
DESCRIPTION AND OPERATION

Engine

Engine Component View

The concept of modularity allows engine designs to share concepts and hardware. The following illustration represents the basic cross-sectional view of a modular V10 engine. The four modules are:

- intake module
- cylinder head module (RH)
- cylinder head module (LH)
- lower engine module

Due to the modular design, most out-of-vehicle repairs benefit in reduction of time and labor needed to repair the engine.

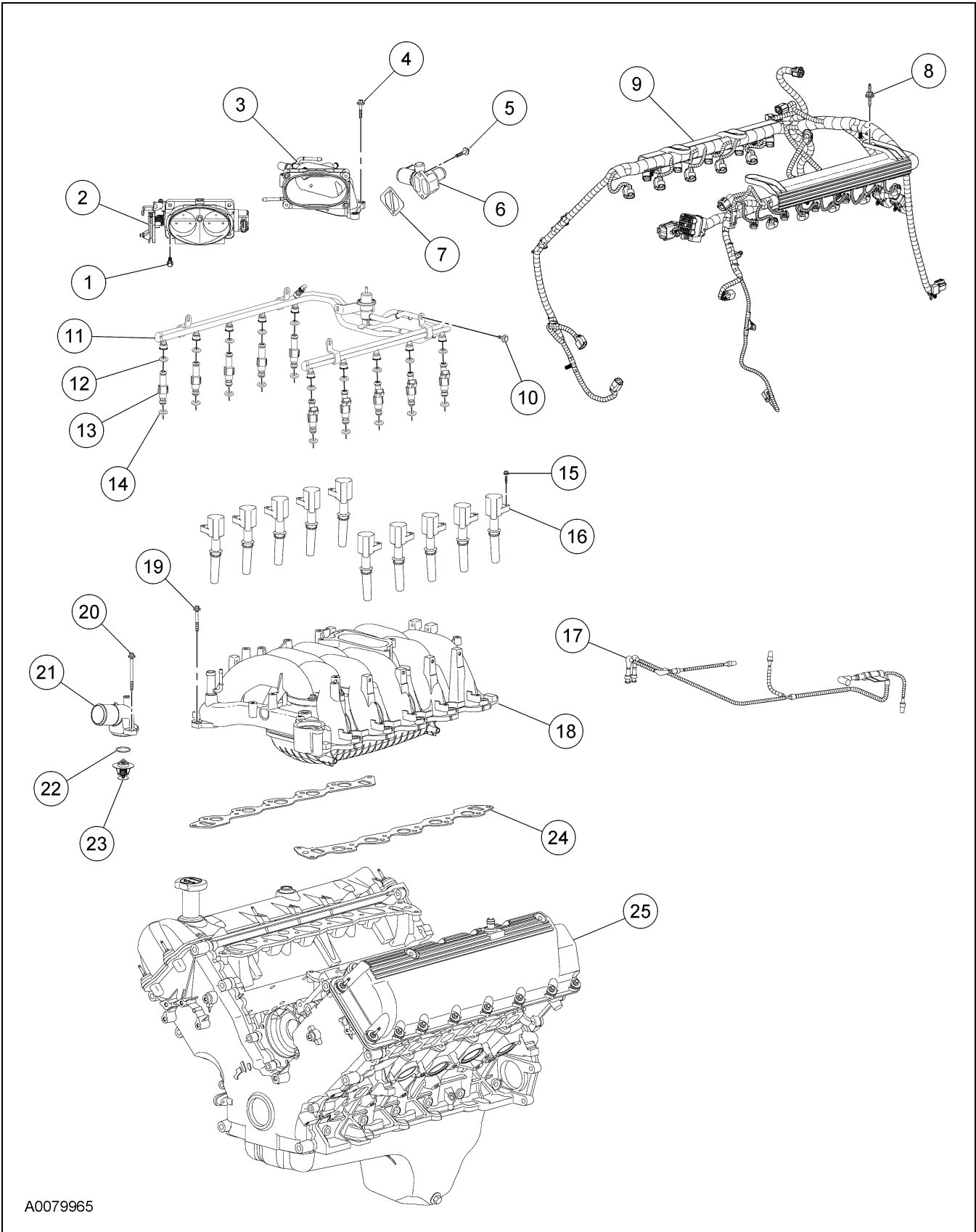
Bi-fuel vehicles differ from gasoline vehicles through the addition of hardened valves and valve seats.

