70	12	9,500	40 ounces
C7DF-11001-A	460	6	9	70	12	8,500	40 ounces
240, 289 & 302 CID							
C7AF-11001-B	670	5	15.5	70	12	9,500	40 ounces
C7AF-11001-D	670	5	15.5	70	12	9,500	40 ounces
C7AF-11001-F	670	5	15.5	70	12	9,500	40 ounces
390, 427 & 428 CID							
C7AF-11001-C	670	5	15.5	70	12	9,500	40 ounces
C7AF-11001-E	700	4	15.5	70	12	11,000	40 ounces
429 CID							
C7VF-11001-A	700	4	15.5	70	12	11,000	40 ounces
C8VF-11001-A	700	5	15.5	70	12	10,000	40 ounces

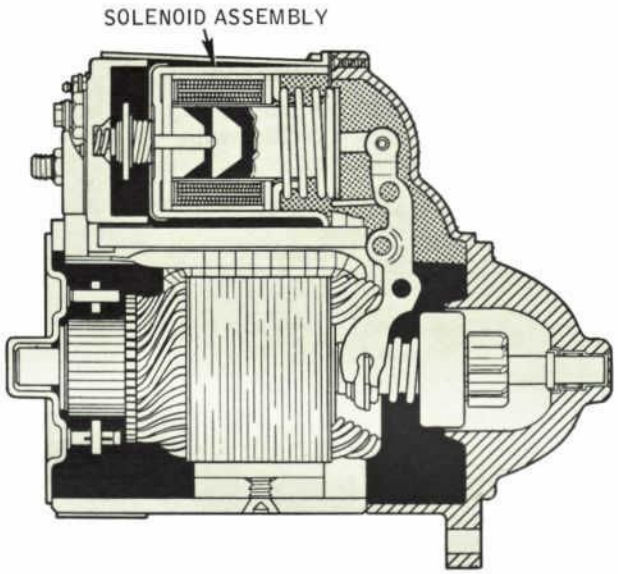
Q 5-1 b) No! In fact, you're bound to break away the plastic retaining the bearings when you press them out of the yokes — they won't come out any other way. But don't worry . . . new snap rings come with the replacement bearings.

FORD CAR AND TRUCK

CAR

SOLENOID STARTER FOR 429 V-8 — THUNDERBIRD

The Autolite starter for the Thunderjet 429 V-8 is a solenoid actuated positive engagement unit. It has a 4-brush, 4-field, 4-pole series wound motor with the circuit splitting to parallel through the two pairs of field coils. Major subassemblies are: frame and field coil assembly, armature assembly, brush plate assembly, drive housing assembly, drive assembly, shift lever assembly and solenoid assembly.



Autolite Solenoid Actuated Starting Motor — 429 V-8

Operation

When the ignition switch is turned to "start," the starter relay supplies voltage to the solenoid. The solenoid is energized through two separate windings — a pull-in coil and a hold-in coil. This draws the plunger into the coil windings, moving the shift fork to slide the drive pinion into mesh with the flywheel ring gear. As the plunger nears the end of its travel, it presses against a spring-loaded pin attached to a contact plate. The contact plate completes the circuit to the starting motor only after the pinion gear is engaged. The plunger also closes a set of contacts that bypass the pull-in coil. When the ignition switch is released, the spring-loaded pin pushes the plunger out of the solenoid coils and breaks the circuit to the starting motor.

Testing

Hard Starting: Except for the solenoid (which can be considered as a starting motor relay from the viewpoint of electrical circuitry), electrical tests on the Thunderbird 429 V-8 starting circuit follow the same practice as for the '67 Thunderbird. When you've eliminated other possible causes of hard starting — a weak battery, faulty ignition system, etc., — check voltage drops in the circuit with a voltmeter.

1. Disconnect and ground the high tension lead from the ignition coil to keep the engine from starting.
2. Connect the voltmeter between the battery side of the starter relay and the battery terminal on the starter solenoid. Read the voltage drop with the starting circuit energized through the ignition switch.
3. In the same manner, check the voltage drop between the battery negative post and the starting motor frame.
4. In the same manner, check the voltage drop between the battery terminal on the solenoid and the "S" terminal on the solenoid.

If the voltage drop exceeds 0.10-volt on any of these tests, excessive resistance is indicated. Step 2 tests the battery circuit to the relay. Step 3 tests the effectiveness of the starter ground. Step 4 tests for resistance in the relay and the circuit between the relay and the solenoid.

Inoperative Starting System: If the starter solenoid does not pull in when the circuit is energized, connect one voltmeter lead to the solenoid "S" terminal and ground the other lead. If the voltage reading with the circuit energized is close to battery voltage (ten volts or more), a defective solenoid is indicated. The starter should be removed for solenoid replacement.

Lower voltage readings, or no voltage, indicate trouble in the circuit ahead of the solenoid. Isolate the source by moving the voltmeter lead from the solenoid "S" terminal to the starter terminal on the relay, the ignition switch terminal on the relay and the battery terminal on the relay, in that order, until a proper voltage reading is registered on the meter.

Q 9-2 a) Right on the nose! The vacuum control valve vents the distributor vacuum retard line when the engine gets hot . . . which gives less spark retard at idle . . . which gives a faster idle . . . which gives better cooling! Quite a chain reaction, isn't it?

If necessary, test for grounded armature and field windings after the starter has been removed as you would on any other Autolite positive engagement starter.

Removal and Installation Tips

To provide working clearance, turn the front wheels fully to the right and disconnect the steering idler arm from the frame before you remove the starter. When installing the starter, be sure all mating surfaces are clean to insure a good electrical ground. To maintain proper alignment, hold the starter squarely against the mounting plate and fully inserted into the mounting hole while you snug up the mounting bolts.

Solenoid Removal

1. Remove the screw and washer attaching the starter solenoid motor terminal to the starter field connector strap.
2. Remove the two screws and washers which attach the solenoid to the drive housing, and remove the solenoid and rubber seal.

Quick-Quiz

Q 14-1 Electrical circuit tests on the starting system for the Thunderjet 429:

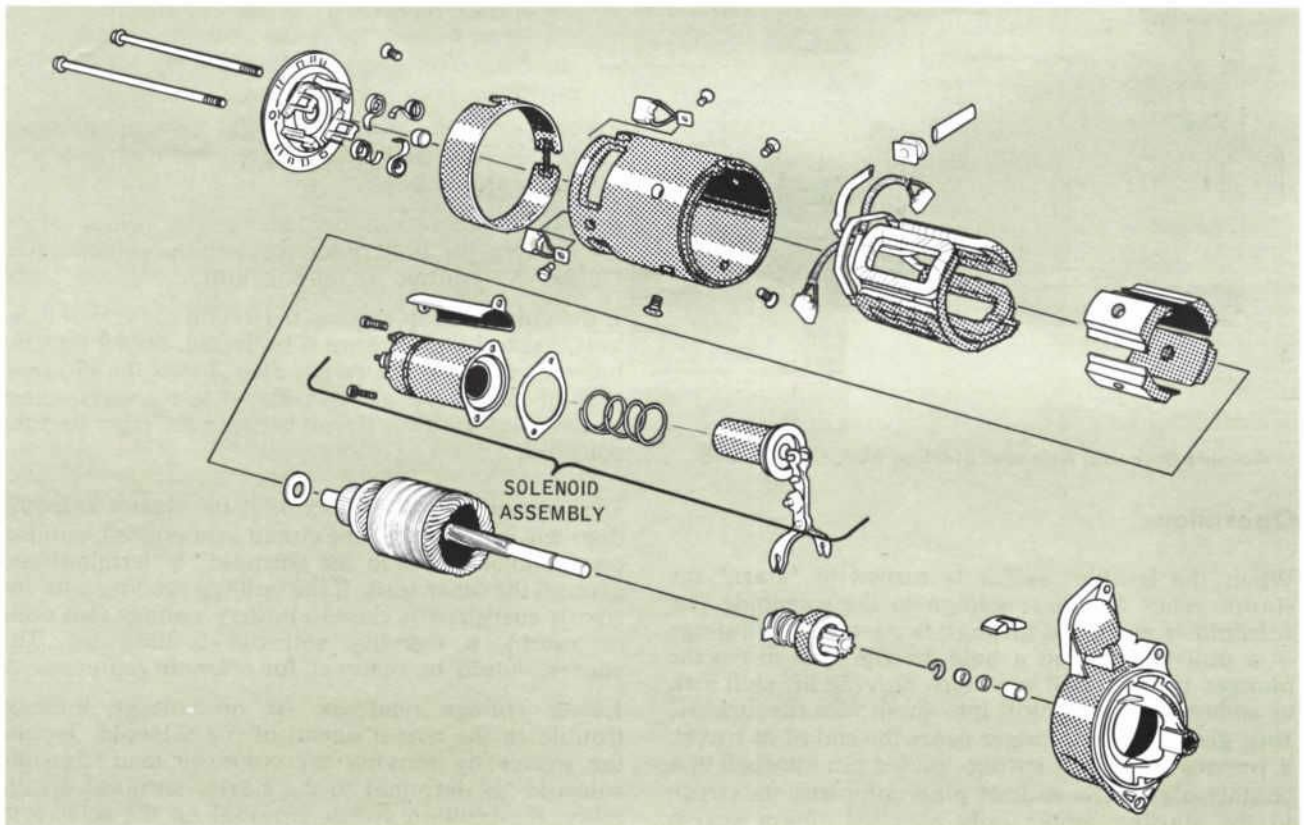
a) follow 1967 practice except for testing the solenoid. (See page 184)

b) are entirely new because of the new starter. (See page 21)

c) are identical with 1967 tests except that no relays are involved. (See page 9)

Solenoid Installation

1. Set the solenoid and seal on the drive housing. Be sure that the heat shield is in position and that the rubber seal is properly aligned, all around. Fasten the solenoid to the housing with the two screws and washers (45-85 lbs.-in.).
2. Attach the field connector strap to the motor terminal on the solenoid with the screw and washer (20-30 lbs.-in.).



Autolite Solenoid Actuated Starting Motor Disassembled

Q 3-1 c) Wrong! All the quick operating check tells you is whether or not the automatic load leveler system is working . . . and you've already found out it isn't! Try again!

Overhaul Tips

Disassembly and Inspection: Before you remove the solenoid plunger and shift lever assembly, notice the position of the shift lever tangs on the drive assembly so you'll be able to position the tangs properly during assembly. Inspect parts as you remove them, and make any needed tests in the same manner as you would for other Autolite starters. *Never use solvent on the drive assembly* — just wipe it clean with a cloth. Solvent may affect the operation of the drive pinion gear overrunning clutch.

Assembly Procedure:

1. Apply a small amount of Lubriplate to the armature shaft splines. Install the drive assembly on the armature shaft and install a new stop-ring.
2. Apply a small amount of Lubriplate on the shift lever pivot pin. Position the solenoid plunger and shift lever assembly in the drive housing.
3. Place a new retainer in the drive housing. Apply a small amount of Lubriplate to the drive end of the armature shaft. Place the armature and drive assembly into the drive housing. Be sure the shift lever tangs properly engage the drive assembly.
4. Place the fiber washer on the commutator end of the armature and apply a small amount of Lubriplate on the shaft.
5. Position the frame and field assembly to the drive housing. Be sure the frame is properly indexed to the drive housing assembly.
6. Position the brush plate assembly to the frame assembly. Be sure the brush plate is properly indexed to the frame. Install the through-bolts and tighten to 55-75 lbs.-in.
7. Place the brushes in their holders and center the brush springs on the brushes. Dress the insulated brush leads away from all other interior components to prevent possible shorts.
8. Install the starter solenoid and heat shield assembly.
9. Position the cover band and tighten the retaining screw.
10. Connect the starter to a battery to check its operation.

STARTING MOTOR: C8VF-11001-A

Stall Test (at 4 Volts)		Description:	
Minimum Torque		Manufacture:	Autolite-Ford
Pounds Feet:	15.3	Type:	12 volt, 4-1/2 inch,
Maximum Current			solenoid actuated
Amps:	600		positive engagement
			3 hole mount
Free Run Test			
Maximum Current			
Amps at 12 Volts			
and 10,000 RPM	70 Max.		
Brushes			
Number Used:	4		
Original Length (inches)	1/2		
Reusable Length (inches)	5/16		
Spring Tension (ounces)	40		
Drive			
Type:	Overrunning Clutch (deep cam)		
Part Number:	C8VF-11350-A		
Number of Teeth:	9		
Lead Pitch (inches):	6		
Tooth Pitch:	12/14		
Solenoid			
Part Number:	C8VF-11390-A		

Q 2-2 b) Good . . . you got it right! That M-1044-C fluid is just the ticket for helping with this part of the job without damaging either the insulator or the pin. Got enough in *your* shop?

TRUCK

TRUCK STARTING SYSTEMS UNCHANGED FROM '67

Bronco, light duty, medium duty and heavy duty truck starting systems are similar to those used in the previous models. Use 1967 service instructions for these systems. The only change in the Ranchero starting system is the use of new neutral start switches with automatic transmissions. This is covered in the car section of Group 7 of this publication.

Quick-Quiz

Q 14-2 The Autolite solenoid starter isn't mentioned for truck engine applications in this handbook because:

a) it's not used with truck engines. (See page 33)

b) it's not *new* for trucks, having been used in 1965. (See page 57)

SPECIFICATIONS

STARTERS

Starter Motor					Starter Brushes				Mounting Bolt Torque (Ft-Lbs)		
Dia. (Inches)	Current Draw Under Normal Load (Amps)	Normal Engine Cranking Speed (rpm)	Min. Stall Torque at 5 Volts (Ft-Lbs)	Max. Load (Amps)	No Load (Amps)	Mfg. Length (Inches)	Wear Limit (Inches)	Spring Tension (Ounces)	Through Bolt Torque (In-Lbs)	3/8-In. Bolt Two-Hole Mfg.	5/16-In. Bolt Three-Hole Mfg.
4-1/2	150-200	250-290	15.5	670	70	0.50	0.25	40	55-75	15-20	12-15

Maximum Commutator runout is 0.005 inch. Maximum starting circuit voltage drop (battery positive terminal to starter terminal) at normal engine temperature is 0.5 volt.

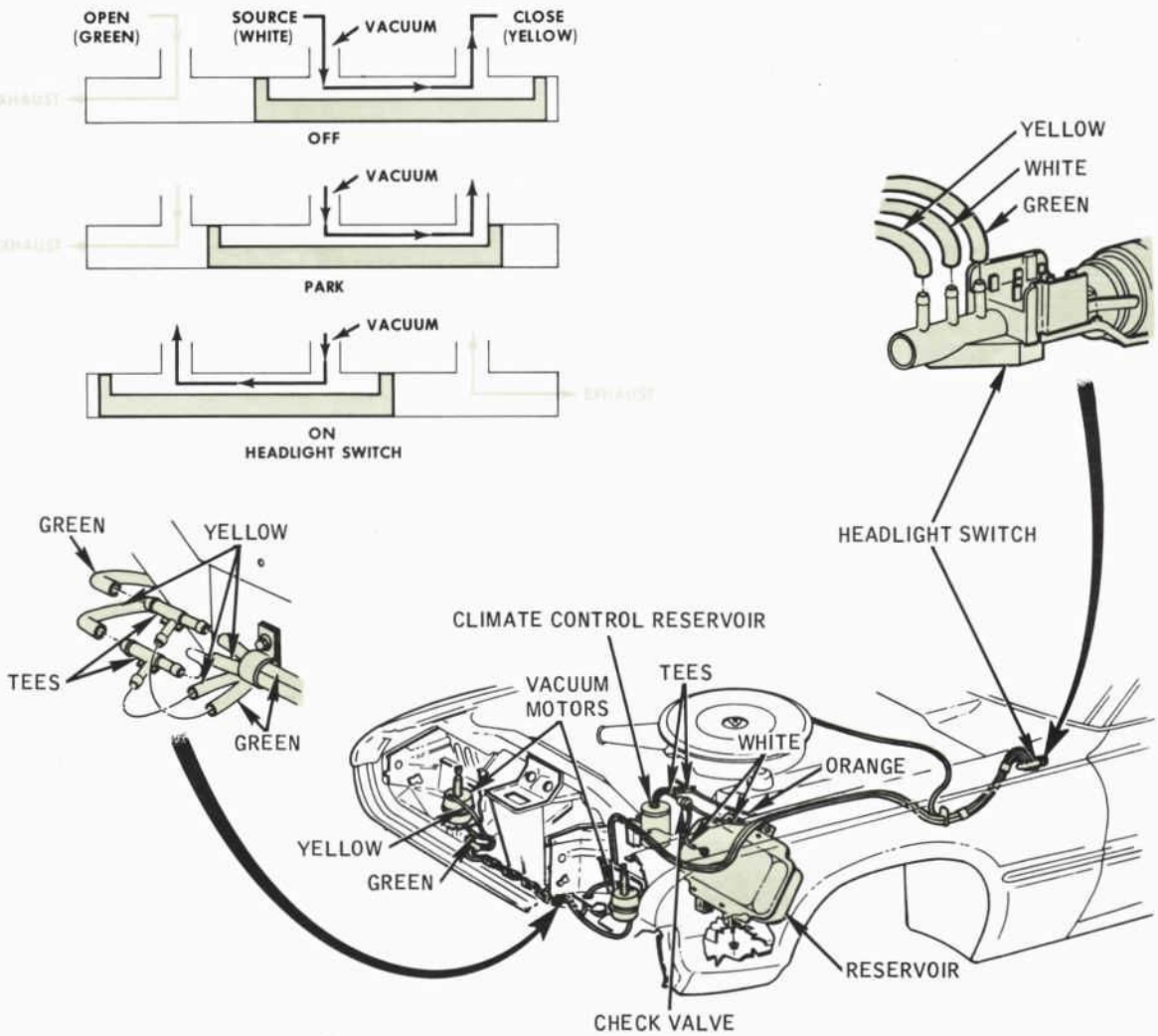
FORD CAR AND TRUCK

CAR

RETRACTING HEADLIGHT DOOR SYSTEM — THUNDERBIRD

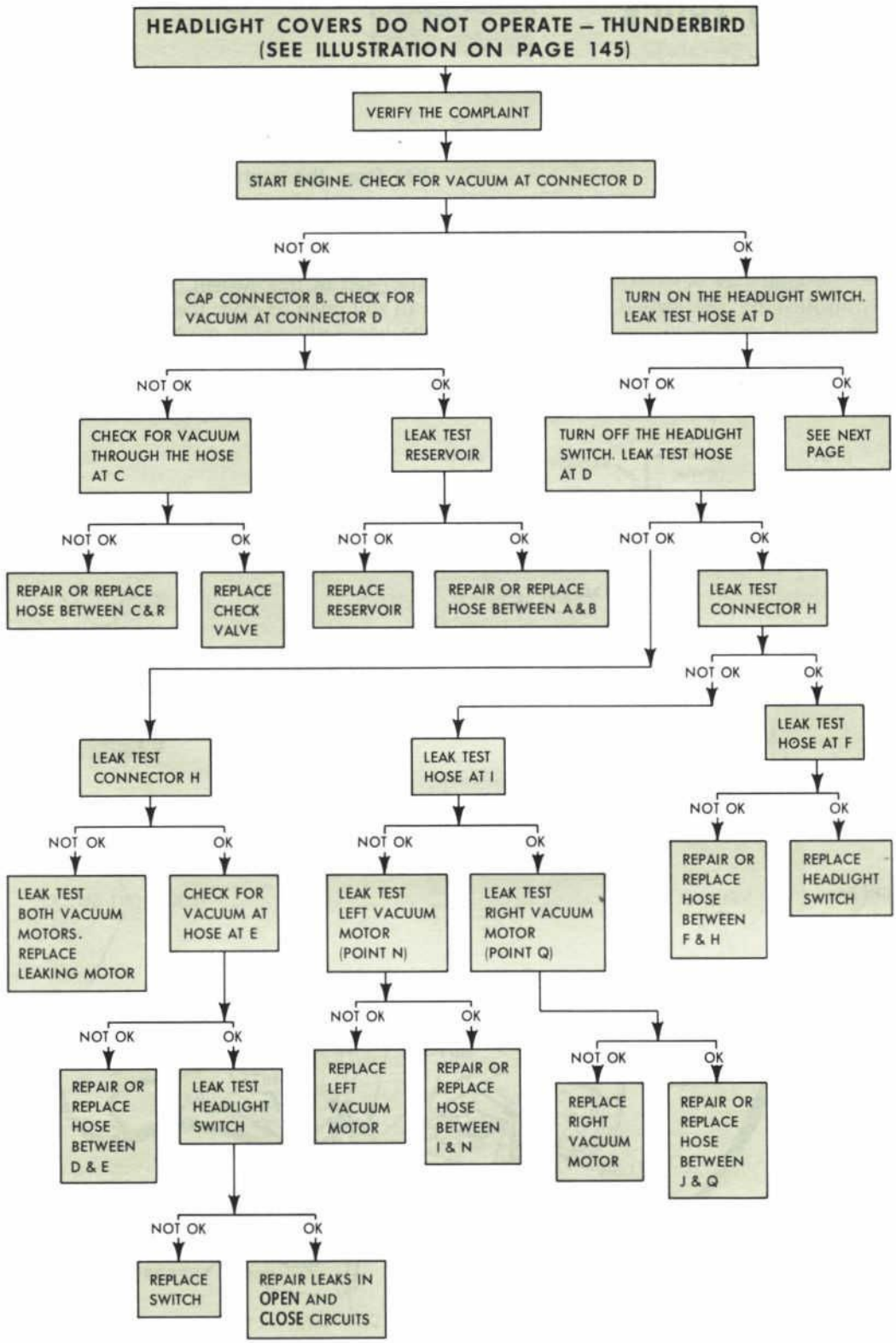
The actuating system for Thunderbird's retracting headlight doors has been simplified for 1968. Vacuum distribution and venting is provided by a three-port valve mounted directly in front of the headlight switch and controlled by the switch control knob shaft. Hose routing is similar to that of last year's Thunderbird, except that the valve at the headlight switch takes the place of the electrically actuated control valve in the engine compartment of the '67 models. A separate check valve in the vacuum source line from the engine prevents reverse venting of system vacuum to the manifold and provides a vacuum storage for operation without running the engine.

Two vacuum motors and a single vacuum reservoir are used in this system. In case of vacuum loss, you can still open or close the doors manually. Just place the headlight switch control knob in the corresponding position — "ON" to raise the headlight doors, "OFF" or "PARK" to lower the doors — and move the doors to the desired position.

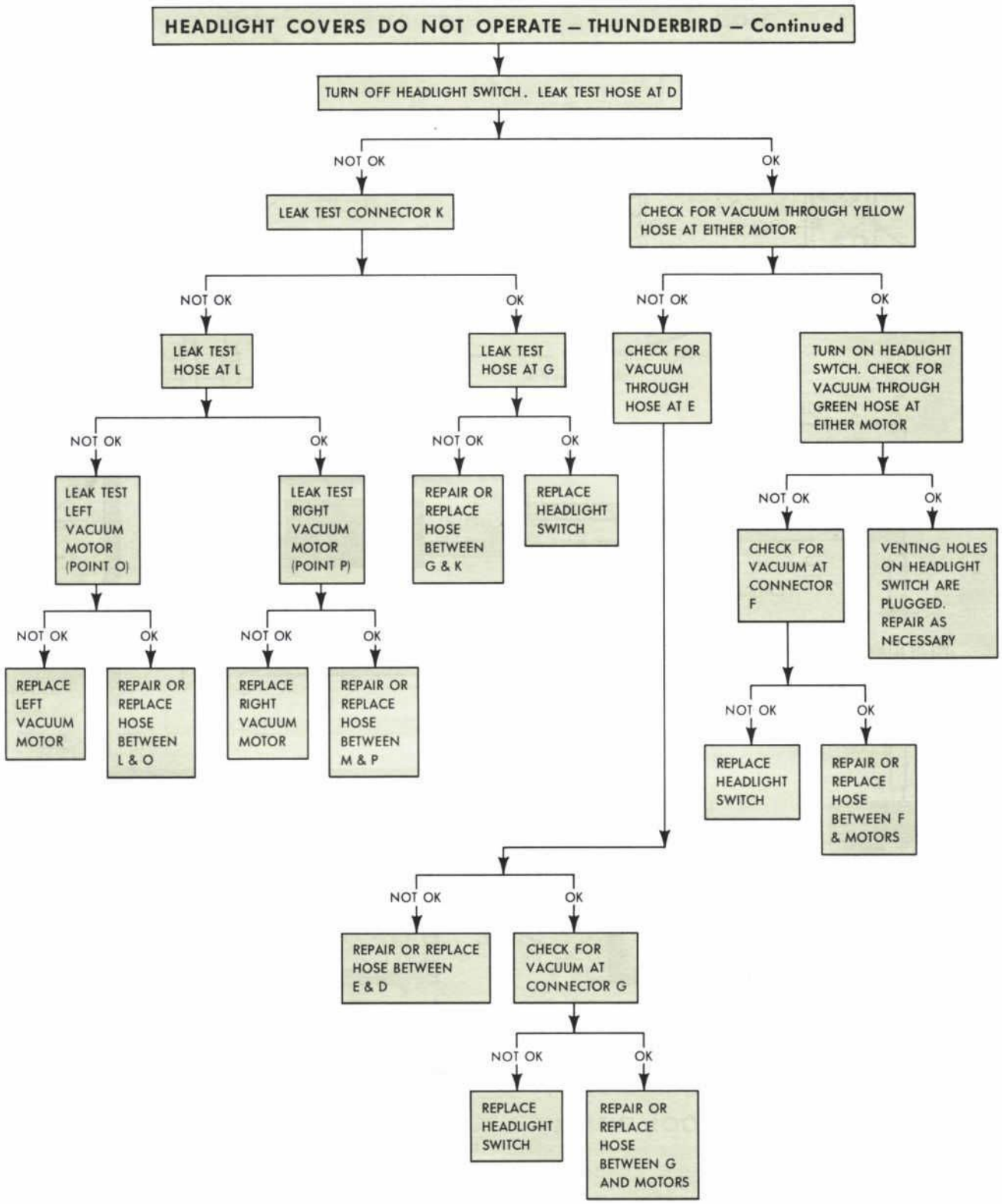


Vacuum Distribution Valve for Retracting Headlight Doors — Thunderbird

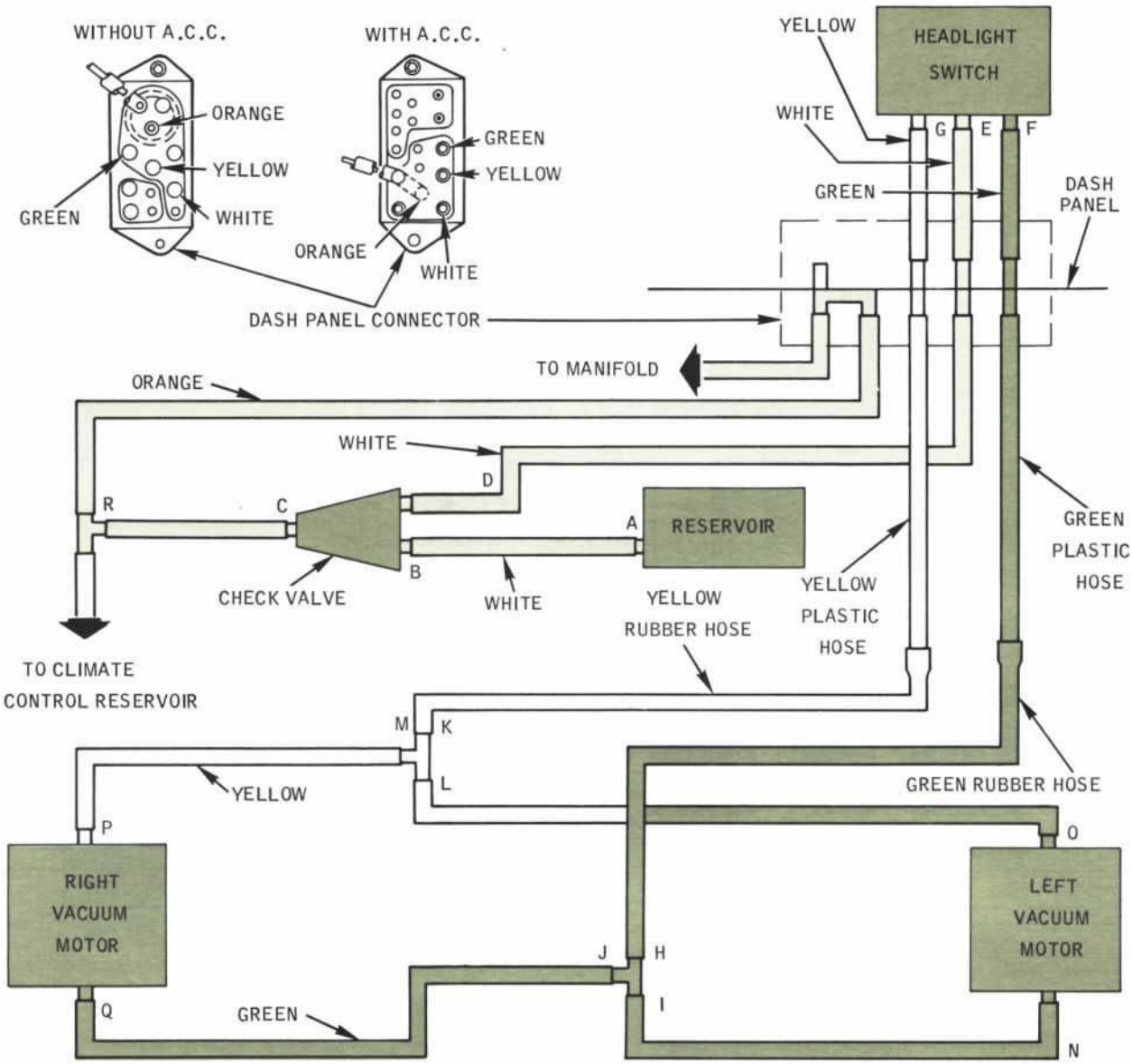
Q 6-3 a) That's the way to do it! It's an easy way to install a new mainshaft pilot bearing . . . and it's practically foolproof! To reinstall the *old* bearing, you can use a rubber band in place of the sleeve, with the same good results.



Q 16-4 c) Sorry . . . that's not what's meant by "5 by 10" push buttons! Each of the five buttons can be set to an FM station *and* an AM station, giving a total of ten — but not all of one type!



