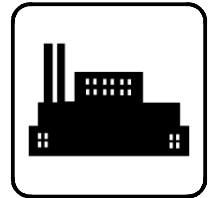


Service Parts

Engine



Engine Model:

KG10V08T 10.3L

Generator Models:

KG150- KG200
KG150R

KOHLER®

TP-7177 4/21

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Notes

Introduction

This manual lists service replacement parts for Kohler KG10V08T engines.

Information in this publication represents data available at the time of print. Kohler Co. reserves the right to change this publication and the products represented without notice and without any obligation or liability whatsoever.

This manual includes the following main sections:

Table of Contents. Lists the sections of the manual.

Introduction (and other information sections). Contains introductory material about part numbers, illustrations, and hardware.

Group Parts Lists. List the part numbers of parts in the groups.

Numbering System Significance

This manual uses the following numbering systems:

Model. The product identification number located on the nameplate. Engines break down into groups.

Group Number. A unique number representing a parts group needed to assemble a generator set function. For example, Group 5 is the Crankshaft Assembly group.

Part Number. The part number identifies an individual assembly, subassembly, component, or accessory kit.

Illustrations

Illustrations (or exploded-view drawings) best representing the widest range of variations accompany most groups in this manual. Illustrations do not depict all details and may not show all parts. Do not substitute illustrations for assembly or disassembly.

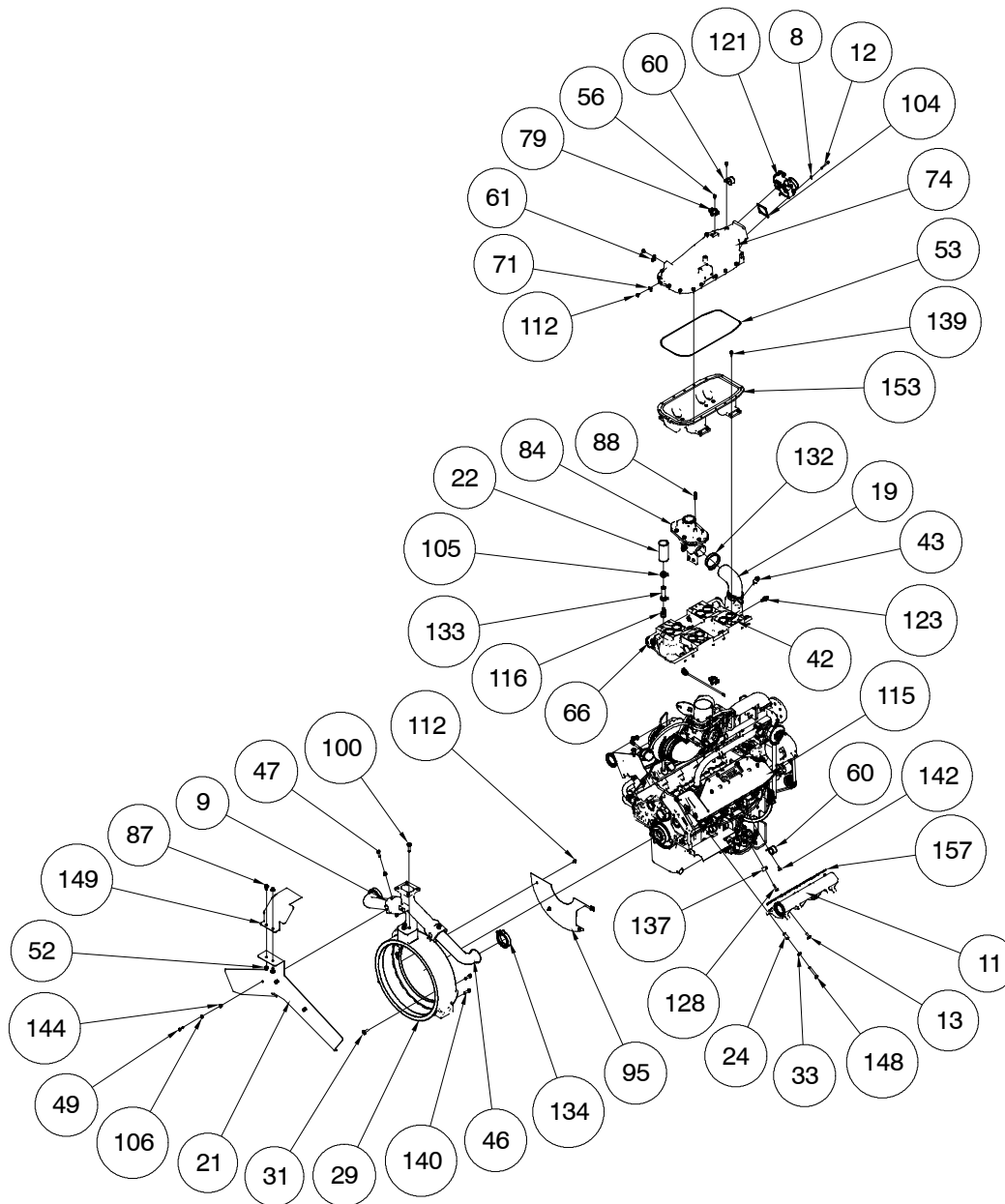
How to Find Part Numbers

Use the following steps to locate a service replacement part.

1. Locate the nameplate to **identify the model number**.
2. **Page forward to locate the group** or find the appropriate page in the Table of Contents.
3. **Find the part on the illustration** and note the item number of the part or **find the part description in the parts list**.

1: Engine

KG150, GM109253, Figure 1 of 3



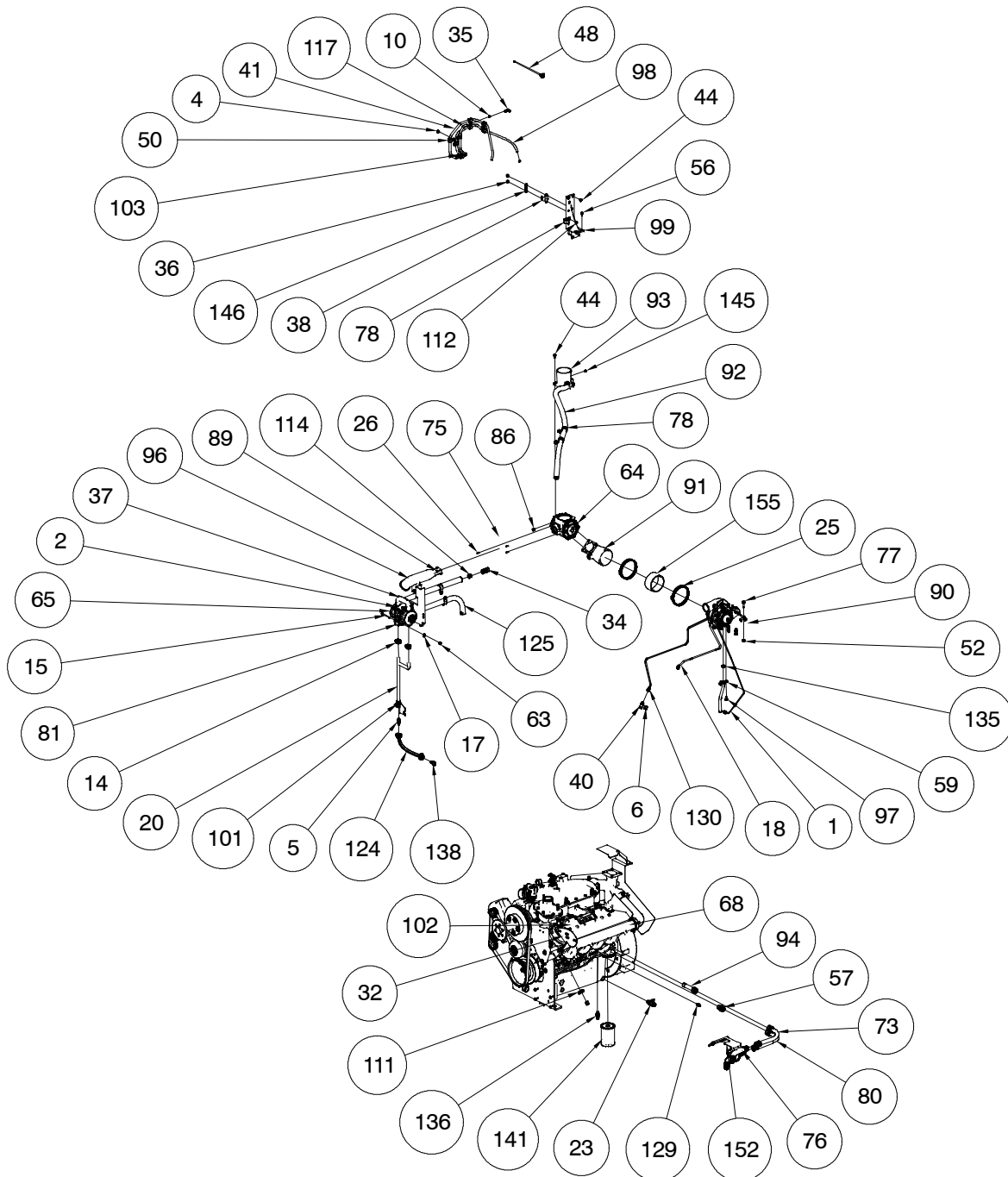
1: Engine

KG150, GM109253

Item	Part Number	Description	Qty.
1	GM106867	Line, Turbo Oil Feed	1
2	GM109483	Bracket, CCV	1
3	GM106849	Bearing, Fan Hub	1
4	M6921-06014-60	Screw, Hex Cap Flange	3
5	GM103883	Check Valve	1
6	X-75-61	Plug, Pipe 1/2 NPTF	3
7	GM104226	Screw, HHFB, 3/8- 16 X 0.5 in.	8
8	X-25-173	Washer, Plain	4
9	GM106842	Pedestal, Turbo	1
10	X-426-9	Clamp, Hose, .25/.70 In.	6
11	GM106726	Exhaust Manifold, RH	1
12	X-55-39	Screw, Hex Socket Head Machine	4
13	GM103875	Screw, HHFB, 3/8- 16 X 1 in.	12
14	X-426-10	Clamp, Hose, .5/1 In.	5
15	GM107484	Screw, HHFB, 5/16- 18 X 3 in.	2
16	GM106695	Bracket Fead	1
17	X-25-20	Washer, Flat .312 ID X.75 OD	2
18	GM106947	Line, Turbo Coolant Inlet	1
19	GM106862	Hose, Eng Cool Stat	1
20	GM106964	Hose, CCV Oil Drain	1
21	GM115375	Shield, Heat, Turbo	1
22	GM115259	Shield, Heat	1
23	272701	Valve Oil Drain	1
24	X-400-218	Spacer, .406 ID X .625 OD X 1.23 In.	4
25	11805000200	Hose Clamp D115.4/137	2
26	M912-05014-60	Screw, Socket Head Cap	4
27	X-6210-2	Nut, Flange Spirallock, 1/4- 20	4
28	GM106993	Spring, Spark Plug Ground	8
29	GM106844	Housing, Flywheel 10.3L	1
30	GM106965	Bracket, Coil Mounting	1
31	GM104230	Screw, HHFB, 3/8- 16 X 1.25 in.	6
32	GM114693	Bracket, Rad Pipe Support Brkt	1
33	X-25-93	Washer, Plain .406 ID X .75in. OD	4
34	X-582-16	Connector, Hose + Vibra Seal	2
35	X-391-1	Connector, 90 Deg. (in. ID Hose)	1
36	GM103552	Screw, HHFB, 1/4- 20 X 0.625 in.	3
37	GM106860	Hose, CCV To Intake	1
38	GM107007	Mount, Main Boost Control Solenoid	1
39	GM107490	Wire Set, Spark Plugs, 10.3L	1
40	GM115579	Adapter, Male To Male, JIC6 To 1/2 NPT	2
41	GM109819	Hose, Silicone	1
42	GM109835	Gasket, Upper Intake 10.3L Eng	2
43	GM39458	Sender, Temperature	1
44	M6921-06020-SS	Screw, Hex Flange (M6- 1.0 X 20mm)	7
45	X-6238-9	Bolt, Hex Cap	1
46	GM115580	Pipe, Turbo W Rings	2
47	X-6238-27	Bolt, Hex Cap	4
48	GM99119	Sensor, 6.2L Hego	1
49	X-465-27	Bolt, Hex Cap (1/4- 20 X 1 in.)	3
50	X-672-13	Clamp, Insulated, .88 In.	8
51	GM106697	Extension, Fan	1
52	X-6210-9	Nut, Flange Spirallock, 3/8- 16	12
53	GM107418-1	Oring, Intake Manifold 10.3L Eng	1
54	GM110494	Module, 10.3L TSD ECM	1
55	M6921-12050-60	Screw, Hex Flange (M12- 1.50 X 50mm)	4
56	GM103553	Screw, HHFB, 1/4- 20 X 0.75 in.	14
57	GM108057	Adapter, Male Jic- 16 To 3/4- 14 NPT	1
58	GM107485	Screw, HHFB, 1/4- 20 X 1.25 in.	4
59	GM106866	Line, Turbo Drain	1
60	X-672-6	Clamp, Insulated, 1.38 In.	5
61	X-672-7	Clamp, Insulated, .44 In.	5
62	GM107718	Belt, Engine 10.3L	1
63	X-6234-2	Nut, Hex, 5/16- 18	2
64	GM103886	Mixer, Turbo, 100kw+, ERC	1
65	GM106925	Impactor, Crankcase Ventilation	1
66	GM109757	Manifold, Intake LWR Mach 10.3L Eng	1
67	GM103873	Screw, HHFB, 3/8- 16 X 0.75 in.	3

