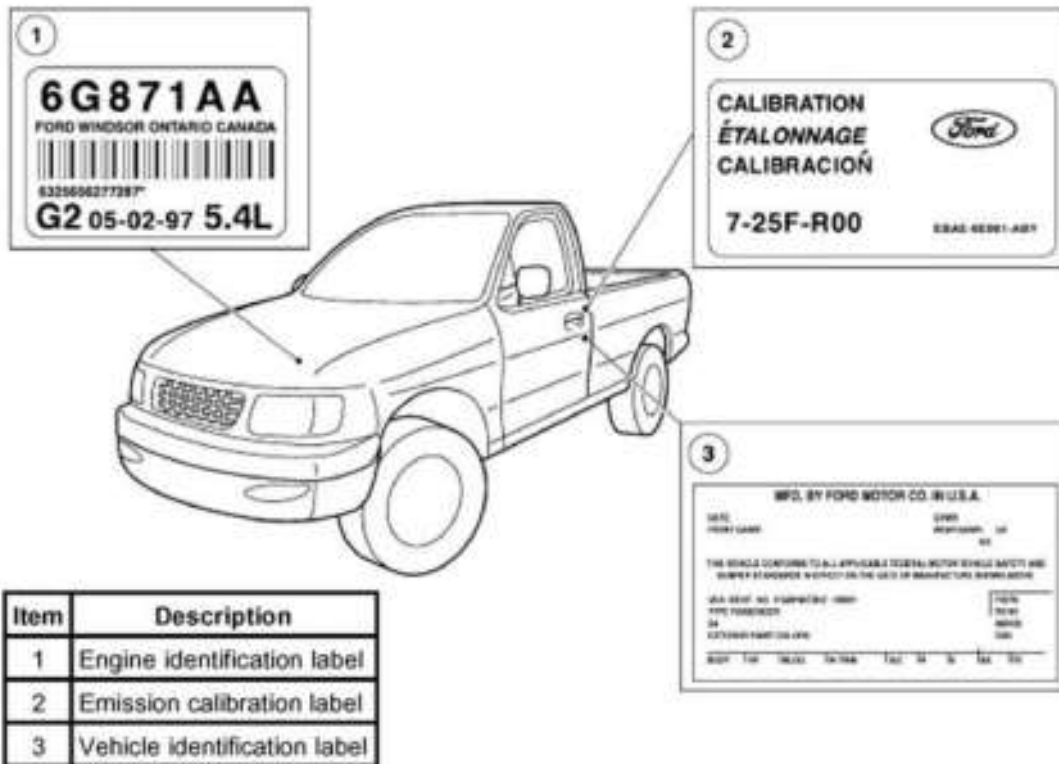


# DESCRIPTION AND OPERATION

## ENGINE



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**Fig. 1: Engine Labels**

Courtesy of FORD MOTOR CO.

## ENGINE COMPONENT VIEW

The concept of modularity allows engine designs to share communization between concepts and engine hardware. The four modules are the:

- Intake module
- Cylinder head module (RH)
- Cylinder head module (LH)
- Lower engine module

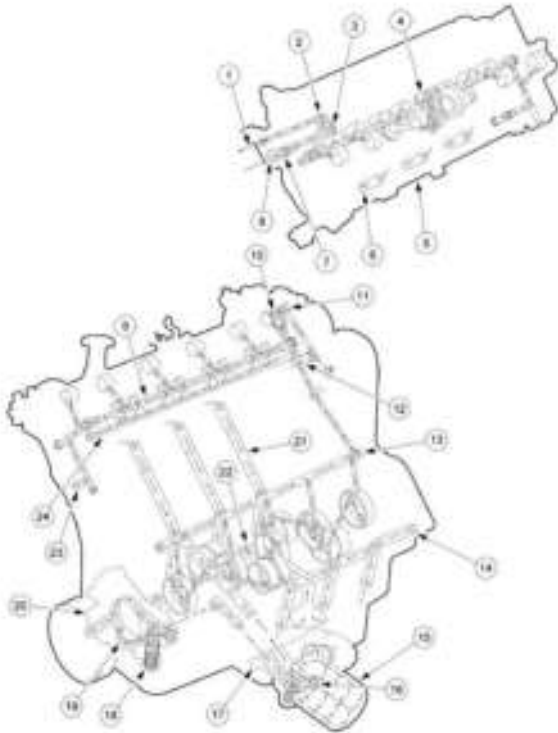
The modular engine concept supports efficiencies during repairs by allowing the removal and installation of these modules. While not all in-vehicle repairs can take advantage of the modular concept, most out-of-vehicle repairs benefit in reduction of time and labor needed to repair the engine.