Q 8-5 b) Nope! The 390 V-8 is similar to last year's 352 in most respects . . . and three-ring pistons is one detail that's included in these similarities! Four-ring pistons are new for the heavy duty 330 engine . . . and the 361 and 391 engines, too.

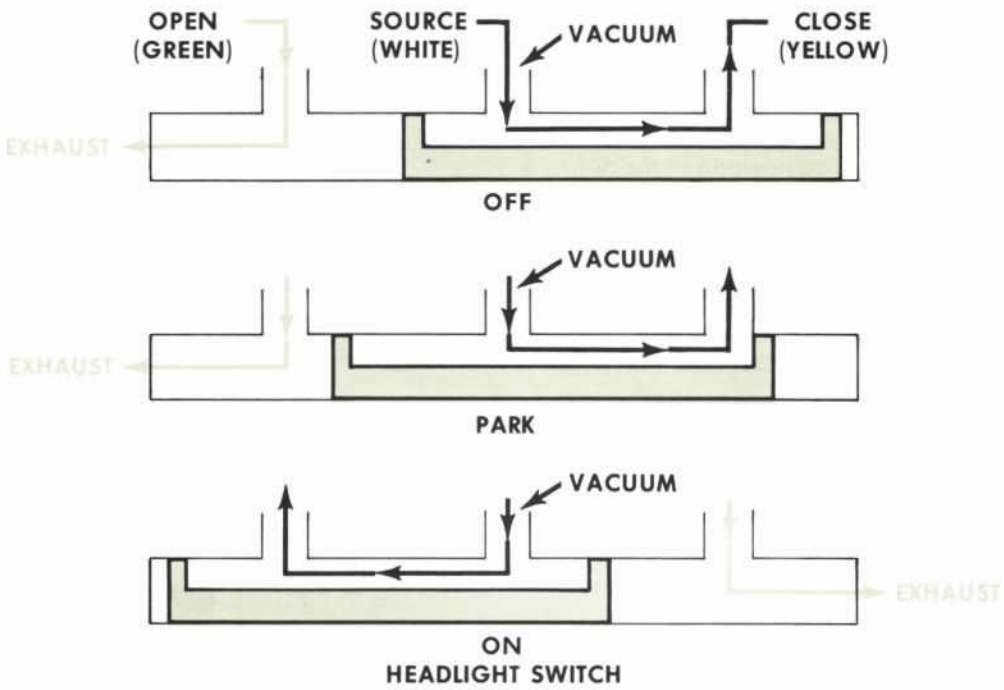


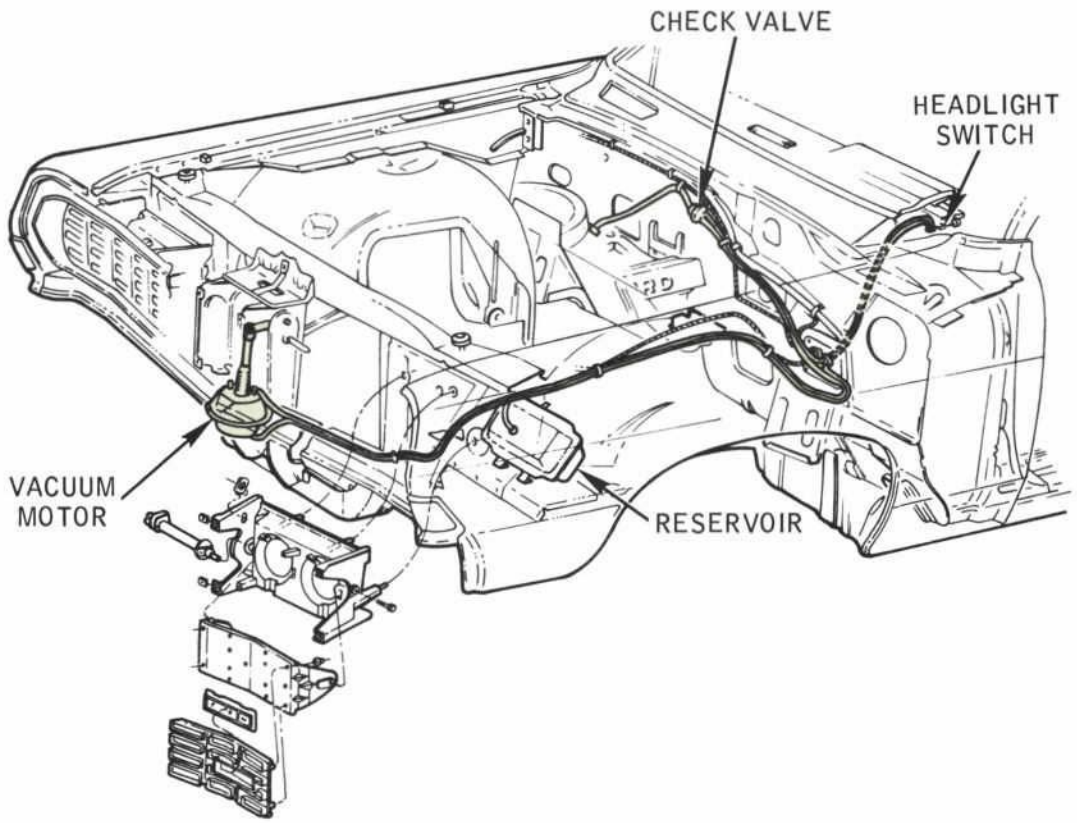
RETRACTABLE HEADLIGHT COVERS
THUNDERBIRD

RETRACTING HEADLIGHT DOOR SYSTEM – FORD

The 1968 Ford XL and LTD series cars and their station wagon counterparts have retracting headlight doors. The vacuum control system is similar to that of the 1968 Thunderbird system, except that only one vacuum motor is used. This motor is mounted behind the center of the grille, below the hood lock hook. It drives a center shaft that, in turn, drives two outer shafts to the covers.

Q 10-1 b) You're right! Overly-rich idle system adjustments can be a big offender for excessive exhaust emissions. So all '68 car carburetors have devices to prevent enriching the idle mixture beyond a legal limit.





Retractable Headlight Door System — Ford

Q 15-1 b) Good — you've scored again! The Ford system uses one vacuum motor to actuate the headlight doors while Thunderbird has two vacuum motors.

Headlight Door Adjustment

There are two adjustable bumpers on the inboard sides of both headlamp housings. These bumpers contact a rubber-covered stop pin on the headlamp cover assembly to limit the travel of the cover. The upper stop determines the open position of the door, while the lower stop determines the door's closed position.

To adjust the position of any bumper, simply loosen the stop bracket bolt slightly, make your adjustment with the door in the desired position, then tighten the bolt. Be sure the engine is running while you adjust the position of the doors, so you'll have full vacuum in the vacuum motor.

If it is necessary to open or close the doors manually, follow the instructions given for the Thunderbird unit.

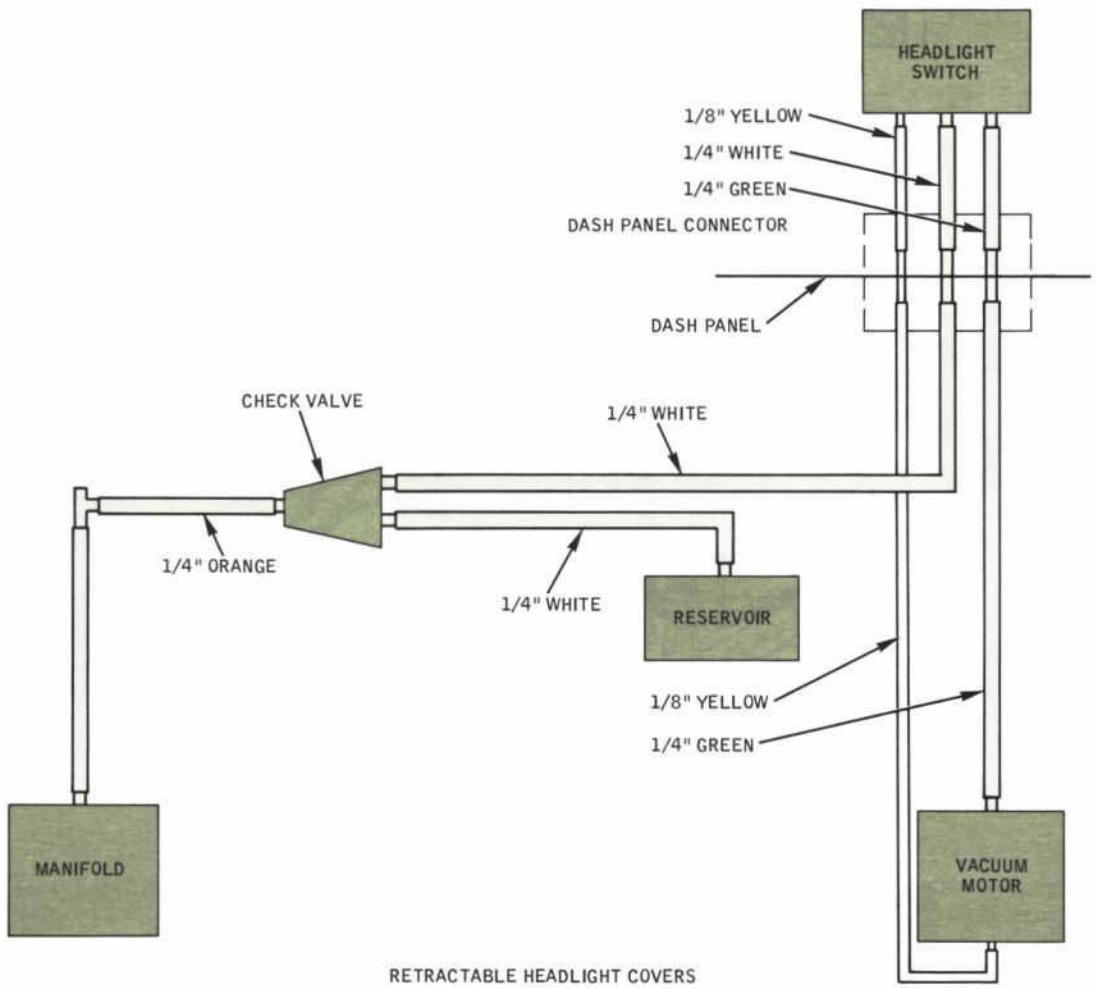
Quick-Quiz

Q 15-1 The Ford retracting headlight door system differs from the Thunderbird system in the:

a) function of the valve at the headlight switch. (See page 191)

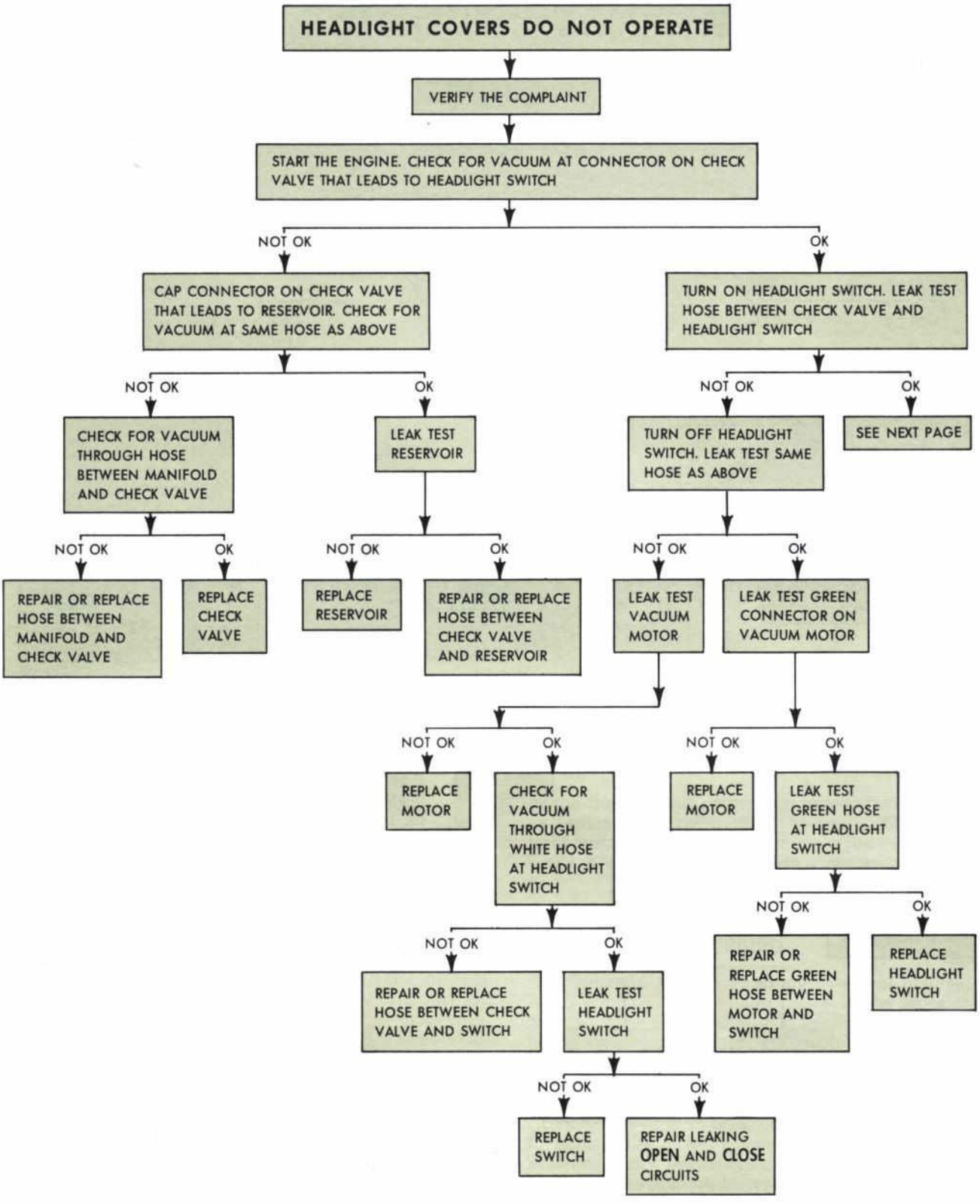
b) number of vacuum motors used. (See page 149)

c) procedure for opening the doors manually. (See page 200)

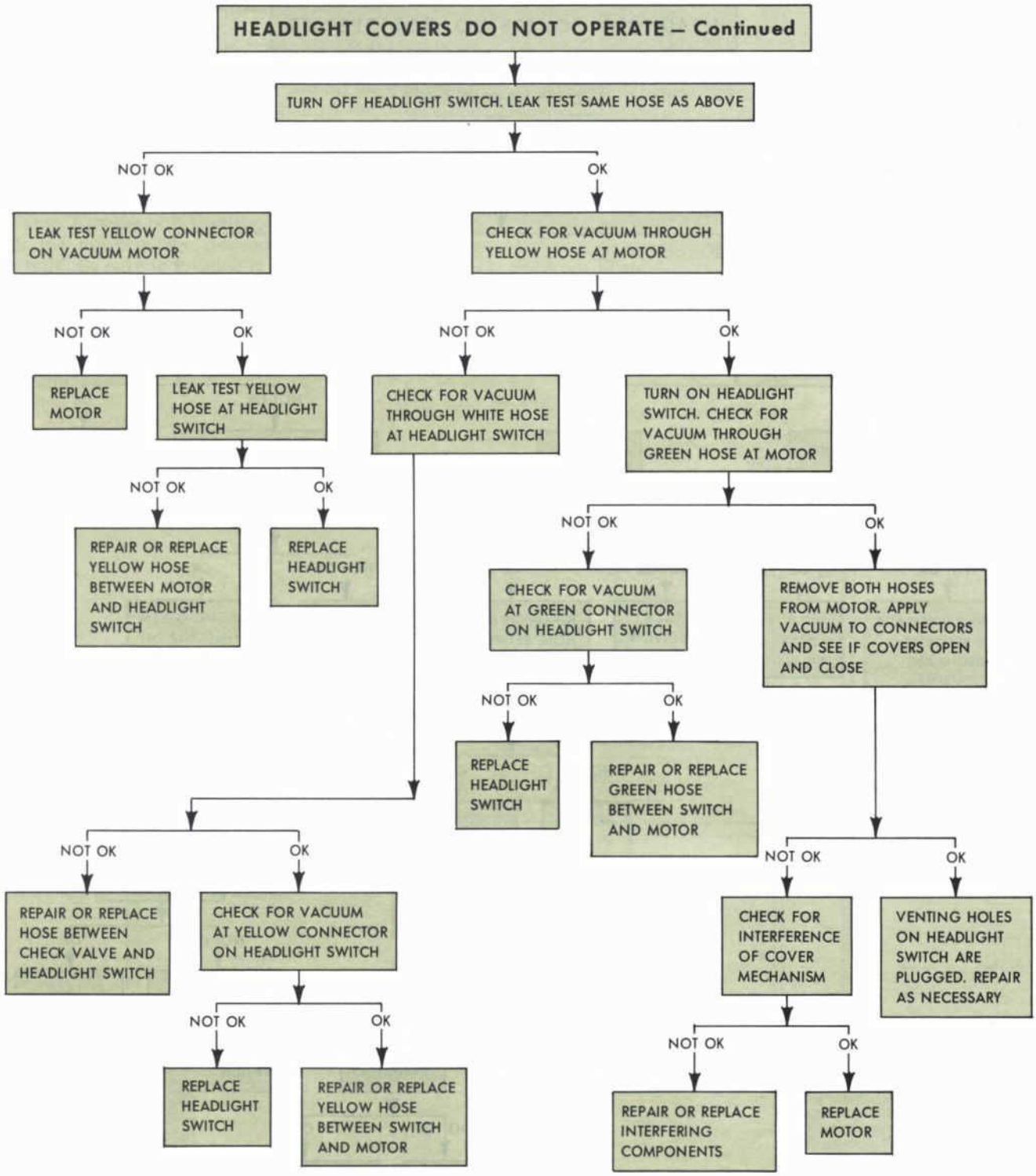


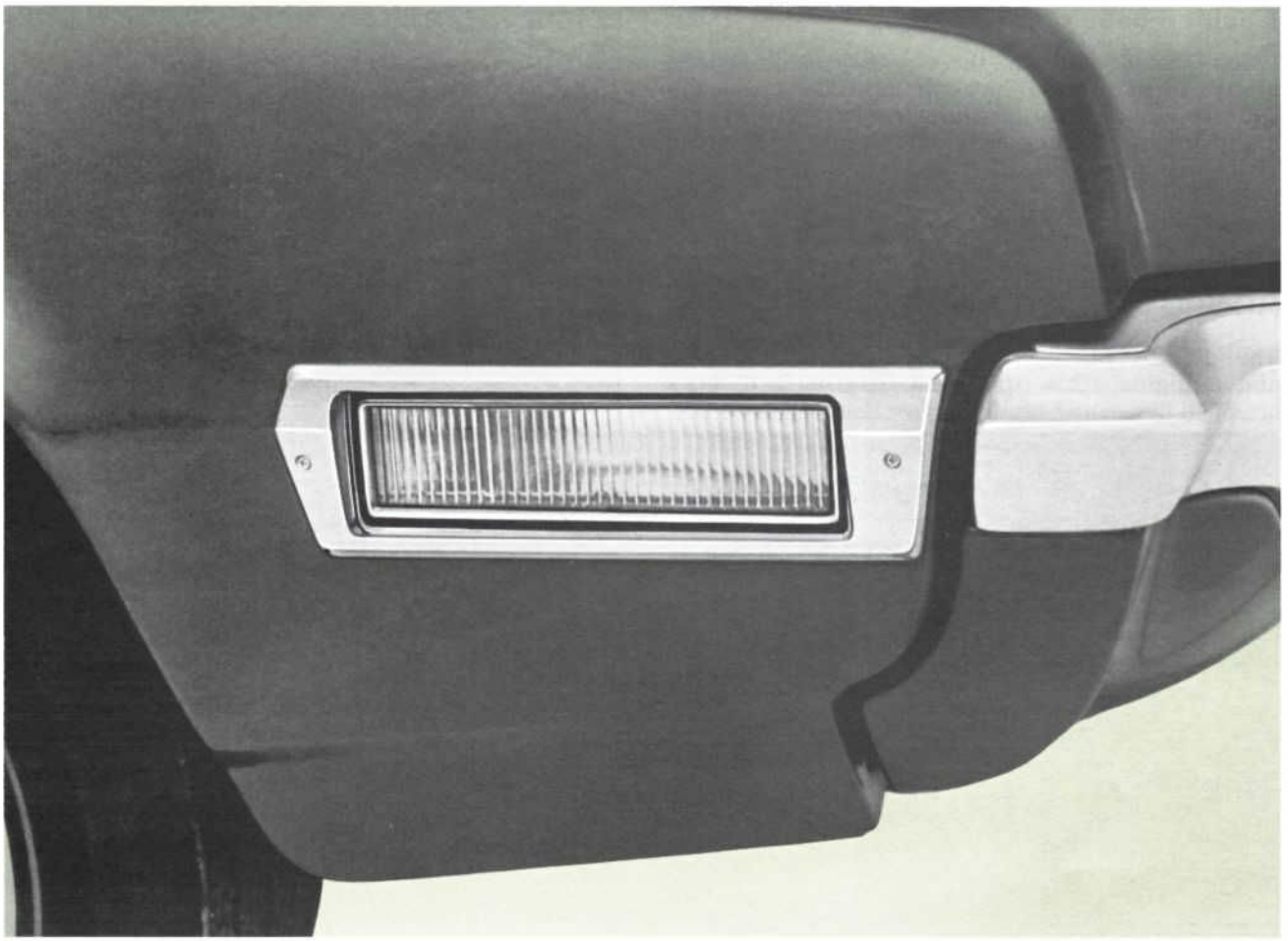
RETRACTABLE HEADLIGHT COVERS
FORD

Q 15-3 b) No — in the new turn signal/warning flasher switch design, the warning switch knob is an integral part of the switch. You can't replace it separately. Try another answer, please!



Q 15-4 c) You're right . . . and how! Removal of the instrument panel pad in either a Fairlane or a Falcon is a snap. And with the pad off, all of the cluster attaching screws are right out in the open, where you can easily get to them.


HEADLIGHT COVERS DO NOT OPERATE – Continued
TURN OFF HEADLIGHT SWITCH. LEAK TEST SAME HOSE AS ABOVE
NOT OK
OK
LEAK TEST YELLOW CONNECTOR ON VACUUM MOTOR
CHECK FOR VACUUM THROUGH YELLOW HOSE AT MOTOR
NOT OK
OK
REPLACE MOTOR
LEAK TEST YELLOW HOSE AT HEADLIGHT SWITCH
NOT OK
OK
REPAIR OR REPLACE YELLOW HOSE BETWEEN MOTOR AND HEADLIGHT SWITCH
REPLACE HEADLIGHT SWITCH
CHECK FOR VACUUM THROUGH WHITE HOSE AT HEADLIGHT SWITCH
TURN ON HEADLIGHT SWITCH. CHECK FOR VACUUM THROUGH GREEN HOSE AT MOTOR
NOT OK
OK
CHECK FOR VACUUM AT GREEN CONNECTOR ON HEADLIGHT SWITCH
REMOVE BOTH HOSES FROM MOTOR. APPLY VACUUM TO CONNECTORS AND SEE IF COVERS OPEN AND CLOSE
NOT OK
OK
REPLACE HEADLIGHT SWITCH
REPAIR OR REPLACE GREEN HOSE BETWEEN SWITCH AND MOTOR
NOT OK
OK
REPAIR OR REPLACE HOSE BETWEEN CHECK VALVE AND HEADLIGHT SWITCH
CHECK FOR VACUUM AT YELLOW CONNECTOR ON HEADLIGHT SWITCH
NOT OK
OK
REPLACE HEADLIGHT SWITCH
REPAIR OR REPLACE YELLOW HOSE BETWEEN SWITCH AND MOTOR
NOT OK
OK
CHECK FOR INTERFERENCE OF COVER MECHANISM
VENTING HOLES ON HEADLIGHT SWITCH ARE PLUGGED. REPAIR AS NECESSARY
NOT OK
OK
REPAIR OR REPLACE INTERFERING COMPONENTS
REPLACE MOTOR



Front Marker/Cornering Light – Thunderbird

FRONT MARKER LIGHTS – ALL CARS EXCEPT FALCON

Amber front marker lights are used on all Ford Division cars except Falcon, which has an amber front reflector. These marker lights are illuminated by bulbs wired in parallel with the headlight circuit. Thunderbird and Mustang have separate front marker lights, while Ford and Fairlane marker lights are integrated into the turn signal and parking lights. They are visible from the side of these cars. Reflectors are used on the rear quarter panels of all cars for after dark identification from the side.

Thunderbird Marker/Cornering Lights

Cornering lights are available on the Thunderbird for 1968. They are mounted with the marker lights in the front fender. The bulb for each cornering light is wired in parallel in the turn signal circuit ahead of the flasher unit. When the turn signal is actuated to indicate a turn in either direction, the cornering light on that side is illuminated to provide light forward and outward in the direction of the intended turn.

SUPPLEMENTAL STOP/TURN SIGNAL LIGHTS – THUNDERBIRD

Supplemental high level stop lights and turn signal lights located in two slim cases in the sides of the rear window are available in the Thunderbird. Two bulbs are used in each case. Illumination is controlled by two relays in the turn signal relay assembly — one relay for both bulbs in each case. When the brake lights go on, both relays are closed to feed current from the luggage compartment light circuit to both bulbs in both cases. When the turn signal is actuated, only the relay for that side is energized as the middle sequential turn signal light goes on.

Q 10-1 c) No — that's not where the limiter caps are used. You'll find 'em on the ends of the idle mixture adjusting screws in 1968 Autolite carburetors . . . and the purpose of these caps is to prevent overly-rich idle mixtures.

Troubleshooting Tip

When troubleshooting these supplemental lights, always bear in mind that although they are tied in with their respective signalling circuits, they are actually fed by the luggage compartment light circuit through relays. When checking a "no light" condition for all four bulbs, begin by testing the luggage compartment light circuit.

Quick-Quiz

Q 15-2 In Thunderbird's supplemental stop/turn signal lights:

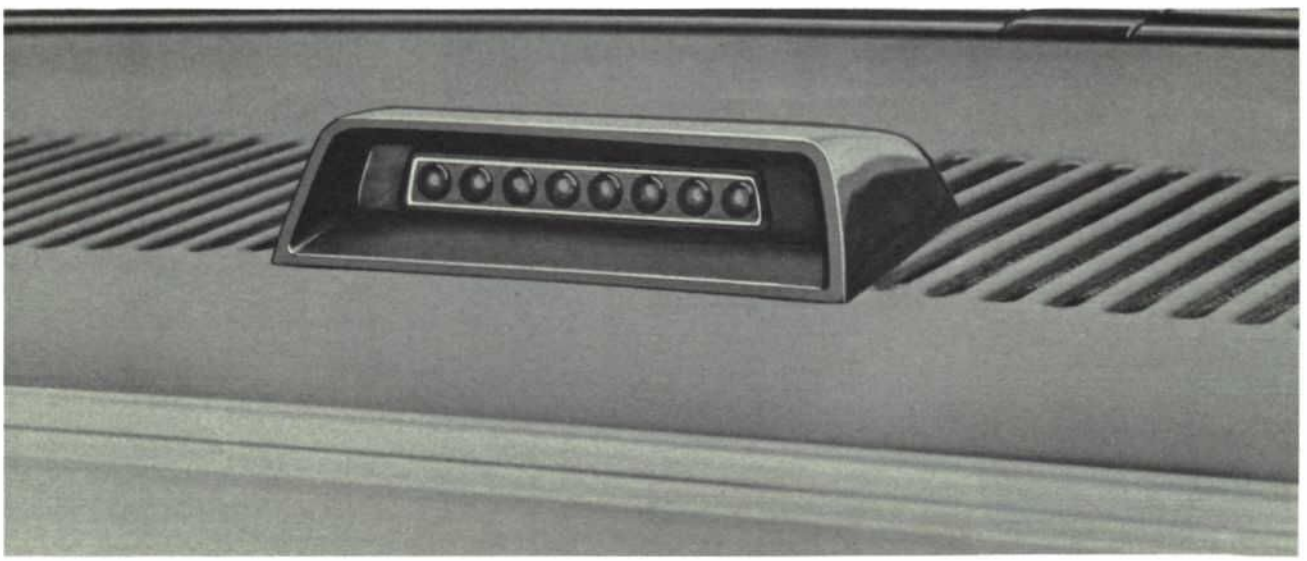
a) one relay controls all of the bulbs. (See page 199)

b) one relay controls the two left bulbs and one relay controls the two right bulbs. (See page 196)

c) there's a separate relay for each bulb. (See page 193)

FIBEROPTIC STOPLIGHT/TAILLIGHT MONITOR – THUNDERBIRD

Thunderbird offers a new monitor for stoplights and taillights. This equipment consists in a series of flexible fiberoptic plastic rods which extend from the taillights through the luggage compartment to small light jewels in an indicator lens housing in the package tray, where they are visible in the rearview mirror.



Stoplight/Taillight Monitor System – Thunderbird

The principle behind these new fiberoptic plastic rods is simple. When light from the stoplight/taillight bulb enters the lower end of the rod, it is transmitted with very little loss through the various curves of the rod until it emerges from the upper end, directly behind the transparent indicator jewel.

Any damage — even a scratch — in the polished surface of the rod will cause it to "leak" light. That is why the fiberoptic rods are bundled inside a protective cover for most of their length. Don't overlook the possibility of damage anywhere along the length of the rod when searching for the cause of poor indicator illumination.

FOUR-NOTE HORN SYSTEM – THUNDERBIRD

A four-note horn system is available for Thunderbird. To the existing two-note horns, this system adds a higher frequency horn and a lower frequency horn. The system uses an overlay wiring harness which includes a horn relay mounted on the right side of the radiator and front fender support apron. The horn button operates the standard horn on the left side. It also operates the horn relay, providing power for the other horns from the hot side of the starter relay through a fuse in the overlay harness.

On Thunderbirds equipped with speed control, a horn relay is already provided for the standard two-note horn system. This relay is mounted at the top of the brake pedal support on the left side. Thunderbirds with both speed control and the four-note horns have two horn relays. The speed control horn relay operates one horn and the four-note horn relay. The horns are connected in parallel.