1: Engine, continued

KG150, GM109253, Figure 2 of 3



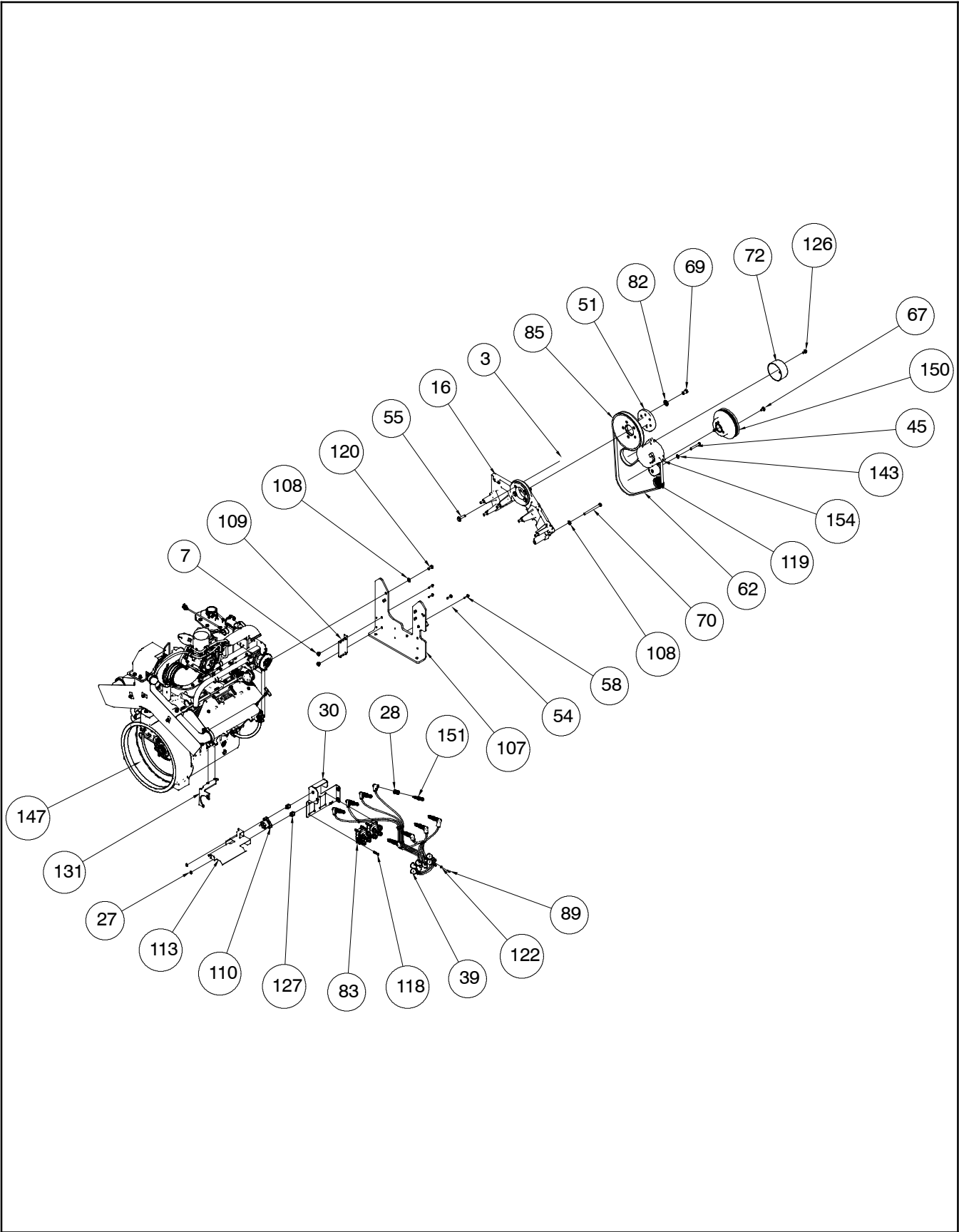
1: Engine, continued

KG150, GM109253

Item	Part Number	Description	Qty.
68	GM106728	Exhaust Manifold, LH	1
69	GM106854	Shank Nut	5
70	GM114123	Bolt, Hex Cap	6
71	X-672-15	Clamp, Insulated, .25 In.	2
72	GM103469	Pulley, 6.2L Water Pump	1
73	GM107974	Line, Oil Thermostat Outlet	1
74	GM109753	Manifold, Intake CVR Mach 10.3L Engine	1
75	GM95636	Regulator, 6.2L Electronic, ERC	1
76	GM107167	Assembly, Oil Thermostat	1
77	GM103561	Screw, 3/8- 16 X 1.5 in.	18
78	X-672-20	Clamp, Insulated, 1.25 In.	5
79	GM104078	Sensor, 20- 300kpa TMAP, ERC	2
80	GM107975	Line, Oil Thermostat Inlet	1
81	GM109482	Bracket, CCV	1
82	M125A-18-80	Washer, Plain	5
83	GM105832	6.2L Turbo Standard 4 Tower Coil	2
84	GM106864	Assembly, Coolant Thermostat	1
85	GM106913	Pulley, Fan	1
86	X-75-51	Plug, Pipe (1/4 in. NPTF)	2
87	GM103876	Screw, 3/8- 16 X 0.75 in.	7
88	X-380-5	Connector, Hose + Vibra Seal	1
89	M912-04016-60	Screw, Socket Head Cap	7
90	GM107670	Turbo, 10.3L	1
91	GM106848	Inlet, Turbo 10.3L	1
92	GM110403	Hose, Intake To Valve CVR	1
93	GM106846	Inlet, Mixer 10.3L	1
94	GM108089	Adapter Male Jic- 16 To 3/4- 14 NPT	1
95	GM106856	Dust Cover	1
96	GM107032	Transition, Duct	1
97	M6921-08020-SS	Screw, Hex Flange Inst	6
98	GM109818	Hose, Silicone	1
99	GM106931	Bracket, EPR Mounting	1
100	GM103558	Screw, 3/8- 16 X 1.75 in.	5
101	GM107169	Bracket, CCV Check Valve	1
102	GM113936	Shield, Exhaust Lt 10.3L Eng	1
103	GM96916	Fuel Control Valve, 2.2L Turbo, ERC	1
104	GM92860	Gasket, 200 Mixer	1
105	X-309-19	Clamp, Hose Spring, 1 in. Dia	2
106	X-20-1	Washer, Lock, .259 ID X .489 In. OD	3
107	GM106863	Mount, 10.3L Front Engine	1
108	X-25-34	Washer, Plain,.469 IDx.922 In. OD	13
109	GM108058	Bracket, Wires	1
110	GM114223	Solenoid, Starter, 12V HD	1
111	358310	Plug, Freeze	1
112	GM103551	Screw	24
113	GM115492	Shield, Heat, Starter	1
114	X-426-21	Clamp, Hose, .81/1.75 In.	7
115	GM113941	Shield, Exhaust Rt 10.3L Eng	1
116	X-582-3	Connector, Hose + Vibra Seal	1
117	GM109820	Hose, Silicone	1
118	X-55-58	Fastener. Shcs, #12- 24 X 1 1/2 in.	8
119	GM106858	Tensioner, 10.3L	1
120	X- 6024-2	Bolt, Hex Cap	7
121	GM110910	Throttle, Elect, 60mm, 10.3L Eng	1
122	M125A-04-80	Washer, Plain	3
123	GM105601	ECT Sensor	1
124	GM107168	Hose: F1- 6- 275- AF9	1
125	GM106859	Hose, Impactor, 10.3L Turbo	1
126	M6921-08020-60	Screw, Hex Flange M8 X 20	4
127	241769	Mount, Controller	2
128	GM106358	Screw, 5/16- 8 X 1.25 in.	1
129	GM107202	Adapter, Male Jic- 4 To 1/4- 18 NPT	1
130	GM106946	Line, Turbo Coolant Outlet	1
131	GM116068	Bracket, Starter	1
132	GM106397	Clamp, SAE 338, 67- 80mm	2
133	GM109886	Hose, Turbo Oil Drain	1
134	GM107175	Clamp Exhaust (2.50 In.)	2

1: Engine, continued

KG150, GM109253, Figure 3 of 3



1: Engine, continued

KG150, GM109253

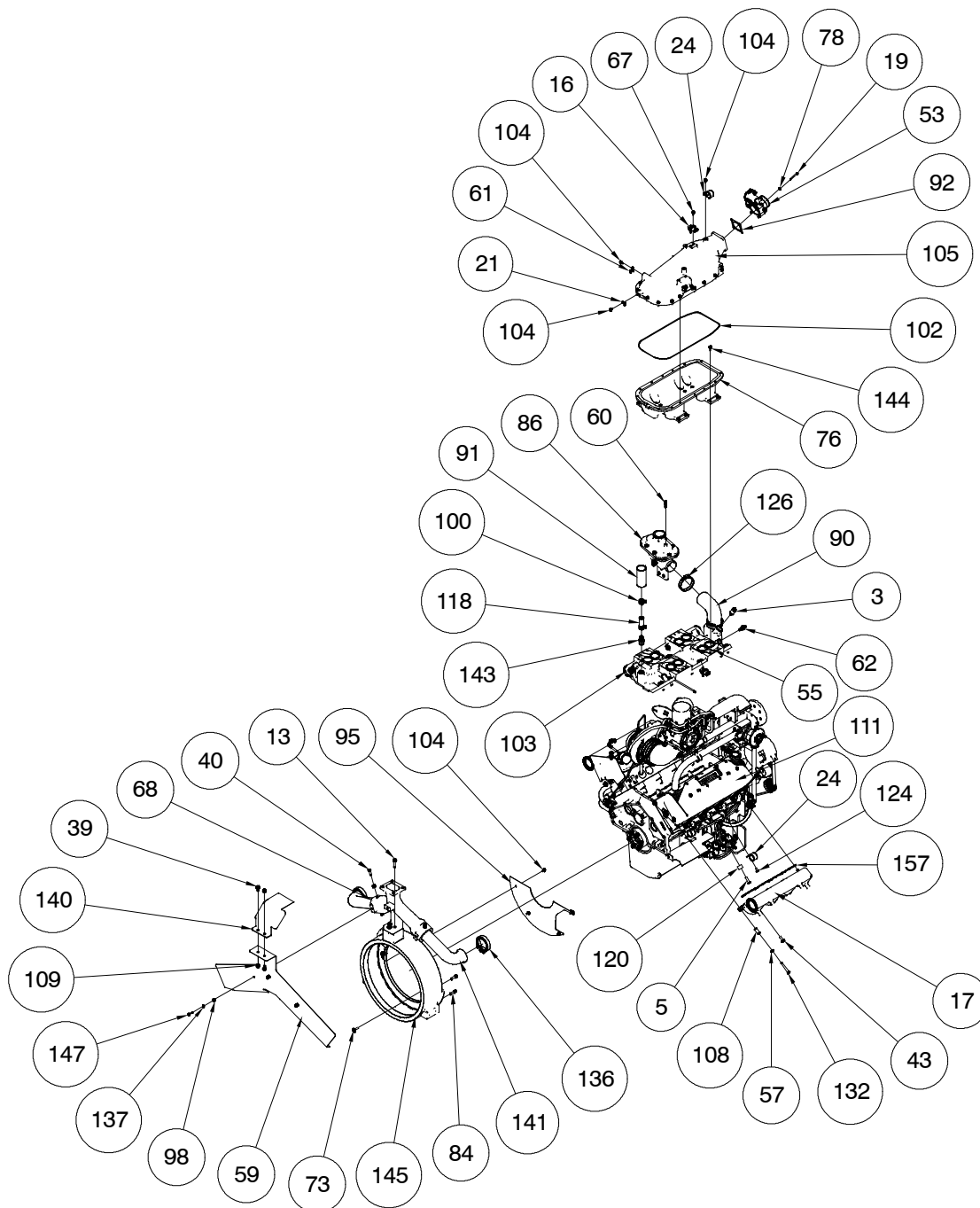
Item	Part Number	Description	Qty.
135	GM107199	O- Ring, 7/8 in.	1
136	GM101223	Sensor, 6.2L Oil Pressure	1
137	GM106359	Knock Sensor, ERC	1
138	X-582-34	Connector, Hose + Vibra Seal	1
139	GM103563	Screw, 1/4- 20 X 1 in.	33
140	X-55-42	Screw, Hex Socket Head Machine	2
141	GM101269	Filter, 6.2L Oil	1
142	GM103554	Screw, 5/16- 18 X 0.625 in.	1
143	X-25-37	Washer, Plain, .406 ID X.812 In. OD X	1
144	X-400-262	Spacer	3
145	X-75-62	Plug, Pipe, 1/8 NPTF	1
146	GM107008	Mount, Lock Boost Control Solenoid	1
147	GM109672	Engine 10.3L Longblock 150kWe	1
148	X-6238-38	Bolt, Hex Cap	4
149	GM115381	Shield, Heat, Rear Exhaust	1
150	GM105362	Pulley, 10.3L Crank	1
151	GM104391	Spark Plug, 6.2L Turbo, ERC	8
152	GM107976	Bracket, Oil Thermostat	1
153	GM109755	Manifold, Intake Plentum Mach 10.3L Eng	1
154	GM105833	Alternator, 6.2L Engine	1
155	GM106906	Hose, Turbo Coupling	1
156	GM107155	Harness, Engine,10.3L 150-200kW, APM402	1
157	GM115029	Gasket, Exhaust Manifold	2