The basic engine components consist of:

- Single overhead camshafts
- Two valves per cylinder
- Sequential multiport fuel injection (SFI)

- Aluminum cylinder heads
- A cast aluminum, 90-degree V-cylinder block (4.6L engines, early build)
- A cast iron, 90-degree V-cylinder block (4.6L engines, late build)
- A cast iron, 90-degree V-cylinder block (5.4L engines)
- Individual ignition coils for each spark plug
- A two-piece intake manifold system with an aluminum upper and composite-material lower intake manifold with noise insulator (4.6L engines)
- A composite-material intake manifold with noise insulator and aluminum cross-over tube (5.4L engines)
- A large-bore throttle body

## **Engine Lubrication**

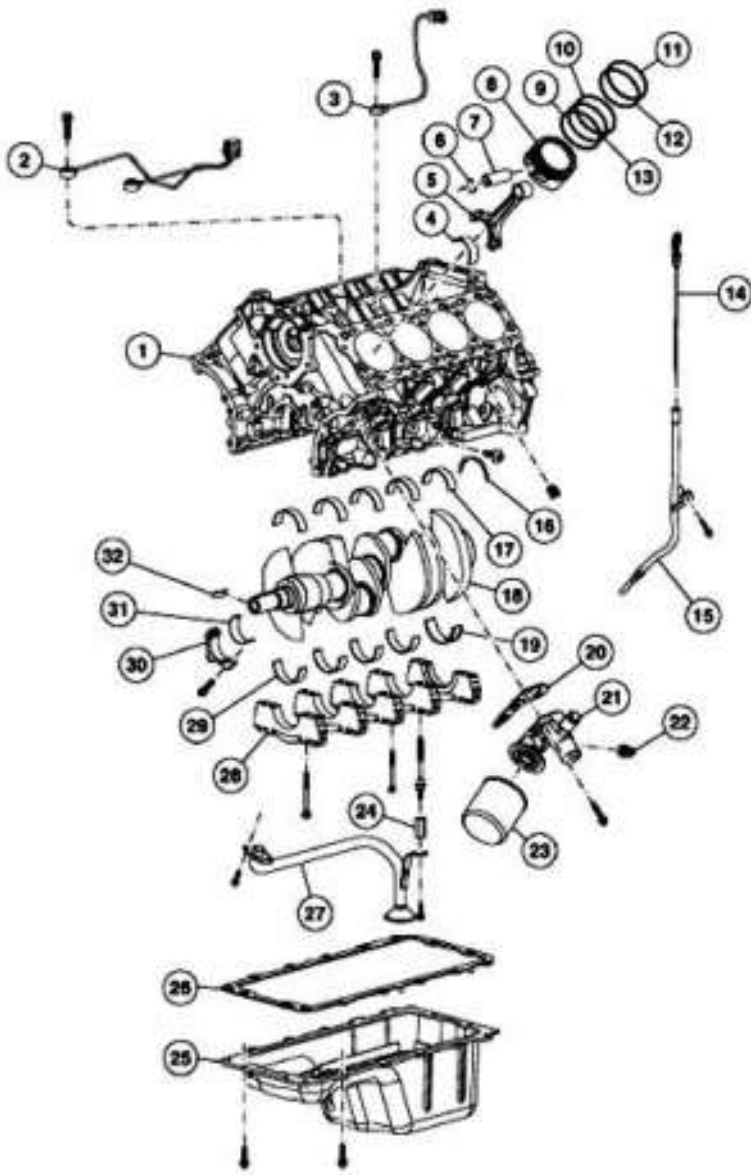


Item	Part Number	Description
1	—	To hydraulic chain tensioner
2	—	Head gallery oil reservoir
3	—	Orifice and strainer
4	—	Metered oil travels through tappet and rocker arm and is splashed onto the cam lobe, roller bearings in rocker arm, and valve tip. Valve stem is lubricated by metered leakage past the lip of the stem seal.
5	0040	LH cylinder head
6	—	Oil drain to sump
7	—	Flare prelude access
8	—	From the left bank of the cylinder block
9	—	Tappet and cam bearing feed gallery (reduced pressure)
10	—	Orifice and strainer
11	—	Head gallery oil reservoir
12	—	Flare prelude access
13	—	Primary main gallery pressure (not restricted)
14	—	Oil drain to sump
15	6714	Oil bypass filter
16	9278	Oil pressure switch
17	6861	Oil filter adapter
18	Part of 8621	Oil pump integral relief valve
19	—	Bypass
20	8621	Oil pump
21	—	Oil drain to sump
22	—	To LH cylinder head
23	—	To hydraulic chain tensioner. Chain lubrication is metered through the tensioners
24	—	Tappet vent gallery (open to crankcase)

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**Fig. 2: Engine Lubrication Components**  
 Courtesy of FORD MOTOR CO.