Q 16-1 a) Rack up another point! The power servo switch controls the circuit to the blower motor, routing the current through resistors to slow the blower when the temperature is close to the desired setting.

Three horns are of the standard type; the other is of the trumpet type. Each operates within its own prescribed frequency of sound vibration. Each horn has an adjusting screw for calibration from 4.0-5.0 amperes at 12 volts if required.

FLASHER UNIT LOCATIONS – FORD, FAIRLANE, FALCON, MUSTANG

The following chart lists the locations of the flasher units for the turn signal and emergency flasher circuits for Ford, Fairlane, Falcon and Mustang.

Model	Turn Signal Flasher Unit	Emergency Flasher Unit
Ford	At the back of the instrument cluster, to the right of the speedometer.	At the left of the brake pedal support.
Fairlane and Falcon	At the bottom of the instrument panel, just to the right of the steering column.	At the bottom of the instrument panel, just to the left of the steering column.
Mustang	At the right side of the brake pedal support, under the dash panel.	At the left side of the steering column "Y" brace.

SEAT BELT WARNING LIGHT SWITCH LOCATIONS – ALL CAR LINES

The following chart lists the locations of the switch for the seat belt warning light in all Ford car lines.

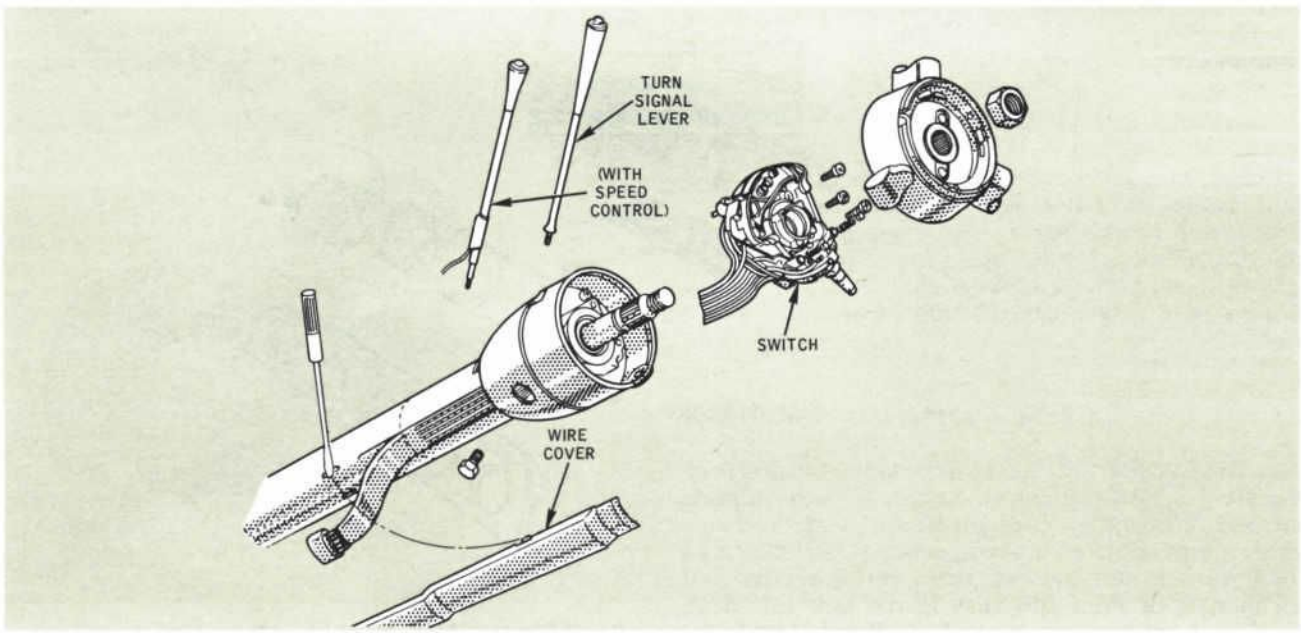
Model	Seat Belt Warning Light Switch Location
Thunderbird	At the right side of the brake pedal support bracket, under the instrument panel.
Ford	Under the center of the instrument panel, to the left of the glove box above the ash tray (in either of two locations).
Fairlane and Falcon	At the bottom of the instrument panel, to the left of the ash tray.
Mustang	On a bracket above and to the left of the fuse panel.

The Ford seat belt warning light switch will be found in either of two positions in the same general location. The switch is located either above the ash tray at the left side of the support bracket, or above the ash tray at the right side of the bracket.

To determine which installation is used on a specific car, open the ash tray and look up underneath the panel. If the switch is to the left of the support bracket, remove the ash tray for access to the switch. If the switch is to the right of the support bracket, remove the glove box for access to the switch.

TURN SIGNAL/WARNING FLASHER SWITCH – ALL CAR LINES

The combination turn signal and hazard warning switch for cars with fixed steering columns has been redesigned for 1968. The warning switch knob is now an integral part of the switch and is no longer replaceable. Electrical wiring is bonded for ease of installation.



Turn Signal/Warning Switch Removal – All Cars with Fixed Columns

Q 10-3 b) You're a winner! The vacuum motor is a refinement that gives a cold engine just a bit more "oomph" when it needs it — when the heated air supply from the exhaust manifold shroud can't meet high airflow demands at high engine speeds.

Switch Removal

1. Disconnect the battery and remove the steering wheel.
2. Remove the protective wire cover that runs along the bottom of the steering column tube and disconnect the electrical plug, noting the color codes and location.
3. If the car is equipped with automatic speed control, remove the sleeve around the wiring and pull the first three automatic speed control wires out of the column.
4. Remove the turn signal lever. Then remove the three screws holding the switch to the column and lift the switch from the column.

Switch Installation

1. Set the switch assembly in place on the steering column, slipping the bonded wiring into position through the steering column upper flange and down along the column tube.
2. Install the screws to secure the switch assembly to the column.
3. Install the turn signal lever. If a speed control is used, thread the three speed control wires into the column upper flange and position them with the bonded wiring.
4. Install the wiring sleeve and connect all wires to their electrical plugs.
5. Install the protective wire cover to the steering column tube.
6. Install the steering wheel.
7. Connect the battery and check the operation of the flasher switch.

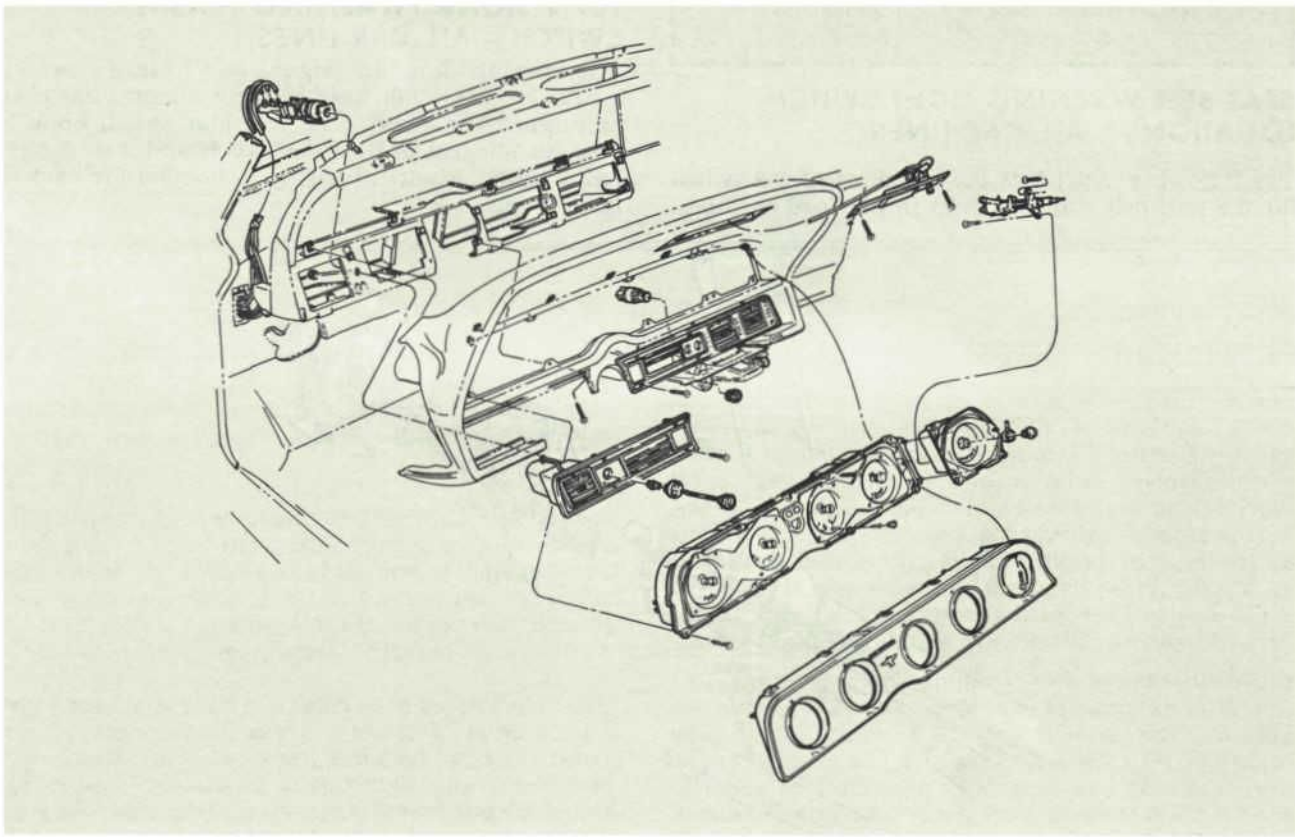
Quick-Quiz

Q 15-3 A feature of 1968 turn signal/warning flasher switches is that:

a) all wires are bonded together. (See page 180)

b) the warning switch knob is replaceable separately. (See page 150)

c) all speed control knobs are on the instrument panel. (See page 195)



Thunderbird Instrument Panel Disassembled

Q 8-3 a) Not by a long shot! Any troubles with this new Thermactor air pump that can't be fixed by replacing the pressure setting plug or impeller vanes call for replacement of the pump. Don't try to disassemble it!

INSTRUMENT PANEL – THUNDERBIRD

The 1968 Thunderbird instrument cluster is a new design. The face covering gives the illusion of five integrated housings. Actually, only the four to the left form the main cluster — the right housing is attached to the main instrument panel. The housings can not be removed individually until the cluster cover, lens and mask have been removed.

Instrument Panel Details

Relocated Components: You'll find a number of significant changes in this instrument panel. Individual instruments are fastened to the cluster by screws and clipped to the flexible printed circuit. The instrument voltage regulator is located between the two left housings — the oil pressure-fuel level housing and the speedometer housing. Rear vent and windshield wiper controls are incorporated in concentric round knobs in the center of the right housing. The brake warning light and seat belt light are also in this housing, except in cars having the overhead console. In these cars only, the seat belt light is in the console.

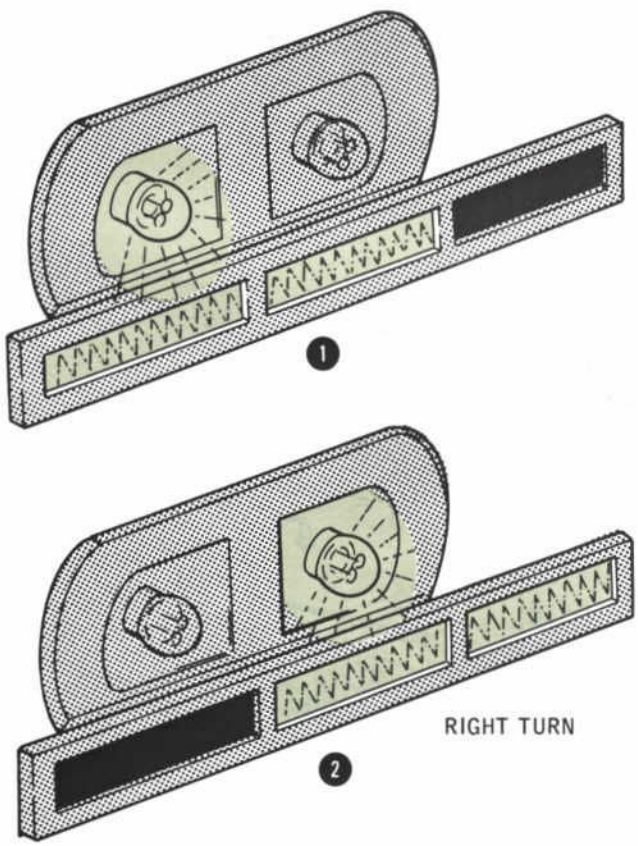
The air conditioner or heater controls are mounted to the left of the steering column, with the optional rear window defogger switch located in the same area.

Sequential Turn Signal Indicator Lights: Perhaps the most unusual feature of the new Thunderbird instrument panel is the single sequential turn signal indicator lens. This indicator gives the same effect as the rear turn signal sequential lights — a moving bar of light that travels in the direction of the turn.

Sequential turn signal operation is unchanged from last year's system, but the new indicator light function was achieved by four changes. One of the emergency flasher relays was eliminated, as was the emergency flasher relay for the overhead convenience panel. The turn signal indicator relay was changed from a normally closed relay to a normally open relay, and the two turn signal indicator bulbs were brought closer together, side by side, under a three-section lens.

Here's what this new system does. The indicator circuit is integrated into the front turn signal light circuit. When the turn signal flasher motor for the rear lights reaches the second step in the sequence, the front turn signal light goes on and so does the panel indicator light corresponding to *the side opposite the turn.* As the turn signal sequence switches to the third step, the opposite side indicator light goes off. But at the same time, the panel indicator light *on the side of the turn* goes on. In the next step, the flasher motor turns off all the lights in the signalling circuits.

The two indicator light patterns overlap in the center section of the indicator lens, and when the first light goes off simultaneously as the second light comes on, the effect of a bar of light moving in the direction of the indicated turn is created. Emergency flasher operation causes both indicator lights to go on and off simultaneously.

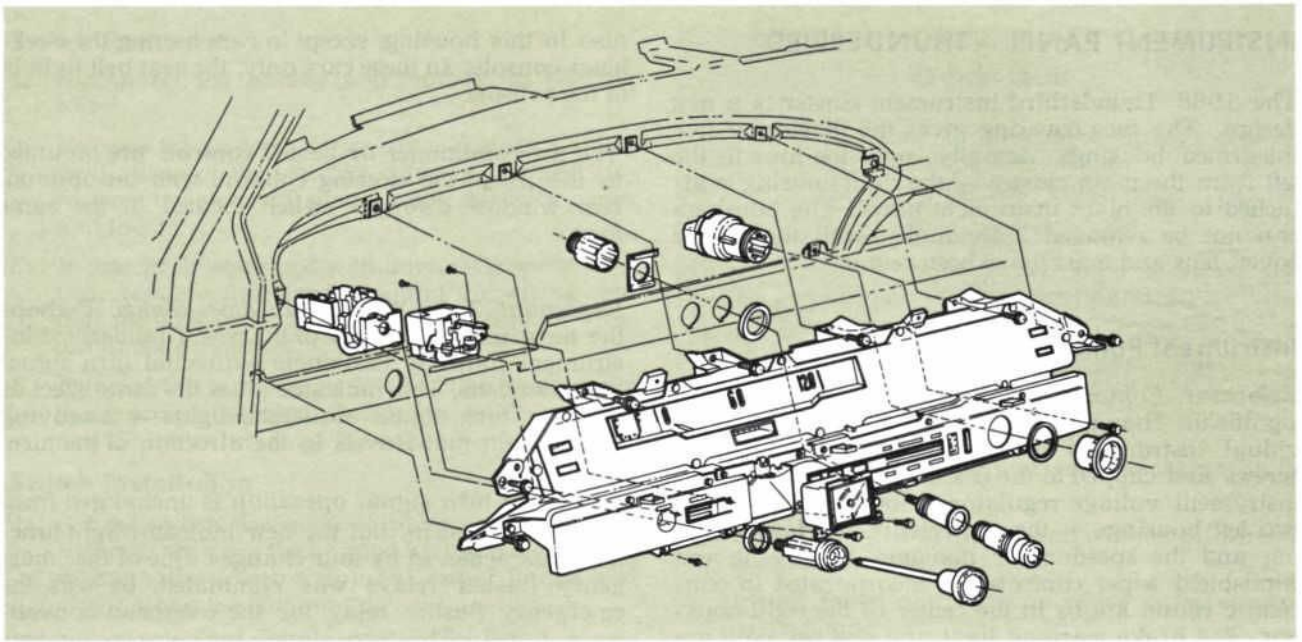


Sequential Turn Signal Indicator – Thunderbird

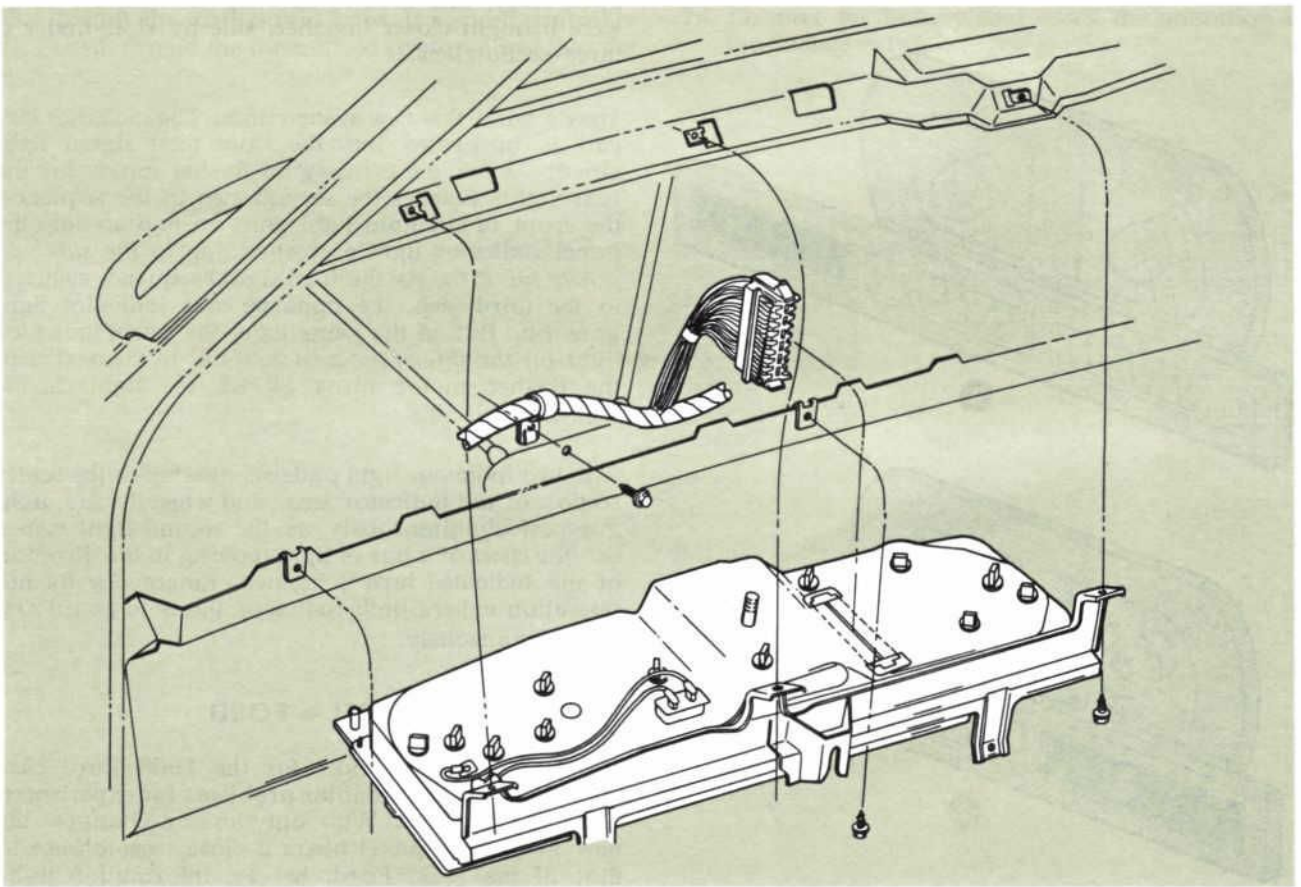
INSTRUMENT PANEL – FORD

Instrument panel service for the 1968 Ford cars should pose no unfamiliar problems for experienced Ford Technicians. With only minor changes, the new instrument panel bears a close resemblance to that of the 1966 Ford. Service information published for that model year will serve as a guide for most problems. (See illustration next page.)

Q 16-1 b) Nope! No separate blower switch is used with Thunderbird's automatic climate control system. Blower speed is controlled by the position of the power servo switch, which routes current through resistors to the blower motor.



Ford Instrument Panel Exploded View



Fairlane Instrument Panel Exploded View

Q 3-1 a) Right! A clamp, colored red so you can spot it more easily, is fastened on the compressor vacuum hose of Ford station wagons to keep the automatic load leveler from working during transportation. Don't forget to remove it.

INSTRUMENT PANEL — FAIRLANE

1968 Fairlanes have new instrument clusters with flexible printed circuits. Two types of clusters are used — a standard cluster and a cluster that includes the optional tachometer. Each has its own specific printed circuit panel. With either cluster, the instrument panel gives the illusion of having four pods. Actually only the three pods to the left are for the instrument cluster. The right pod, which is attached to the instrument panel pad, is used for the optional clock. This pod will accommodate the convenience unit, which is attached to the instrument panel pad. However, when deluxe seat belts are installed in a car without the convenience unit, the seat belt light will be found in the left-hand pod above the brake warning light.

Instrument Accessibility — Fairlane

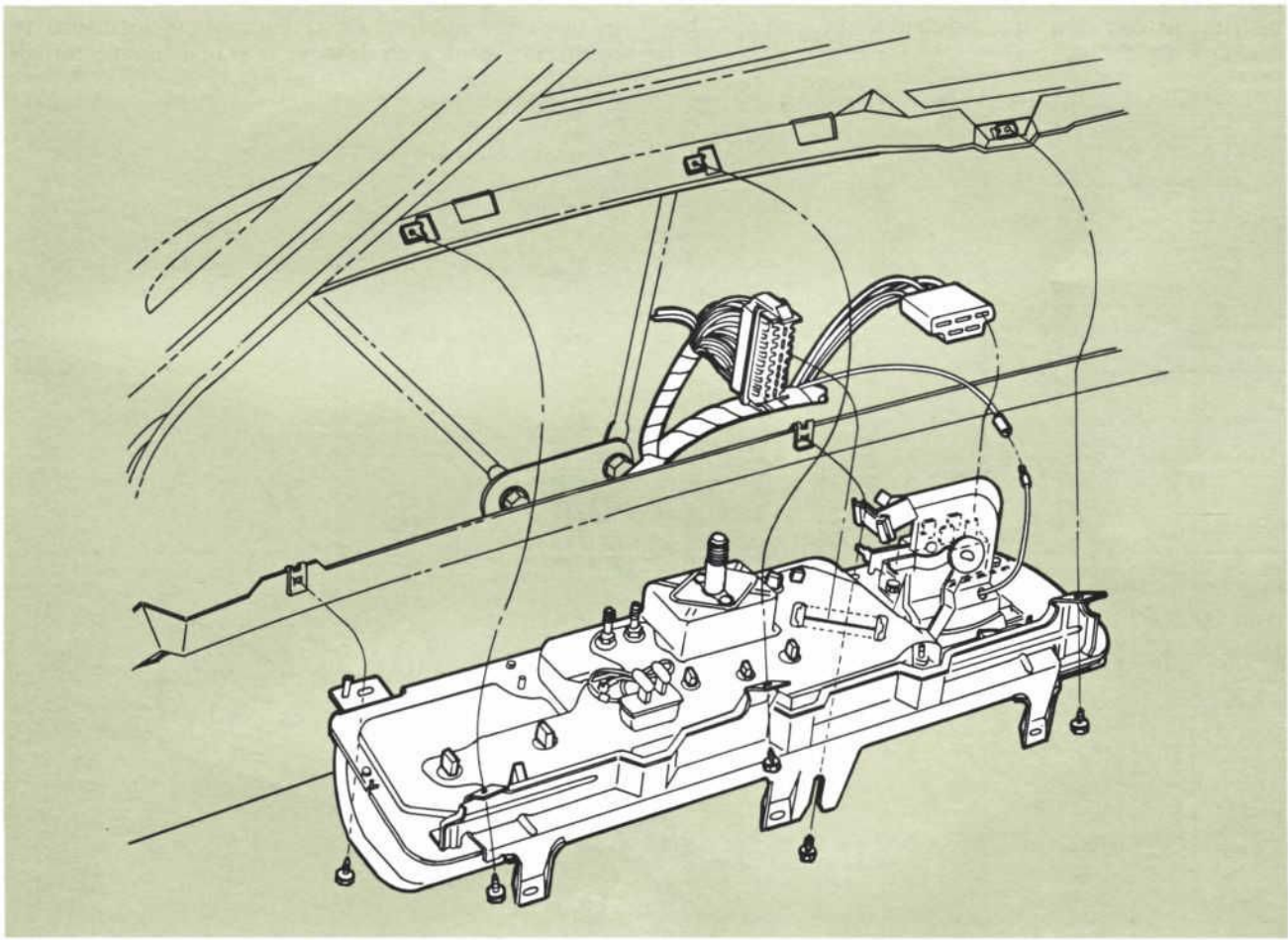
In the 1968 Fairlane, accessibility to instruments is outstanding. No longer is it necessary to work up from underneath. Removal of the instrument panel pad exposes the instrument cluster to your view and reach from above. You'll find the instrument voltage regulator at the upper left side of the back of the flexible circuit.

The oil, alternator, and illumination bulbs on the lower right side of the instrument panel can be changed by reaching under the instrument panel and pulling the bulb socket from the panel and replacing the bulb.

The instrument panel control nomenclature bulbs can be changed after the panel cover has been removed to allow access to the bulbs.

To change any of the thirteen bulbs in the instrument cluster, it is necessary to remove the panel cover and position the cluster out to replace the bulbs.

But for most other instrument panel service, it's best to remove the cluster. If it is necessary to remove the instrument cluster for service, remember that the three left pods share a single common mask of clear plastic.



Falcon Instrument Panel Exploded View

Q 7-4 b) You bet you can! In addition to using the '68 forward clutch friction plates and forward planet carrier in earlier C4 units, you can also use the new intermediate band *provided you also install the new apply strut!*

INSTRUMENT PANEL – FALCON

The Falcon instrument cluster assembly with a flexible printed circuit is also new for 1968. The optional convenience panel, containing the seat belt light and the door ajar and low fuel warning lights, is located below the alternator and brake system warning lights at the left of the instrument panel. When the deluxe seat belt option is installed without the convenience panel, only the seat belt light is located in this area.

Instrument Accessibility – Falcon

The 1968 Falcon instruments, like those of the Fairlane, are easily accessible by removing the instrument panel pad. The instrument voltage regulator is at the top of the cluster, to the left of the speedometer. Instrument panel bulbs can be removed and replaced without removing the pad. For most other instrument service, it's advisable to remove the cluster from the car.

Quick-Quiz

Q 15-4 The 1968 Fairlane and Falcon instrument clusters are:

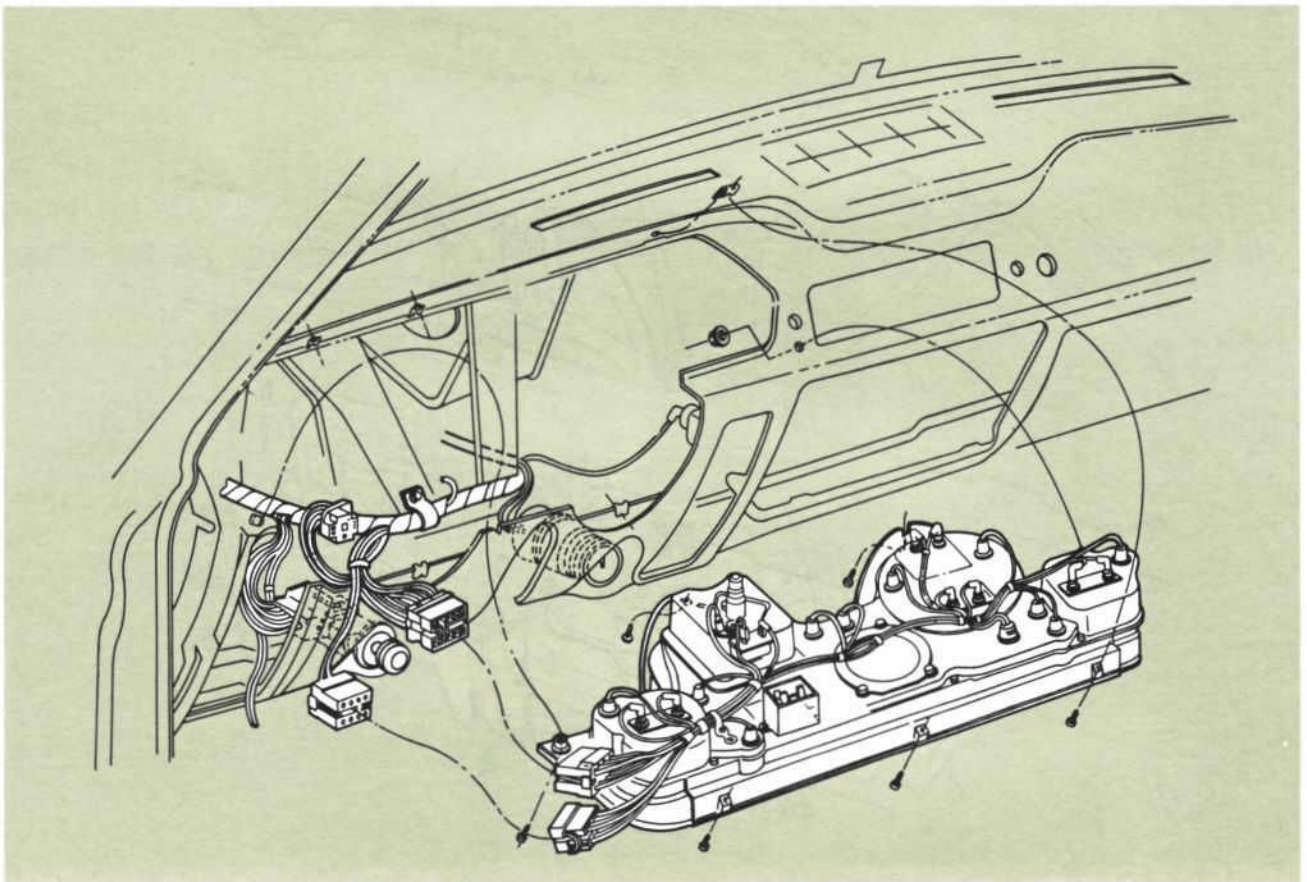
a) 1967 clusters with only appearance changes. (See page 181)

b) hand-wired with new wiring harnesses. (See page 183)

c) easily accessible with the panel pad removed (See page 151)

INSTRUMENT PANEL – MUSTANG

Changes to the Mustang instrument panel are mainly appearance changes. In the standard cluster, the oil pressure and fuel level gauge positions have been reversed. In the tachometer-equipped panel, these two gauges remain in the same positions as in the 1967 models. Other component locations remain identical with last year's instrument panels.