The basic engine components consist of:

- single overhead camshafts
- two valves per cylinder
- balance shaft
- sequential multiport fuel injection (SFI)
- aluminum cylinder heads
- cast-iron, 90-degree V-cylinder block
- individual ignition coils for each spark plug
- two-piece intake manifold system
- composite-material lower intake manifold
- large-bore throttle body

DESCRIPTION AND OPERATION (Continued)

Engine Intake Components



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DESCRIPTION AND OPERATION (Continued)

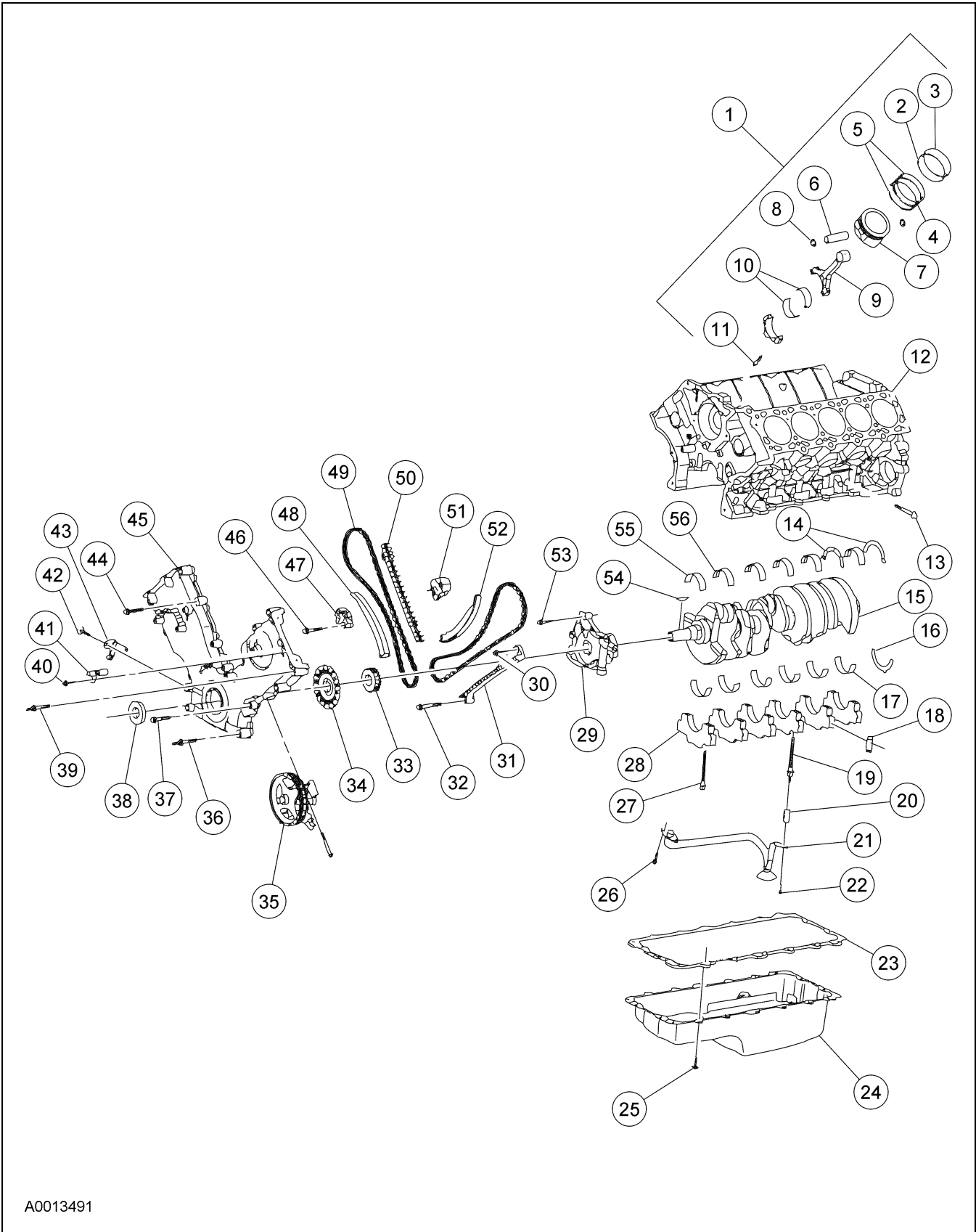
Item	Part Number	Description
1	N605894	Bolt (4 req'd)
2	9E926	Throttle body (TB)
3	9A589	TB adapter
4	N808598	Bolt (4 req'd)
5	N808598	Bolt (2 req'd)
6	9F715	Idle air control (IAC) valve
7	9D460	IAC valve gasket
8	N806155	Bolt (4 req'd)
9	12B637	Fuel charging wiring
10	N807309	Bolt (4 req'd)
11	9F792	Fuel injection supply manifold
12	—	Fuel injector upper O-ring seal (10 req'd)
13	9F593	Fuel injector (10 req'd)