#### 4.6L Romeo Engine - Lower End



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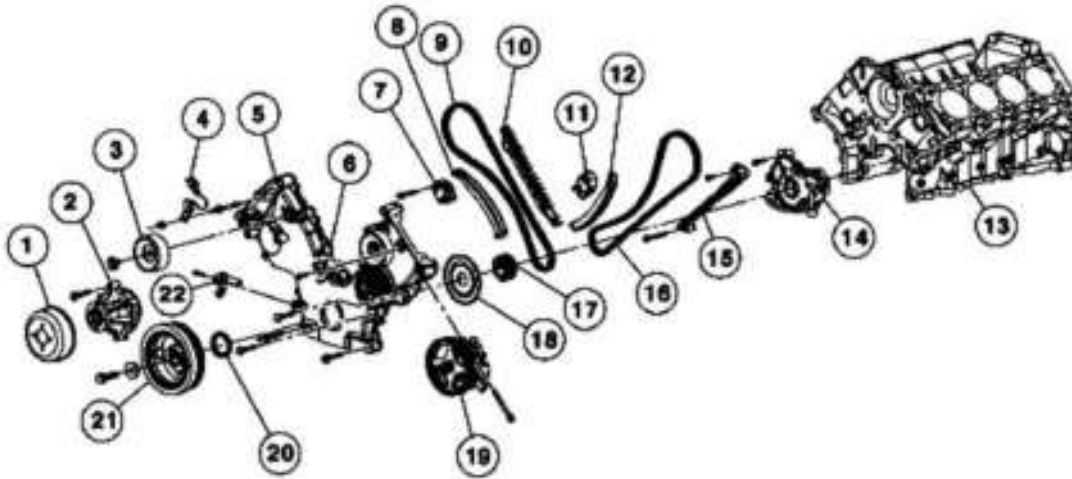
**Fig. 3: Identifying 4.6L Romeo Engine - Lower End (1 Of 2)**  
Courtesy of FORD MOTOR CO.

Item	Part Number	Description
1	6010	Cylinder block
2	12A699	Dual knock sensor assembly (cast aluminum 4.6L cylinder block only)
3	12A699	Single knock sensor assembly (cast iron 4.6L cylinder block only)
4	6211	Connecting rod bearing — upper (8 req'd)
5	—	Connecting rod assembly (8 req'd) (part of 6200)
6	6140	Piston pin retainer (16 req'd)
7	6135	Piston pin (8 req'd)
8	6110	Piston (8 req'd)
9	6159	Oil control ring — outer (8 req'd)
10	6159	Oil control ring — outer (8 req'd)
11	6150	Compression ring — upper (8 req'd)
12	6152	Compression ring — lower (8 req'd)
13	6161	Oil control ring — inner (8 req'd)
14	6750	Oil level indicator
15	6754	Oil level indicator tube
16	6A341	Crankshaft thrust washer
17	6333	Crankshaft main bearing — upper (5 req'd)
18	6303	Crankshaft
19	6A339	Crankshaft thrust bearing — lower
20	6A636	Oil filter adapter gasket
21	6681	Oil filter adapter
22	9278	Oil pressure switch
23	6714	Oil bypass filter
24	N806180	Spacer
25	6675	Oil pan
26	6710	Oil pan gasket
27	6622	Oil pump screen and pickup tube
28	6325	Crankshaft bearing cap (5 req'd)
29	6A338	Crankshaft main bearing — lower (4 req'd)
30	—	Connecting rod cap (8 req'd) (part of 6200)
31	6211	Connecting rod bearing — lower (8 req'd)
32	N806201	Key

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**Fig. 4: Identifying 4.6L Romeo Engine - Lower End (2 Of 2)**  
 Courtesy of FORD MOTOR CO.