Mustang Instrument Panel Exploded View

Q 7-5 a) Nice try . . . but wrong! Some "hunting" in the "Neutral" position is permissible *but there must be none in the "Park" position.* Otherwise, the neutral start switch should be removed and adjusted.

TRUCK

TURN SIGNAL FLASHER UNIT LOCATION – LIGHT DUTY TRUCKS

The turn signal flasher unit has been relocated in all 1968 Ford light duty trucks. It is now mounted on the left side of the forward face of the instrument cluster, just above the instrument voltage regulator.

INSTRUMENT CLUSTER WIRE COLOR CODES CHANGED

Color-coding of the wires to the instrument panels of most trucks has been changed slightly from the 1967 models. However, you'll have no trouble finding the proper connections for these wires at the instrument cluster since the names of the correct color codes are stamped into the cluster housings adjacent to the wire connector sockets.

SPECIFICATIONS

CAR

BULB USAGE CHART – FORD

Lamp Description	Number of Bulbs Required	Candlepower or Wattage	Trade Number	Ford Part Number
Standard Equipment				
Headlamps – Hi & Lo	2	37.5 & 50 watts	4002	C4AB-13007-A
Headlamps – Hi-Beams	2	37.5 watts	4001	C4AB-13007-B
Front Park & Turn Signal & Front Side Marker	2	4-32 cp	1157NA	C6MB-13465-A
Rear Tail/Stop/Turn Signal (Sedan)	2	4-32 cp	1157	C3AB-15198-A
Rear Tail/Stop/Turn Signal (Sta. Wag.)	4	4-32 cp	1157	C3AB-15198-A
Four-Way Emergency Flasher – Included in "Front & Rear Turn Signals"				
Back-Up Lamps	2	32 cp	1156	C3DB-13465-A
License Plate Lamp	1	4 cp	97	C6AB-13465-A
Dome Lamp 62, 71, 54A, B&E, 57B	1	15 cp	1003	FDU-13730-A
Courtesy Lamp ("C" Pillar), 63, 65, 57, 54C	2	15 cp	1003	FDU-13730-A
Inst. Courtesy Lamp (Convertible)	1	6 cp	631	C3VB-13730-A
Cargo Lamps (Sta. Wag.) Models 71A; B; C; 71E; RPO 71-D, H, -J	1	15 cp	1003	FDU-13730-A
Door Courtesy 65A	2	6 cp	631	C3VB-13730-A
Door Courtesy 54C-57F	4	6 cp	631	C3VB-13730-A
Instrument Panel				
Hi-Beam Indicators	1	2 cp	1895	C3AB-13466-B
Turn Signal Indicators	2	2 cp	1895	C3AB-13466-B
Warning Lights – (Oil, Alt., Hot, Cold, Brakes)	5	2 cp	1895	C3AB-13466-B
Seat Belts Warning	1	2 cp	1895	C3AB-13466-B
Open Door Warning (Taxis)	1	2 cp	1895	C3AB-13466-B
Park Brake Rel. Warn. (RPO)	1	2 cp	257	C0AF-10A918-A
Instruments	5	2 cp	1895	C3AB-13466-B
Tachometer (Console) (RPO)	2	2 cp	1895	C3AB-13466-B
Clock	1	3 cp	1816	FEY-15021-A
Heater Control Pnl.	2	2 cp	1895	C3AB-13466-B
Optional Equipment				
Spotlight 4.4" Dia.	1	30 watts	4405	FDT-15330-B
Fog Lamps – Clear	2	35 watts	4415	FDU-15220-A
Fog Lamp Switch	1	1 cp	53X	8MB-15021
Air Conditioner Cont.	1	2 cp	1895	C3AB-13466-B
Radio Pilot Light	1	1.9 cp	1893	C1VF-18843-A
Convenience Panel: Low Fuel Warning	1	2 cp	1895	C3AB-13466-B
Door Ajar Warning	1	2 cp	1895	C3AB-13466-B
Seat Belt Warning	1	2 cp	1895	C3AB-13466-B
Park Brake Warn'g	1	2 cp	1895	C3AB-13466-B
Tachometer	1	2 cp	1895	C3AB-13466-B
Auto. Trans. Select. Ind.	1	2 cp	158	C2AB-13730-B
Map Lamp	1	6 cp	631	C3VB-13730-A
Ash Tray Recept.	1	2 cp	1895	C3AB-13466-B

BULB USAGE CHART – FORD – Continued

Lamp Description	Number of Bulbs Required	Candlepower or Wattage	Trade Number	Ford Part Number
Glove Compt.	1	3 cp	1816	FEY-15021-A
Speed Control Actuator Ind.	1	1 cp	161	C2AB-13730-A
Luggage Compt. (Exc. 71)	1	6 cp	631	C3VB-13730-A
Portable Trunk Lamp	1	15 cp	1003	FDU-13730-A
Engine Compt.	1	6 cp	631	C3VB-13730-A
Floor Shift-Auto. Trans. Select. Ind.	1	1.5 cp	1445	FDU-15021-A
Auxiliary Instrument Cluster	1	2 cp	1895	C3AB-13466-B

BULB USAGE CHART – FALCON

Lamp Description	Number of Bulbs Required	Candlepower or Wattage	Trade Number	Ford Part Number
Standard Equipment				
Headlamps	2	50 & 40 watts	6012	C4DB-13007-A
Front Park & Turn Signal	2	4-32 cp	1157NA	C6MB-13465-A
Front Side Marker	2	4 cp	1178A	C8ZB-13465-A
Rear Tail/Stop/Turn Signal	2	4-32 cp	1157	C3AB-15198-A
Back-Up Lamp – Sedan	2	32 cp	1156	C3DB-13465-A
Back-Up Lamp – Sta. Wgn.	2	32 cp	1076	C1TB-13465-A
License Plate Lamp	1	4 cp	97	C6AB-13465-A
Dome Lamp	1	15 cp	1003	FDU-13730-A
Emergency Flasher – Included in "Front and Rear Turn Signals"				
Map Lamp 62D Only	1	6 cp	631	C3VB-13730-A
Instrument Panel				
Instr. Courtesy Lamp (Conv. Only)	2	6 cp	631	C3VB-13730-A
Hi-Beam Indicators	1	2 cp	194	C8MB-13465-B
Turn Signal Indicators	2	2 cp	194	C8MB-13465-B
Emergency Flasher Indicators – Included in "Turn Signal Indicators"				
Warning Lights – (Oil, Alt., Hot, & Brakes)	4	2 cp	194	C8MB-13465-B
Convenience Panel: Low Fuel, Belts, Door Ajar, Park (RPO)	4	2 cp	1895	C3AB-13466-B
Ignition Switch	1	2 cp	1895	C3AB-13466-B
Speedometer & Fuel Gauge	2	2 cp	194	C8MB-13465-B
Heater Controls	1	2 cp	1895	C3AB-13466-B
Optional Equipment				
Spotlight – 4.4" Dia.	1	30 watts	4405	FDT-15330-B
Air Cond. Control	1	2 cp	1895	C3AB-13466-B
Radio Pilot Light	1	1.9 cp	1893	C1VF-18843-A
Warning – Open Door	1	2 cp	1895	C3AB-13466-B
Warning – Park Brake	1	1.6 cp	257	C0AF-10A918-A
Safety Conv. Pkg: Low Fuel, Belts, Door Ajar, Park	4	2 cp	1895	C3AB-13466-B
Courtesy Lamp (Instr. Pnl.)	2	6 cp	631	C3VB-13730-A
Auto. Trans. Select. Ind.	1	1 cp	161	C2AB-13730-A
Tachometer	1	2 cp	1895	C3AB-13466-B
Ash Tray	1	1.5 cp	1445	FDU-15021-A
Glove Compt.	1	2 cp	1895	C3AB-13466-B
Clock	1	3 cp	1816	FEY-15021-A
Luggage Compt.	1	6 cp	631	C3VB-13730-A
Engine Compt.	1	6 cp	631	C3VB-13730-A
Portable Trunk Lamp	1	15 cp	1003	FDU-13730-A
Auxiliary Instrument Cluster	1	2 cp	1895	C3AB-13466-B
Map Lamp (Except 62D)	1	6 cp	631	C3VB-13730-A
Cargo Lamp – Sta. Wagon	1	15 cp	1003	FDU-13730-A

BULB USAGE CHART – FAIRLANE

Lamp Description	Number of Bulbs Required	Candlepower or Wattage	Trade Number	Ford Part Number
Standard Equipment				
Headlamps – Hi & Lo	2	37.5 & 50 watts	4002	C4AB-13007-A
Headlamps – Hi-Beams	2	37.5 watts	4001	C3AB-13007-B
Front Park & Turn Signal	2	4-32 cp	1157NA	C6MB-13465-A
Front Side Marker – Included in "Front Park Lamp"				
Rear Tail/Stop/Turn Signal (Sedan)	2	4-32 cp	1157	C3AB-15198-A
Rear Tail/Stop/Turn Signal (Sta. Wgn.)	4	4-32 cp	1157	C3AB-15198-A
Back-Up Lamp	2	32 cp	1156	C3DB-13465-A
License Plate Lamp	1	4 cp	97	C6AB-13465-A
Dome Lamp	1	15 cp	1003	FDU-13730-A
Four-Way Emergency Flashers – Included in "Front & Rear Turn Signals"				
Instrument Panel				
Instrument Panel Courtesy Lamp (Conv. Only)	2	6 cp	631	C3VB-13730-A
Hi-Beam Indicator	1	2 cp	194	C8MB-13465-B
Turn Signal Indicators	2	2 cp	194	C8MB-13465-B
Emergency Flasher Indicator – Included in "Turn Signal Indicators"				
Warning Lights – (Oil, Alt., Hot, Cold, Brakes)	5	2 cp	194	C8MB-13465-B
Convenience Panel: Fuel, Door Ajar, Park Brake, Belts (RPO)	4	2 cp	1895	C3AB-13466-B
Fuel Gauge, Speedometer	4	2 cp	194	C8MB-13465-B
Glove Compt. (RPO)	1	2 cp	1895	C3AB-13466-B
Ignition Switch	1	2 cp	1895	C3AB-13466-B
Clock	2	2 cp	1895	C3AB-13466-B
Ash Receptacle	1	1.5 cp	1445	FDU-15220-A
Nomenclature Bar	4	2 cp	1895	C3AB-13466-B
Deluxe Seat Belt Option	1	2 cp	1895	C3AB-13466-B
Optional Equipment				
Instr. Panel Courtesy Lamp (Exc. Conv.)	2	6 cp	631	C3VB-13730-A
Fog Lamps – Clear	2	35 watts	4415	FDU-15220-A
Fog Lamp – Switch	1	1 cp	53X	8MB-15021
Spotlight (4.4" Dia.)	1	30 watts	4405	FDT-15330-B
Warning – Park Brake	1	1.6 cp	257	C0AF-10A918-A
Radio Pilot Light	1	1.9 cp	1893	C1VF-18843-A
Tachometer	1	2 cp	1895	C3AB-13466-B
Auto. Trans. Select. Indicator	1	1 cp	161	C2AB-13730-A
Console Lamp	2	3 cp	1816	FEY-15021-A
Luggage Compt.	1	6 cp	631	C3VB-13730-A
Engine Compt.	1	6 cp	631	C3VB-13730-A
Portable Trunk Lamp	1	15 cp	1003	FDU-13730-A
Floor Shift-Auto. Trans. Select. Ind.	1	1.9 cp	1893	C1VF-18843-A
Auxiliary Instrument Cluster	1	2 cp	1895	C3AB-13466-B
Map Lamp	1	6 cp	631	C3VB-13730-A
Cargo Lamp – Sta. Wagon	1	15 cp	1003	FDU-13730-A

BULB USAGE CHART – MUSTANG

Lamp Description	Number of Bulbs Required	Candlepower or Wattage	Trade Number	Ford Part Number
Standard Equipment				
Headlamps – Hi & Lo	2	40 & 50 watts	6012	C4DB-13007-A
Front Park & Turn Signal	2	4-32 cp	1157A	C3AB-13465-A
Front Side Marker	2	4 cp	1178A	C8ZB-13465-A
Rear Tail/Stop/Turn Signal	2	4-32 cp	1157	C3AB-15198-A
Four-Way Emergency Flashers – Included in "Front & Rear Turn Signals"				
Back-Up Lamp	2	21 cp	1142	C4ZB-13730-A
License Plate Lamp	1	4 cp	97	C6AB-13465-A
Courtesy Lamp – Fastback (Qtr. Panel)	2	15 cp	1003	FDU-13730-A
Courtesy Lamp – Under Inst. Pnl. (63 & 76)	1	6 cp	631	C3VB-13730-A
Dome Courtesy (65 Only)	1	15 cp	1003	FDU-13730-A
Instrument Panel				
Hi-Beam Indicators	1	2 cp	1895	C3AB-13466-B
Turn Signal Indicators	2	2 cp	1895	C3AB-13466-B
Turn Signal Indicators – Are also Emergency Flasher Indicators				
*Warning Lights – (Oil, Alt., & Brakes)	3	2 cp	1895	C3AB-13466-B
Glove Compt. Light	1	2 cp	1895	C3AB-13466-B
**Instruments	7	2 cp	1895	C3AB-13466-B
Optional Equipment				
Courtesy Lamp 65-63-76 RPO	2	6 cp	631	C3VB-13730-A
Fog Lamps	2	35 watts	4415	FDU-15220-A
Fog Lamp – Switch	1	1 cp	53X	8MB-15021
Spotlight – 4.4" Dia.	1	30 watts	4405	FDT-15330-B
Radio Pilot Light	1	1.9 cp	1893	C1VF-18843-A
Warning Light – Brake	1	1.6 cp	256	C4SB-13466-A
Convenience Panel: Seat Belt & Low Fuel	2	2 cp	1895	C3AB-13466-B
Convenience Panel: Door Ajar & Park Brake	2	1 cp	257	C0AF-10A918-A
Courtesy Lamp – Console	2	3 cp	1816	FEY-15021-A
Glove Compt. Lamp (Console)	1	2 cp	1895	C3AB-13466-B
Floor Shift-Auto. Trans. Select. with Console	1	1.9 cp	1893	C1VF-18843-A
Auto. Trans. without Console	1	1.9 cp	1893	C1VF-18843-A
Illuminated Emblem	1	15 cp	1003	FDU-13730-A
Luggage Compt. Lamp	1	6 cp	631	C3VB-13730-A
Engine Compt. Lamp	1	6 cp	631	C3VB-13730-A
Portable Trunk Lamp	1	15 cp	1003	FDU-15021-A
Auxiliary Instrument Cluster	1	2 cp	1895	C3AB-13466-B
Interior Lamp (Quarter Panel)	2	2 cp	1895	C3AB-13466-B
Door Courtesy RPO (76-65-63)	2	6 cp	1895	C3AB-13466-B
Roof Console RPO	2	6 cp	631	C3VB-13730-A

NOTES: (*) Oil and Alt. Warning Lights are Required with Tachometer Installation Only.
(**) Six (6) Illumination Bulbs only with Tachometer Installation.

BULB USAGE CHART – THUNDERBIRD

Lamp Description	Number of Bulbs Required	Candlepower or Wattage	Trade Number	Ford Part Number
Standard Equipment				
Headlamps – Hi & Lo	2	37.5 & 50 watts	4002	C4AB-13007-A
Headlamps – Hi-Beams	2	37.5 watts	4001	C4AB-13007-B
Front Park & Turn Signal	2	4-32 cp	1157A	C3AB-13465-A
Rear Tail/Stop/Turn Signal	8	4-32 cp	1157	C3AB-15198-A
Four-Way Emergency Flasher – Included in "Front & Rear Turn Signals"				
Back-Up Lamp	2	32 cp	1156	C3DB-13465-A
License Plate Lamp	1	4 cp	97	C6AB-13465-A
"C" Pillar Light	2	15 cp	1003	FDU-13730-A
Glove Compt.	1	2 cp	1895	C3AB-13466-B
Auto. Trans. Select. Ind. – Fixed & Tilt Column	1	1.5 cp	1445	FDU-15021-A
Courtesy – Door	4	12 cp	211 or 211-1	C3AB-13730-A or C7SB-13465-A
Map Light	2	3 cp	1816	FEY-15021-A
Luggage Compt.	1	6 cp	631	C3VB-13730-A
Front Side Marker	2	4 cp	97NA	C8MB-13465-A
Instrument Panel				
Inst. Panel Courtesy Light	2	6 cp	631	C3VB-13730-A
Hi-Beam Indicators	1	2 cp	194	C8MB-13465-B
Turn Signal Indicators	2	2 cp	194	C8MB-13465-B
Warning-Brakes & Belts	2	2 cp	194	C8MB-13465-B
Ignition Switch	1	2 cp	158	C2AB-13730-B
Instruments	5	2 cp	194	C8MB-13465-B
Heater Controls	1	2 cp	1895	C3AB-13466-B
Control Nomenclature, Rear Vent & Wipers	2	2 cp	194	C8MB-13465-B
Optional Equipment				
Fog Lamps – Clear	2	35 watts	4415	FDU-15220-A
Fog Lamp – Switch	1	1 cp	53X	8MB-15021
Spotlight – 4.4" Dia.	1	30 watts	4405	FDT-15330-A
Manual A/C Control	1	2 cp	1895	C3AB-13466-B
ATC Control	1	2 cp	1895	C3AB-13466-B
Radio Pilot Light	1	1.9 cp	1893	C1VF-18843-A
Park Brake Signal	1	2 cp	1895	C3AB-13466-B
Convenience Panel: Low Fuel Warning	1	2 cp	1891	2702289
Door Ajar Warning	1	1.6 cp	256	C4SB-13466-A
Seat Belt Warning	1	2 cp	1891	2702289
Emergency Flasher Warning	1	2 cp	1891	2702289
Cigar Lighter	1	2 cp	1895	C3AB-13466-B
Engine Compt.	1	6 cp	631	C3VB-13730-A
Portable Trunk Lamp	1	15 cp	1003	FDU-13730-A
Auxiliary Instrument Cluster	1	2 cp	1895	C3AB-13466-B
Tachometer	1	2 cp	1895	C3AB-13466-B
Supplemental Stop Lamp	4	32 cp	1156	C3DB-13465-A

TRUCK

BULB USAGE CHART – TRUCK

Lamp Description	Number of Bulbs Required	Candlepower or Wattage	Trade Number	Ford Part Number
Standard Equipment				
Headlights – (Heavy Tilt) N1000D, NT850D, NT950D & "H" Series	2	50 & 40 watts	6013	C1TF-13007-A
Headlights – 7	2	50 & 40 watts	6012	C4DB-13007-A
Front Parking Light	2	4 cp	97	C6AB-13465-A
Rear License & Stop	1 or 2	4-32 cp	1157	C3AB-15198-A
License (Styleside & Integral Box)	1	4 cp	97	C6AB-13465-A
License (Separate Box)	1 or 2	4 cp	97	C6AB-13465-A
Dome Lamp	1	15 cp	1004	C3SB-13464-A
Back-Up Lamp	2	32 cp	1156	C3DB-13465-A
Instrument Panel				
Hi-Beam Ind. (Tilt Cab)	1	2 cp	1895	C3AB-13466-B
Hi-Beam Ind. (Conv. Cab)	1	2 cp	1895	C3AB-13466-B
Instruments – (Tilt Cab)	2	2 cp	1895	C3AB-13466-B
Instruments – Conv. Cab (F800-1000)	3	2 cp	1895	C3AB-13466-B
Turn Signal Ind.	2	2 cp	1895	C3AB-13466-B
Instruments (Conv. & Bus F-500-F-750) (B-500-B-750)	2	2 cp	1895	C3AB-13466-B
F-100 and 350 Conv. Standard & Custom (Model 81)				
Hi-Beam Indicator	1	2 cp	1895	C3AB-13466-B
Turn Signal Indicator	2	2 cp	1895	C3AB-13466-B
Warning Lights – (Oil & Gen.)	2	2 cp	1895	C3AB-13466-B
Warning – Brakes	1	1.5 cp	1445	FDU-15021-A
Instruments	2	2 cp	1895	C3AB-13466-B
Optional Equipment				
Fog Lamps – Amber	2	35 watts	4415A	FDU-15220-B
Fog Lamp Switch	1	1 cp	53X	8MB-15021
Spotlight (Par 46)	1	30 watts	4435	FDT-15330-A
Spotlight (Par 36)	1	30 watts	4405	FDT-15330-B
Front Turn Signal	2	32 cp	1156	C3DB-13465-A
Parking & Turn Signal Lamp Intgr.	2	4-32 cp	1157	C3AB-15198-A
Rear Turn Signal	2	32 cp	1156	C3DB-13465-A
Radio Pilot Light, F-100 to F-750	1	1.9 cp	1893	C1VF-18843-A
Radio Pilot Light, F-800 Up, C, W, & C.O.E.	1	2 cp	1895	C3AB-13466-B
Warning Light – Belts (RPO)	1	2 cp	1895	C3AB-13466-B
Glow Plug Indicator – Lamp Ass'y.	1	1 cp	53X	8MB-15021
Power Divider Diff. Lock – Lamp Ass'y.	1	1 cp	53X	8MB-15021
Trans. Retarder Oil Temp – Lamp Ass'y.	1	1 cp	53X	8MB-15021
Water Temp – Lamp Ass'y.	1	1 cp	53X	8MB-15021
Low Oil Pressure – Lamp Ass'y.	1	1 cp	53X	8MB-15021
Heavy Truck				
Warning Light – Differential Lockout	1	1.5 cp	1445	FDU-15021-A
•Low Oil Pressure	1	1.5 cp	1445	FDU-15021-A
Water Temp.	1	1.5 cp	1445	FDU-15021-A
Hydraulic	1	1.5 cp	1445	FDU-15021-A
Glow Plug Indicator	1	1.5 cp	1445	FDU-15021-A
Brake	1	1.5 cp	1445	FDU-15021-A
Parking Brake Signal	1	2 cp	1895	C3AB-13466-B
Auto. Cigar Lighter	1	1.5 cp	1445	FDU-15021-A
Engine Compt.	1	15 cp	93	FDT-13799-A
Identification Lamp (Cab – Roof)	3	4 cp	97	C6AB-13465-A
Marker Lamp (Cab – Roof)	2	4 cp	97	C6AB-13465-A
Marker Lamp – Stake & Platform	8	4 cp	97	C6AB-13465-A
Vacuum Gauge	2	2 cp	1895	C3AB-13466-B
Tachometer	1	2 cp	1895	C3AB-13466-B
Air Pressure Gauge	1	2 cp	1895	C3AB-13466-B

BULB USAGE CHART – TRUCK – Continued

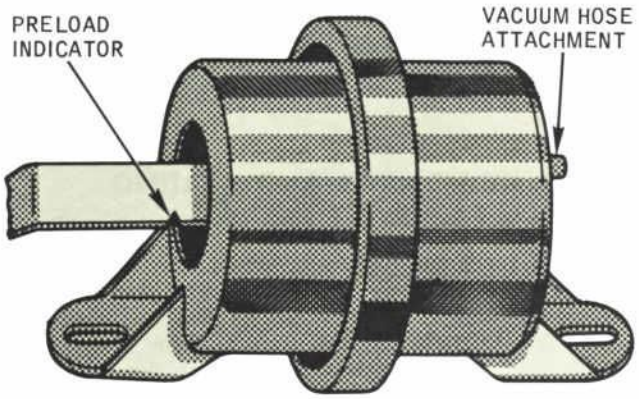
Lamp Description	Number of Bulbs Required	Candlepower or Wattage	Trade Number	Ford Part Number
"W" Series Truck				
Instrument Panel				
Tachometer	1	3 cp	1816	FEY-15021-A
Speedometer	1	3 cp	1816	FEY-15021-A
Indicator Gauges	6	2 cp	1895	C3AB-13466-B
Parcel Delivery				
Instrument Panel Hi-Beam Indicator	1	2 cp	1895	C3AB-13466-B
Turn Signal Indicator	2	2 cp	1895	C3AB-13466-B
Gen. Illumination	3	2 cp	1895	C3AB-13466-B

BULB USAGE CHART – BRONCO

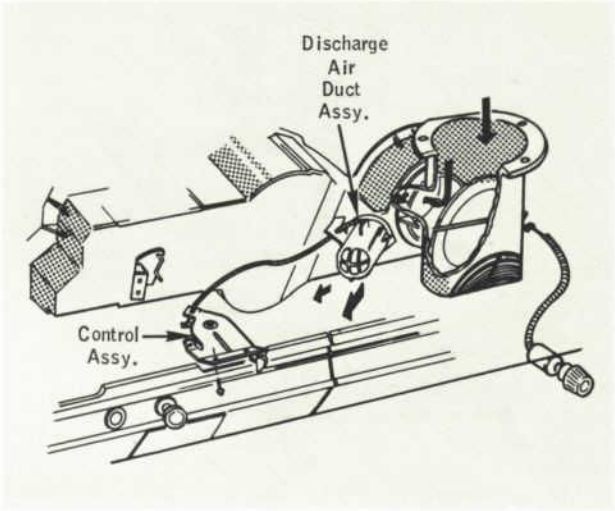
Lamp Description	Number of Bulbs Required	Candlepower or Wattage	Trade Number	Ford Part Number
Standard Equipment				
Headlamps – 7"	2	50 & 40 watts	6012	C4DB-13007-A
Front Park & Turn Signal	2	4-32 cp	1157A	C3AB-13465-A
Rear Tail/Stop/Turn Signal	2	4-32 cp	1157	C3AB-15198-A
License Plate Lamp	1	4 cp	1178	C5TB-13465-A
Map Lamp	1	6 cp	631	C3VB-13730-A
Back-Up Lamp	2	32 cp	1156	C3DB-13465-A
Instrument Panel				
Hi-Beam Indicator	1	2 cp	1895	C3AB-13466-B
Turn Signal Indicator	2	2 cp	1895	C3AB-13466-B
Instruments	3	2 cp	1895	C3AB-13466-B
Optional Equipment				
Radio Pilot Light	1	2 cp	1895	C3AB-13466-B
Warning – Brakes	1	2 cp	1895	C3AB-13466-B
Engine Compt. Lamp – Models, 96-98	1	6 cp	631	C3AB-13730-A
Portable Trunk Lamp – Models, 96-98	1	15 cp	1003	FDU-13730-A
Courtesy Lamp (RPO)	1	6 cp	631	C3VB-13730-A
Seat Belt Warning	1	2 cp	1895	C3AB-13466-A

FORD CAR AND TRUCK

CAR



Vacuum Motor Adjustment



Comfort Stream Ventilation – Fairlane

HEATING AND VENTILATION SYSTEM – FORD

Vacuum Motor Adjustment

Vacuum motors (actuators) used to operate any of the air doors in the Ford heating and ventilating systems should be adjusted so the return spring in the motor is preloaded slightly by the link when no vacuum is applied. To adjust a vacuum motor, loosen the attaching screws or nuts just enough to allow the motor to be moved. Then slide the motor so that the preload indicator notch in the link is flush with the motor body when the air door is in its normal position and no vacuum is applied, and tighten the screws or nuts.

Heater Blower Motor Access

On the '68 Ford, you won't need to remove the hood to gain access to the heater motor. Just remove the right front wheel and take the retaining bolts out of the fender apron so you can pull the apron down and block it out of the way. You'll also have to remove the starter solenoid and heater hose bracket from the apron, of course.

COMFORT STREAM VENTILATION – FAIRLANE

Comfort Stream ventilation is new for the 1968 Fairlane. Forced fresh air ventilation is provided by an additional discharge air duct on the heater plenum that distributes outside air to the front seat area from below the instrument panel. The three-speed heater blower is utilized for this system. The duct contains a damper, controlled by a lever on the instrument panel adjacent to the heater controls, which opens for Comfort Stream ventilation and closes for normal heater operations.

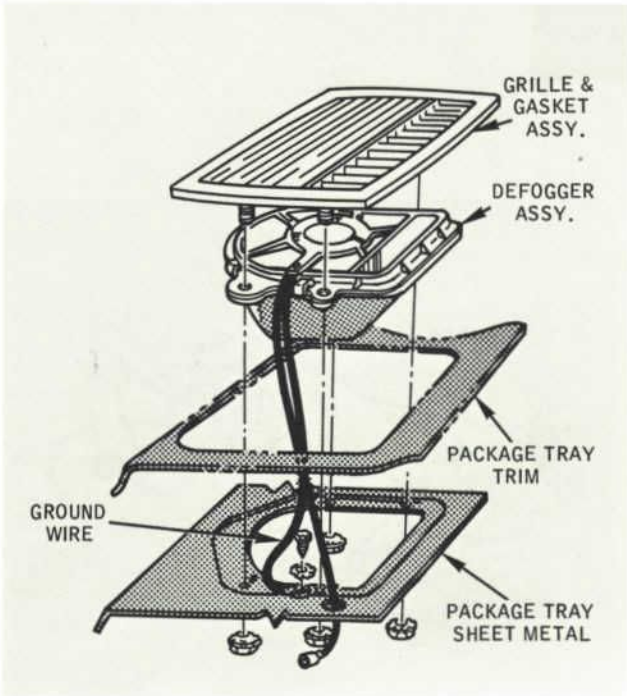
Adjustment

Adjust the Comfort Stream control cable with the damper in the "Off" position. You can make this adjustment at either end of the control cable.