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Item	Part Number	Description
14	—	Fuel injector lower O-ring seal (10 req'd)
15	N606500	Bolt (10 req'd)
16	12A366	Ignition coil (10 req'd)
17	9E498	Vacuum harness
18	9424	Intake manifold
19	N806156	Bolt (11 req'd)
20	N806178	Bolt (2 req'd)
21	8594	Water outlet housing
22	N806807	O-ring seal
23	8575	Thermostat
24	9439	Intake manifold gasket (2 req'd)
25	6010	Cylinder block

DESCRIPTION AND OPERATION (Continued)

Low End Components



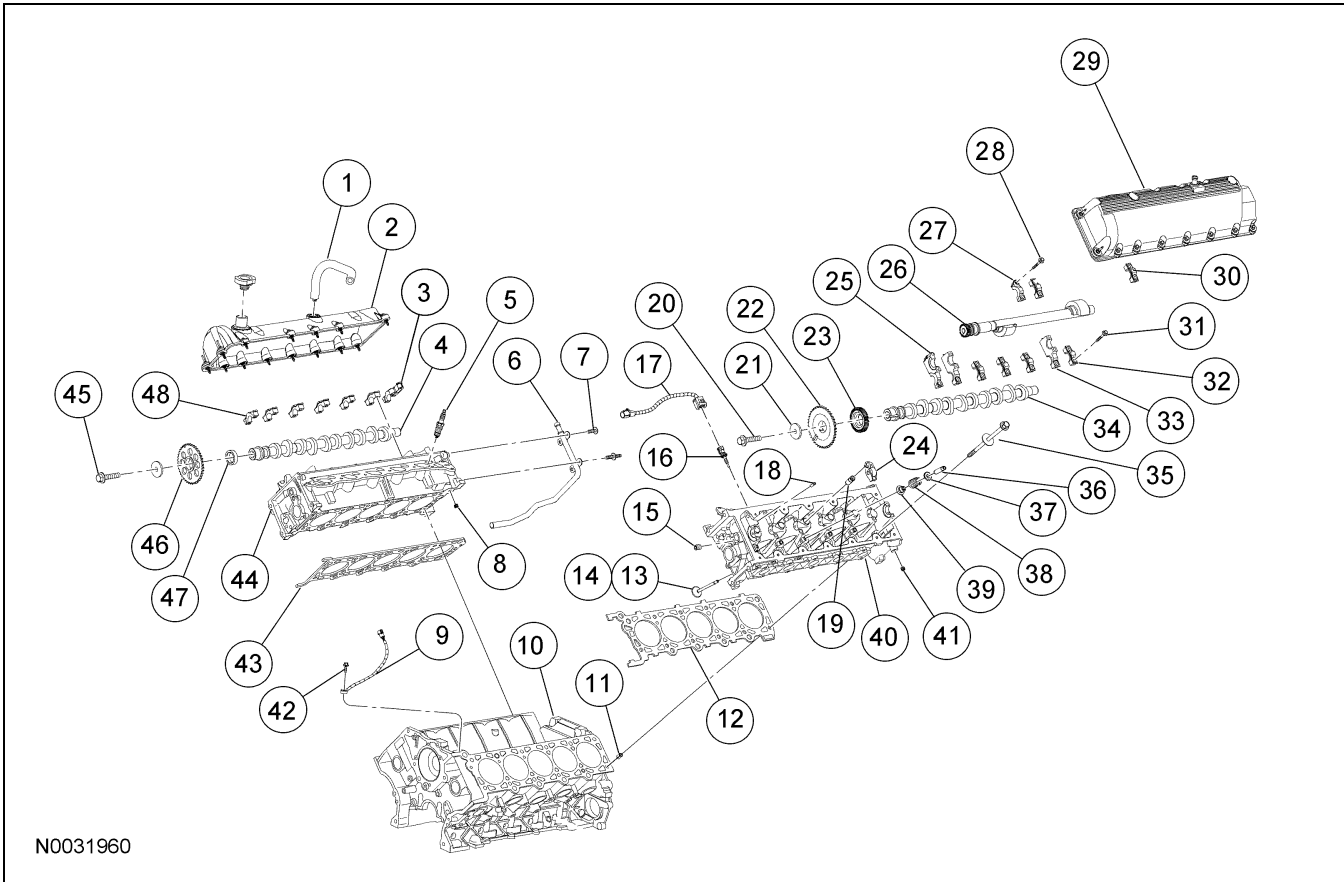
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DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1	6100	Piston and rod assembly (10 req'd)
2	6152	Compression ring, lower (10 req'd)
3	6150	Compression ring, upper (10 req'd)
4	6161	Oil control ring, center (10 req'd)
5	6159	Oil control ring, outer (20 req'd)
6	6135	Piston pin (10 req'd)
7	6110	Piston (10 req'd)
8	6140	Piston pin retainer clip (20 req'd)
9	6200	Connecting rod assembly (10 req'd)
10	6211	Connecting rod bearing (20 req'd)
11	6214	Bolt (20 req'd)
12	6010	Cylinder block
13	6C357	Side bolt (12 req'd)
14	6A431	Upper crankshaft thrust washer (2 req'd)
15	6303	Crankshaft
16	6K302	Lower crankshaft thrust washer