**4.6L Romeo Engine - Front End**

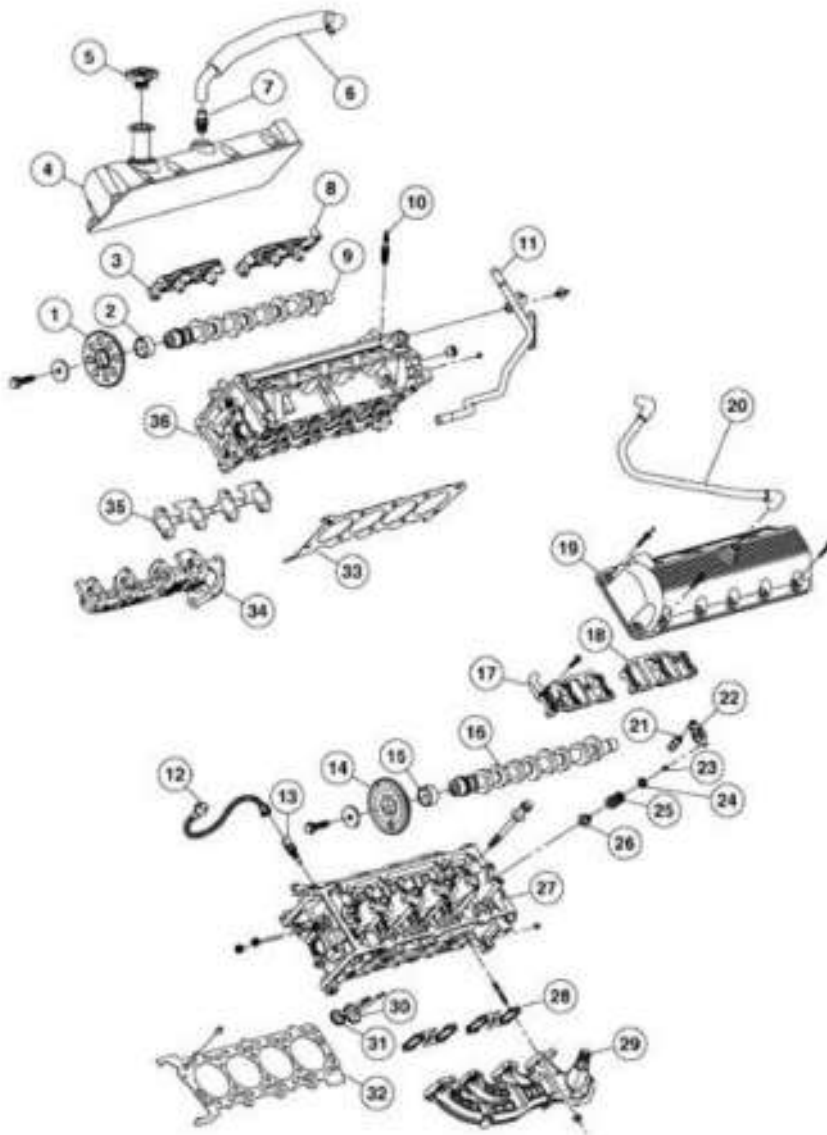


Item	Part Number	Description
1	8A528	Water pump pulley
2	8501	Water pump
3	19A216	Idler pulley
4	18801	Radio ignition interference capacitor (2 req'd)
5	6C086	Engine front cover
6	6B288	Camshaft position sensor
7	6L266	Timing chain tensioner — RH
8	6L253	Timing chain tensioner arm — RH
9	6268	Timing chain — RH
10	6K297	Timing chain guide — RH
11	6L266	Timing chain tensioner — LH
12	6L253	Timing chain tensioner arm — LH
13	6010	Cylinder block
14	6621	Oil pump
15	6K297	Timing chain guide — LH
16	6268	Timing chain — LH
17	6306	Crankshaft sprocket
18	12A227	Ignition pulse wheel
19	3A696	Power steering pump assembly
20	6700	Crankshaft front oil seal
21	6316	Crankshaft pulley
22	6C315	Crankshaft position sensor

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**Fig. 5: Identifying 4.6L Romeo Engine - Front End**  
 Courtesy of FORD MOTOR CO.

## 4.6L Upper End Components



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**Fig. 6: Identifying 4.6L Upper End Components (1 Of 2)**  
Courtesy of FORD MOTOR CO.