REAR WINDOW DEFOGGER – ALL CAR LINES

All Ford Division car lines offer a rear window defogger, except in convertible and station wagon models. This device consists of a blower aimed at the inside of the rear window and controlled by a switch on the instrument panel. The Mustang 2+2 Fastback has a remote blower in the luggage compartment with ducting to the discharge openings. All other installations have the blower and plenum suspended below the package shelf.

Q 16-1 c) Pretty close . . . but still a miss! The vacuum motor for one of the doors does control blower speed, all right. But it's the vacuum motor that operates the temperature blend door and the power servo switch! This is the switch that controls the blower speed.



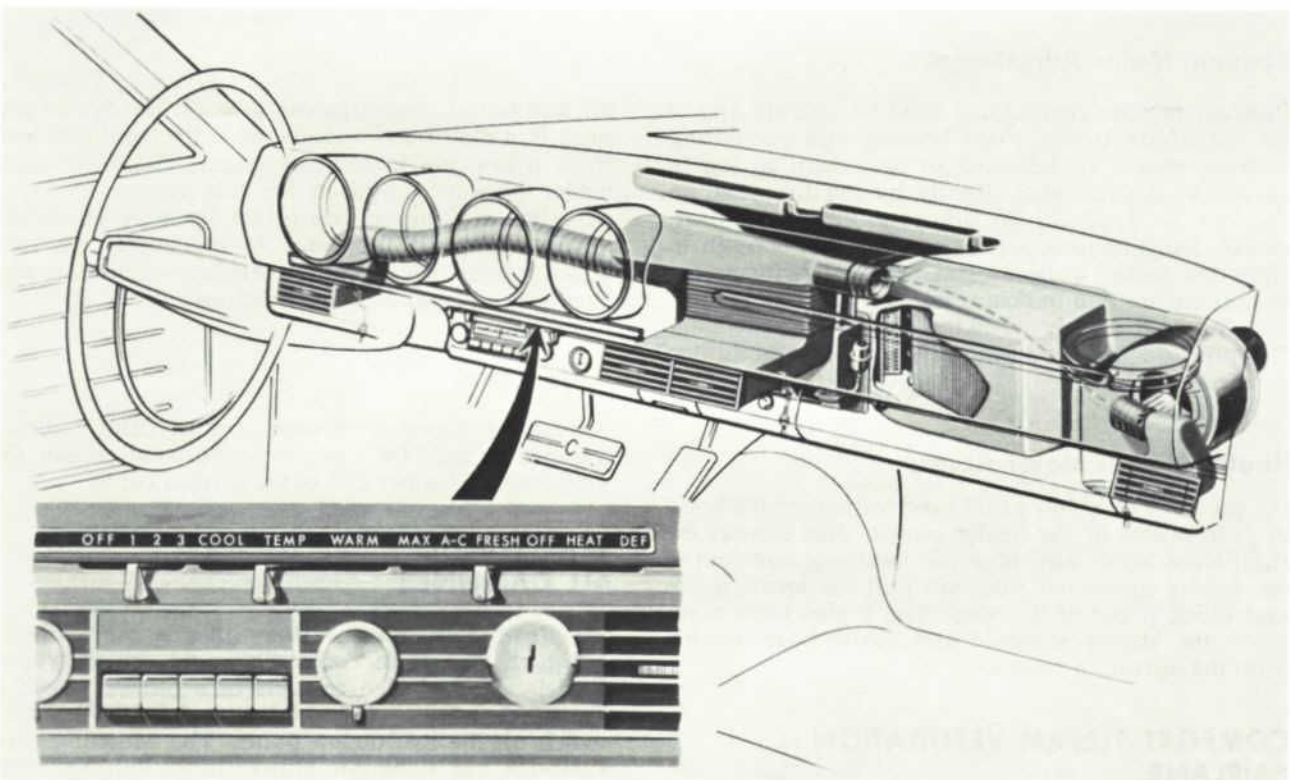
Rear Window Defogger – Typical

Service Tips

On the Mustang Fastback, you can disconnect the duct work and remove the blower for service from the luggage compartment. On all other installations, you can remove the motor mounting nuts and disconnect the motor wire from the luggage compartment. Then you'll need to get inside the car to remove the defogger assembly from the package shelf. Before you lift the unit all the way out, be sure to disconnect the ground wire.

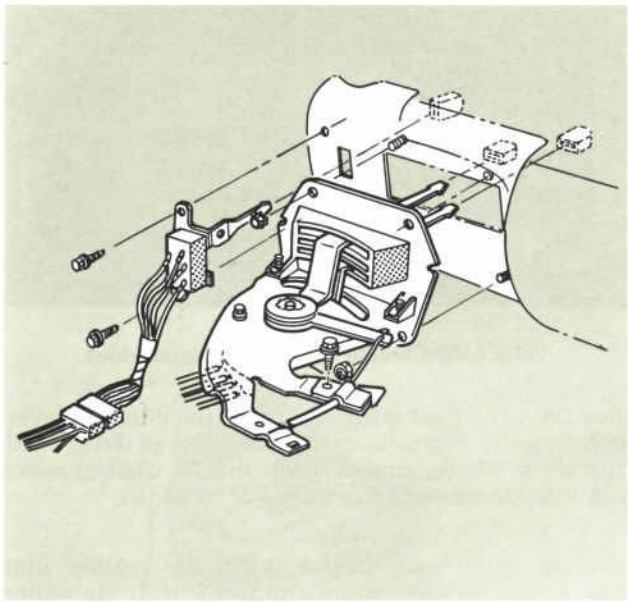
AIR CONDITIONING AND HEATING SYSTEM – FAIRLANE

With the exception of new controls and a few other changes, the Fairlane air conditioning and heating system is basically the same as the unit used last year. You'll find the air conditioner thermostat switch and blower resistor located on the rear face of the evaporator case near the plenum chamber. The clutch switch is a vacuum actuated electrical switch on the water valve mounting plate. And the expansion valve no longer has a capillary tube — a diaphragm is used to sense the pressure and temperature of the refrigerant leaving the evaporator.



Air Conditioning and Heating System – Fairlane

Q 18-1 a) Right is right, as the saying goes! Only the *right* guide rod of the manually adjustable headrest can be adjusted horizontally . . . and that's the way you'll have to move it to eliminate a bind in the guide rods!



Control Assembly Removed – Fairlane

Control Assembly Removal

1. Remove the three control knobs from the right instrument panel pod.
2. Remove the instrument panel pod as described in Group 17.
3. Remove the three control mounting nuts and the two blower switch mounting nuts from the rear of the instrument cluster.
4. Disconnect the control cable, the four vacuum hoses at the control assembly, and the multiple connector at the blower switch. Then remove the control assembly and blower switch.

After completing any required servicing of the control assembly or components, use the illustration of the control assembly as a guide to installation.

AIR CONDITIONER SERVICE TIPS – FORD

Testing

System Pressure Tests: Minimum pressure reading for the high pressure gauge when testing the air conditioning refrigeration system pressures is *120* psi. And if you get a low pressure reading above normal (above 50 psi, in other words) with the high pressure reading within limits (under 300 psi), check the heater water valve to be sure it is closed. Then operate the system on "Maximum Cooling" and be sure the outside air door is closed.

Thermostatic Switch Test: Here's a good test for proper operation of the thermostatic switch. It determines the ability of the switch to stop the current flow to the magnetic clutch when evaporator temperature drops to the point where heavy frosting of the fins could occur.

1. Fill a container with crushed ice and water. Add enough salt to cause the temperature of the solution to drop to 25°F. or lower.
2. Remove the thermostatic switch from the evaporator. If the switch is the adjustable type, set it for maximum cooling.
3. Use a self-powered test light or ohmmeter connected to the switch terminals to see if the switch is closed at room temperature.
4. Place the sensing tube in the ice water and salt solution. *Be sure no salt water gets into the control.* The switch contacts should open and remain open while the tube is in the solution.
5. Remove the sensing tube from the solution and hold it in your hand to warm it. As the tube warms up, the contacts should close. An ohmmeter check between the switch terminals should show a resistance of less than one ohm. If the control fails to operate as outlined, replace the switch.

Receiver-Drier Test: Operate the air conditioner for at least five minutes. Then run your hand along the length of the receiver-drier from one end to the other. You shouldn't be able to notice any difference in temperature in the unit. Cold spots indicate that the refrigerant flow is being restricted, and the receiver-drier should be replaced. Never try to "bake out" moisture from the unit with heat. This will only cause traces of refrigerant compressor oil that are present to coat the drying agent in the unit, destroying its effectiveness.

Servicing Recommendations

Refrigerant Service: When discharging the refrigeration system through the manifold gauge set, open *both the high pressure service valve and the low pressure service valve* just enough to allow the refrigerant to discharge slowly. Don't allow it to rush out or oil from the compressor will be forced out, too.

When charging the system, be sure you use only pure Refrigerant 12. Never attempt to use refrigerant that was canned for pressure-operated accessories such as boat air horns or collapsible spare tires. This fluid is not pure enough for air conditioner use and will cause a refrigeration system malfunction.

Compressor Oil Level Check: If you've had to draw out excess oil from the compressor, recheck the oil

Q 16-2 a) No . . . they're still in their '67 positions — right there on the steering wheel spoke! They're both used in the same way as in '67, too. Go ahead and try another answer — it's free!

level *after operating the system for five minutes.* This second check is important — if there's too much oil in the system, all of it won't have returned to the compressor before you made your first check. And before you connect the compressor back into the system, evacuate the compressor at *both the high pressure and low pressure* service valve gauge ports.

Air Door Vacuum Motor Adjustment: The single-acting vacuum motors for air door actuation in the air conditioning system are adjusted in the same manner as the heater vacuum motors. This adjustment was described earlier in this group.

Heater Core and Heater Access: On the 1968 Ford, the best way to get to the heater core and heater hoses of the air conditioning unit for removal and installation is through the space made available after you've moved the right fender apron out of the way. This, too, has been described earlier in this group.

Expansion Valve Installation: When you install the expansion valve to the evaporator, clean the suction line and temperature sensing bulb clamp to assure a good contact before you slide the bulb in the clamp.

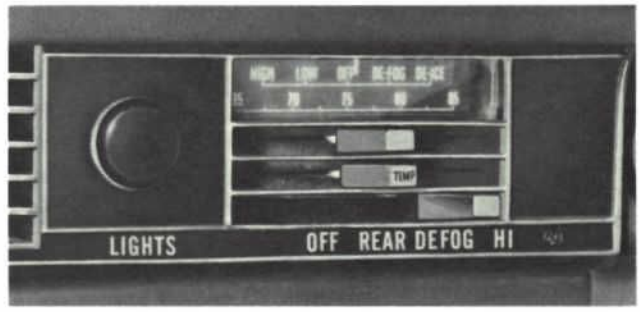
Thermostatic Switch Adjustment: After you install the spring clip that retains the control arm to an adjustable thermostatic switch, adjust the Bowden cable so the switch is at the maximum warm position when the control lever is still 1/8 inch from the full "Warm" position.

Temperature Regulator Control Valve, Heat Door Vacuum Motor and Blower Motor Resistor Locations: The temperature regulator control valve, the heat door vacuum motor and the blower motor resistor are mounted on top of the evaporator case in the engine compartment. Remove the plastic cover to gain access to any of these parts.

Compressor Crankshaft Seal: A secondary dust shield has been added to the compressor for 1968. After you remove the clutch and Woodruff key, remove this dust shield carefully to avoid marring the compressor shaft. Press the secondary dust shield, cupped portion toward the seal plate, on the shaft as far as possible with your fingers before you install the Woodruff key and clutch.

AUTOMATIC CLIMATE CONTROL — THUNDERBIRD

The new automatic climate control system used in the 1968 Thunderbird provides fully automatic control of the temperature, blower speed and excess humidity of discharge air from the combination air conditioner-heater of which it is an integral part. Only two instrument panel slide levers are used to give the driver complete control of the unit — a lever with five detent positions for selection of the desired operating phase, and a lever that is used to select any interior temperature from 65° to 85°F.



Automatic Climate Controls — Thunderbird

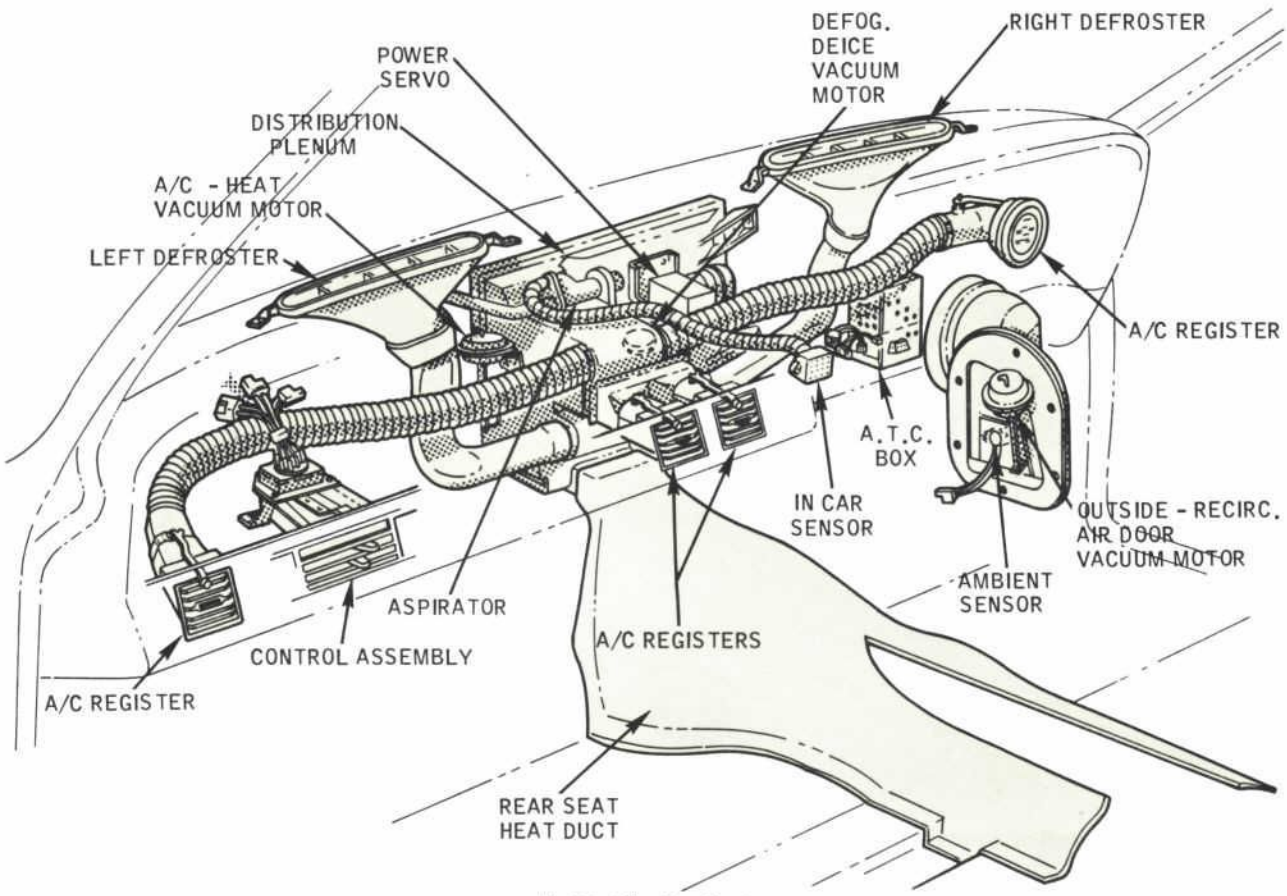
The air conditioner-heater is an all-weather unit that provides a constant supply of fresh air under all conditions except when maximum cooling is necessary. It is a reheat type of unit in which the maximum amount of moisture is extracted from the air by the evaporator before heating to the desired temperature. Discharge temperature is controlled by an automatically regulated temperature blend door that divides air flow downstream from the evaporator, some to the heater core and some bypassing it, as necessary to provide the proper blend of warm and cold air.

Controls

Operating Phase Selector: The slide lever in the instrument panel that gives the driver a selection of operating phases has five positions — "High," "Low," "Off," "Defog" and "Deice." The fastest blower speeds are provided with the lever set in the "High" position. Only when the unit is operating in the "High" position to lower the temperature of the car's interior — in other words, maximum air conditioner operation — the air supply for use in the unit is taken from inside the car for fast cooldown. Then, as interior temperature approaches the desired range, the unit automatically switches from recirculating to fresh air operation.

When "Low" is selected, blower speeds are reduced and no provision is made for recirculating air — all air used in the unit comes from the cowl grille vent. Blower speed is determined by the discrepancy between the setting of the temperature control lever and the actual interior temperature within the passenger compartment, modified slightly by the temperature of the air entering the unit. However, the blower will not operate to warm the car's interior until engine coolant temperature has reached at least 130°F.

Q 10-2 b) No, don't expect to find a limiter cap on the idle mixture adjusting screw of the Carter YF carburetor. Idle mixture richness is limited by an internal needle in the fuel passage, instead. You missed this one!



Air Distribution System

When "Defog" is selected, blower speed and temperature are modulated automatically, the same as in "High." However, 40% of the discharge air flows to the defroster vents, and there is no delay in blower operation until the engine warms up.

For "Deice," the maximum heat and highest blower speed are supplied all the time — there is no modulation. 90% of the air discharged from the unit flows through the defroster vents. There is also no blower delay for coolant warm-up in this position.

"Off," of course, shuts the unit off entirely. It even halts the flow of coolant through the heater core.

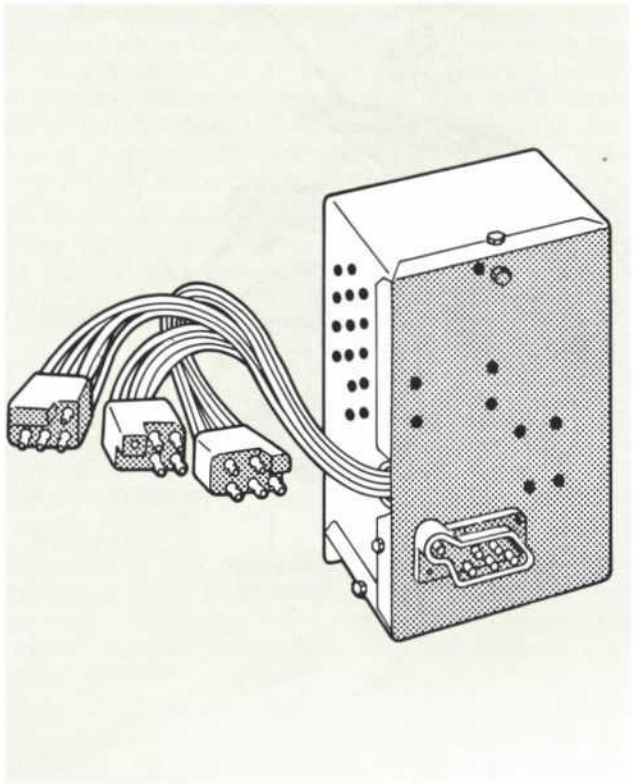
Temperature Selector: The temperature selector slide lever operates a rheostat that sends an electrical signal to the automatic climate control box. On its way to the control box, the temperature signal from the rheostat is modulated by two temperature-sensitive thermistors — devices in which the electrical resistance varies according to the temperature to which the thermistor is exposed.

One of these thermistors, the in-car sensor, senses the temperature of the air within the car, while the other thermistor, the ambient sensor, senses the temperature of the air just before it enters the blower. The in-car sensor exercises primary control over the final temperature signal, with the ambient sensor modifying it slightly.

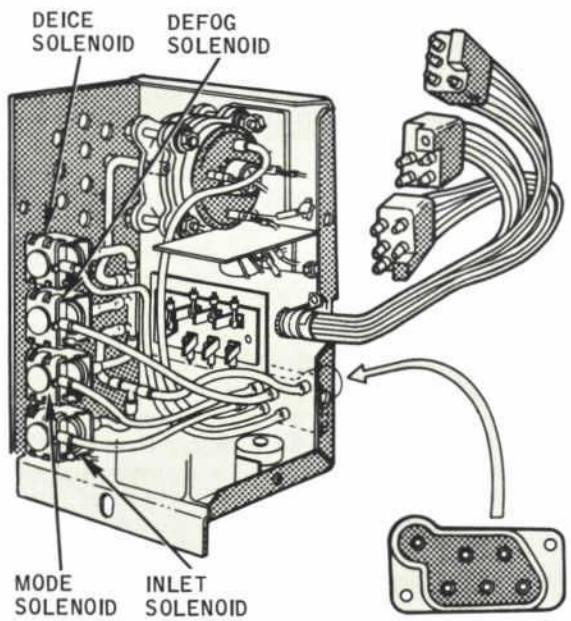
Within the automatic climate control box, other signals — both electrical and vacuum — are generated. These signals operate the various airflow directional doors and other units that operate the air conditioner-heater. The temperature blend door, which can be positioned to either extreme to route all blower discharge air either through the heater core or past it, or any position in between, is operated by the power servo switch assembly. This is a vacuum actuated unit with a rotary electrical switch (a potentiometer) that sends a signal back to the control box, advising it of the position of the temperature blend door. This signal is used by the control box in determining whether heating or air conditioning operation is needed.

Naturally, there are other components involved in the complete control system, but they will be briefly described later.

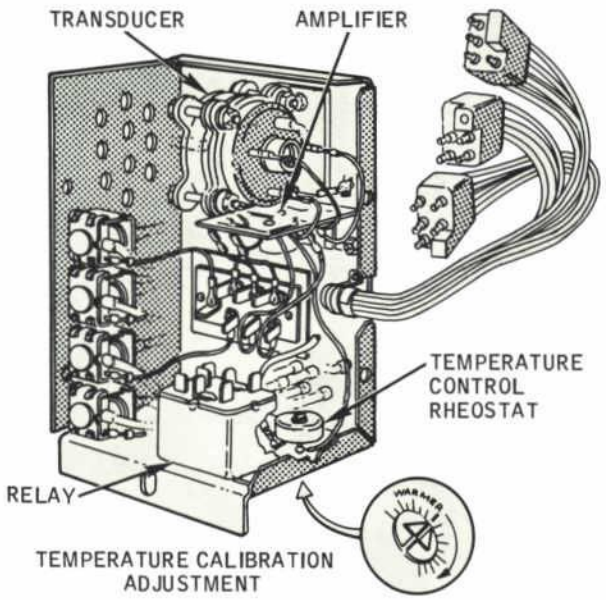
Q 8-1 b) Fine! You got it! Use only the preferred procedure of tightening the stud nut 3/4-turn beyond the point where you've eliminated all clearance between the push rod and the rocker arm. The full procedure is in this handbook.



Automatic Climate Control Box



Automatic Climate Control Box Vacuum Systems



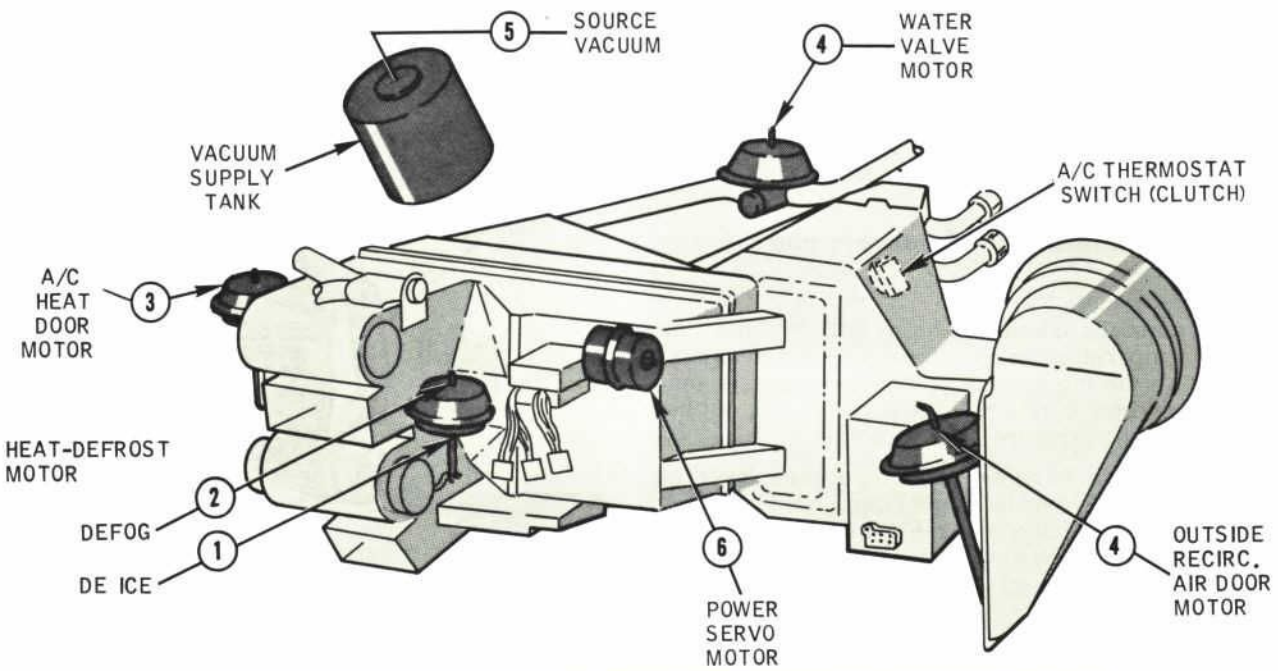
Automatic Climate Control Box Electrical Systems

Functional Check-Out of Automatic Climate Control System

Here's a fairly simple test of the entire automatic climate control system that should be an excellent starting point for diagnosing service problems. And you would be wise to use it as a part of your new car "prep" procedure, too!

1. Place the selector lever in the "Off" position and start the engine. Check to be sure the blower is off and the right cowl damper door is open to the interior of the car.
2. Set the temperature lever to 65°F. and put the selector lever in "Deice." Keep the controls this way until the engine warms up (190°F.). During this time, make sure the blower is on high speed and hot air is coming from both defroster outlets. You should also be able to feel a slight flow of air from the low-level heater outlets. See if the right cowl damper door is closed — in the fresh air position.
3. When the temperature inside the car is 75°F. or above, move the selector lever to "High." Momentarily, there should be a high speed discharge of air from the outlets, but it should drop off rapidly. Then the airflow should change to the air conditioning outlets and the air should get cooler. The blower speed should also increase and the right cowl damper door should open to the recirculating position as the air conditioner cuts in.

Q 8-2 a) No, sir! Although the design of many components of the Thunderjet 429 resemble those of the 289 V-8, the intake manifold bolt patterns and tightening sequences *are far different.* Stick to the illustrated sequence and avoid problems.



VACUUM LINE COLOR CODE AND NUMBER		HIGH AUTOMATIC	LOW AUTOMATIC	OFF	DEFOG	DE-ICE
Yellow	1	Vac	Vac	Vent	Vent	Vent
Red	2	Vac	Vac	Vent	Vac	Vent
Tan	3 *	Vent / Vac	Vent / Vac	Vent	Vent	Vent
Brown	4 *	Vent / Vac	Vent	Vac	Vent	Vent
Black	5	Source Vacuum				
White	6	Transducer Vacuum				Vent
A/C Thermostat Switch (Clutch)		Clutch On		Clutch Off	Clutch On	

*Depends upon mode of operation selected by control system.

Q 6-1 a) No, it isn't! A split-type snap ring holds the third-speed gear in place, but the second-speed gear thrust washer is retained another way. See if you can find the answer in the procedures.

4. Move the selector lever to "Low." Immediately, there should be a drop in air flow and the right cowl damper door should move to the fresh air position. You'll also notice a lessening of noise from the unit.
5. Finally, move the selector lever to "Defog." You should get a high blower speed, with about the same amount of airflow from the defroster outlets and heater outlets (actually, it's a 40-60% distribution). Discharge air temperature should stay cool.

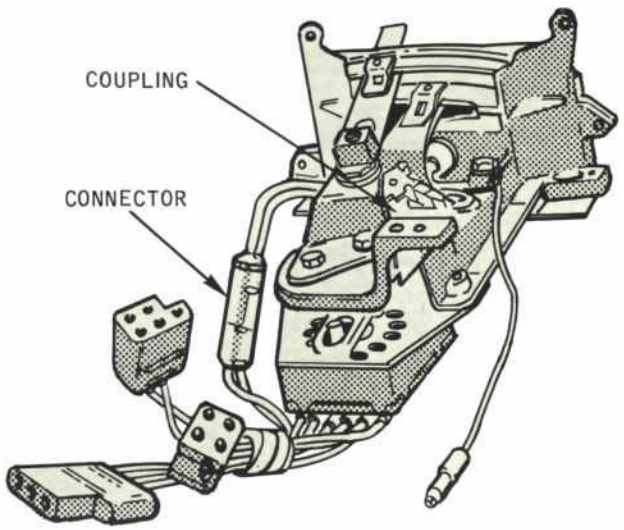
Functional Check-Out of Sensors and Rheostat

If the automatic climate control fails to hold the desired temperature or you have any other reason to question the functioning of the temperature signal sending devices, here's a quick way to check out the sensors and temperature lever rheostat.

With the engine running, the temperature lever at 75°F. and the selector lever in "High," hold a lighted match in front of the aspirator inlet to the in-car sensor at the instrument panel. Within 15 seconds, the system should go to high blower air conditioning.

If the system fails to react to this test, you'll have to test the sensors and rheostat separately. Follow this procedure.

1. With the interior of the car at 70° to 80°F., set the temperature lever at 75°F. and disconnect the battery.
2. Disconnect the red wiring at the automatic climate control box and connect an ohmmeter between the green wire and a ground. The resistance should be between 1200 and 1300 ohms at 70° to 80°F. if the sensors and rheostat are okay.
3. To see if the rheostat is faulty, take a reading with the ohmmeter hooked up as in step 2 and the temperature lever set at 85°F. Then take another reading with the lever set to 65°F. If the difference between the two readings is between 400 and 500 ohms, the rheostat is functioning correctly. (However, it may need adjustment, which will be described later.)
4. To test the ambient sensor, remove the connector and connect your ohmmeter across the two terminals. The reading should be between 165 and 185 ohms at 70° to 80°F.
5. Test the in-car sensor only after you're sure the rheostat is good. Connect the ohmmeter between the terminal on the sensor for the blue wire and a suitable ground. Set the temperature lever to 65°F and read the meter. It should indicate between 750 and 900 ohms.