Recommended Kohler Genuine Oil

GM105292	Oil, Synthetic Quart 10W40 (case of 12)
GM105293	Oil, Synthetic Gallon 10W40 (case of 4)
GM105294	Oil, Synthetic 5 Gallon Pail 10W40
GM105295	Oil, Synthetic 55 Gallon Drum 10W40
GM105296	Oil, Synthetic 275Gallon Tote 10W40

1: Engine, continued

KG180/KG200, GM106900, Figure 1 of 3



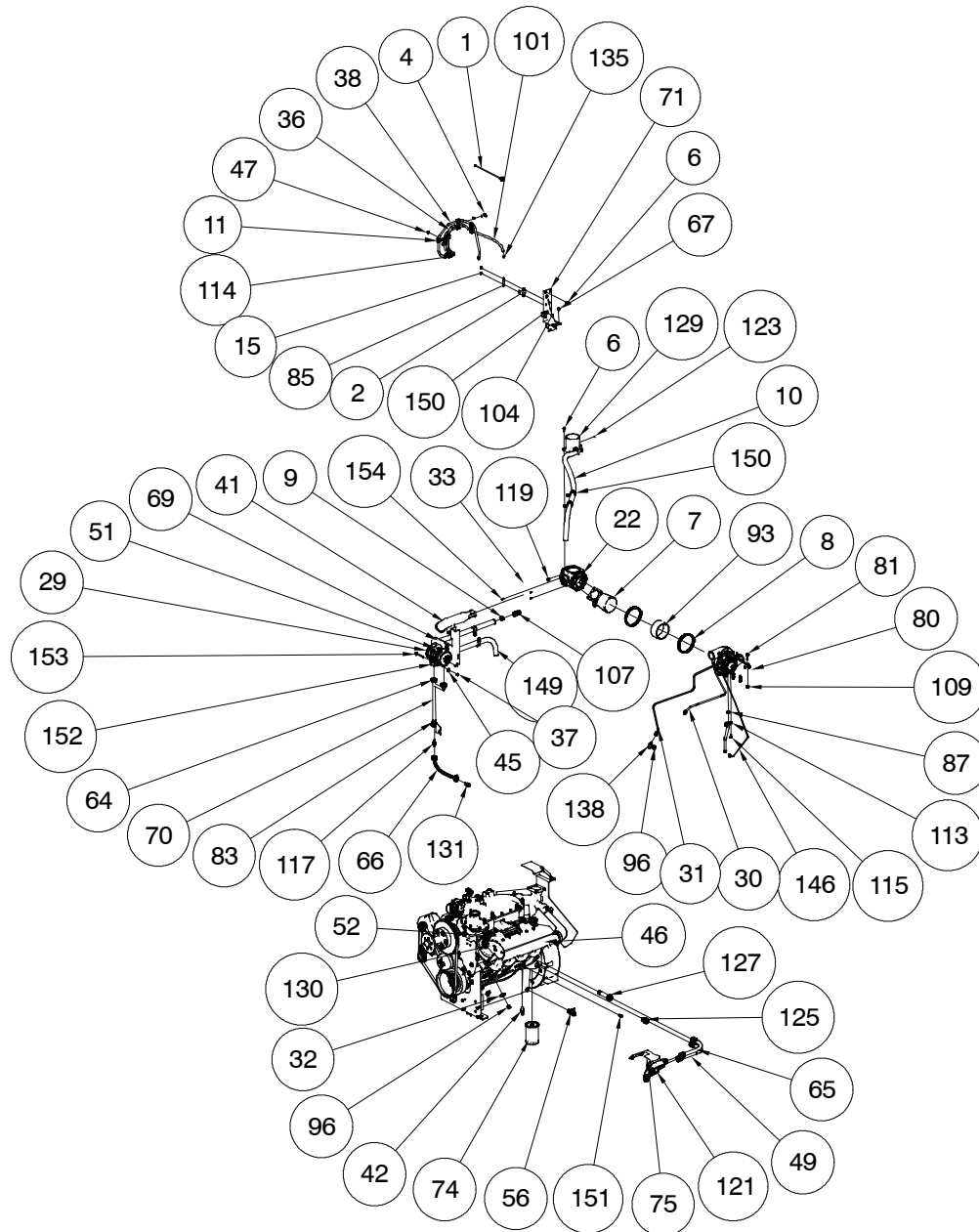
1: Engine, continued

KG180/KG200, GM106900

Item	Part Number	Description	Qty.
1	GM99119	Sensor, 6.2L Hego, ERC	1
2	GM107007	Mount, Main Boost Control Solenoid	1
3	GM39458	Sender, Temperature	1
4	X-391-1	Connector, 90 Deg. (1/4 in.ID Hose)	1
5	GM106358	Screw, 5/16- 8 X 1.25 in.	1
6	M6921-06020-SS	Screw, Hex Flange (M6- 1.0 X 20 mm)	7
7	GM106848	Inlet, Turbo 10.3L	1
8	11805000200	Hose Clamp D115.4/137	2
9	X-426-21	Clamp, Hose, .81/1.75 In.	7
10	GM110403	Hose, Intake To Valve CVR	1
11	X-672-13	Clamp, Insulated, .88 In.	8
12	GM103469	Pulley, 6.2L Water Pump	1
13	GM103558	Screw, 3/8- 16 X 1.75 in.	5
14	GM106849	Bearing, Fan Hub	1
15	GM103552	Screw, HHFB, 1/4- 20 X 0.625 in.	3
16	GM104078	Sensor, 20- 300kpa TMAP, ERC	2
17	GM106726	Exhaust Manifold, RH	1
18	GM106965	Bracket, Coil Mounting	1
19	X-55-39	Screw, Hex Socket Head Machine	4
20	M6921-08020-60	Screw, Hex Flange M8 X 20	4
21	X-672-15	Clamp, Insulated, .25 In.	2
22	GM103886	Mixer, Turbo, 100kW+, ERC	1
23	GM114223	Solenoid, Starter, 12V HD	1
24	X-672-6	Clamp, Insulated, 1.38 In.	5
25	M6921-12050-60	Screw, Hex Flange (M12- 1.50 X 50 mm)	4
26	GM106993	Spring, Spark Plug Ground	8
27	GM104226	Screw, 3/8- 16 X 0.5 in.	8
28	GM105833	Alternator, 6.2L Engine	1
29	GM106925	Impactor, Crankcase Ventilation	1
30	GM106947	Line, Turbo Coolant Inlet	1
31	GM106946	Line, Turbo Coolant Outlet	1
32	358310	Plug, Freeze	1
33	GM95636	Regulator, 6.2L Electronic, ERC	1
34	GM105832	6.2L Turbo Standard 4 Tower Coil, ERC	2
35	GM114123	Bolt, Hex Cap	6
36	GM109820	Hose, Silicone	1
37	X-6234-2	Nut, Hex, 5/16- 18	2
38	GM109819	Hose, Silicone	1
39	GM103876	Screw, 3/8- 16 X 0.75 in.	7
40	X-6238-27	Bolt, Hex Cap	4
41	GM107032	Transition, Duct	1
42	GM101223	Sensor, 6.2L Oil Pressure	1
43	GM103875	Screw, 3/8- 16 X 1 in.	12
44	M125A-18-80	Washer, Plain	5
45	X-25-20	Washer, Flat .312 ID X.75 OD	2
46	GM106728	Exhaust Manifold, LH	1
47	M6921-06014-60	Screw, Hex Cap Flange	3
48	GM106695	Bracket Fead	1
49	GM107975	Line, Oil Thermostat Inlet	1
50	GM106863	Mount, 10.3L Front Engine	1
51	GM109483	Bracket, CCV	1
52	GM113936	Shield, Exhaust Lt 10.3L Eng	1
53	GM110910	Throttle, Elect, 60mm, 10.3L Eng	1
54	GM106697	Extension, Fan	1
55	GM109835	Gasket, Upper Intake 10.3L Eng	2
56	272701	Valve Oil Drain	1
57	X-25-93	Washer, Plain .406 ID X .75in. OD	4
58	X-6238-9	Bolt, Hex Cap	1
59	GM115375	Shield, Heat, Turbo	1
60	X-380-5	Connector, Hose + Vibra Seal	1
61	X-672-7	Clamp, Insulated, .44 In.	5
62	GM105601	ECT, Sensor	1
63	M912-04016-60	Screw, Socket Head Cap	7
64	X-426-10	Clamp, Hose, .5/1 In.	5
65	GM107974	Line, Oil Thermostat Outlet	1
66	GM107168	Hose: F1- 6- 275- AF9	1
67	GM103553	Screw, 1/4- 20 X 0.75 in.	14
68	GM106842	Pedestal, Turbo	1