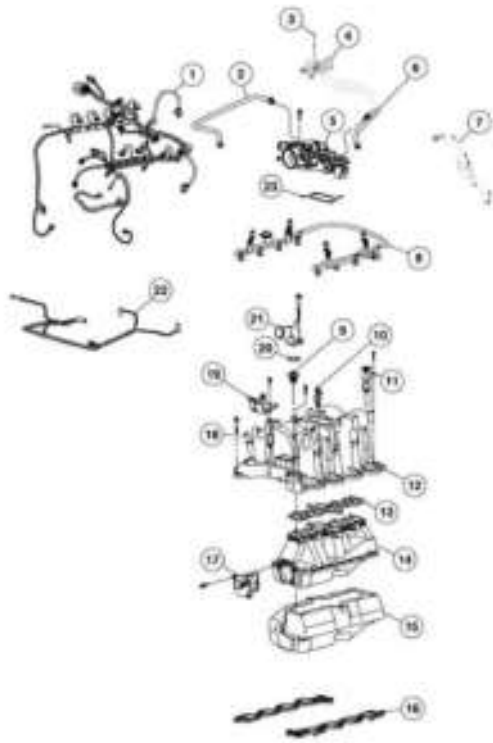
Item	Part Number	Description
1	6256	Camshaft sprocket — RH
2	6265	Spacer
3	6B280	Camshaft bearing cap — RH, front
4	6582	Valve cover — RH
5	6766	Oil filler cap
6	6C324	Crankcase ventilation tube
7	6A666	Positive crankcase ventilation valve
8	6B280	Camshaft bearing cap — RH, rear
9	6250	Camshaft — RH
10	12405	Spark plug (8 req'd)
11	18663	Heater outlet tube
12	14B102	Jumper wire — CHT sensor
13	6G004	Cylinder head temperature sensor
14	6256	Camshaft sprocket — LH
15	6265	Spacer
16	6250	Camshaft — LH
17	6B280	Camshaft bearing cap — LH, front
18	6B280	Camshaft bearing cap — LH, rear
19	6A505	Valve cover — LH
20	6758	Crankcase ventilation tube
21	6C501	Hydraulic lash adjuster (16 req'd)
22	6529	Roller follower (16 req'd)
23	6518	Valve spring retainer key (32 req'd)
24	6514	Valve spring retainer (16 req'd)
25	6513	Valve spring (16 req'd)
26	6A517	Valve stem seal (16 req'd)
27	6050	Cylinder head — LH
28	9Y431	Exhaust manifold gasket — LH (2 req'd)
29	9429	Exhaust manifold — LH
30	6507	Intake valve (8 req'd)
31	6505	Exhaust valve (8 req'd)
32	6083	Cylinder head gasket — LH
33	6051	Cylinder head gasket — RH
34	9430	Exhaust manifold — RH
35	9448	Exhaust manifold gasket — RH
36	6049	Cylinder head — RH

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**Fig. 7: Identifying 4.6L Upper End Components (2 Of 2)**  
**Courtesy of FORD MOTOR CO.**

#### **4.6L Engine Induction System Components**



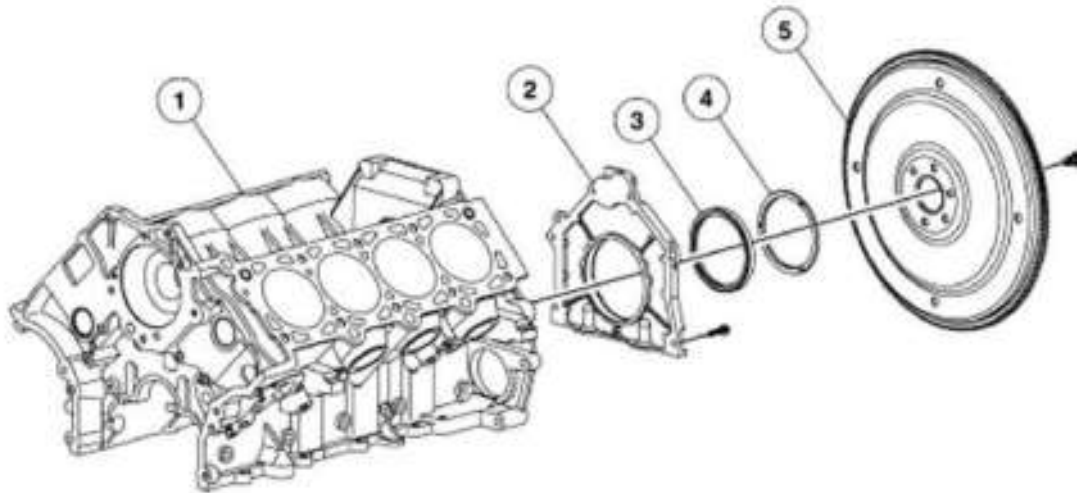


Item	Part Number	Description
1	128637	Engine sensor control wiring harness
2	18465	Heated throttle body hose — inlet
3	M807309	Differential pressure feedback EGR system bracket bolt (2 req'd)
4	3J472	Differential pressure feedback EGR system
5	9E822	Throttle body and spacer assembly
6	18465	Heated throttle body hose — outlet
7	9D477	Exhaust manifold to EGR valve tube
8	9F792	Fuel injection supply manifold
9	8575	Water thermostat
10	9F503	Fuel injector (8 req'd)
11	12A386	Ignition coil (8 req'd)
12	9424	Intake manifold — upper
13	9481	Intake manifold gasket — lower
14	9K481	Intake manifold — lower
15	6N641	Noise shield
16	9439	Intake manifold gasket — upper (2 req'd)
17	9L490	Intake manifold tuning valve
18	8567	Fitting — heated throttle body inlet
19	9728	Accelerator cable bracket
20	M806807	O-ring seal
21	8394	Water outlet housing
22	9E488	Vacuum harness
23	9L437	Throttle body adapter gasket

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**Fig. 8: Identifying 4.6L Engine Induction System Components**  
 Courtesy of FORD MOTOR CO.