Temperature Lever and Rheostat Adjustment Points

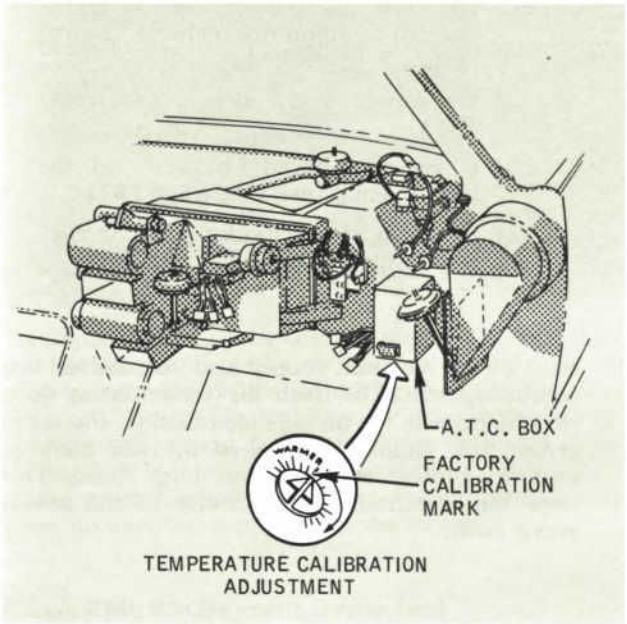
Temperature Lever and Rheostat Adjustment

A temperature calibration control is provided at the bottom of the automatic climate control box. This control, which is preset at the factory, gives you a means of making minor adjustments to discharge air temperature to suit the owner's particular requirements. However, before you alter the original setting of the temperature calibration control, it's advisable to assure yourself that the temperature selector rheostat and lever at the instrument panel are properly adjusted to give the full range of control they are capable of providing. Here's how to check and adjust the lever and rheostat.

1. Loosen the coupling between the temperature lever and rheostat shaft. Set the lever to the 75°F. position.
2. Disconnect the two-wire connector to the rheostat from the wiring harness. Connect an ohmmeter between the terminals for the black wire and the white wire at the connector.
3. Without moving the temperature lever, turn the rheostat shaft until you get an ohmmeter reading of 268 ohms. Tighten the coupling between the lever and shaft. Recheck your adjustment —

Q 16-3 a) You're on the ball! If the speed control "hunts" or won't lock in, or if the car continues to accelerate slowly with the speed control engaged, it's a pretty safe bet that the regulator is acting up.

268 ohms at 75°F. lever setting — to be sure nothing slipped when you tightened the coupler.



Temperature Calibration Control Adjustment

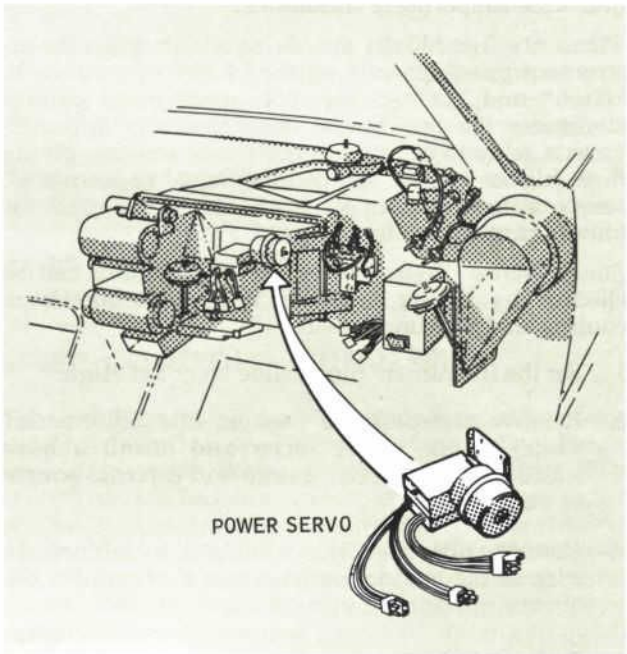
Temperature Calibration Control Adjustment

The automatic climate control box mounted in front of the dash panel near the glove box has an adjustable temperature calibration control which provides about 30° of adjustment. This control consists of an indicator and dial in the bottom of the box, preset at the factory to the center of the adjustment range. If necessary, the setting can be altered to suit an owner's individual preferences.

Before you change the temperature calibration control setting, make sure the temperature lever and rheostat are properly adjusted. Use the procedure given earlier. And if any other part of the automatic climate control system is not functioning properly, never attempt to compensate for it by adjusting this calibration control — instead, correct the source of the problem.

Control Adjustment: Mark the original control setting before adjustment. If the owner has complained that the car is too cold for a given temperature lever setting, rotate the dial clockwise, in the direction of the "warmer" arrow. If the car is too warm, rotate the dial in the other direction. Each calibration division is roughly equal to a 2° change in temperature.

Control Adjustment After Service: With the engine running, set the slide levers to "75°F." and "High." While you're waiting for the temperature within the car to stabilize, tape an accurate thermometer to the instrument panel pad adjacent to the aspirator inlet, and take the car out on the road. At about 40 miles an hour and with the internal temperature stabilized, the thermometer should read 80°F. for a 75°F. lever setting. The system is designed for this initial calibration. If your test indicates a need for further temperature calibration adjustment, repeat this test after making the adjustment.



Power Servo Location

Power Servo Switch Tests and Adjustment

Power Servo Operation: The power servo switch works in conjunction with the automatic temperature control box to provide control over temperature. Electrical temperature signals from the control lever rheostat and two sensors are received by the control box, where they are amplified and transmitted to a transducer in the box. The transducer operates a valve which meters vacuum to the power servo switch at the temperature blend door, and the strength of the vacuum determines the position of the door. A strong vacuum will call for less heat, and a weak vacuum (or no vacuum) will call for increased heat.

A potentiometer in the power servo unit sends an electrical signal back to the amplifier in the control

Q 17-4 c) Definitely not! You don't need to do anything to the defroster ducts — just remove the nut at the forward edge of the pad through the glove box opening and turn out the screws around the edges of the pad. You're home free!

box, reflecting the position of the temperature blend door. This signal is used to determine when to switch from heater operation to air conditioning, or vice versa.

Blower Speed Control: The power servo switch also controls the electrical circuit to the blower motor, routing the circuit through resistors to slow blower speed when the door is near a position which indicates that discharge air temperature is close to the desired setting. As the door moves farther from this position, the resistors are bypassed one at a time by the power servo switch to step up blower speed and increase air circulation for faster response to undesirable temperature conditions.

There are five blower speeds available when the instrument panel lever is set for "Low" operation, In "High" and "Defog," the instrument panel control eliminates the two lowest speed resistors and activates a relay to cut out an additional resistor, giving three higher blower speeds. In "Deice," of course, all resistors are eliminated from the circuit and the blower runs at maximum speed.

Power Servo Tests: Power servo operation can be checked by testing its ability to provide maximum cooling and maximum heat.

1. Set the instrument panel slide lever to "High."
2. Remove and plug the vacuum line (color coded white) at the power servo and install a hose leading to a vacuum gauge and external source of vacuum.
3. Connect one lead of a voltmeter to the orange wire in the engine compartment that supplies the blower motor, and ground the other lead.
4. Start the engine.
5. Admit vacuum (at least 12 inches of mercury) to the power servo. The fresh air-recirculating door should go to the recirculating position — open to the interior of the car. The link between the power servo crank and the temperature door should be pulled out of the plenum. The blower should go to high speed immediately.
6. Check the voltmeter reading. It should be between 10 and 12 volts.
7. Slowly and carefully reduce the vacuum to the power servo until the blower speed changes. Blower motor voltage should drop about 1 1/2 volts, within the limits of 8 1/2 to 10 1/2 volts.
8. Again reduce vacuum carefully until blower speed changes. Check for another 1 1/2 volt drop in the circuit, within the range of 7 to 9 volts. This completes the maximum cooling portion of your test.

Quick-Quiz

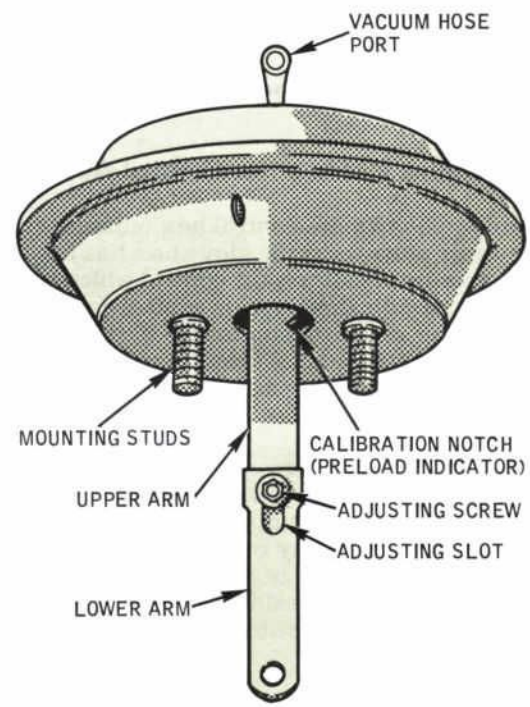
Q 16-1 In "Low," the blower speed of Thunderbird's automatic climate control system is controlled by:

a) the power servo switch. (See page 154)

b) a switch marked "blower" on the instrument panel. (See page 157)

c) the fresh air-recirculating door vacuum motor. (See page 169)

9. Shut off the vacuum supply and vent the test line to atmosphere. The fresh air-recirculating door should close to the outside air position, the servo crank link should be pushed into the plenum, and the blower should to to high speed. This tests the maximum heat ability of the power servo switch.



Vacuum Motor Adjustment Points

Q 9-3 c) You're 'way off base! Using a screwdriver to set the ignition switch in the different positions required for continuity tests is an open invitation to trouble. Use a lock cylinder and key for this job.

Power Servo Adjustment: If either extreme of travel of the link between the power servo crank and the temperature door is restricted, loosen the three power servo mounting screws and push the servo firmly toward the dash panel, applying at least two pounds of force to the link on the door. Holding the servo in this position, tighten the three screws.

Vacuum Motor Adjustment

Vacuum motors that control the air conditioning-heat door and the fresh air-recirculating door are two-position actuators. The vacuum motor for the defroster door is a three-position actuator which can not be adjusted.

To adjust either the air conditioning-heat door vacuum motor or the fresh air-recirculating door vacuum motor, loosen the adjusting screw in the two-piece actuating shaft. Hold the air door in its normal position and adjust the shaft so the indicator notch in the shaft is flush with the motor body. Then tighten the adjusting screw. Perform this adjustment only when no vacuum is applied to the motor.

Blower Motor Current Draw Test

Connect a 0-50 amp ammeter between the positive post of the battery and the orange blower motor supply wire in the engine compartment. The motor should operate, and its current draw should be between 12 and 23 amperes.

High Range Relay Test

When "High" operation is selected, the high range relay on the right fender apron bypasses resistors in the blower motor circuits to give faster blower speeds. If blower speed doesn't drop with a switch from "High" to "Low" operation when conditions call for high blower speeds, the relay may not be functioning properly. To check this, set the temperature control lever to the extreme that will call for the greatest change in interior temperature, and switch from "High" to "Low" with the engine running. Blower speed should drop noticeably.

Water Control Valve Test

The heater water flow valve halts the flow of coolant through the heater core when maximum air conditioning with recirculated air is called for. It also cuts off flow when the lever is moved to "Off." To test the valve, set the controls for "Low" and "85°F." and run the engine until it's warmed up. (If necessary, first lower the car's interior temperature as much as possible with the air conditioning.) Warm air should be discharged from the heater ducts. If the air isn't warm, remove the vacuum line from the valve and see if vacuum is present. If there's vacuum in the line, the valve is defective. If no vacuum is present, the trouble is in the vacuum system.

Component Removal Tips

Before removing the heater core, you'll have to remove the hood, carburetor air cleaner and the transmission dipstick tube. Only the dipstick tube must be removed to remove the icing control switch for the air conditioner evaporator.

Items accessible from inside the car include the power servo unit, the automatic climate control box and the in-car sensor. To remove the power servo unit or the control box, first remove the glove box and disconnect the right-hand defroster duct and register duct. To remove the in-car sensor, first remove the glove box and then disconnect the right-hand register duct and move it away from the sensor.

SPEED CONTROL – THUNDERBIRD

The speed control in the 1968 Thunderbird has been changed from last year's unit. However, the driver's controls provide the same operating features. The On/Off switch has been relocated to the lower edge of the instrument panel to the left of the steering wheel. The Set Speed and Resume/Retard switches remain in the same positions in the steering wheel spoke. And the brake stoplight switch is actuated to cancel the speed control whenever the brake pedal is depressed.

Mainly, the changes are internal or involve relocation of certain components. Five relays — the on/off relay, the anti retard relay, the brake release relay, the retard disconnect relay and the stoplight relay — are mounted on the regulator mounting bracket. The retard solenoid valve is mounted directly on the brake booster. And there is a horn relay included in the electrical system of cars having the speed control, but this relay has no control over the speed control system.

In the regulator assembly, the most notable change is the use of a flyweight governor to sense car speed. The speed regulator valve magnetically couples the governor to the modulating air valve to meter atmospheric air pressure for blending with manifold vacuum. Except for the substitution of flyweights for the copper and magnetic discs of the previous unit.

Q 17-3 c) Right! The rolling door lock feature is *not* used with the vacuum door lock systems in '68. There are some other changes, too — changes that make the system simpler and easier to work on.

On/Off Switch Test

Disconnect switch from circuit. Connect a self-powered test light across the connector outside terminals. The light should glow. Now push the switch to the "OFF" position, the light should go out. Move one end of the test light to the center terminal. The light should not glow. Now push the switch to the "ON" position and the light should glow.

On/Off Relay Test

Disconnect the relay from the circuit. Perform a continuity test by connecting a self-powered test light across the two connectors. This being a normally open relay, the light should not glow.

To perform an operation test, connect a test light to the terminal in the middle of the connector. Apply a 12-volt supply lead to the other connector. (Be sure relay is properly grounded.) This should energize the relay coil, close the normally open points and the test light should glow.

Brake Release Relay and Retard Disconnect Relay Test

Disconnect the relay from the circuit. Connect a self-powered test light across the two female connectors. Since this is a normally closed relay, the light should glow. Apply a 12-volt lead to the relay male terminal. (Be sure relay is properly grounded.) This should energize the relay coil, open the contact points and the light should go out.

Set Speed Switch Test

Remove switch from the steering wheel and disconnect from circuit. Connect a self-powered test light across one of the center terminals and one of the outside terminals, the light should not glow. Hold the button down and the light should glow. Repeat test between center terminal and other outside terminal.

Resume/Retard Switch Test

Remove switch from the steering wheel and disconnect from circuit. Connect a self-powered test light between the left and center terminal, the light should not glow. Hold down Resume portion of switch, light should glow. Move test light from left to right connector. Light should not glow. Hold Retard portion of switch down, light should glow.

Slip Rings and Brushes Test

Remove the switches from the steering wheel and disconnect from circuit. Disconnect connector E at lower end of steering column. Using a self-powered test light check for continuity from the connectors in the steering wheel through the slip rings and brushes to connector P at the lower end of the steering column. The light should glow in each test. If the light does not glow, remove the steering wheel and repair or replace slip rings or brushes.

Quick-Quiz

Q 16-2 Changes in the Thunderbird speed control for '68 include:

a) relocating the set/speed and resume/retard switches. (See page 171)

b) elimination of the retard solenoid valve. (See page 91)

c) the use of a flyweight governor to sense car speed. (See page 83)

Anti-Retard Relay Test

Disconnect the relay from the circuit. Connect a self-powered test light across the two center connectors. Since this is a normally closed relay, the light should glow. Apply a 12-volt lead to the connector end female terminal. (Be sure relay is properly grounded.) This should energize the relay coil, open the contact points and the light should go out.

Place the test light across the male and adjacent female connector. The light should not glow, since this is a normally open switch. Apply power to the end female terminal. The test lamp should light.

Brake Retard Relay Test

Disconnect wiring connectors from valve. Ground one of the terminals. Start the engine to provide vacuum to the brake booster. Observe brake pedal when 12-volt supply is connected to other terminals on brake retard valve. Pedal should go down as the booster applies the brake lightly If the pedal does not go down, the valve is not working.

Simulated Road Test

The road test may be simulated by raising the vehicle on a hoist enough to have the rear wheels clear the floor. Remove the vacuum hose from the servo, install a vacuum gauge so that it can be read from the driver's seat.

Start engine, place transmission into Drive and raise speed over 30 mph. System is now ready to test.

Q 15-3 a) You're right . . . and that's a big time-saver when it's time to install those wires. You just thread the bonded assembly down through the upper flange of the steering column — no taping together of separate wires to keep from getting 'em confused.

Vacuum Test

Remove vacuum source hose at the regulator. Install vacuum gauge in the hose and start engine. Readings should be the same as engine vacuum.

Replace hose on the regulator. Remove regulator to servo vacuum hose at the regulator.

Simulate road test. Attach a vacuum hose to the regulator. Install a vacuum gauge in the hose. Increase speed to 40 mph. Press Set/Speed button.

Vacuum reading on gauge indicates system is engaged. No reading indicates system is not engaged.

Servo Test

Disconnect servo vacuum hose at the regulator. Collapse servo and seal end of hose. If servo remains collapsed, servo and hose do not have a leak. If servo expands, there is a leak in the servo or hose.

Servo Adjustment

Adjust the ball chain to maintain a 1/2 to 1 ball link slack with the engine at hot idle.

Regulator Test

1. Disconnect the regulator from the wiring harness. This isolates the regulator from any other electrical components which may be faulty.
2. Check the case of the regulator for a good ground. Connect a 12-volt test light from battery (+) power to the regulator case. If the light glows brightly, the case is well grounded. If the light glows dimly or does not glow, the ground is poor. Repair the ground.
3. With the regulator case properly grounded and the vehicle prepared for the simulated road test, apply battery (+) power to the connector white wire terminal.

   The vacuum control valve should open and the gauge should indicate vacuum. If no vacuum is indicated, replace the regulator.

   If vacuum was indicated on the gauge, reduce the speed below 20 mph. The inhibit switch should open. The vacuum control valve should close and the gauge should indicate no vacuum.
4. Increase speed to 35 mph. Apply battery (+) power to the connector white wire terminal. Apply battery (+) power to the connector yellow wire terminal. Remove power from the white wire terminal. No change should occur in the vacuum reading. If there is any change in the vacuum gauge reading, replace the regulator.
5. Vary the vehicle speed between 30 and 40 mph. Note the vacuum reading. As the speed is increased, the vacuum should drop. As the speed is decreased, the vacuum should increase. If the vacuum does not vary as the speed is increased and decreased, replace the regulator.
6. With the speed held steady at 35 mph, apply battery (+) power to the connector red wire terminal. The vacuum should show an increase. Remove the power from the red wire terminal. Vacuum should drop. If the vacuum does not change, replace the regulator.

   The regulator that passes these tests is okay.

SPEED CONTROL – FORD, MUSTANG

Ford and Mustang speed control units are new for 1968. Both speed controls are similar in design, so they will be treated as a unit here. In operation, these units can best be compared with last year's Mustang speed control, with which they share many functional features.

Operation

These new speed controls have flyweights in the regulator assembly to sense car speed and operate controlling components. However, the operation of the solenoids and valves is slightly different. The advance solenoid coil, for instance, is not energized until the set speed button is depressed to the first detent at speeds above 30 mph — and when the solenoid is energized, it closes the valve to block air from entering the regulator. At the same time, the vacuum solenoid valve is energized to open it and admit intake manifold vacuum to the regulator. This vacuum is transmitted to the bellows servo, where it increases throttle opening.

When the set speed button is released at the desired road speed, the advance solenoid is de-energized. This permits air to enter the regulator. But the vacuum solenoid valve remains energized, thanks to a holding circuit that is supplied with electrical power whenever the speed control is turned on.

The holding circuit also supplies current to the coupling coil, or clutch. But this coupling coil circuit is routed through the advance solenoid in such a way that the circuit is completed to ground only when the advance solenoid valve is de-energized and open. And this, of course, occurs when the set-speed button is released. When the coupling coil is energized in this manner, it locks the governor to the orifice metering valve. Then the metering valve allows just enough air to enter the bellows to equalize vacuum and stabilize the car's speed at the desired setting.

Q 15-4 a) Definitely not! Fairlane and Falcon instrument cluster designs are brand-new for '68 with flexible printed circuits. Not only that, they're much easier to get to for service than they've ever been before. Just remove the panel pad.

Instrument Panel Switch Test

1. Turn the ignition switch to the accessory position.
2. Pull out on the switch knob. The knob should stay in the out position.
3. If the knob does not stay in the out position, check for voltage between the voltage supply connector (green wire) and ground with a test light or voltmeter.
4. If there was voltage at the supply connector, and the knob does not stay in the out position, the switch is defective. Replace it.

Turn Signal Lever Set Speed Switch Test

1. Disconnect the set speed switch connector (three-wire connector at the base of the steering column).
2. With the switch in the normal out position, check for continuity between the connector treminals with the ohmmeter of a self-powered test light. There should be continuity between the center terminal of the connector and the violet wire terminal. There should be no continuity between the two outer terminals.
3. Depress the switch to the first detent. There should be no continuity between the center terminal of the connector and the violet wire terminal. There should be continuity between the two outer terminals.
4. Depress the switch all the way. There should be no continuity between any of the terminals.

Brake Release Relay Test

1. Disconnect the brake release relay at the quick disconnect. The relay is mounted on the speed control regulator bracket in the engine compartment.
2. Connect an ohmmeter or self-powered test light between the black orange wire relay terminal and ground. There should be continuity. If there is no continuity, the relay is defective.
3. Connect the blue-white wire relay terminal to the battery positive terminal with a jumper wire. The relay should click, and there should be no continuity between the black-orange wire terminal and ground. If the relay does not fulfill these conditions, it is defective.

Quick-Quiz

Q 16-3 If the Mustang speed control "hunts" during road testing, it's an indication:

a) of a faulty regulator assembly. (See page 176)

b) that the speed control is working properly. (See page 194)

c) of a short circuit in the set/speed switch. (See page 185)

Regulator Assembly Road Test

After checking both connections of the vacuum hose to the regulator assembly, visually inspecting the regulator assembly housing for cracks, loose cover screws, excessive dirt and other defects, and making sure that all electrical connections in the system are good, road test the speed control as follows:

1. Start the engine and pull the on/off switch to the "ON" position.
2. Accelerate the car to 35 mph and push the set speed button to the first detent. The speed control system should control the speed.
3. Push the set speed button all the way in. The car should slow down.
4. When the speed slows to 30 mph, release the set speed button slowly. The speed control unit should control the speed at about 30 mph.
5. Depress the brake pedal. The speed control system should be cancelled.

Failure of the speed control regulator is usually indicated if the speed control will not lock in at any speed when all other system components are in good condition, or if the car continues to accelerate slowly or "hunts" above and below the set speed. If further testing is needed, continue with the following tests.

Regulator Assembly Electrical Tests

1. Disconnect the regulator assembly electrical connector and connect jumper wires from the regulator side of the harness connector to its mating half of the connector.
2. Start the engine and remove the manifold vacuum supply line from the regulator assembly. Check for sufficient vacuum at the regulator assembly. If OK, connect the hose to the regulator assembly.

Q 9-1 b) Bullseye! The centrifugal advance mechanism in the distributor provides a basic spark advance in relation to engine speed, and this advance is increased or decreased by the actions of the two diaphragms.

3. Depress the set speed switch button to the first detent. Check for voltage with a test light between ground and the violet and the white wires. The test light should glow for both voltage checks. If the test light does not glow, check the set speed and on/off switches.
4. Depress the set speed switch button all the way (second detent). Check for voltage with a test light between ground and the violet and the white wires. The test light should not glow for either voltage check. If the test light glows, check the set speed switch in the turn signal lever.
5. Check the black-orange stripe wire for continuity to ground with an ohmmeter or a self-powered test light. There should be continuity to ground. If there is no continuity to ground, check the brake release relay.
6. Turn the ignition switch off and disconnect the jumper wires from the regulator assembly connector and the mating half of the connector.

If any defect is noted in the previous test procedure, the regulator must be replaced. After installing a new regulator assembly, check it for proper operation by performing the preceding road test and checks.

Servo Assembly Test

1. Check the servo assembly for binding linkage and loose vacuum hose. Check the linkage for proper adjustment.
2. Disconnect the servo vacuum hose at the speed control regulator. Compress the servo bellows, hold your thumb over the end of the vacuum hose, and observe the servo assembly. The bellows should not expand.
3. If the bellows do expand, check the bellows hose for leaks. If the hose is in good condition, the servo assembly has a leak.

Brake Stoplight Switch Test

1. Disconnect the stoplight switch connector at the switch.
2. Connect an ohmmeter or self-powered test light to the two switch terminals.
3. Depress the brake pedal. The switch should show continuity. If it does not, it is defective.

RADIOS — ALL CAR LINES

There is a new line up of radios for '68, giving a choice of push button AM radios, push button AM radios with stereo tape players, or AM/FM stereo radios with "5 by 10" push buttons that can be tuned to five AM stations and five FM stations.

Stereo FM broadcasts will be reproduced with full stereo sound.

Generally, you'll be on familiar ground with all these new radios. There is one feature, however, that deserves explanation. The AM/FM stereo radios have a conventional array of five push buttons, but contrary to previous practice, each push button can be tuned to both an AM station and an FM station. It's simple to do — here's how.

AM/FM Stereo Radio — Ford

Q 15-4 b) No, sir! An outstanding feature of these new Fairlane and Falcon instrument clusters is a flexible printed circuit that eliminates most of the wiring of last year's clusters. Accessibility, too, is excellent with the panel pad removed.

"5 by 10" Push Button Tuning — AM/FM Stereo Radios

After the radio has warmed up for 15 minutes, slide the dial selector to "AM" and set each push button by pulling it out, manually tuning in the desired AM station, and depressing the button. Then slide the dial selector over to "FM" and repeat the procedure to tune in five FM stations. Don't worry — you won't disturb the AM settings!

For the most accurate setting of the push buttons, have the antenna extended to 33 inches and lower the volume almost to a whisper when making your final fine tuning manual adjustments before depressing each push button.

Quick-Quiz

Q 16-4 Push buttons of the '68 AM/FM stereo radios can be tuned to:

a) five stations, either AM or FM. (See page 72)

b) five AM stations and five FM stations. (See page 90)

c) ten AM or ten FM stations. (See page 146)

TRUCK

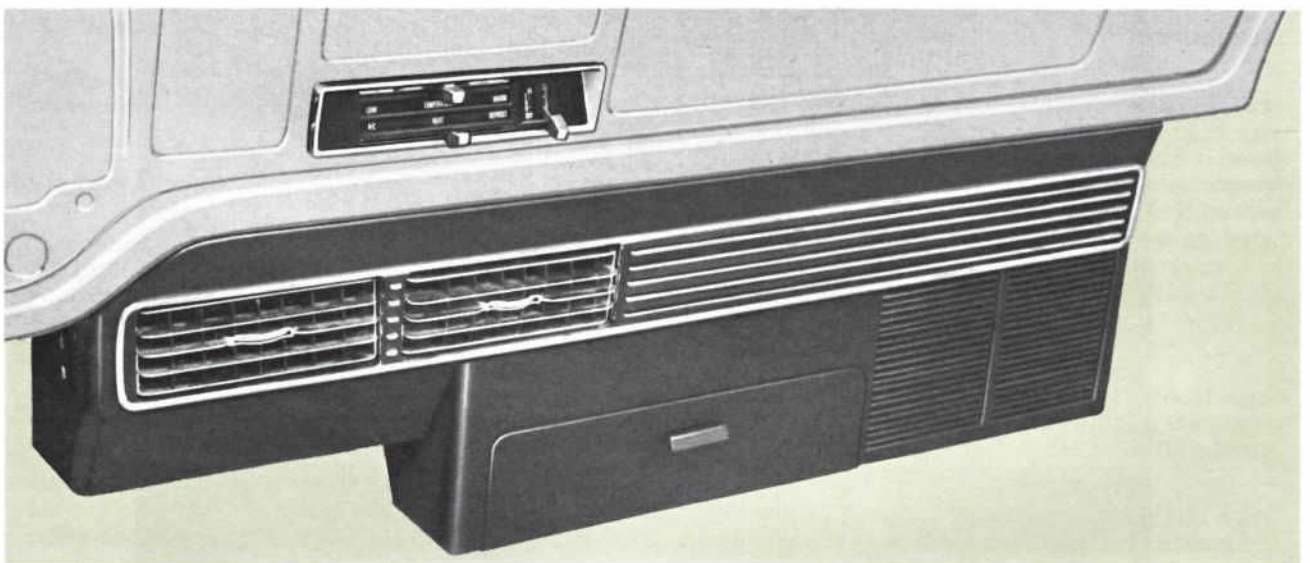
HEATER/AIR CONDITIONER — F-100 THROUGH F-350 TRUCKS

There's a new factory-installed combination fresh air heater and air conditioner available in 1968 F-100 through F-350 light trucks. Three slide lever controls at the center of the instrument panel operate the unit for either heating or air conditioning. The top horizontal lever provides temperature control for heating and cooling. It controls two Bowden cables, one to the water control valve in the heater inlet hose and the other to the thermostatic switch that controls evaporator temperature by cycling the compressor when the air conditioner is operating. The bottom horizontal lever, which allows the driver to select either heating or air conditioner operation, also controls two Bowden cables that operate the air door and the defroster door in the unit housing. The small vertical lever to the right of the two horizontal levers is a blower motor switch.

Operating Note: To turn the unit off so that neither the heater nor the air conditioner is operating, move the lower horizontal lever to "A/C" and the blower switch to "Off." Later models will have an "Off" position detent added to the lower lever.

Service Tips

Technicians with experience servicing other air conditioning units should have no problems with this

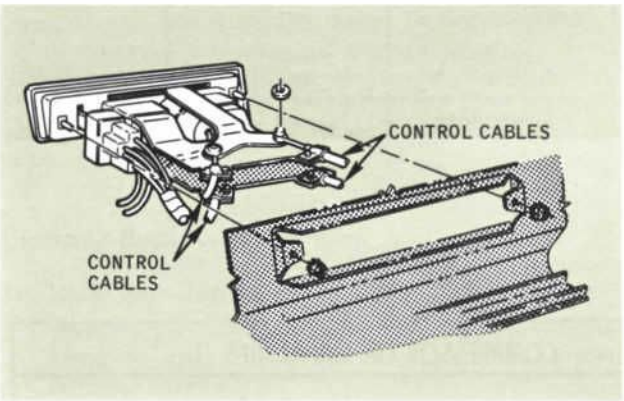


Heater/Air Conditioner — Light Trucks

Q 14-1 a) Give yourself credit for another correct answer! Voltage drop tests for the circuit are the same as in '67. Of course, the starter battery terminal is on the solenoid, instead of on the starting motor frame . . . but that's no problem!

new combination heater/air conditioner. Accessibility to all components is excellent. However, here are a few tips to make your work easier.