17	6A338	Lower crankshaft main bearing (6 req'd)
18	6A346	Spacer (12 req'd)
19	6K258	Stud bolt
20	N806180	Spacer
21	6622	Oil pump screen cover and tube
22	N605904	Bolt
23	6710	Oil pan gasket
24	6675	Oil pan
25	W701605	Bolt (18 req'd)

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Item	Part Number	Description
26	N806155	Bolt (2 req'd)
27	6345	Bolt (11 req'd)
28	6325	Main bearing cap (6 req'd)
29	6621	Oil pump
30	N605892	Bolt (3 req'd)
31	6B274	Timing chain guide
32	N606527	Bolt
33	6306	Crankshaft sprocket
34	12A227	Ignition pulse wheel
35	N806176	Bolt (3 req'd)
36	N808529	Stud bolt (2 req'd)
37	N806177	Bolt (5 req'd)
38	6700	Crankshaft front seal
39	N808140	Stud bolt (5 req'd)
40	N806155	Bolt
41	6B288	Camshaft position sensor
42	N806155	Bolt
43	6C315	Crankshaft position sensor
44	N808142	Bolt (3 req'd)
45	6C086	Engine front cover
46	N606543	Bolt (4 req'd)
47	6L266	Timing chain tensioner — RH
48	6K255	Timing chain tensioner arm
49	6268	Timing chain (2 req'd)
50	6M256	Timing chain guide
51	6M269	Timing chain tensioner
52	6M274	Timing chain tensioner arm
53	N806183	Bolt (3 req'd)
54	N806201	Woodruff key
55	6W337	Upper front crankshaft main bearing
56	6333	Upper crankshaft main bearing (5 req'd)