#### 4.6L Engine Rear End Components

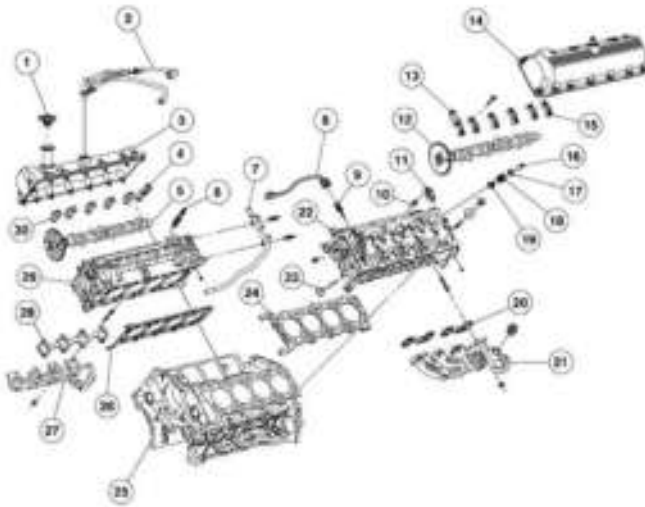


Item	Part Number	Description
1	6010	Cylinder block
2	6K318	Rear main seal retainer
3	6701	Rear main oil seal
4	6310	Rear main seal oil slinger
5	6375	Flexplate

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**Fig. 9: Identifying 4.6L Engine Rear End Components**  
 Courtesy of FORD MOTOR CO.

### 5.4L Engine - Upper End

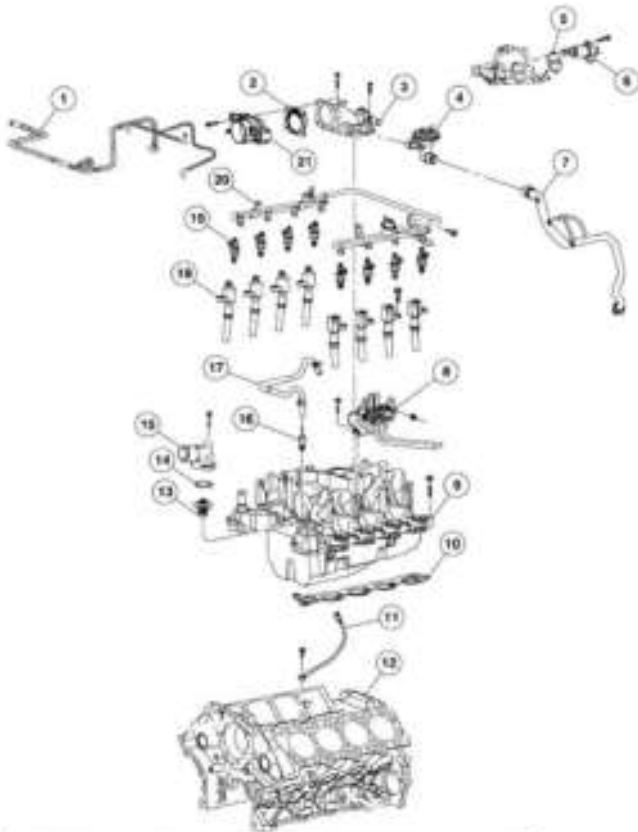


Item	Part Number	Description
1	61766	Oil filter cap
2	6C324	Crankcase ventilation hose — with valve
3	6582	Valve cover — RH
4	68284	Camshaft bearing cap
5	6251	Camshaft — RH
6	12405	Spark plug (8 req'd)
7	18663	Heater outlet tube
8	14B102	Cylinder head temperature sensor jumper harness
9	6G004	Cylinder head temperature sensor
10	6C501	Hydraulic lash adjuster (16 req'd)
11	6529	Roller follower (16 req'd)
12	6C255	Camshaft — LH
13	68284	Camshaft bearing cap
14	6A505	Valve cover — LH
15	68280	Camshaft bearing cap (5 req'd)
16	5618	Valve spring retainer key (32 req'd)
17	6514	Valve spring retainer (16 req'd)
18	6513	Valve spring (16 req'd)
19	6A517	Valve stem seal (18 req'd)
20	9Y431	Exhaust manifold gasket (2 req'd)
21	9431	Exhaust manifold — LH
22	6050	Cylinder head — LH
23	6905	Exhaust valve (8 req'd)
23	6507	Intake valve (8 req'd)
24	6083	Cylinder head gasket — LH
25	6010	Cylinder block
26	6951	Cylinder head gasket — RH
27	9430	Exhaust manifold — RH
28	9448	Exhaust manifold gasket — RH
29	6049	Cylinder head — RH
30	68280	Camshaft bearing cap (5 req'd)

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**Fig. 10: Identifying 5.4L Engine - Upper End**  
 Courtesy of FORD MOTOR CO.