1: Engine, continued

KG180/KG200, GM106900, Figure 2 of 3



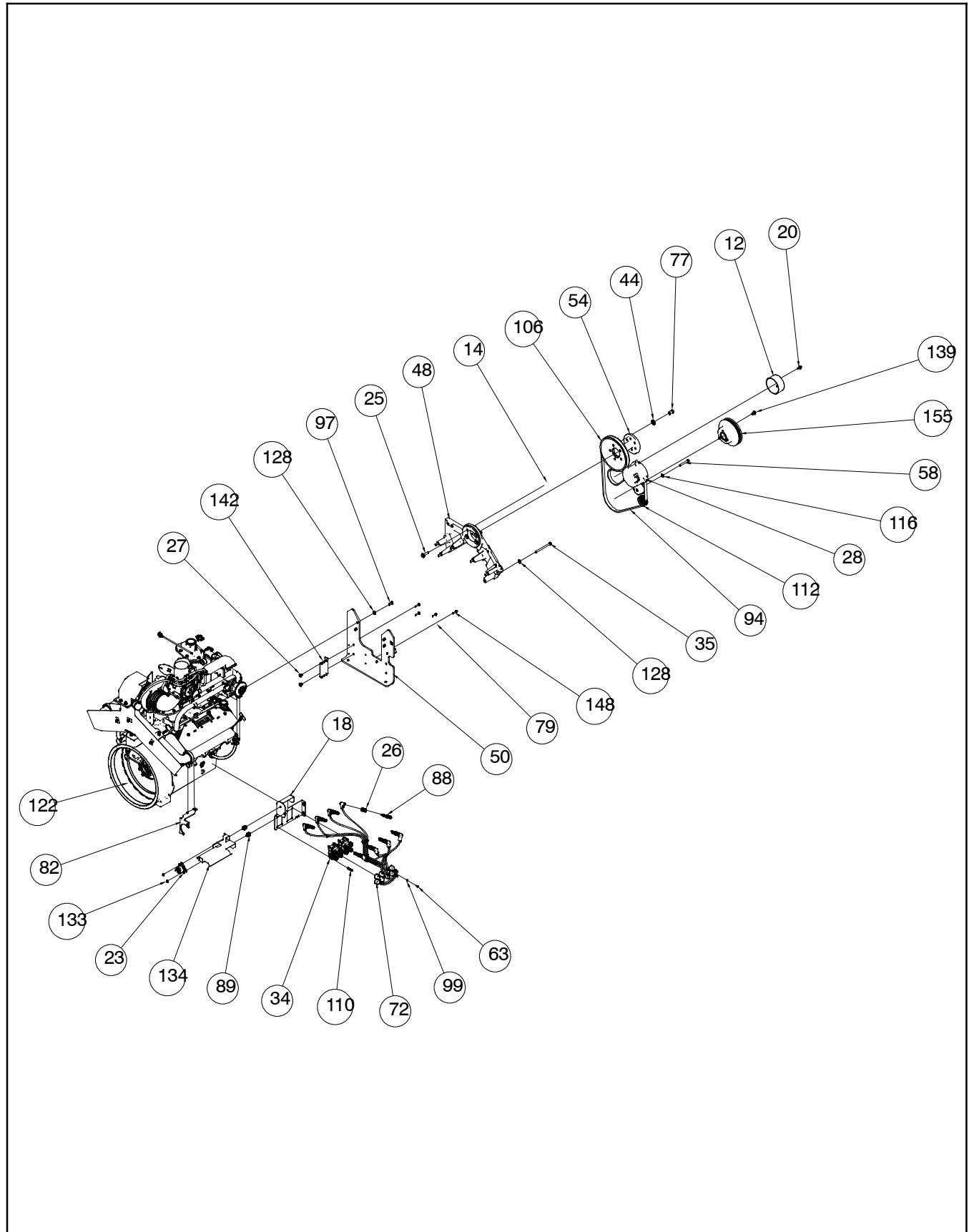
1: Engine, continued

KG180/KG200, GM106900

Item	Part Number	Description	Qty.
69	GM106860	Hose, CCV To Intake	1
70	GM106964	Hose, CCV Oil Drain	1
71	GM106931	Bracket, EPR Mounting	1
72	GM107490	Wire Set, Spark Plugs, 10.3L	1
73	GM104230	Screw, 3/8- 16 X 1.25 in.	6
74	GM101269	Filter, 6.2L Oil	1
75	GM107976	Bracket, Oil Thermostat	1
76	GM109755	Manifold, Intake Plentum Mach 10.3L Eng	1
77	GM106854	Shank Nut	5
78	X-25-173	Washer, Plain Inst	4
79	GM110493	Module, 10.3L Thd Ecm, ECR	1
80	GM107670	Turbo, 10.3L	1
81	GM103561	Screw, 3/8- 16 X 1.5 in.	18
82	GM116068	Bracket, Starter	1
83	GM107169	Bracket, CCV Check Valve	1
84	X-55-42	Screw, Hex Socket Head Machine	2
85	GM107008	Mount, Lock Boost Control Solenoid	1
86	GM106864	Assembly, Coolant Thermostat	1
87	GM107199	O- Ring, 7/8 in.	1
88	GM104391	Spark Plug, 6.2L Turbo, ERC	8
89	241769	Mount, Controller	2
90	GM106862	Hose, Eng Cool Stat	1
91	GM115259	Shield, Heat	1
92	GM92860	Gasket, 200 Mixer	1
93	GM106906	Hose, Turbo Coupling	1
94	GM107718	Belt, Engine 10.3L	1
95	GM106856	Dust Cover	1
96	X-75-61	Plug, Pipe 1/2 NPTF	3
97	X-6024-2	Bolt, Hex Cap	7
98	X-400-262	Spacer	3
99	M125A-04-80	Washer, Plain	3
100	X-309-19	Clamp, Hose Spring, 1 in. Dia	2
101	GM109818	Hose, Silicone	1
102	GM107418-1	O- ring, Intake Manifold 10.3L Eng	1
103	GM109757	Manifold, Intake LWR Mach 10.3L Eng	1
104	GM103551	Screw	24
105	GM109753	Manifold, Intake CVR Mach 10.3L Engine	1
106	GM106913	Pulley, Fan	1
107	X-582-16	Connector, Hose + Vibra Seal	2
108	X-400-218	Spacer, .406 ID X .625 OD X 1.23 In.	4
109	X-6210-9	Nut, Flange Spirallock, 3/8- 16	12
110	X-55-58	Fastener. Shcs, #12- 24 X 1 1/2 in.	8
111	GM113941	Shield, Exhaust Rt 10.3L Eng	1
112	GM106858	Tensioner, 10.3L	1
113	GM106866	Line, Turbo Drain	1
114	GM96916	Fuel Control Valve, 2.2L Turbo, ERC	1
115	M6921-08020-SS	Screw, Hex Flange Inst	6
116	X-25-37	Washer, Plain, .406 ID X.812 In. OD	1
117	GM103883	Check Valve	1
118	GM109886	Hose, Turbo Oil Drain	1
119	X-75-51	Plug, Pipe (1/4 in. NPTF)	2
120	GM106359	Knock Sensor, ERC	1
121	GM107167	Assembly, Oil Thermostat	1
122	GM106868	Engine, 10.3L Turbo Long Block	1
123	X-75-62	Plug, Pipe, 1/8 NPTF	1
124	GM103554	Screw, 5/16- 18 X 0.625 in.	1
125	GM108057	Adapter, Male Jic- 16 To 3/4- 14 NPT	1
126	GM106397	CLAMP, SAE 338, 67- 80mm	2
127	GM108089	Adapter Male Jic- 16 To 3/4- 14 NPT	1
128	X-25-34	Washer, Plain, .469 IDx.922 In. OD	13
129	GM106846	Inlet, Mixer 10.3L	1
130	GM114693	Bracket, Rad Pipe Support Brkt	1
131	X-582-34	Connector, Hose + Vibra Seal	1
132	X-6238-38	Bolt, Hex Cap	4
133	X-6210-2	Nut, Flange Spirallock, 1/4- 20	4
134	GM115492	Shield, Heat, Starter	1
135	X-426-9	Clamp, Hose, .25/.70 In.	6
136	GM107175	Clamp Exhaust (2.50 In.)	2

1: Engine, continued

KG180/KG200, GM106900, Figure 3 of 3



1: Engine, continued

KG180/KG200, GM106900

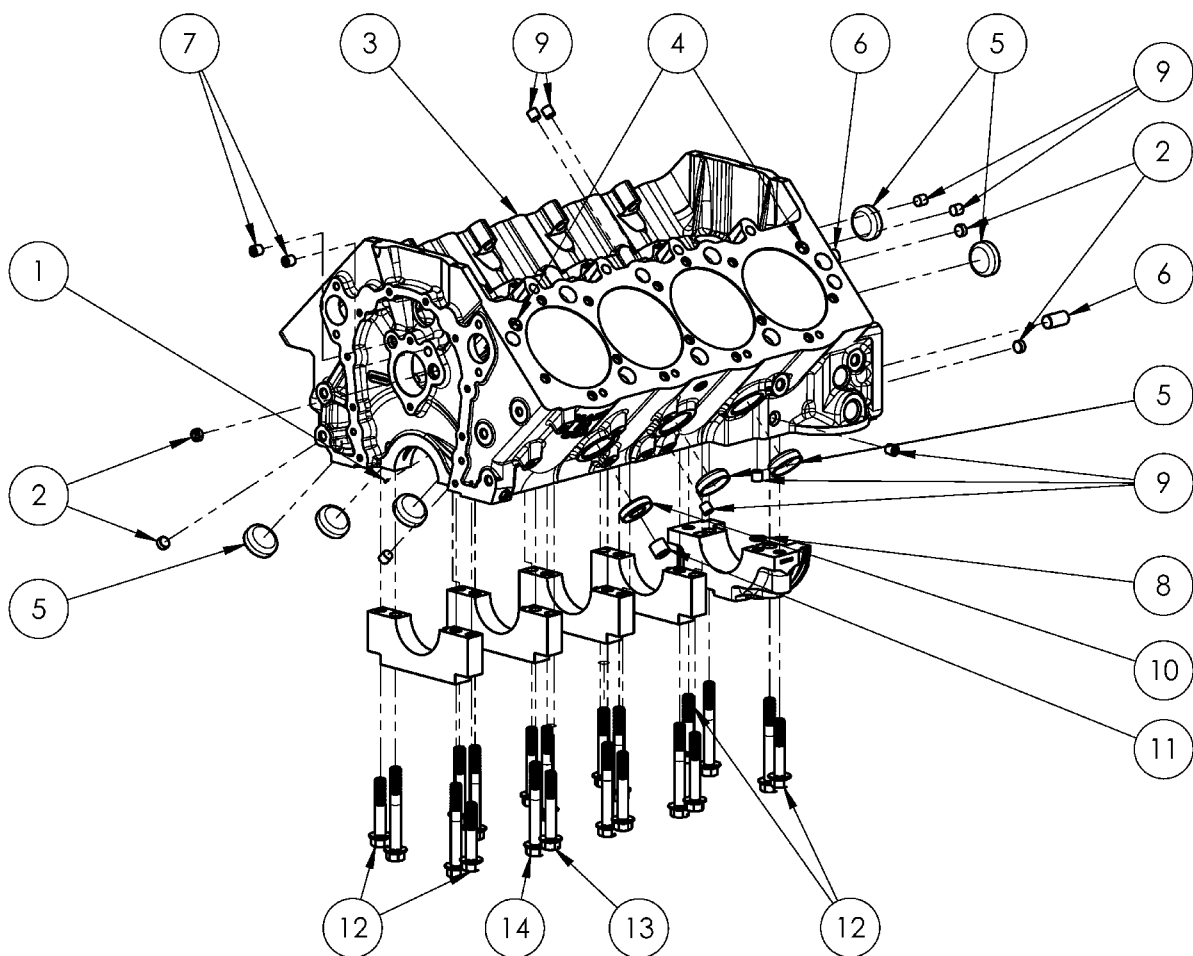
Item	Part Number	Description	Qty.
137	X-20-1	Washer, Lock, .259 ID X .489 In. OD	3
138	GM115579	Adapter, Male To Male, JIC6 To 1/2 NPT	2
139	GM103873	Screw, 3/8- 16 X 0.75 in.	3
140	GM115381	Shield, Heat, Rear Exhaust	1
141	GM115580	Pipe, Turbo W Rings	2
142	GM108058	Bracket, Wires	1
143	X-582-3	Connector, Hose + Vibra Seal	1
144	GM103563	Screw, 1/4- 20 X 1 in.	33
145	GM106844	Housing, Flywheel 10.3L	1
146	GM106867	Line, Turbo Oil Feed	1
147	X-465-27	Bolt, Hex Cap (1/4- 20 X 1 in.)	3
148	GM107485	Screw, 1/4- 20 X 1.25 in.	4
149	GM106859	Hose, Impactor, 10.3L Turbo	1
150	X-672-20	Clamp, Insulated, 1.25 In.	5
151	GM107202	Adapter, Male Jic- 4 To 1/4- 18 NPT	1
152	GM109482	Bracket, CCV	1
153	GM107484	Screw, 5/16- 18 X 3 in.	2
154	M912-05014-60	Screw, Socket Head Cap	4
155	GM105362	Pulley, 10.3L Crank	1
156	GM107155	Harness, Engine, 10.3L 150-200kW, APM402	1
157	GM115029	Gasket, Exhaust Manifold	2

Recommended Kohler Genuine Oil

GM105292	Oil, Synthetic Quart 10W40 (case of 12)
GM105293	Oil, Synthetic Gallon 10W40 (case of 4)
GM105294	Oil, Synthetic 5 Gallon Pail 10W40
GM105295	Oil, Synthetic 55 Gallon Drum 10W40
GM105296	Oil, Synthetic 275Gallon Tote 10W40

2: Block

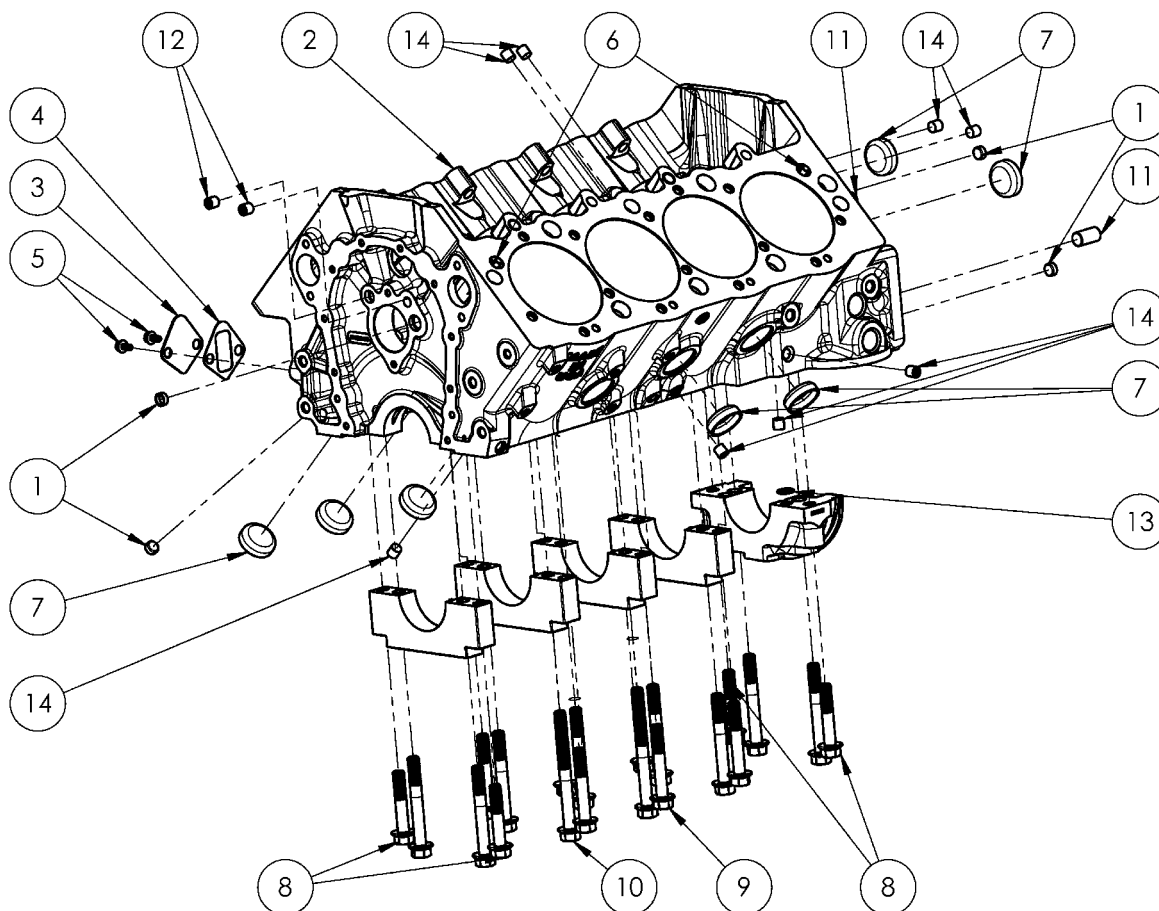
KG150, GM114863



Item	Part No.	Description	Qty.
1	GM114965	Oiler	8
2	GM115026	Plug, Pipe, 3/8 in.	4
3	NA	Engine Block 10.3L	1
4	GM115000	Dowel Pin, Cylinder Head	4
5	GM115025	Plug, Expansion, 1- 5/8 in. Cup, Brass	7
6	GM105057	Dowel Pin; Bell Housing	2
7	GM115846	Pipe Plug, 1/4" NPT Drilled To .031	2
8	GM115017	O- Ring, Rear Main Cap 9/16 in. X 3/4 in.	1
9	GM105076	Pipe Plug; 1/4 Npt, Steel	8
10	GM115847	Plug, Freeze	1
11	GM115024	Plug, Pipe, 1/2 in. Head Water	1
12	GM115848	Main Bolts 1/2- 13 X 2.75 HFH	4
13	GM115849	Main Bolts 1/2- 13 X 3.25 HFH	6
14	GM115850	Main Bolts 1/2- 13 X 4.00 HFH	10