Installation: If you've removed the heater/air conditioner unit from the truck for service, be sure you get everything (defroster nozzle hoses, for instance) back in place under the instrument panel before you install the unit. And remember to securely seat all electrical connectors.



Control Assembly Installation

When you're ready to install the controls and unit, here's how to do it:

1. Be sure the four Bowden cable housings extend 1/4 inch beyond the rear edges of the cable clamps on the control assembly and the clamp screws are tight. Then mount the control assembly to the instrument panel.
2. Set the two horizontal slide levers in their centered positions and secure them positively in that position until you've completed the installation of the entire heater/air conditioner.
3. Route the heater temperature control cable (the upper left cable from the front of the control assembly) through the insulator in the dash. Connect the cable to the crank of the water temperature control valve at the heater inlet hose in the engine compartment. Hold the crank toward the front of the truck while you clamp the cable housing to the valve bracket.
4. Place the heater/air conditioner unit on the floor of the cab.
5. Connect the heater and air conditioner control cable (the cable with a turnbuckle that comes from the lower right of the control assembly) to the crank link for the heater/air conditioner air door. Push the crank forward until it stops and hold it there while you clamp the cable housing to the bracket.
6. Connect the thermostatic switch control cable (the cable with a vinyl sleeve and a turnbuckle that is attached to the upper right of the front of the control assembly) to the thermostatic switch crank arm. Push the crank to the right (toward the passenger's side of the cab) until it stops and hold it there while you clamp the cable housing to the bracket.
7. Install the heater/air conditioner unit to the dash panel and instrument panel. Don't forget to connect the ground wire to the side panel above the fresh air duct before you install the flexible duct connector.
8. Connect the defroster control cable (the short cable from the lower left of the front of the control assembly) to the defroster door crank at the top left side of the unit. Pull the crank rearward until it stops and hold it there while you clamp the cable housing to the hold down bracket.
9. Remove whatever device you used to secure the two control slide levers in their centered positions and work the two levers to both extremes of travel to see if they operate freely. If it takes much effort to move the levers to any extreme position, proceed with the adjustment that follows.

Control Cable Adjustment: A turnbuckle is located in the right cable from each of the two horizontal slide levers to provide an adjustment for the cable. If either lever must be forced, to move it to either end of the slot, the cable length is not correct. Remove the glove box to gain access to the turnbuckles and adjust them as follows:

1. If the temperature selector lever (upper lever) binds, turn the turnbuckle in the cable to the thermostatic switch. If binding occurs at the left end of the lever slot, adjust the turnbuckle to extend the length of the cable. If binding occurs at the right end of the slot, shorten the cable. *Never turn the turnbuckle more than one full turn from its original position.*
2. If the "Heat-A/C" selector lever (lower lever) binds, turn the turnbuckle in the cable to the heater/air conditioner air door. If binding occurs at the left end of the lever slot, adjust the turnbuckle to extend the length of the cable. If binding occurs at the right end of the slot, shorten the cable. *Never turn the turnbuckle more than one full turn from its original position.*

Caution: If you ever have to disconnect any of the control cables for any reason, never do so without first securing the control slide levers in their centered positions as described previously in step 2 under Installation. And be sure to position all affected components as described in that procedure when you connect the cables. Also test the levers for freedom of operation after the cables are connected.

Q 16-3 c) Nope! The likely cause is a faulty regulator assembly. Besides, you should have tested continuity at the set/speed switch before you took the car out for a road test if you suspected the switch to be at fault!

SPECIFICATIONS

VENTILATING – HEATING – AIR CONDITIONING – RADIO					
Refrigerant 12 Capacity (Pounds)	Current Draw at 12.5 Volts				
	Blower Motor (High Speed)		Radio (A.M.)	Magnetic Clutch	Antenna
	Heater	Air Conditioner			
2-1/4	6-8 Amps	13-16 Amps	0.8 Amp Max.	1.5-3.5 Amps	8 Amps

AIR CONDITIONING COMPRESSOR (ALL CARS)		
Torque Limits (Ft-Lbs)		
Description	Tecumseh	York
Cylinder Head	20 - 24	15 - 23
Front Seal Plate	6 - 10	7 - 13
Service Valve (Rotolock)	25 - 35	25 - 35
Mounting Bolt	20 - 30	20 - 30
Oil Filler Plug	18 - 22	4 - 11
Clutch Mounting	20 - 30	20 - 30
Base Plate		14 - 22
Back Plate		9 - 17

COMPRESSOR OIL CAPACITIES (1)		
Tecumseh	Min. 7/8-inch Max. 1-5/8-inch (11 Fluid Ounces)	
York	Min. 13/16-inch Max. 13/10-inch (10 Fluid Ounces)	
Driven Belt Tension (Between Fan Pulley and Air Conditioner Compressor:	New	140
	Used (2)	110

(1) Use Suniso #5 or Capella E.
(2) Belt Operated for a Minimum of 10 minutes is considered a Used Belt.

RADIO APPLICATIONS			
Car Line	AM Radio	AM/FM Multiplex Radio	AM Radio/Stereo Tape Player
Thunderbird	Philco 8TPS	Bendix F8TBS	Motorola T8MS
Ford	Philco or Motorola 8TPE	Bendix F8TBF	Motorola T8MF
Fairlane, Falcon	Philco 8TPO	Bendix F8TBO	
Mustang	Philco 8TPZ	Bendix F8TBZ	Motorola T8MZ

GROUP 17

BODY, DOORS AND WINDOWS

FORD CAR AND TRUCK

CAR

FRONT BUMPER – THUNDERBIRD

The 1968 Thunderbird has a new two-piece bumper. The bumper has a slotted center section to permit a greater flow of air to the radiator and provide better engine cooling. The lower section of the bumper is painted the same color as the body. The adjusting plate used on last year's model is carried over this year.

Bumper Replacement

1. Raise the vehicle.
2. Remove the bolts and nuts retaining the bumper arms to the frame and remove the complete bumper assembly.
3. Remove the bolts and nuts retaining the bumper arms reinforcement and extension to the upper and lower bumper.
4. Install the extension, bumper arms and reinforcements to the new bumper.
5. Position the complete bumper assembly to the vehicle and install the retaining bolts and nuts.
6. Align, as necessary, and torque the bolts to specifications.
7. Lower the vehicle.

GRILLE – FAIRLANE

The grille replacement for the 1968 Fairlane is slightly more involved than in 1967 because the attaching screws are very hard to gain access to.

GRILLE REPLACEMENT

1. Lift the hood and disconnect the sealed beam unit wires.
2. Remove the bolts attaching the headlamp housings to the body.
3. Remove the bolts attaching the headlamp housings to the headlamp supports.
4. Remove the bolts attaching the grille to the hood lock hook support and the stone deflector.
5. Remove the grille assembly.
6. Remove the headlamp doors, headlamp housings, sealed beam units and grille ornament, and transfer them to the new grille.
7. Position the grille assembly to the body, and install the bolts that attach the grille to the hood lock hook support and stone deflector.
8. Install the bolts that attach the headlamp housings to the body and headlamp supports.
9. Connect the sealed beam unit wires, and close the hood.

VENTLESS DOOR GLASS – FAIRLANE HARDTOPS AND CONVERTIBLE

Ventless door glass is used in the Fairlane hardtop and convertible doors. The bottom of the glass assembly has two guides that fit on tubular vertical runs, and the window moves up and down on these runs. Window adjustment is new, but easy. In fact, you'll be able to make most adjustments without even removing the door trim panel!

Inboard-Outboard Tilt Adjustment

At the bottom surface of the door, you'll find two screws — one near the front of the door and the other near the rear. To adjust the inboard-outboard tilt of the glass, just loosen these two screws. Then run the window full up and move it in or out so it fits properly in the roof rail weatherstrip.

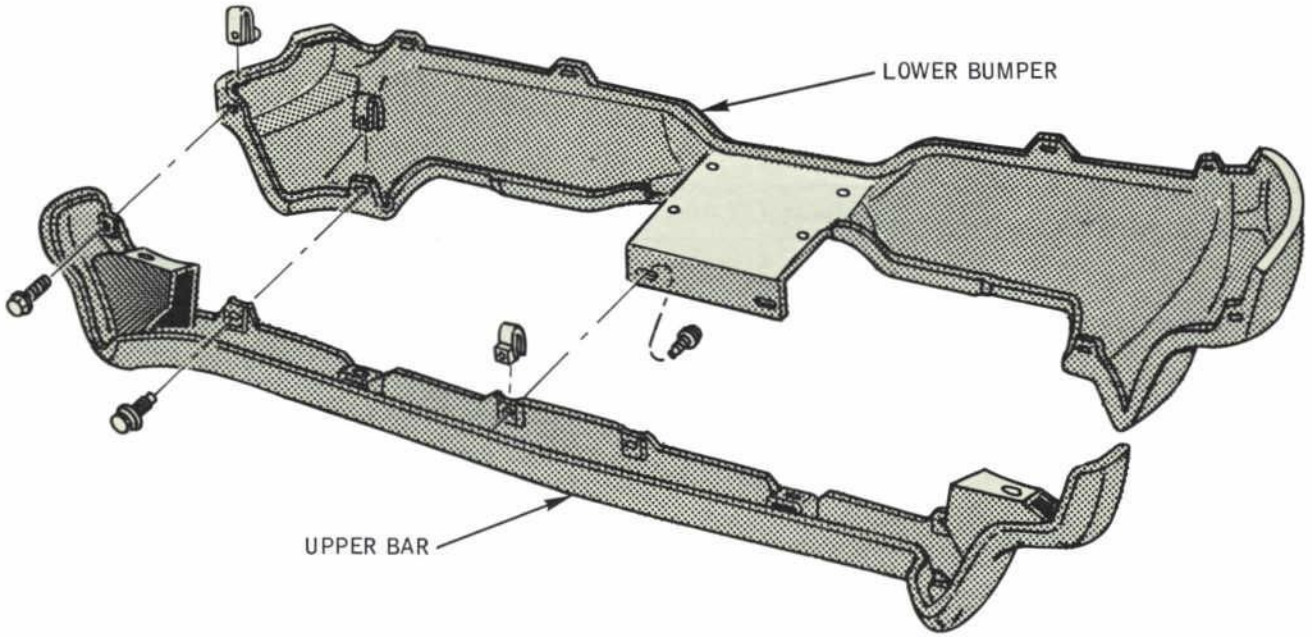
Upper Rear Stop Adjustment

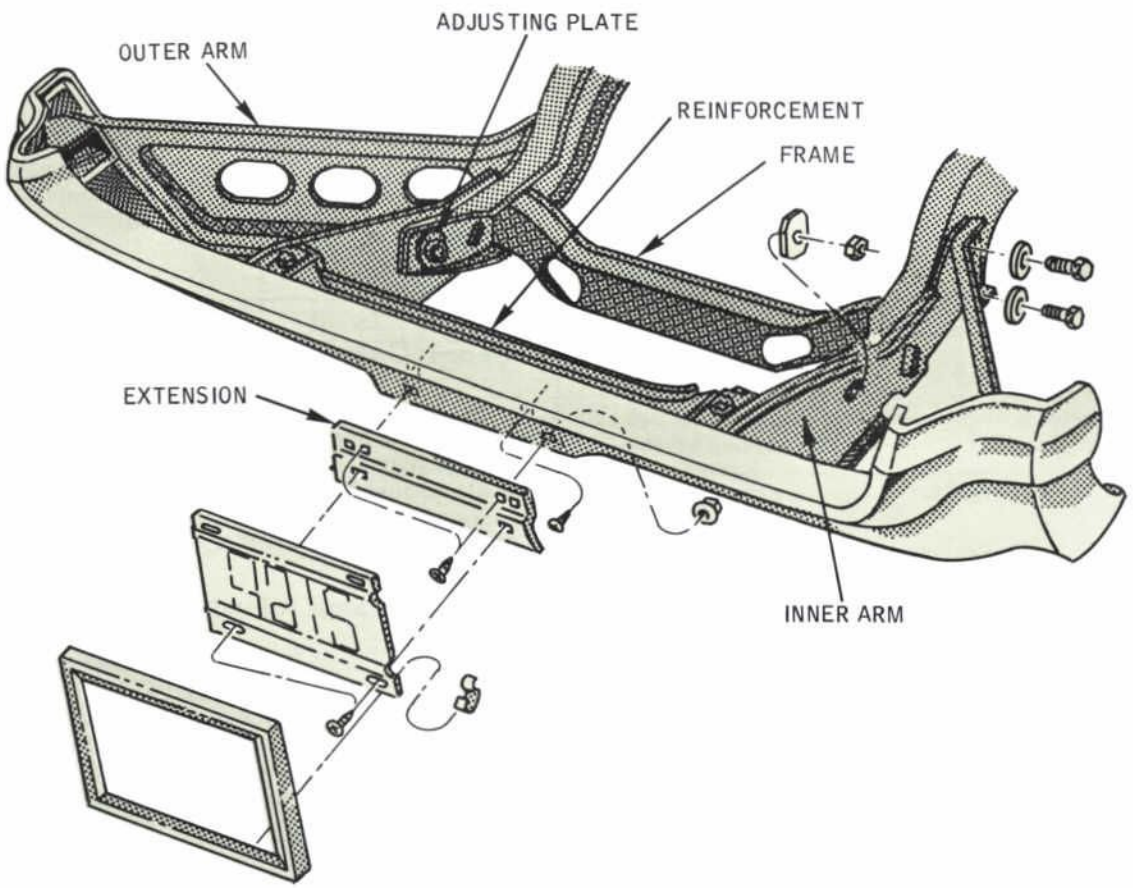
At the rear surface of the door, near the top, you'll see two screws close together in a small cover plate. To adjust the upper rear stop, loosen these two screws and move them and the cover plate up or down to position the stop so the window will fit properly in the vertical direction in the roof rail weatherstrip when it's fully up.

Upper Front Stop Adjustment

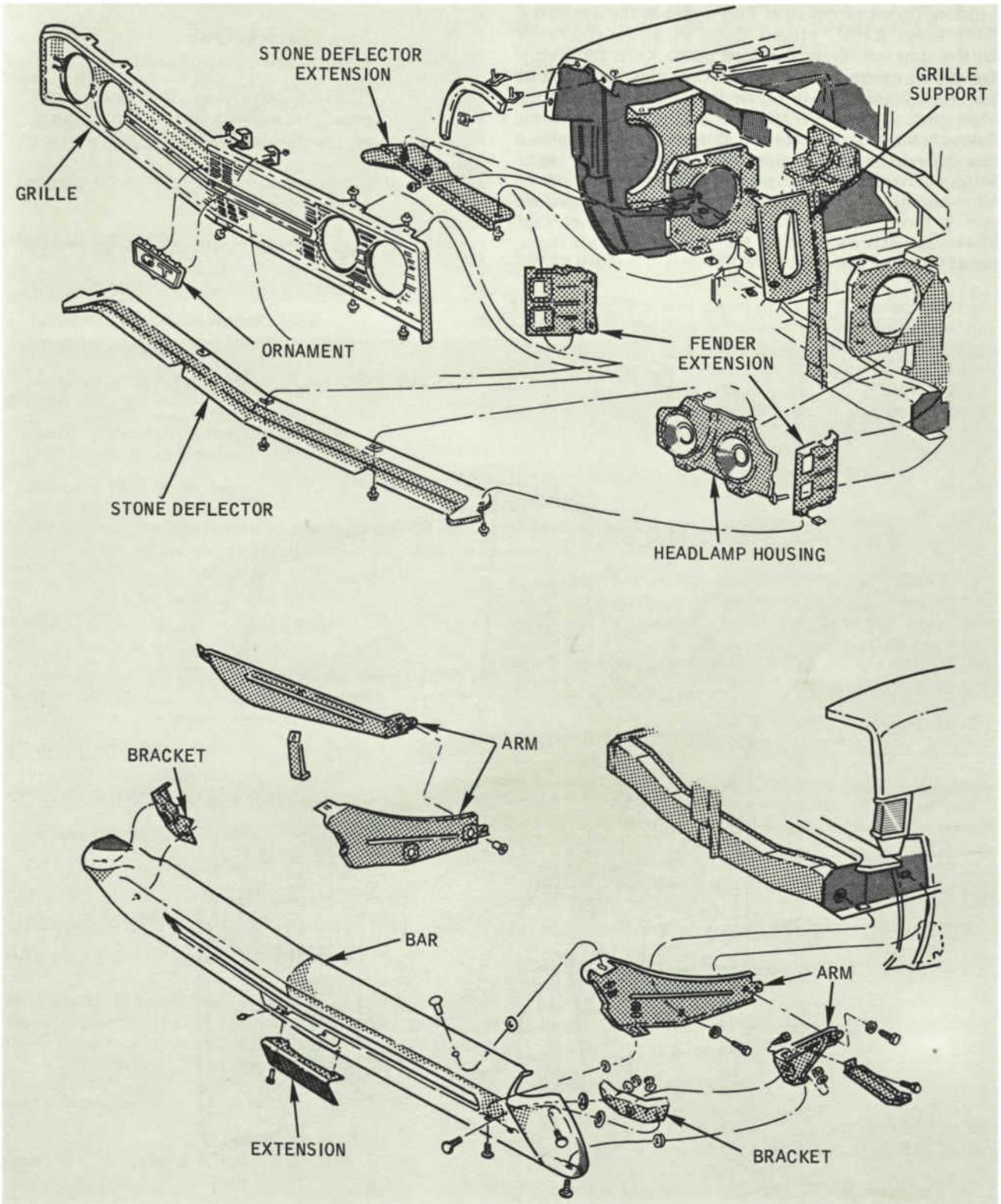
You can make small adjustments to the upper front stop without removing the door trim panel. Run the

Q 8-4 b) You've scored again! Pinching off the vacuum line reduces internal vacuum in the by-pass valve. When you release the line, normal vacuum causes the valve to respond by interrupting airflow to the outlet port or ports.





Front Bumper — Thunderbird



Bumper and Grille – Fairlane

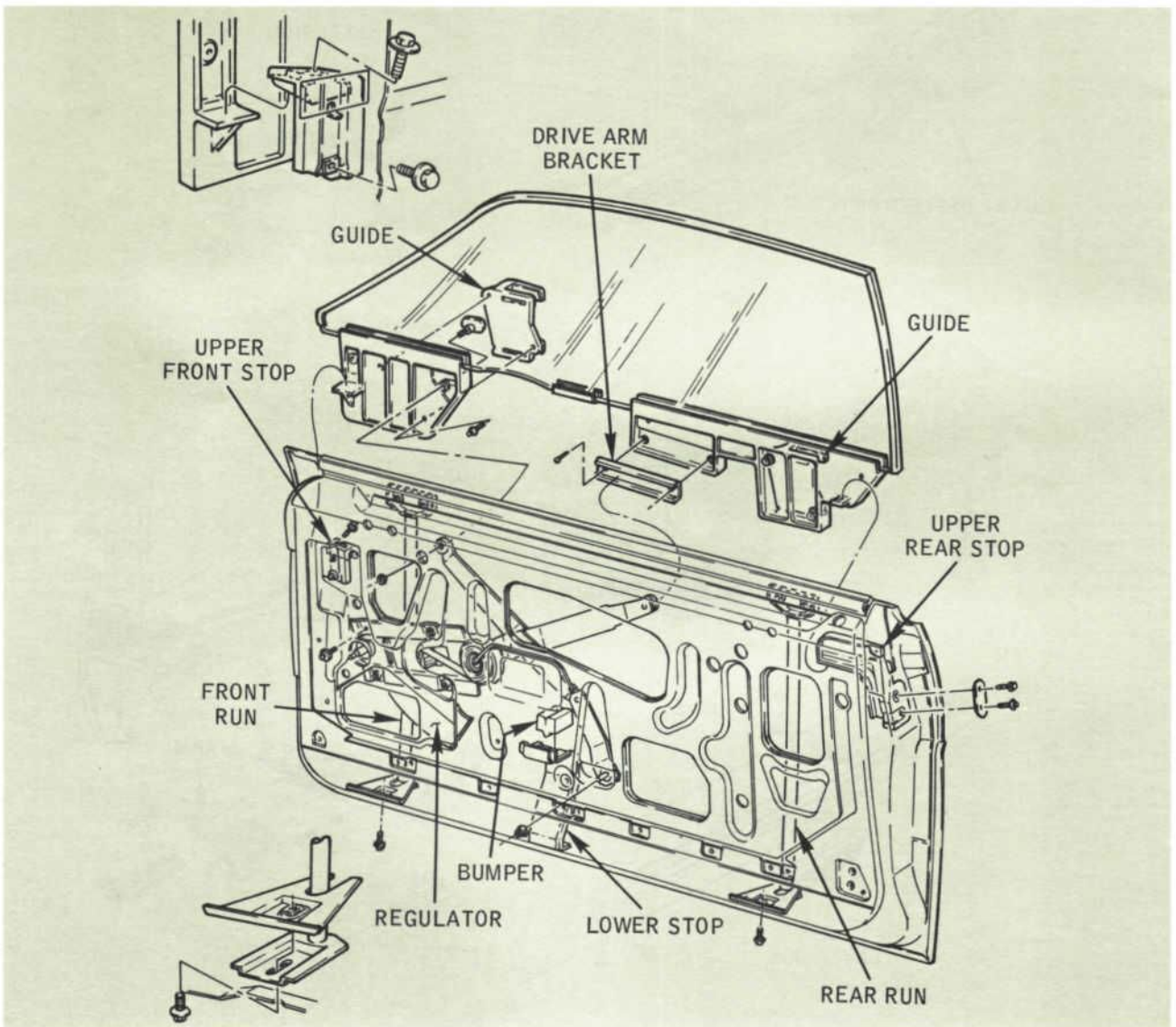
window down and you'll find a slot in the top of the door inner panel, placed there to allow clearance for the stop tab on the forward guide when removing the glass assembly. Below and slightly forward of this slot you'll find a screw in the top of the upper front stop. Insert a 7/16 inch socket and extension through the slot and loosen this screw. Then move the screw forward to raise the stop bumper, or rearward to lower it. This provides a limited range of adjustments — if a greater adjustment is needed, you'll have to remove the door trim panel and loosen the screws holding the stop to the door inner panel to move the stop.

Quick-Quiz

Q 17-1 Without removing the door trim panel, you can adjust the door glass of any Torino GT for proper:

a) inboard - outboard tilt. (See page 121)

b) fore-and-aft position. (See page 84)



Door Window Mechanism — Fairlane Hardtop and Convertible

Q 8-2 c) Yep! On the Thunderjet 429 . . . and other V-8 engines, too . . . it's a good idea to go through the torque tightening sequence a second time after engine heat has caused the parts to "snuggle down!"

Fore-and-Aft Adjustment

Fore-and-aft adjustment of the ventless door glass requires removal of the door trim panel. With the window fully up, you'll be able to get to a nut at the top of the regulator arm through a hole in the door inner panel, near the top front of the door. Loosen this nut and move the glass forward or rearward until it fits the weatherstrip on the front pillar.

Ventless Door Glass Removal

1. Remove the trim panel and watershield.
2. Remove both of the upper stops.
3. Remove both guides.
4. Remove the drive arm bracket from the rear glass assembly.
5. Remove the nut and bolt retaining the regulator arm to the front glass assembly.
6. Remove the glass assembly from the door. To lift the glass assembly free from the door, tilt it slightly and guide the two stop tabs on the bottom of the glass assembly through the slots in the top of the door structure, one at a time.

Ventless Door Glass Installation

1. Position the glass assembly in the door and attach the nut and bolt retaining the regulator arm to the front glass assembly.
2. Install the drive arm bracket to the rear glass assembly.
3. Install both guides and upper stops.
4. Adjust the window as necessary.
5. Install the watershield and trim panel.

QUARTER WINDOW — FAIRLANE HARDTOPS AND CONVERTIBLE

The quarter window mechanism of Fairlane hardtops and convertibles is also new. The glass assembly slides up and down on a tubular run in front and in a conventional channel-and-roller run in the rear. All adjusting points are located under the quarter trim panel.

Inboard-Outboard Tilt Adjustment

With the trim panel removed and the window up, loosen the two screws that attach the bottom of the guide assembly to the body structure. Then move the glass in or out to get the proper fit in the roof rail weatherstrip and tighten the screws.

If the front edge of the window needs to be moved in or out to align it with the door glass, loosen the screw in the top of the tubular run that's accessible through the hole in the forward face of the center pillar near the top and adjust as necessary. It will be necessary to remove the rubber seal at the top of the pillar to gain access to the screw.

Fore-and-Aft Adjustment

With the trim panel removed and the window lowered, loosen the two screws attaching the top of the rear run to the body structure at the top of the run. On some models, you'll have to remove the lower stop on the rear run and lower the window all the way to reach these screws. Then raise the window and move it backward or forward to align it with the door glass. When it's in position, carefully lower it and tighten the screws.

Fore-and-Aft Tilt Adjustment

If necessary, the glass can be tilted forward or backward to align it with the door glass and weatherstrip. With the trim panel removed, loosen the screw that holds the lower end of the regulator arm to the body structure. Then make the desired adjustment and tighten the screw.

Upper Stop Adjustment

The two upper stops are adjustable with the trim panel removed. The upper stops are located at either end of the channel.

Quarter Window Removal

1. Remove the quarter trim panel.
2. Remove the rear regulator arm channel bracket from the glass assembly.
3. Remove the bolts and nut retaining the regulator, and remove the regulator.
4. Remove both upper stops.
5. Remove the lower stop from the rear guide to allow the wheel on the rear glass assembly to be removed from the rear guide.
6. Remove the bolts retaining the front guide to the front glass assembly, and remove the guide.

Q 15-1 a) No! The valve at the front of the headlight switch that routes engine vacuum to open the headlight doors functions in the same way for both the Ford and the Thunderbird systems. Try another answer!

7. Remove the rubber seal assembly at the top front side of the quarter pillar.
8. Remove the front regulator arm channel bracket from the glass assembly.
9. Remove the quarter window belt line weatherstrip.
10. Remove the glass assembly.

Quarter Window Installation

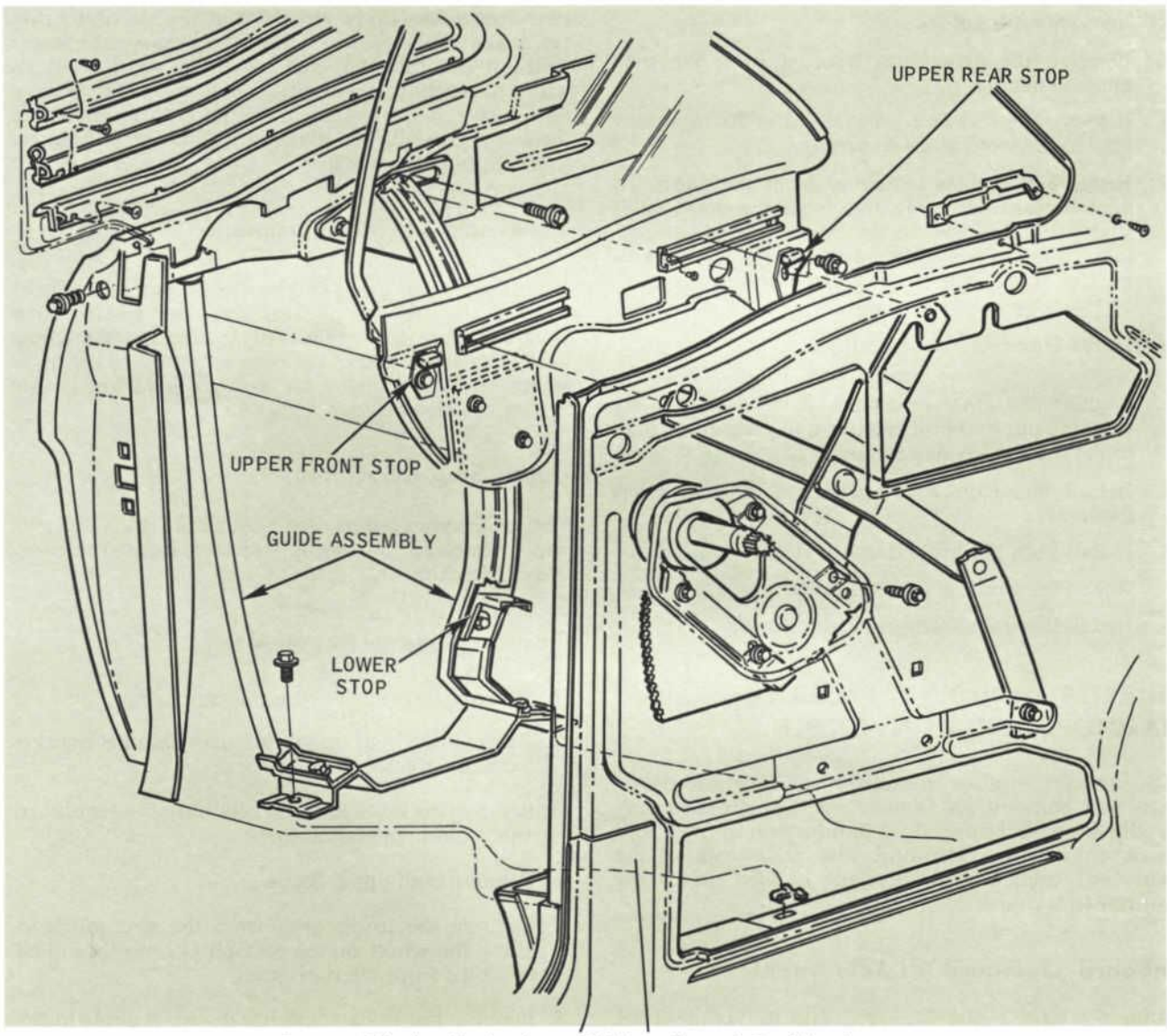
1. Position the new quarter window assembly in the quarter.