DESCRIPTION AND OPERATION (Continued)**Upper End Components**

Item	Part Number	Description
1	6C342	Crankcase ventilation tube
2	6582	Valve cover — RH
3	6B284	Camshaft bearing cap — RH
4	6250	Camshaft — RH
5	12405	Spark plug (10 req'd)
6	18663	Water outlet tube
7	N808897	Bolt (2 req'd)
8	87836	Hollow dowel (2 req'd)
9	12A699	Knock sensor
10	6010	Cylinder block
11	W704688	Hollow dowel (4 req'd)
12	6083	Cylinder head gasket — LH
13	6505	Exhaust valve (10 req'd)
14	6507	Intake valve (10 req'd)
15	87838	Pipe plug (6 req'd)
16	6G004	Cylinder head temperature (CHT) sensor
17	14B102	CHT sensor jumper harness
18	6F087	Dowel
19	6C501	Valve tappet (20 req'd)

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Item	Part Number	Description
20	N811085	Bolt
21	—	Washer (2 req'd)
22	6256	Camshaft sprocket — LH
23	6A303	Balance shaft drive gear
24	6529	Rocker arm (20 req'd)
25	6C272	Camshaft bearing cap — LH
26	6A305	Balance shaft
27	6C267	Balance shaft bearing cap
28	N808777	Bolt (6 req'd)
29	6A505	Valve cover — LH
30	6C266	Balance shaft bearing cap (2 req'd)
31	N807834	Bolt (26 req'd)
32	6B280	Camshaft bearing cap — LH (4 req'd)
33	6C266	Camshaft bearing cap — LH (2 req'd)
34	6A274	Camshaft — LH
35	6065	Head bolt (24 req'd)
36	6518	Valve key (40 req'd)

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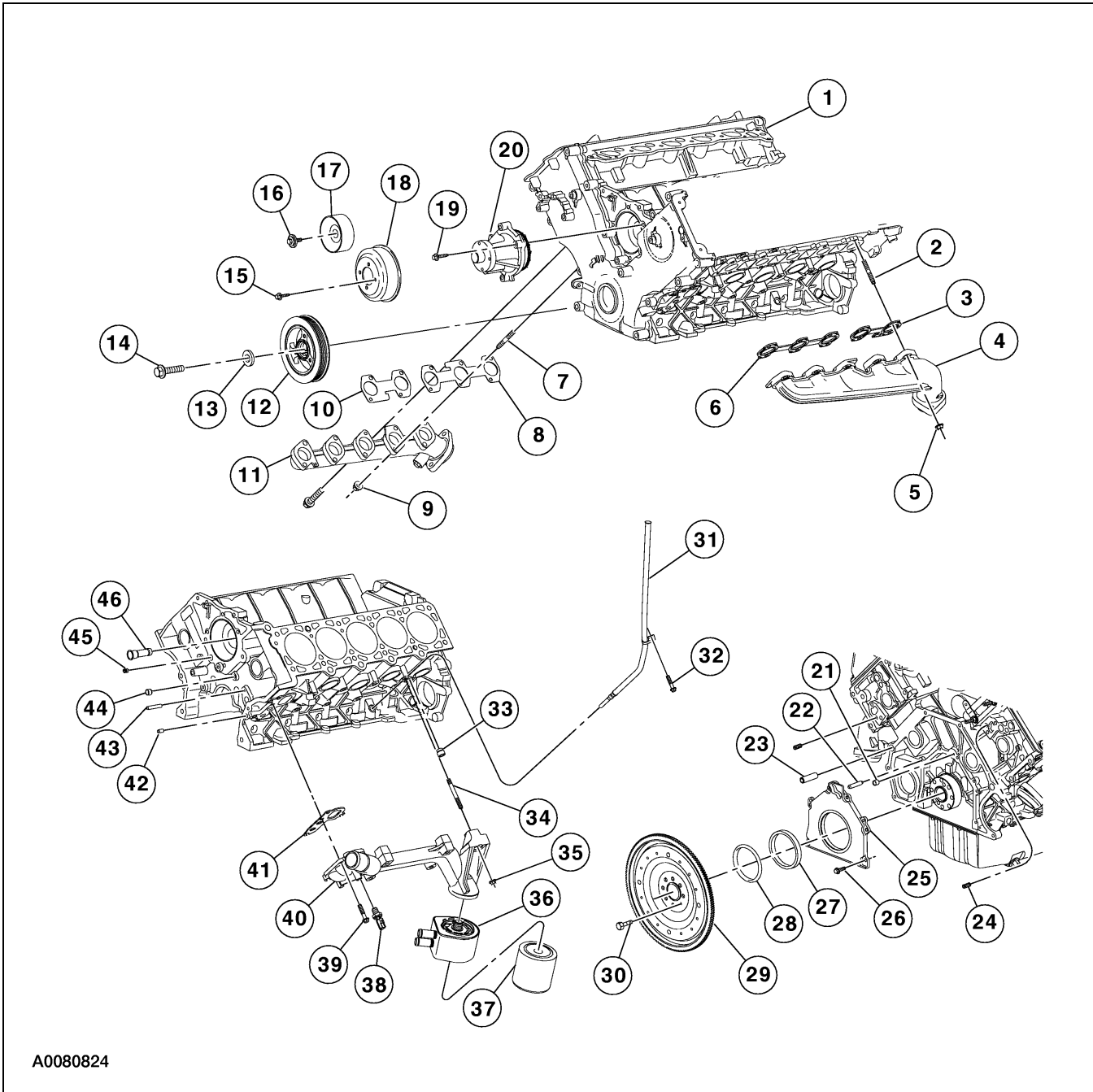
DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
37	6514	Valve spring retainer (20 req'd)
38	6513	Valve spring (20 req'd)
39	6A517	Valve stem seal (20 req'd)
40	6050	Cylinder head — LH
41	87836	Pipe plug (2 req'd)
42	W500225	Bolt