2: Block, continued

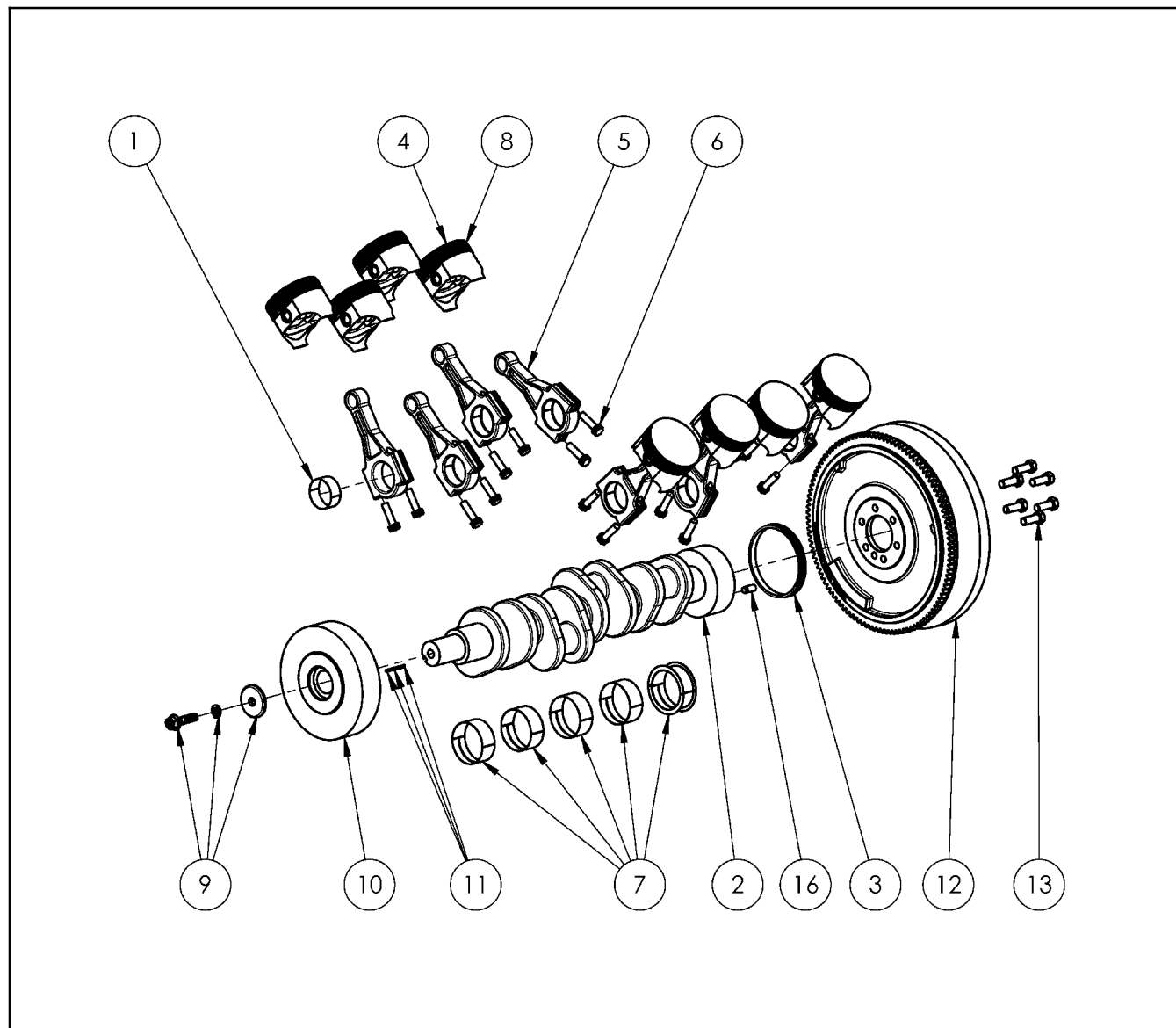
KG180/KG200, GM115838



Item	Part No.	Description	Qty.
1	GM115026	Plug, Pipe, 3/8 in.	4
2	-	Block, Machined	1
3	GM115879	Fuel Pump Block Off Plate	1
4	GM115880	Fuel Pump Gasket	1
5	GM105080	Bolt; Hfh, 3/8- 16 X .75, Whz	2
6	GM115000	Dowel Pin, Cylinder Head	4
7	GM115025	Plug, Expansion, 1- 5/8 in. Cup, Brass	7
8	GM115881	Bolt, HFH 1/2- 13 X 2.70, Main Cap	4
9	GM115849	Main Bolts 1/2- 13 X 3.25 HFH	6
10	GM115882	Bolt, HFH, 1/2- 13 X 3.88, Main Cap	10
11	GM105057	Dowel Pin; Bell Housing	2
12	GM115846	Pipe Plug, 1/4 in. NPT Drilled To .031	2
13	GM115017	O - Ring, Rear Main Cap 9/16 in. X 3/4 in.	1
14	GM105076	Pipe Plug; 1/4 Npt, Steel	8

3: Crank and Piston

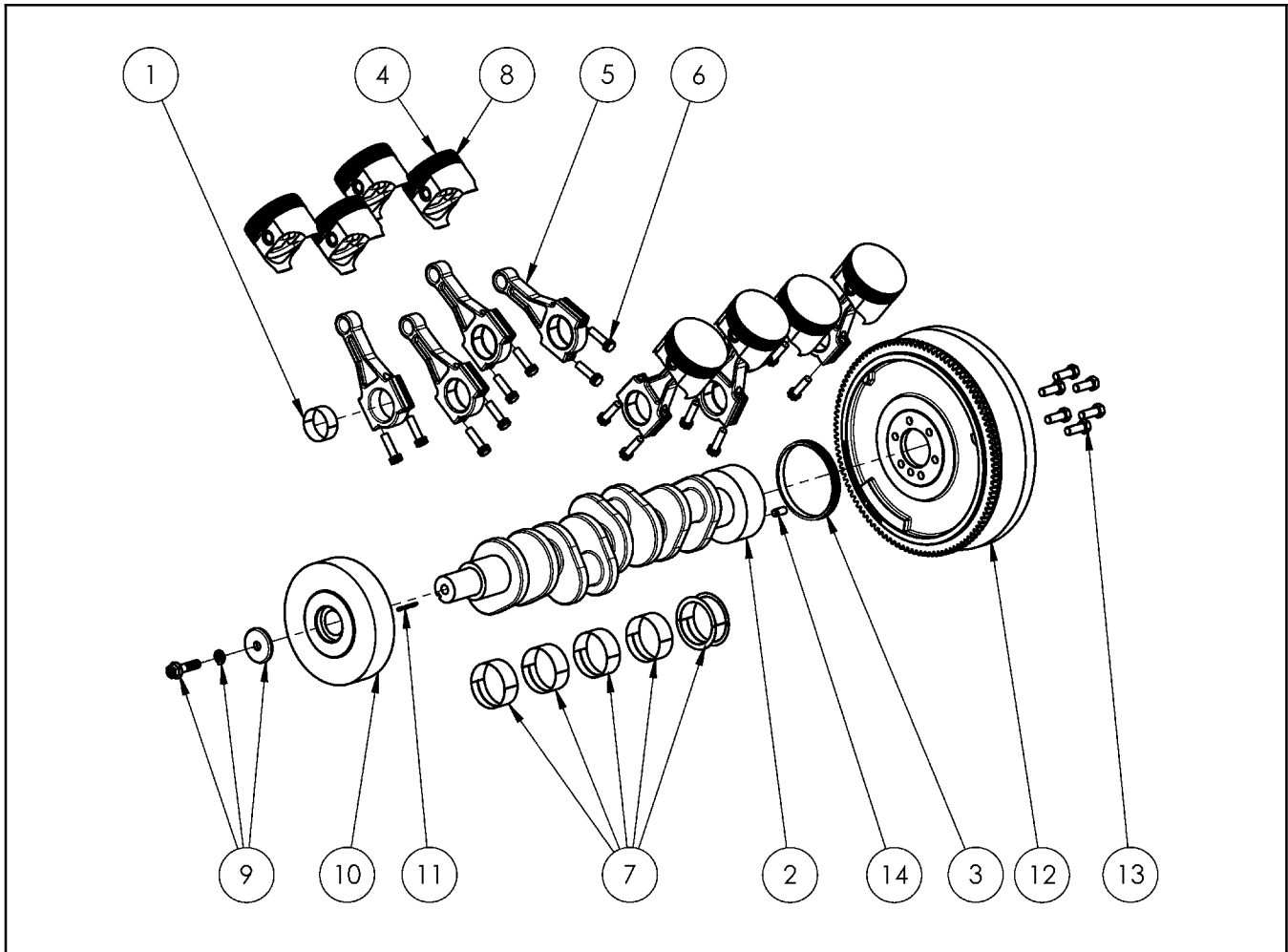
KG150, GM114864



Item	Part No.	Description	Qty.
1	GM114987	Bearing, Rod, Std	8
2	GM114979	Crankshaft	1
3	GM114994	Seal, Rear	1
4	GM114968	Piston, 10.3L	8
5	GM115007	Connecting Rod	8
6	GM115875	Connecting Rod Bolt	16
7	GM114995	Bearing, Main, Std	1
8	GM115876	Piston Rings, Set of 8, 10.3L	1
9	GM114985	Kit, Bolt, Harmonic Balancer	1
10	GM115010	Harmonic Balancer	1
11	GM105056	Crank Key; .750 X .188	3
12	GM114974	Assy, Flywheel, W/SAE Adapter	1
13	GM105055	Bolt; Hwh 7/16-20 Unf X 1.00, Flywheel	6
16	GM105088	Dowel Pin; Crankshaft	1