Quick-Quiz

Q 17-2 In Fairlane hardtops and convertibles, the quarter window mechanism is similar to the door window mechanism in that:

a) some glass adjustments can be made without removing the trim panel. (See page 48)

b) the front run in both mechanisms is tubular. (See page 92)



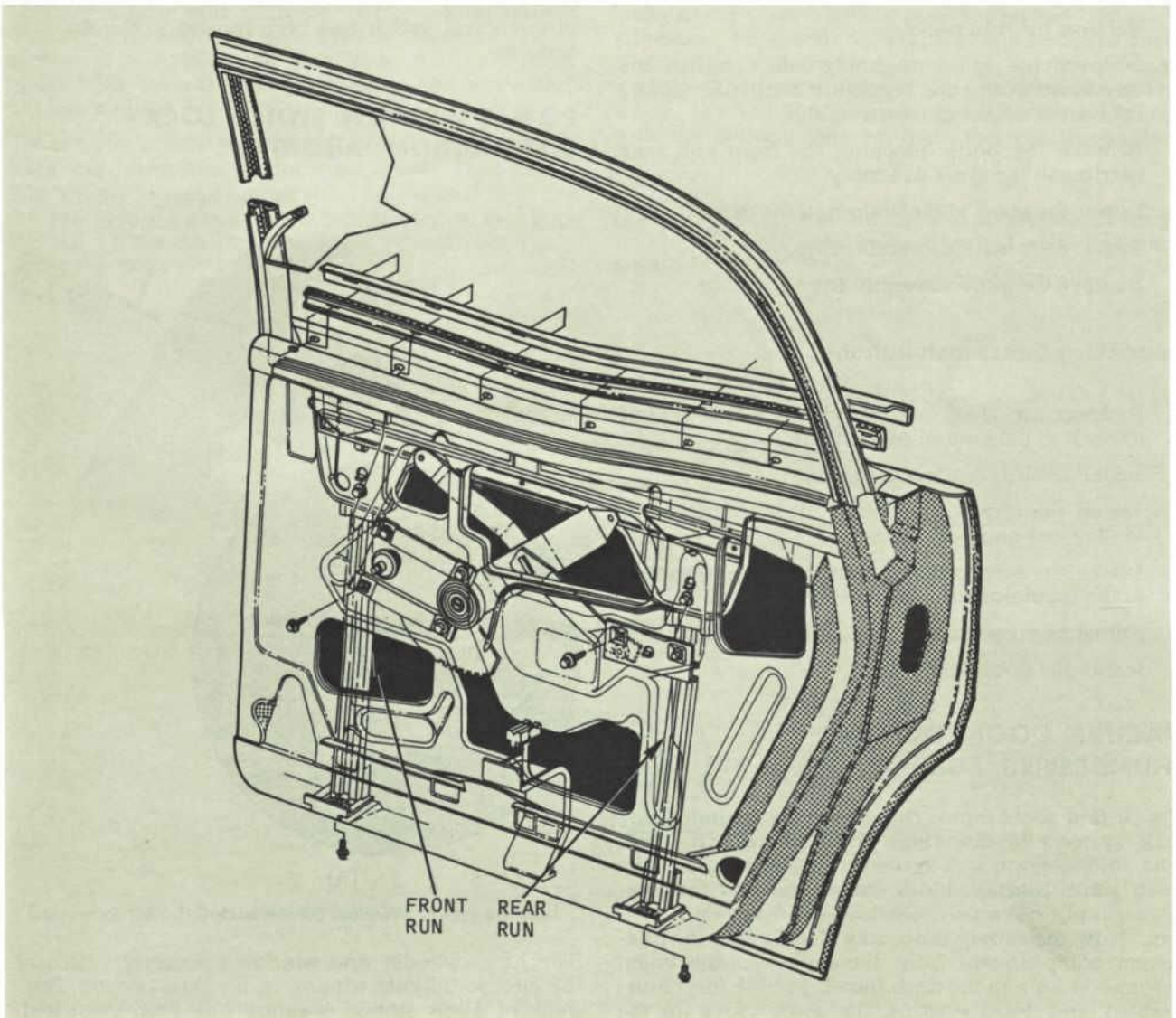
Quarter Window Mechanism — Fairlane Formal Roof Hardtop

Q 17-4 a) That's right! With the exception of this one nut, you can reach all of the attaching parts for the pad from around the outside edges of the pad. It's quick, easy . . . and then it's a snap to get at instrument panel components!

2. Install the belt line weatherstrip.
3. Install the front regulator arm channel bracket.
4. Install the front guide.
5. Position the wheel on the rear glass assembly into the rear run, and install the lower stop.
6. Install the regulator after positioning the front regulator arm wheel in the front regulator arm bracket on the glass assembly.
7. Position the rear regulator arm bracket on the rear regulator arm wheel and attach to glass assembly.
8. Install both upper stops.
9. Install the seal assembly on the quarter pillar.
10. Adjust as necessary.
11. Install the trim panel.

VENTLESS REAR DOOR GLASS — FAIRLANE 4-DOOR SEDANS

Fairlane four-door sedans have a new rear door glass assembly. Unlike last year's Fairlane rear doors, these doors do not have permanent vent windows. Two vertical channel runs guide the window when it is raised or lowered.



Rear Door Window Mechanism — Fairlane 4-Door Sedans

Q 15-2 c) Afraid this doesn't jibe with what's written in the text. There are two relays — one for the two right bulbs, one for the two left bulbs. These relays are in the turn signal relay assembly so that either will indicate a turn while both indicate brake application.

Adjustments

Hard operation of the glass assembly can be relieved without taking off the trim panel. Just loosen the two screws that are accessible at the bottom of the door and run the window up and down a few times. Then tighten the screws.

Fore-and-aft adjustment of the glass assembly requires removal of the trim panel. Then run the glass assembly to its full up position and loosen the four screws in the glass channel that secure the two roller carriers to the channel. Make any necessary adjustment, then tighten the screws.

Rear Door Glass Removal

1. Remove the trim panel.
2. Support the glass assembly and remove the screws attaching the regulator arm roller channel bracket to the glass assembly.
3. Remove the bolts attaching the front and rear carriers to the glass assembly.
4. Lower the glass to the bottom of the door.
5. Remove the belt line weatherstrip.
6. Remove the glass assembly from the door.

Rear Door Glass Installation

1. Position the glass assembly into the door and lower it to the bottom of the door.
2. Install the belt line weatherstrip.
3. Install the screws that retain the glass assembly to the front and rear carriers.
4. Install the screws that retain the glass assembly to the regulator arm channel bracket.
5. Adjust as necessary.
6. Install the door trim panel.

VACUUM DOOR LOCKS – THUNDERBIRD, FORD

You'll find some minor changes in the vacuum door lock systems for the 1968 Thunderbird and Ford. The rolling door lock system is no longer used. The dash panel junction block connections for the vacuum supply have been eliminated on the Ford system. Now the supply hose runs directly into the passenger compartment from the engine compartment through a hole in the dash panel. In both the Thunderbird and Ford systems, the check valve for the vacuum supply system is now located near the top of the cowl in the engine compartment. The Thunderbird control switch has been moved to the driver's armrest.

Quick-Quiz

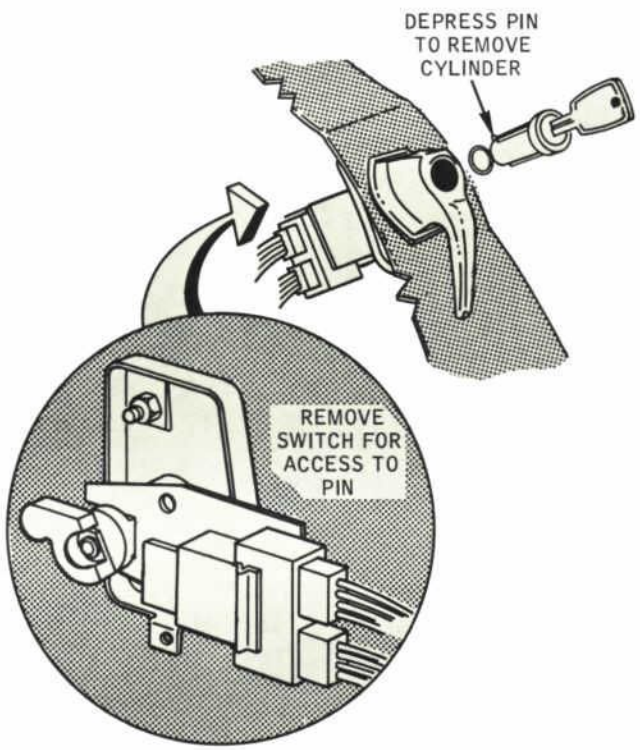
Q 17-3 The rolling door lock feature for Thunderbird and Ford cars with vacuum door locks:

a) is carried over without change for '68. (See page 74)

b) has been extensively modified for '68. (See page 6)

c) was eliminated for '68. (See page 179)

POWER WINDOW SWITCH LOCK – DUAL-ACTION TAILGATES



Tailgate Power Window Switch Lock Cylinder Removed

The lock cylinder and window operating switch of the electric tailgate window in the Dual-Action Tailgate of 1968 station wagons has been relocated. They are now within the outside latch release handle.

Q 16-3 b) No, it isn't! A speed control that "hunts" when it should be holding the car at a steady speed needs service . . . and possibly a new regulator assembly! Check it out with the tests given in this handbook.

Lock Cylinder Removal Tips

You'll have to remove the interior trim panel and access cover from the tailgate and then raise the window to get at the window switch and wiring. To remove the switch from the handle, insert a small steel rod into the two holes in the switch and spread the spring clips outward. Then turn the latch handle to the full clockwise position, depress the cylinder retaining pin at the top of the handle assembly inside the tailgate and remove the cylinder.

BODY TRIM SIDE RAILS – SQUIRE STATION WAGONS

The simulated wood grain side rails of the Ford Country Squire and Fairlane Torino Squire station wagons are attached with hidden fasteners. Each section of the side rails is held to the body sheet metal with several clips and one or two screw and nut assemblies.

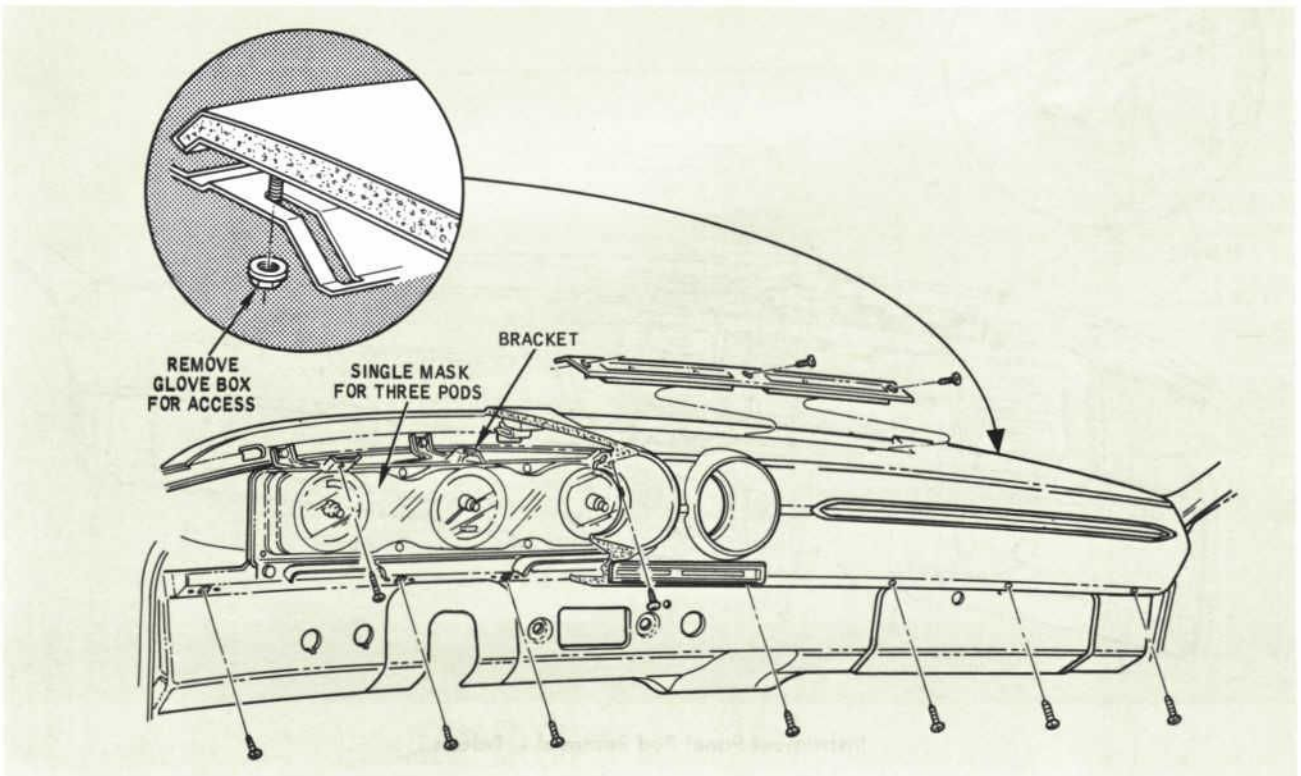
To remove a side rail, first remove the nut or nuts from the underside of the sheet metal. Then slip a thin sheet of vinyl or other suitable material between the rail and the body to protect the finish, and pop the rail off the clips by inserting a screwdriver blade under the rail.

NEW PRESSURE-SENSITIVE WOOD GRAIN TRANSFER FILM

A new pressure-sensitive wood grain transfer film is available from the Autolite-Ford Parts Division in patterns suitable for use in body repairs on 1968 cars to replace the original pressure-sensitive film. On the car, this new film can be identified by a duller appearance with a greater wood grain effect than Di-Noc film. And the brown primer applied to the body under Di-Noc, which is visible around the exposed edges of the film when the body trim side rails are removed, is not used with the new pressure-sensitive film.

You don't need to use adhesive with this new film because it's coated with a special pressure-sensitive adhesive. To install it, you just wet both the back of the film and the prepared body surface with a wetting solution of Liquid Car Wash and warm water, lay the film in place and adjust it to line up with the pattern, then squeegee the wetting solution out from between the film and the panel.

Di-Noc replacement film is also available for body repairs on cars originally trimmed with this material.



Instrument Panel Pad Removal – Fairlane

Q 15-3 c) Sorry, but you're wrong! The set/speed switch for all speed controls except the Thunderbird unit is in the end of the turn signal lever . . . and you'll have to pull the speed control wires from the column to remove the lever.

INSTRUMENT PANEL PAD – FAIRLANE, FALCON

The fully padded upper section of the safety instrument panel in Fairlanes and Falcons extends completely across the width of the car. This pad is designed to collapse uniformly upon severe impact to absorb impact forces. But there is another feature to this padded upper section that should be of interest to you! Removal of this pad exposes many instrument panel components so they are easily accessible for service.

Instrument Panel Pad Removal: Removal of the padded upper section of the instrument panel is quite simple. Just remove the glove box so you can reach in and remove the nut from the stud that secures the forward edge of the pad. Then remove the screws retaining the pad to the panel and remove the pad. You'll find screws in the defroster outlets, under the lip above the instruments, and in the instrument panel moulding — all accessible from outside the instrument panel.

Quick-Quiz

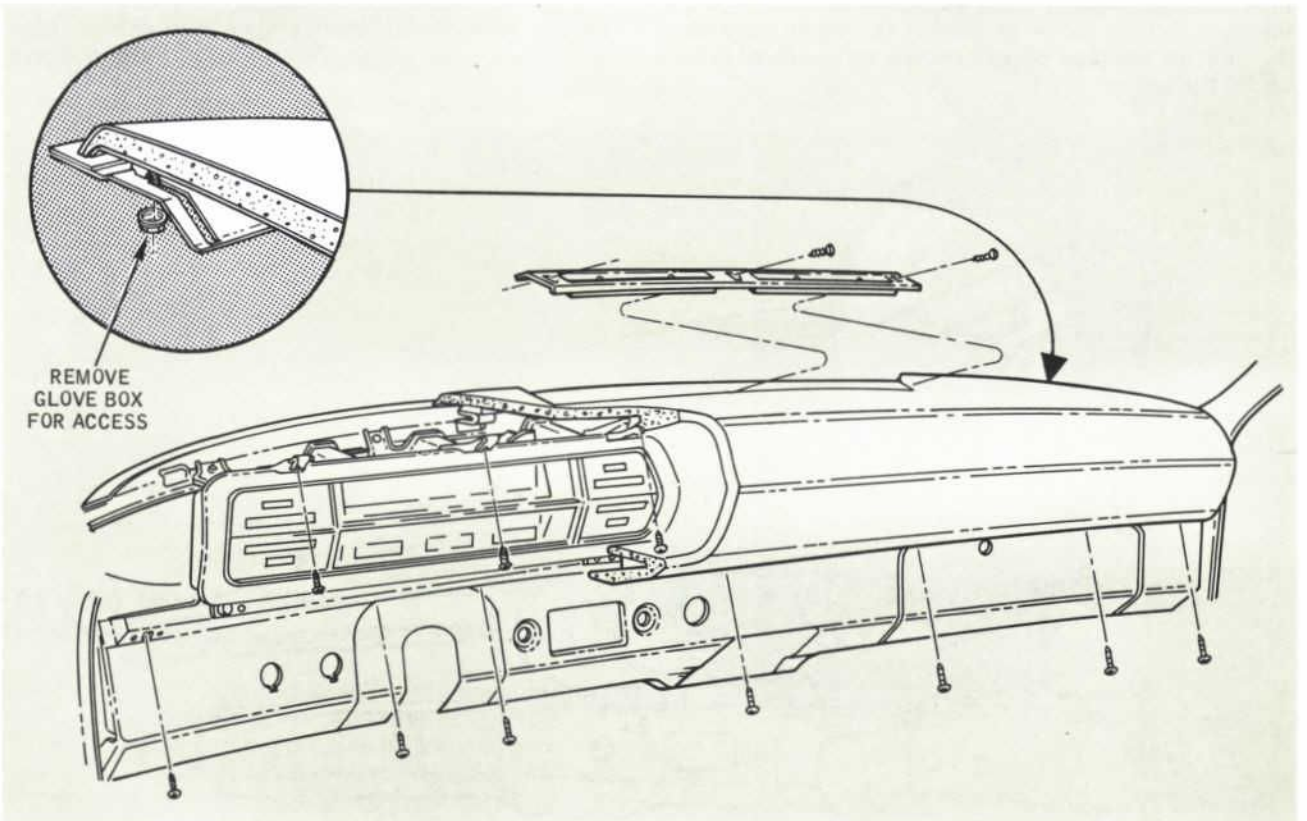
Q 17-4 Before removing the Falcon instrument panel pad, you should remove the glove box so you can reach:

a) one nut at the forward edge of the pad. (See page 192)

b) all of the pad attaching screws. (See page 7)

c) the defroster outlet ducts. (See page 177)

Fairlane Instrument Panel Pad Installation Tip: When positioning the Fairlane instrument panel pad, be sure you guide the locating pin that's in the center of the brow over the instrument cluster in the notched bracket that extends over the instruments.



Instrument Panel Pad Removal – Falcon

Q 15-2 b) That's right! The two relays are in the turn signal relay assembly. Only one is energized to signal a turn, but both are energized to signal brake application. Feed is from the luggage compartment light circuit.

TRUCK

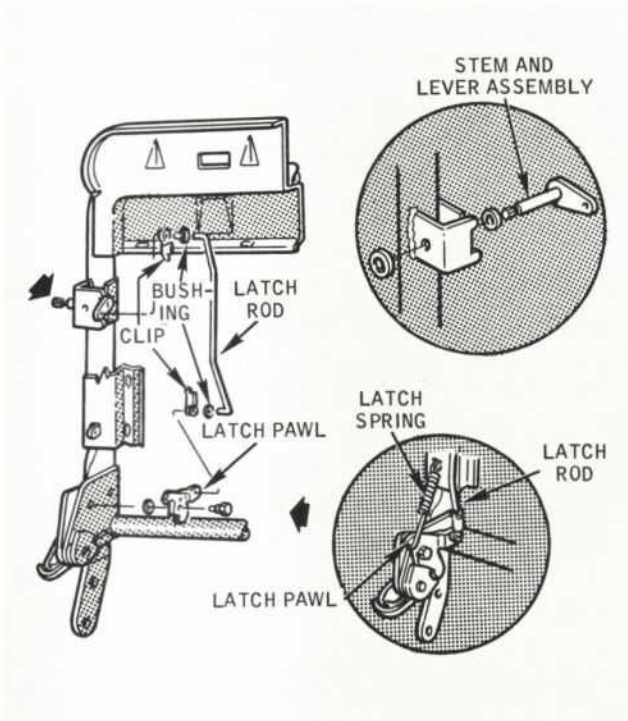
GRILLE AND DOOR GLASS – RANCHERO

The Ranchero grille, like that of its parent Fairlane, is attached in a manner that makes removal and installation more involved than it was last year. And Ranchero's door glass is ventless, like that of the Fairlane hardtop and convertible. Both of these subjects are adequately covered in the car section of this group and should be referred to when servicing the Ranchero grille or door glass.

LOCKING FRONT SEAT BACKS

All folding front seats and the second seat of three-seat station wagons have a safety latch designed to hold the seat back in place in the event of an emergency stop or a crash situation. For rear seat passenger entry and exit, a handle on the side of the seat back releases the safety latch.

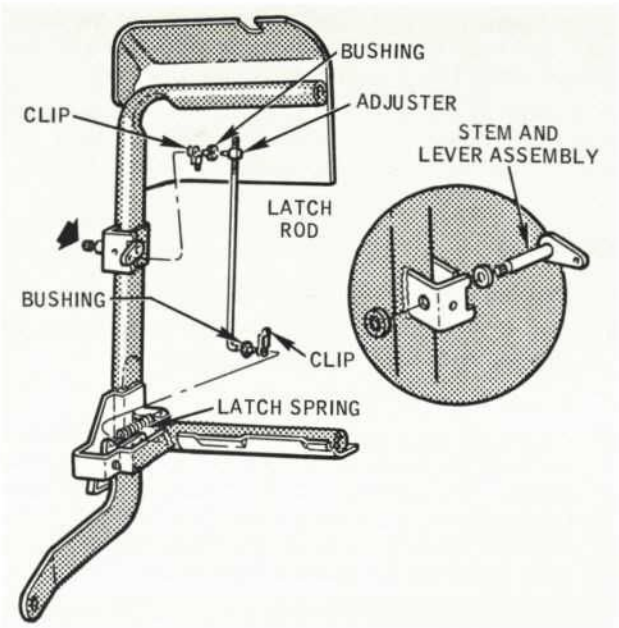
If the seat back will not lock in position or the lock mechanism will not unlock, remove the seat back trim cover far enough to inspect the locking mechanism. Then replace any broken parts and tighten any loose parts to put the locking system in proper working order.



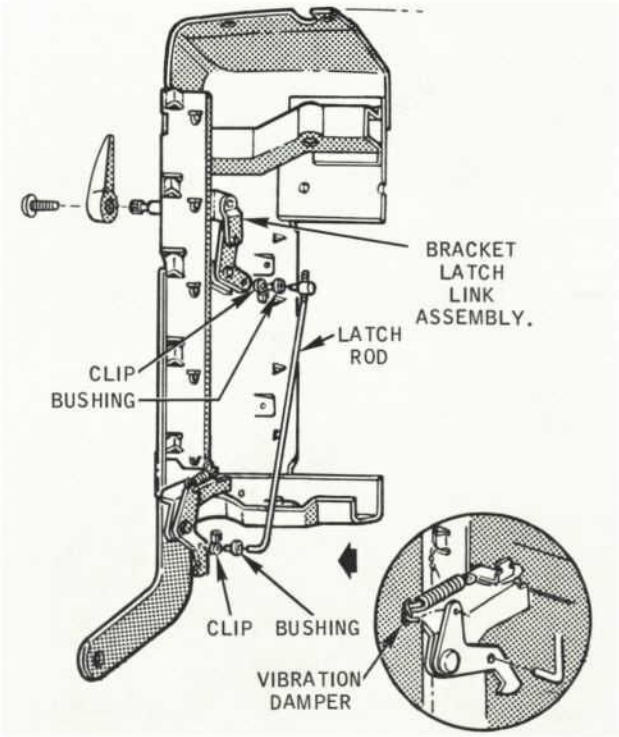
Seat Back Locking Mechanism – Typical of Split Bench Seat Back

MANUALLY ADJUSTABLE HEADRESTS – FORD

Manually adjustable headrests are available in the 1968 Ford. The headrest is supported in the top of the front seat back by two guide rods. Nuts on the underside of the headrest provide adjustment points



Seat Back Locking Mechanism – Typical of Bench Seat Back



Seat Back Locking Mechanism – Typical of Bucket Seat Back

Q 15-2 a) One relay? Not really! Thunderbird's supplemental stop/turn signal light system has *two* relays in the turn signal relay assembly. One relay energizes the two right bulbs, the other relay energizes the two left bulbs.

for the guide rods. The right rod (as viewed from behind the seat) is adjustable both vertically and horizontally, while the left rod is adjustable only vertically. Consequently, you can adjust either rod to compensate for a tilted appearance of the headrest, but only the right rod can be adjusted to relieve a bind caused by the rods not being parallel.

If a bind in the guide rods cannot be eliminated by adjusting them, you'll have to check for bent rods and problems in the components in the seat back.

Removal

1. Pull the headrest up and off the seat back.
2. Use a 9/16 inch allen wrench to unscrew the sleeves from the top of the seat back.
3. Remove the seat back cover.
4. On bench seat backs, remove the two bolts and washers holding each bracket to the seat back frame, and remove the two bracket assemblies. On bucket seat backs, remove the nut and washer holding each guide bolt to the seat back structure, and remove the two guide bolts.

Quick-Quiz

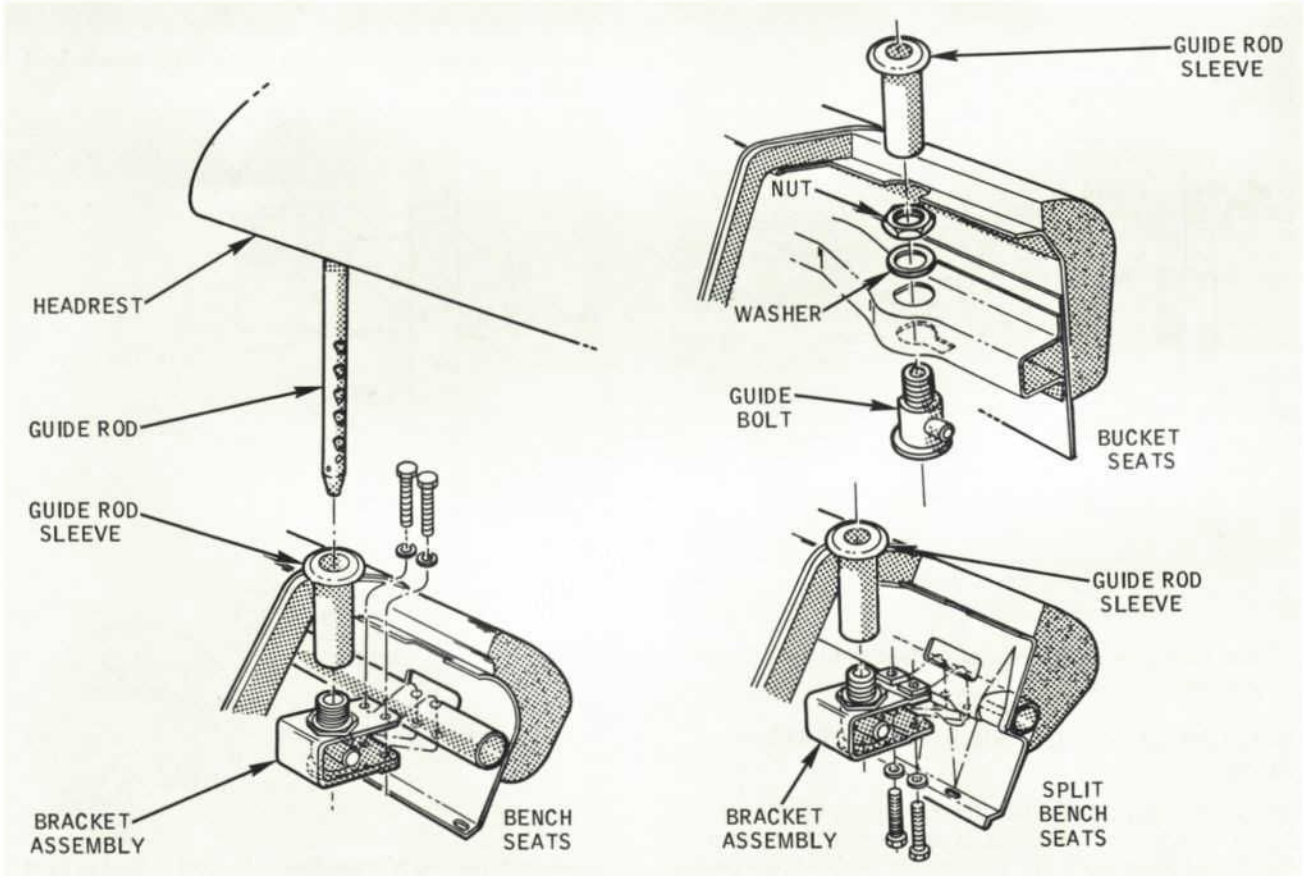
Q 18-1 If you encounter a bind in the manually adjustable headrest in a '68 Ford, you can probably eliminate it by adjusting the:

a) right guide rod. (See page 170)

b) left guide rod. (See page 59)

Installation

1. Install the two bracket assemblies (bench seats) or guide bolts (bucket seats).
2. Install the seat back cover.
3. Install the two sleeves in the top of the seat back.
4. Install the headrest and check for proper operation.



Manually Adjustable Headrests — Ford

Q 15-1 c) Nope! To open the headlight doors manually on either the Ford or the Thunderbird, pull the headlight switch to "On" and move the doors open by hand. To close 'em, put the switch in "Off" or "Park" and push the doors closed.

TRUCK

LOCKING SEAT BACKS – BRONCO, RANCHERO

Bronco and Ranchero folding seat backs are equipped with safety latches like those described in the car section of this group. To service the locking seat backs, follow the instructions given in the previous section.

Ford

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