### 5.4L Engine Induction System

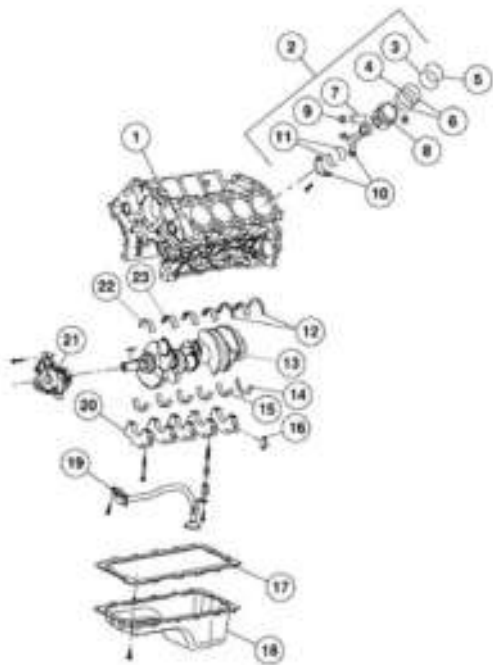


Item	Part Number	Description
1	9E498	Vacuum harness
2	9E936	Throttle body gasket
3	9A580	Throttle body adapter
4	8D460	EGR valve
5	9F670	Idle air control valve gasket
6	9F715	Idle air control valve
7	8D477	Exhaust manifold to EGR valve tube
8	9J472	Differential pressure feedback EGR system
9	9424	Intake manifold
10	9439	Intake manifold gasket (2 req'd)
11	12A899	Knock sensor
12	6010	Cylinder block
13	8575	Water thermostat
14	N906807	C-ring seal
15	6594	Water outlet
16	8597	Fitting — heated throttle body inlet
17	18465	Heated throttle body hose — inlet
18	12A366	Ignition coil (8 req'd)
19	9F593	Fuel injector (8 req'd)
20	9F792	Fuel injection supply manifold
21	9E926	Throttle body

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**Fig. 11: Identifying 5.4L Engine Induction System**  
 Courtesy of FORD MOTOR CO.