3: Crank and Piston, continued

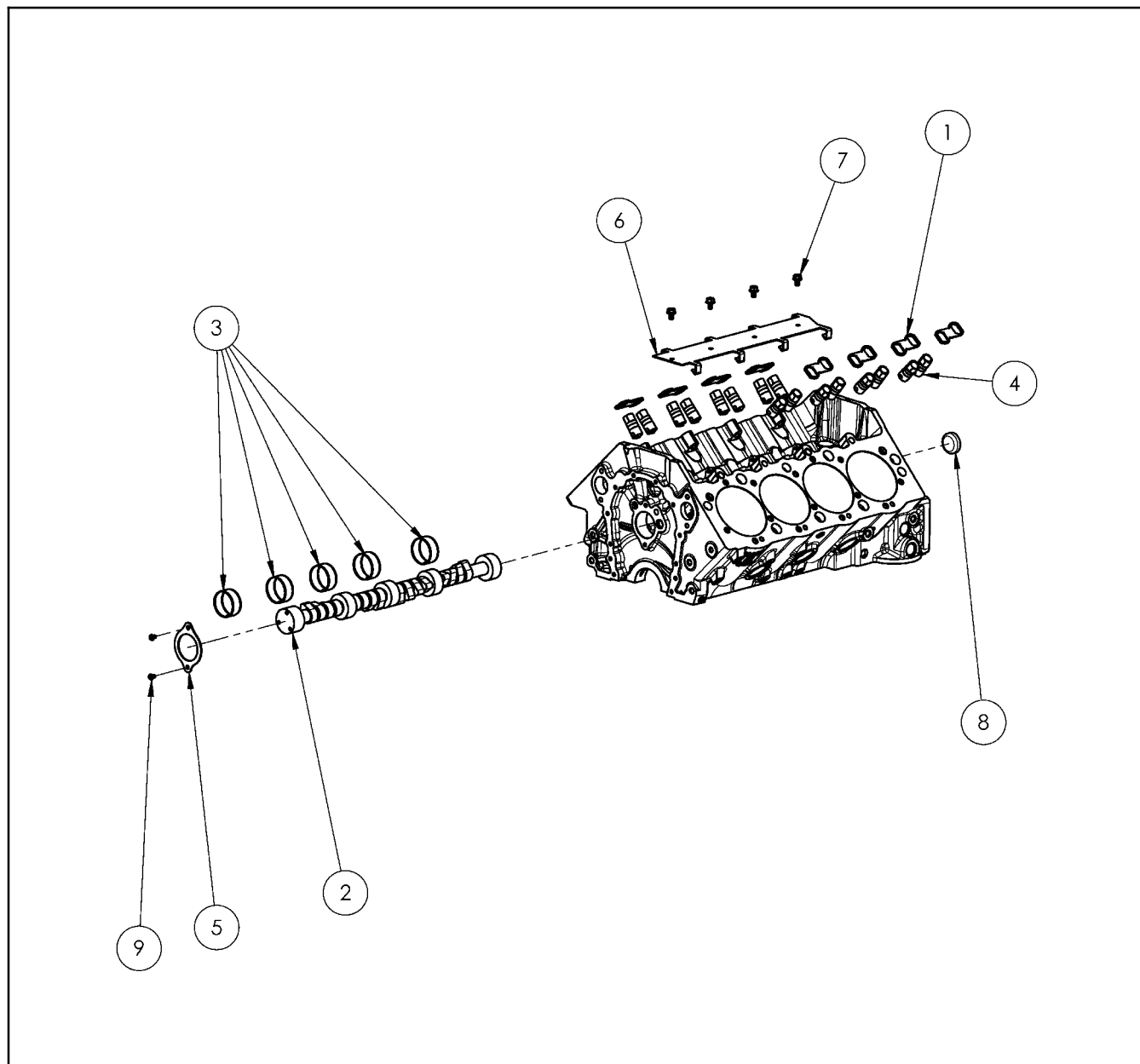
KG180/KG200, GM115839



Item	Part No.	Description	Qty.
1	GM114987	Bearing, Rod, Std	8
2	GM115885	Crankshaft	1
3	GM114994	Seal, Rear	1
4	GM114970	Piston, 10.3L	8
5	GM114971	Connecting Rod	8
6	GM115875	Connecting Rod Bolt	16
7	GM114995	Bearing, Main, Std	1
8	GM115876	Piston Rings, Set of 8, 10.3L	1
9	GM114985	Kit, Bolt, Harmonic Balancer	1
10	GM115010	Harmonic Balancer	1
11	GM105056	Crank Key; .750 X .188	3
12	GM114974	Assy, Flywheel, W/SAE Adapter	1
13	GM105055	Bolt; Hwh 7/16-20 Unf X 1.00, Flywheel	6
14	GM105088	Dowel Pin; Crankshaft	1

4: Camshaft and Lifters

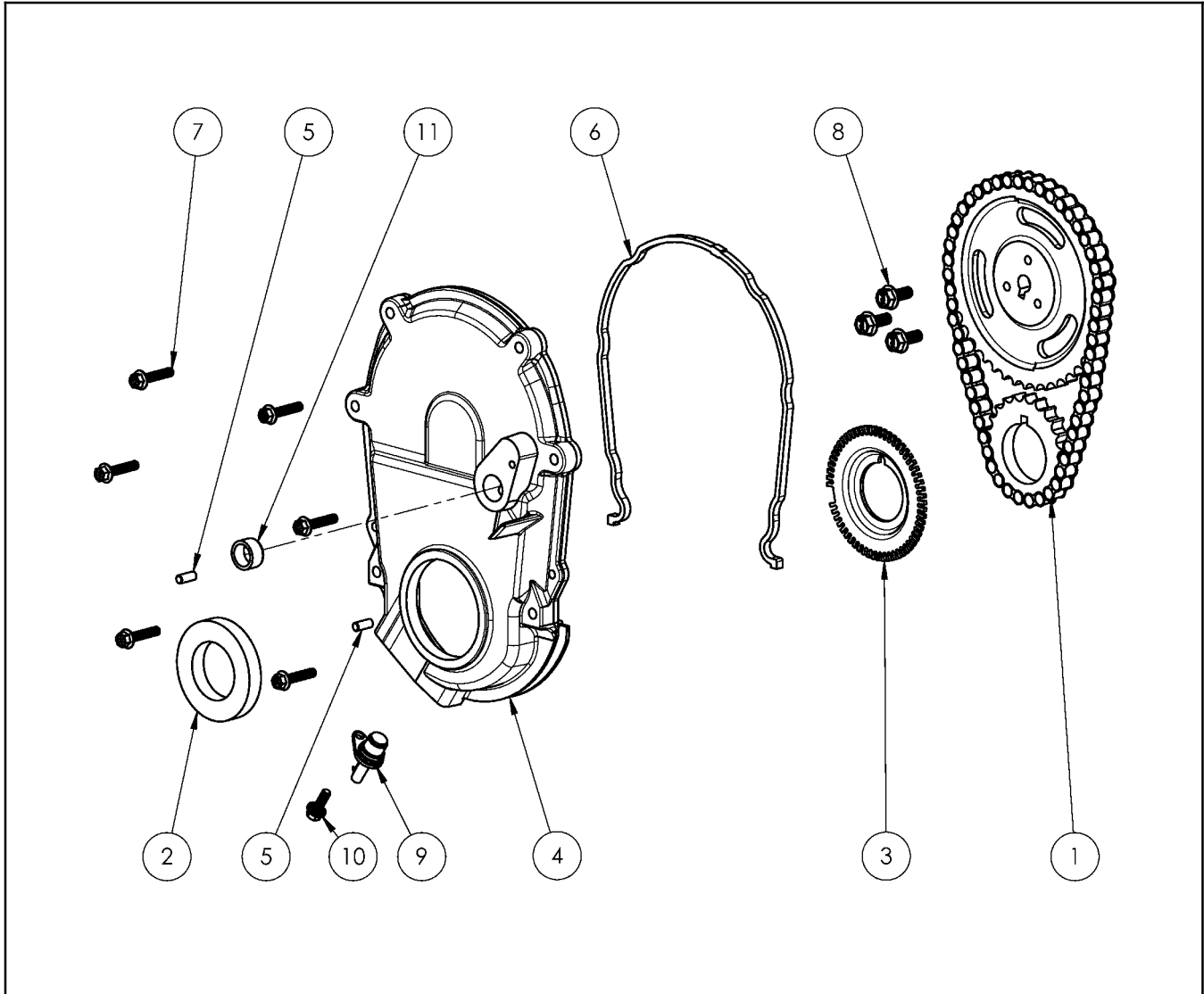
KG150-KG200, GM114865



Item	Part No.	Description	Qty.
1	GM114976	Yoke, Lifter	8
2	GM114980	Camshaft, 10.3L	1
3	GM114992	Bearing, Camshaft	1
4	GM115004	Lifter, Roller	16
5	GM107515	Cam Plate Retainer	1
6	GM115008	Retainer, Lifter	1
7	GM115873	Bolt, 5/16- 18 X .500	4
8	GM115006	Plug, Expansion, 2- 9/32 in.	1
9	GM115874	Screw Button Head 1/4- 20 X .500	2

5: Timing Gear and Cover

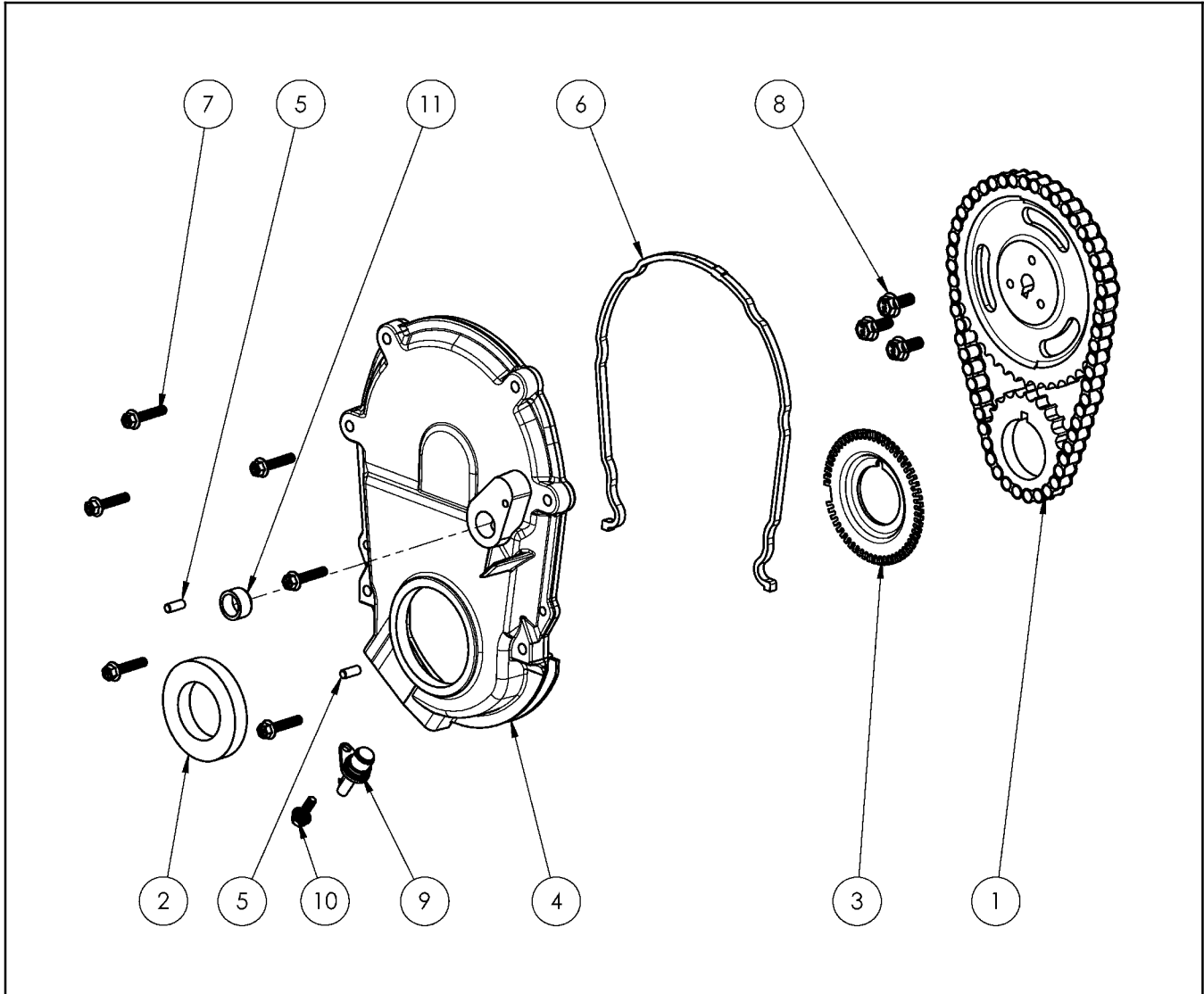
KG150, GM114866



Item	Part No.	Description	Qty.
1	GM114988	Set, Timing	1
2	GM114984	Seal, Timing Cover	1
3	GM114990	Reluctor Wheel	1
4	GM114991	Timing Cover	1
5	GM114999	Dowel Pin, Main & Timing Cover	2
6	GM115005	Gasket, Timing Cover	1
7	GM105075	Bolt; HFH 1/4-20 X 1.25, Gr 8	6
8	GM105078	Bolt; HFH 5/16-18 X .75	3
9	GM105071	Crank Position Sensor	1
10	GM105073	Bolt; HFH, 1/4-20 X .50, Whz	1
11	GM116790	Sensor, Cam Position	1

5: Timing Gear and Cover, continued

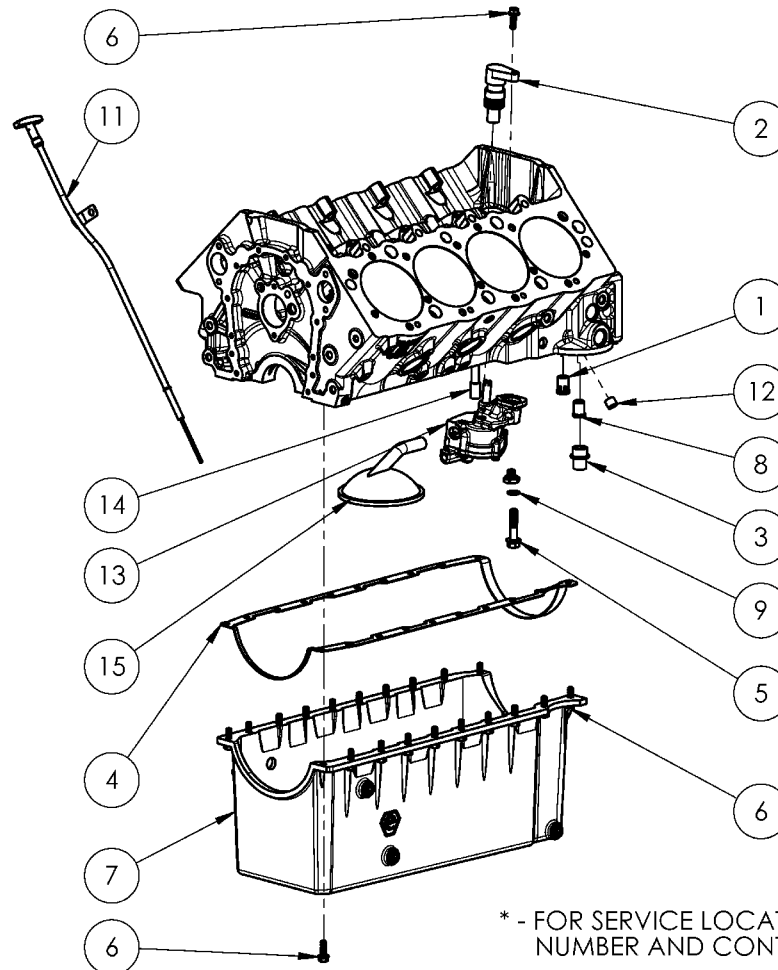
KG180/KG200, GM115840



Item	Part No.	Description	Qty.
1	GM114988	Set, Timing	1
2	GM114984	Seal, Timing Cover	1
3	GM114990	Reluctor Wheel	1
4	GM114991	Timing Cover	1
5	GM114999	Dowel Pin, Main & Timing Cover	2
6	GM115005	Gasket, Timing Cover	1
7	GM105075	Bolt, HFH 1/4- 20 X 1.25, Gr 8	6
8	GM105078	Bolt, HFH 5/16- 18 X .75	3
9	GM105071	Crank Position Sensor	1
10	GM105074	Bolt, HFH, 1/4- 20 X .75, Zp	1
11	GM116790	Sensor, Cam Position	1