Item	Part Number	Description
43	6051	Cylinder head gasket — RH
44	6049	Cylinder head — RH
45	N811085	Bolt
46	6256	Camshaft sprocket — RH
47	6266	Spacer
48	6B280	Front camshaft bearing cap — RH (6 req'd)

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Major Exterior Components



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DESCRIPTION AND OPERATION (Continued)

Item	Part Number	Description
1	6010	Cylinder block
2	N811313	Stud (10 req'd)
3	9Y430	Exhaust manifold gasket — LH rear
4	9429	Exhaust manifold — LH
5	W701706	Nut (10 req'd)
6	9Y431	Exhaust manifold gasket — LH front
7	W701681	Stud (10 req'd)
8	9Y431	Exhaust manifold gasket — RH rear
9	W701706	Nut (10 req'd)
10	9Y430	Exhaust manifold gasket — RH front
11	9428	Exhaust manifold — RH
12	6316	Crankshaft damper
13	N806165	Washer
14	N806139	Bolt
15	N8066282	Bolt (4 req'd)
16	N808102	Bolt
17	19A216	Idler pulley
18	8A528	Water pump pulley
19	N808794	Bolt (4 req'd)
20	8051	Water pump
21	N808315	Pipe plug
22	N806007	Dowel

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Item	Part Number	Description
23	N807198	Hollow dowel (2 req'd)
24	N87836	Dowel (2 req'd)
25	6K318	Crankshaft rear seal retainer plate
26	N806155	Bolt (5 req'd)
27	6701	Crankshaft rear seal
28	6310	Crankshaft rear oil slinger
29	6375	Flexplate
30	—	Bolt (8 req'd)
31	6K873	Oil level indicator tube
32	N806155	Bolt
33	391186	Pipe plug
34	W704787	Stud
35	N620482	Nut
36	6A642	Oil cooler
37	6714	Oil bypass filter
38	9278	Oil pressure sensor
39	N806156	Bolt (4 req'd)
40	6884	Oil filter adapter
41	6A636	Oil filter adapter gasket
42	N806007	Dowel (2 req'd)
43	N806040	Dowel (2 req'd)
44	N806435	Pipe plug (2 req'd)
45	87836	Pipe plug
46	18B402	Water outlet tube