### 5.4L Engine - Lower End

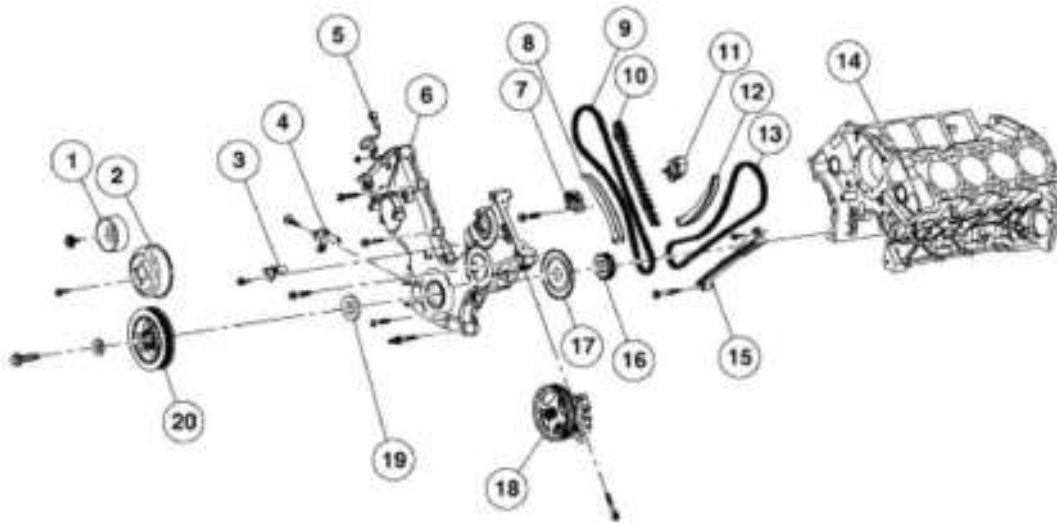


Item	Part Number	Description
1	6010	Cylinder block
2	6100	Piston and rod assembly (8 req'd)
3	6152	Lower compression ring (8 req'd)
4	6161	Inner oil control ring (8 req'd)
5	6150	Upper compression ring (8 req'd)
6	6159	Outer oil control ring (16 req'd)
7	6135	Piston pin (8 req'd)
8	6110	Piston (8 req'd)
9	6140	Piston pin retainer (16 req'd)
10	6200	Connecting rod assembly (8 req'd)
11	6211	Connecting rod bearing (10 req'd)
12	6A341	Crankshaft thrust washer — upper (2 req'd)
13	6303	Crankshaft
14	6K302	Crankshaft thrust washer — lower
15	6A338	Crankshaft bearing — lower (5 req'd)
16	6A346	Dowel (10 req'd)
17	6710	Oil pan gasket
18	6675	Oil pan
19	6622	Oil pump screen and pickup tube
20	6325	Crankshaft main bearing cap (5 req'd)
21	6621	Oil pump
22	6W337	Front crankshaft bearing — upper
23	6333	Crankshaft bearing — upper (4 req'd)

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**Fig. 12: Identifying 5.4L Engine - Lower End**  
 Courtesy of FORD MOTOR CO.

**5.4L Engine - Front End**

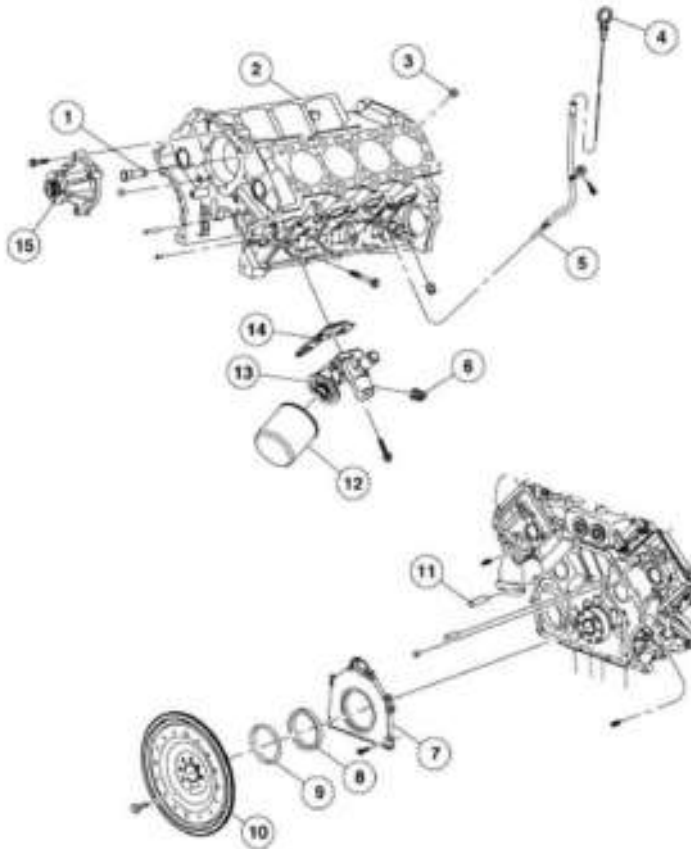


Item	Part Number	Description
1	19A216	Idler pulley (2 req'd)
2	8A528	Water pump pulley
3	6B288	Camshaft position sensor
4	6C315	Crankshaft position sensor
5	18801	Radio ignition interference capacitor (2 req'd)
6	6C086	Engine front cover
7	6L266	Timing chain tensioner — RH
8	6K255	Timing chain tensioner arm — RH
9	6268	Timing chain — RH
10	6M256	Timing chain guide — RH
11	6M269	Timing chain tensioner — LH
12	6M274	Timing chain tensioner arm — LH
13	6268	Timing chain — LH
14	6010	Cylinder block
15	6B274	Timing chain guide — LH
16	6306	Crankshaft sprocket
17	12A227	Ignition pulse wheel
18	3A696	Power steering pump
19	6700	Front crankshaft oil seal
20	6316	Crankshaft pulley

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**Fig. 13: Identifying 5.4L Engine - Front End**  
 Courtesy of FORD MOTOR CO.

### 5.4L Engine - Exterior Components



Item	Part Number	Description
1	18B402	Heater water inlet connector
2	6010	Cylinder block
3	W704688	Hollow dowel (4 req'd)
4	6750	Oil level indicator
5	6K873	Oil level indicator tube
6	9278	Oil pressure switch
7	6K318	Rear main oil seal retainer plate
8	6701	Rear main oil seal
9	6310	Oil slinger
10	6375	Flexplate
11	N807198	Hollow dowel (2 req'd)
12	6714	Oil bypass filter
13	6K623	Oil filter adapter
14	6A636	Oil filter adapter gasket
15	8501	Water pump

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**Fig. 14: Identifying 5.4L Engine - Exterior Components**  
 Courtesy of FORD MOTOR CO.