6: Lubrication System

KG150, GM114867



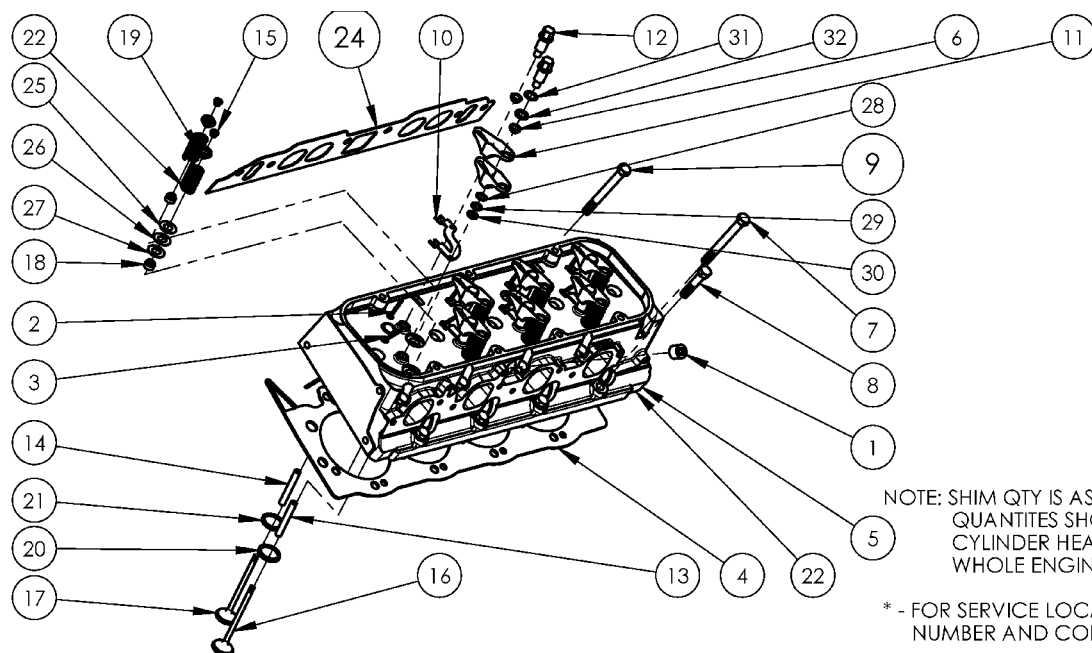
Item	Part No.	Description	Qty.
1	GM114981	Valve, Bypass Oil Filter	1
2	GM114996	Oil Pump, Assembly	1
3	GM114998	Adapter, Oil Filter	1
4	GM115003	Gasket, Oil Pan 10.3	1
5	GM111406	Bolt, 7/16- 14 x 2.50, GR8	1
6	GM115877	5/16- 18 X 1.00 HFH Bolt	21
7	GM114977	Oil Pan Assembly	1
8	GM114972	Plug, Bypass	1
9	GM105050	Washer, 7/16, Black Oxide, Hardened	1
11	GM114978	Dipstick, Tube Assembly	1
12	GM114983	Plug, Expansion, 5/8 in. Cup Exp Plug	1
13	GM114982	Pump, Oil	1
14	GM114993	Intermediate Shaft	1
15	GM115009	Screen, Pickup	1

KG180/KG200, GM11584126

Notes

7: Head and Valves

KG150, GM114868



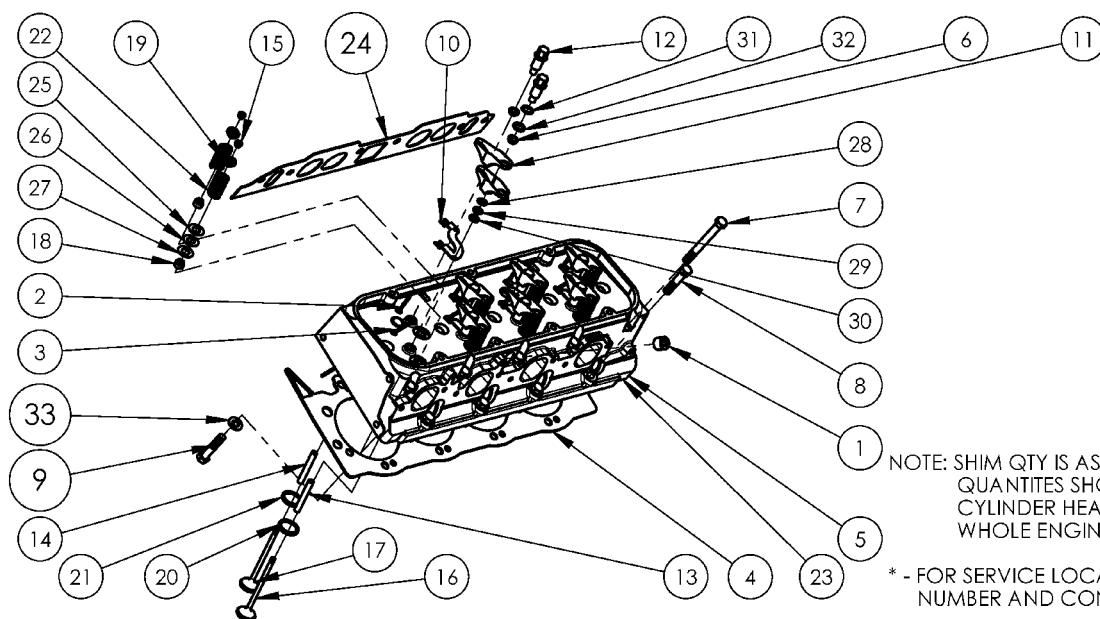
7: Head and Valves, continued

KG150, GM114868

Item	Part No.	Description	Qty.
1	GM115024	Plug, Pipe, 1/2 in. Head Water	1
2	GM115001	Pushrod, Intake	4
3	GM115002	Pushrod, Exhaust	4
4	GM115027	Head Gasket	1
5	NA	Cylinder Head Assembly 10.3L	1
6	GM115011	Rocker Arm Ball	8
7	GM115012	Bolt, Head	12
8	GM115013	Bolt, Head	4
9	GM105102	Bolt, HFH, 7/16- 14 X 1.62, Cylinder Head	2
10	GM115014	Guide Plate, Pushrod	4
11	GM115015	Rocker Arm	8
12	GM115016	Bolt, Rocker, Black Oxide	8
13	GM115853	Valve Guide, Exhaust	4
14	GM115854	Valve Guide, Intake	4
15	GM115855	Valve Keeper	16
16	GM115856	Exhaust Valve	4
17	GM115857	Intake Valve	4
18	GM115858	Valve Stem Oil Seals	8
19	GM115859	Valve Rotator	8
20	GM115860	Valve Seat, Exhaust	4
21	GM115861	Valve Seat, Intake	4
22	GM115862	Valve Spring	8
23	GM115863	Cylinder Head Bare	1
24	GM115864	Intake Manifold Gasket	1
25	GM115865	Shim Valve Spring .015 in.	1
26	GM115866	Shim Valve Spring .030 in.	1
27	GM115867	Shim Valve Spring .060 in.	1
28	GM115868	Shim Rocker .020 in.	1
29	GM115869	Shim Rocker .031 in.	1
30	GM115870	Shim Rocker .047 in.	1
31	GM115871	Shim Rocker .020 in.	1
32	GM115872	Shim Rocker .062 in.	1

7: Head and Valves, continued

KG180/KG200, GM115842



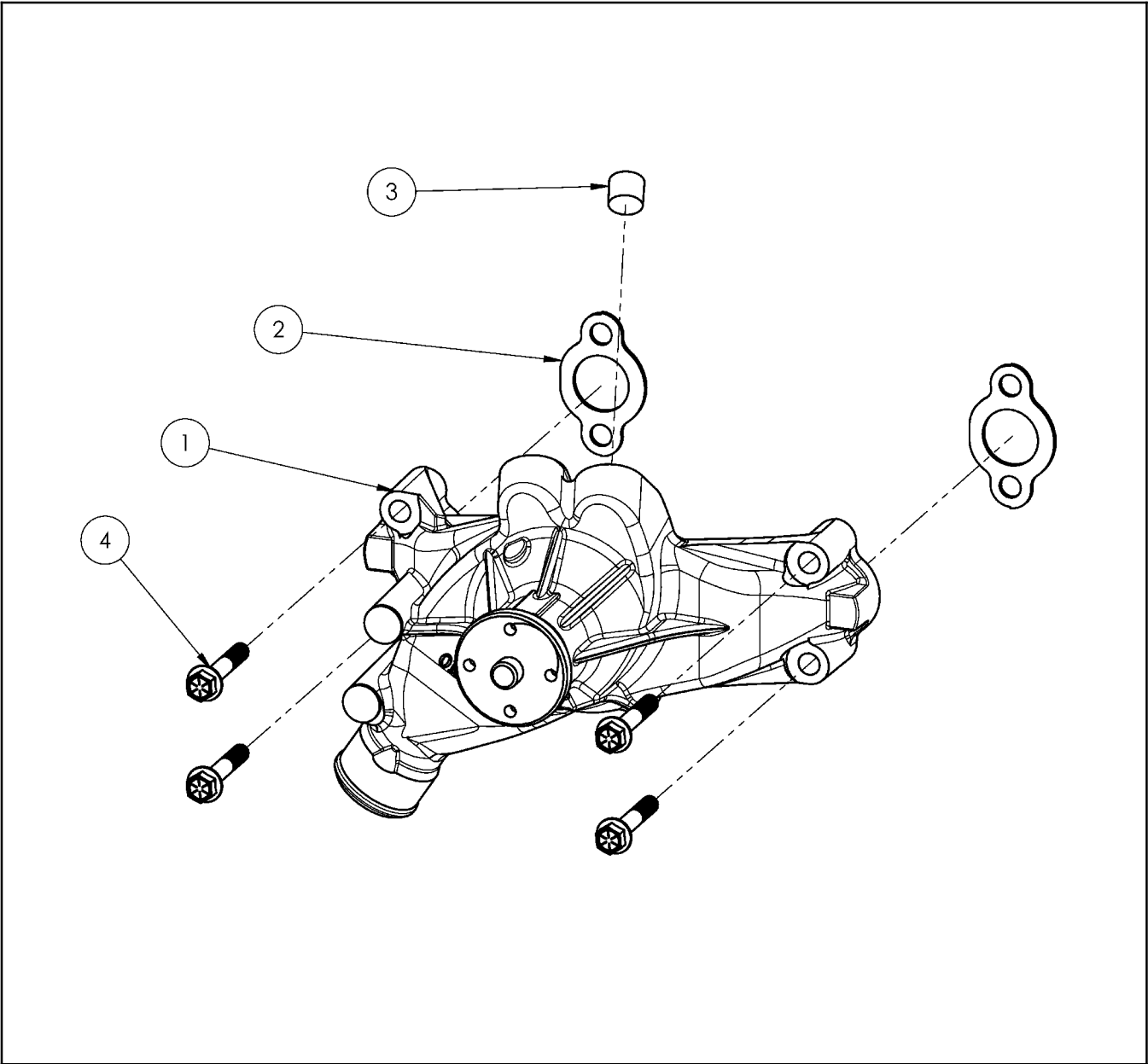
7: Head and Valves, continued

KG180/KG200, GM115842

Item	Part No.	Description	Qty.
1	GM115024	Plug, Pipe, 1/2 in. Head Water	1
2	GM115001	Pushrod, Intake	4
3	GM115002	Pushrod, Exhaust	4
4	GM115027	Head Gasket	1
5	NA	Cylinder Head	1
6	GM115011	Rocker Arm Ball	8
7	GM115012	Bolt, Head	12
8	GM115013	Bolt, Head	4
9	GM115884	Bolt, Head	2
10	GM115014	Guide Plate, Pushrod	4
11	GM115015	Rocker Arm	8
12	GM115016	Bolt, Rocker, Black Oxide	8
13	GM115853	Valve Guide, Exhaust	4
14	GM115854	Valve Guide, Intake	4
15	GM115855	Valve Keeper	16
16	GM115856	Exhaust Valve	4
17	GM115857	Intake Valve	4
18	GM115858	Valve Stem Oil Seals	8
19	GM115859	Valve Rotator	8
20	GM115860	Valve Seat, Exhaust	4
21	GM115861	Valve Seat, Intake	4
22	GM115862	Valve Spring	8
23	GM115863	Cylinder Head Bare	1
24	GM115864	Intake Manifold Gasket	1
25	GM115865	Shim Valve Spring .015 in.	1
26	GM115866	Shim Valve Spring .030 in.	1
27	GM115867	Shim Valve Spring .060 in.	1
28	GM115868	Shim Rocker .020 in.	1
29	GM115869	Shim Rocker .031 in.	1
30	GM115870	Shim Rocker .047 in.	1
31	GM115871	Shim Rocker .020 in.	1
32	GM115872	Shim Rocker .062 in.	1
33	GM105050	Washer, 7/16, Black Oxide, Hardened	2

8: Water Pump

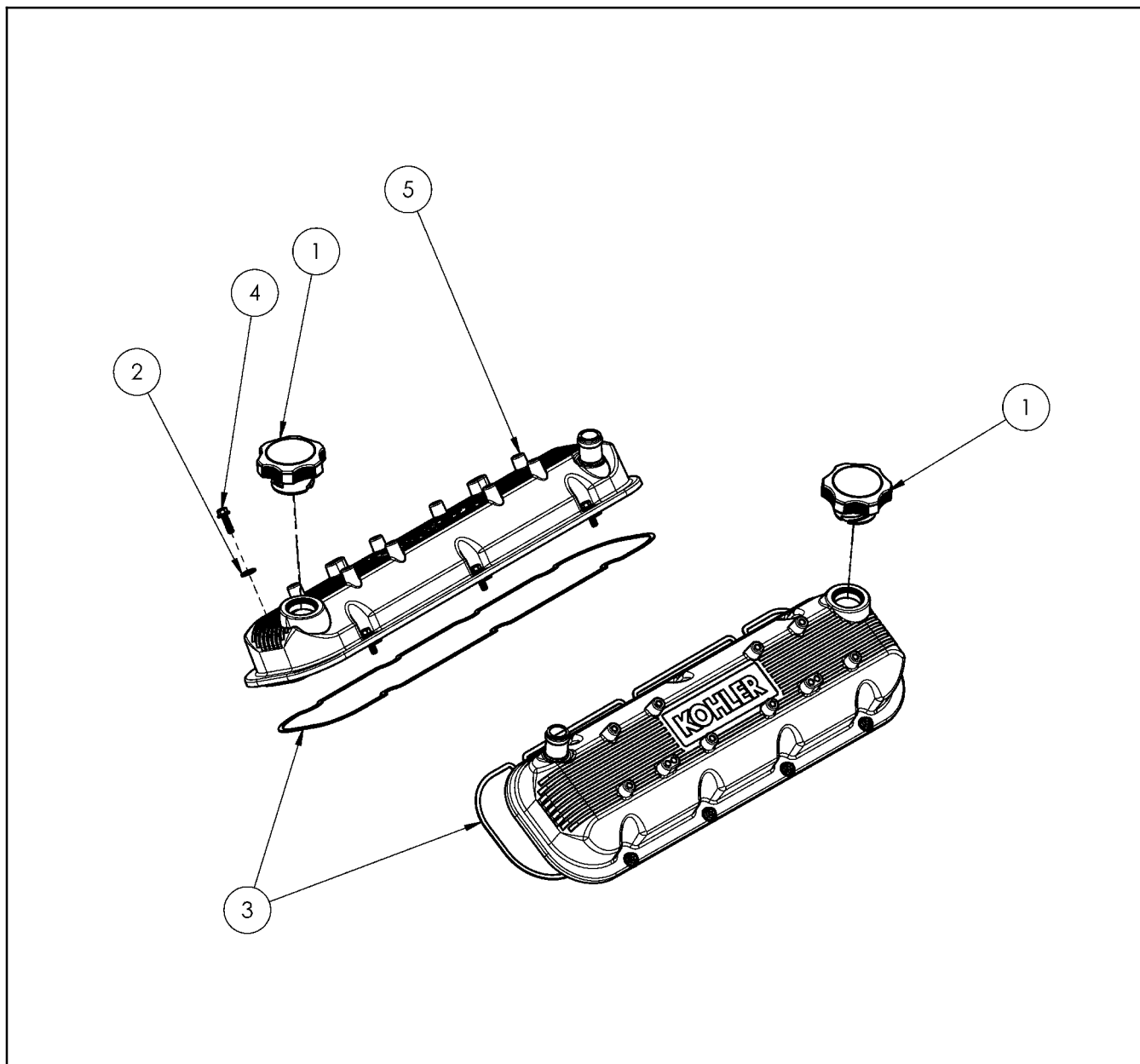
KG150-KG200, GM114870



Item	Part No.	Description	Qty.
1	GM114997	Water Pump	1
2	GM105125	Gasket: Water Pump	2
3	GM115024	Plug, Pipe, 1/2 in. Head Water	1
4	GM105121	Bolt; HFH, 3/8- 16 X 2.25	4

9: Valve Covers

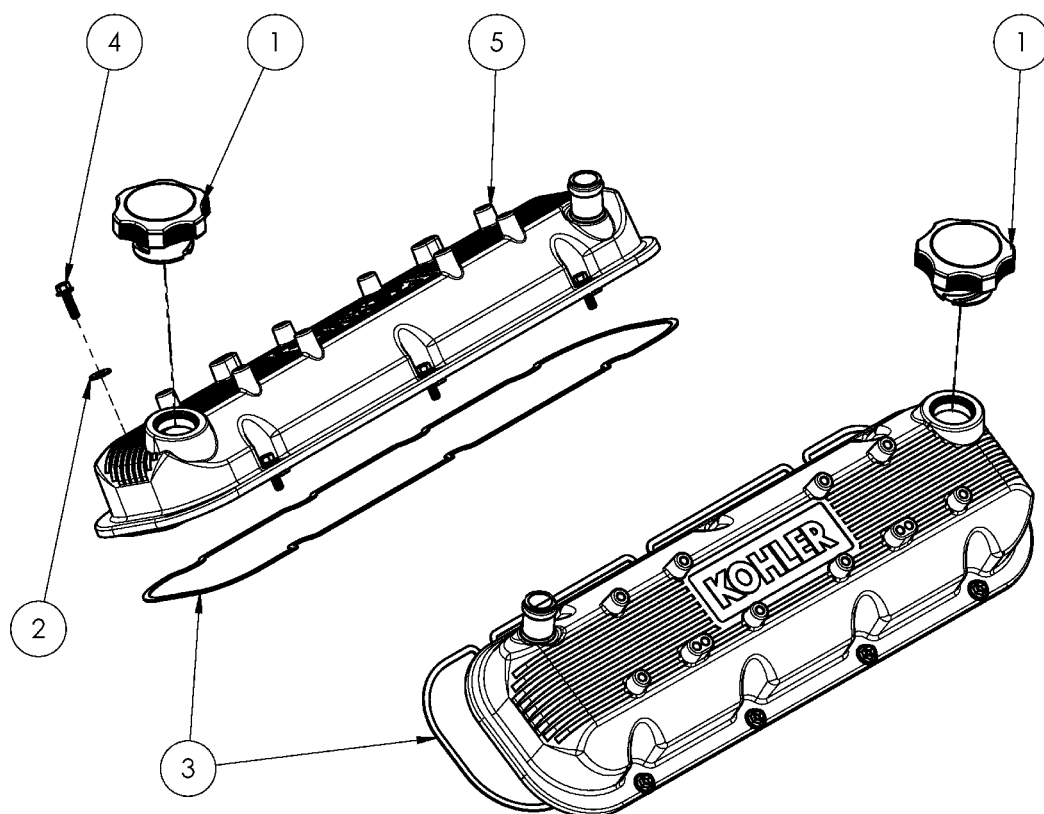
KG150, GM114871



Item	Part No.	Description	Qty.
1	GM115018	Assembly, Oil Cap	2
2	GM115022	Washer, Flat, 6 mm	14
3	GM115030	Gasket, Valve Cover	2
4	GM115023	Bolt, Flange 1/4-20 X 7/8 in.	14
5	GM115851	Valve Cover Assembly	2

9: Valve Covers

KG180/KG200, GM115843



Item	Part No.	Description	Qty.
1	GM115883	Oil Cap	2
2	GM115022	Washer, Flat, 6 mm	14
3	GM115030	Gasket, Valve Cover	2
4	GM115023	Bolt, Flange 1/4- 20 X 7/8 in.	14
5	GM115851	Valve Cover Assembly	2

Appendix A Abbreviations

The following list contains abbreviations that may appear in this publication.

A, amp	ampere	cfm	cubic feet per minute	est.	estimated
ABDC	after bottom dead center	CG	center of gravity	E-Stop	emergency stop
AC	alternating current	CID	cubic inch displacement	etc.	et cetera (and so forth)
A/D	analog to digital	CL	centerline	exh.	exhaust
ADC	advanced digital control; analog to digital converter	cm	centimeter	ext.	external
adj.	adjust, adjustment	CMOS	complementary metal oxide substrate (semiconductor)	F	Fahrenheit, female
ADV	advertising dimensional drawing	cogen.	cogeneration	fglass.	fiberglass
Ah	amp-hour	com	communications (port)	FHM	flat head machine (screw)
AHWT	anticipatory high water temperature	coml	commercial	fl. oz.	fluid ounce
AISI	American Iron and Steel Institute	Coml/Rec	Commercial/Recreational	flex.	flexible
ALOP	anticipatory low oil pressure	conn.	connection	freq.	frequency
alt.	alternator	cont.	continued	FS	full scale
Al	aluminum	CPVC	chlorinated polyvinyl chloride	ft.	foot, feet
ANSI	American National Standards Institute (formerly American Standards Association, ASA)	crit.	critical	ft. lb.	foot pounds (torque)
AO	anticipatory only	CRT	cathode ray tube	ft./min.	feet per minute
APDC	Air Pollution Control District	CSA	Canadian Standards Association	ftp	file transfer protocol
API	American Petroleum Institute	CT	current transformer	g	gram
approx.	approximate, approximately	Cu	copper	ga.	gauge (meters, wire size)
AQMD	Air Quality Management District	cUL	Canadian Underwriter's Laboratories	gal.	gallon
AR	as required, as requested	CUL	Canadian Underwriter's Laboratories	gen.	generator
AS	as supplied, as stated, as suggested	cu. in.	cubic inch	genset	generator set
ASE	American Society of Engineers	cw.	clockwise	GFI	ground fault interrupter
ASME	American Society of Mechanical Engineers	CWC	city water-cooled	GND, ⊕	ground
assy.	assembly	cyl.	cylinder	gov.	governor
ASTM	American Society for Testing Materials	D/A	digital to analog	gph	gallons per hour
ATDC	after top dead center	DAC	digital to analog converter	gpm	gallons per minute
ATS	automatic transfer switch	dB	decibel	gr.	grade, gross
auto.	automatic	dB(A)	decibel (A weighted)	GRD	equipment ground
aux.	auxiliary	DC	direct current	gr. wt.	gross weight
avg.	average	DCR	direct current resistance	H x W x D	height by width by depth
AVR	automatic voltage regulator	deg., °	degree	HC	hex cap
AWG	American Wire Gauge	dept.	department	HCHT	high cylinder head temperature
AWM	appliance wiring material	DFMEA	Design Failure Mode and Effects Analysis	HD	heavy duty
bat.	battery	dia.	diameter	HET	high exhaust temp., high engine temp.
BBDC	before bottom dead center	DI/EO	dual inlet/end outlet	hex	hexagon
BC	battery charger, battery charging	DIN	Deutsches Institut für Normung e. V. (also Deutsche Industrie Normenausschuss)	Hg	mercury (element)
BCA	battery charging alternator	DIP	dual inline package	HH	hex head
BCI	Battery Council International	DPDT	double-pole, double-throw	HHC	hex head cap
BDC	before dead center	DPST	double-pole, single-throw	HP	horsepower
BHP	brake horsepower	DS	disconnect switch	hr.	hour
blk.	black (paint color), block (engine)	DVR	digital voltage regulator	HS	heat shrink
blk. htr.	block heater	E, emer.	emergency (power source)	hsg.	housing
BMEP	brake mean effective pressure	ECM	electronic control module, engine control module	HVAC	heating, ventilation, and air conditioning
bps	bits per second	EDI	electronic data interchange	HWT	high water temperature
br.	brass	EFR	emergency frequency relay	Hz	hertz (cycles per second)
BTDC	before top dead center	e.g.	for example (<i>exempli gratia</i>)	IC	integrated circuit
Btu	British thermal unit	EG	electronic governor	ID	inside diameter, identification
Btu/min.	British thermal units per minute	EGSA	Electrical Generating Systems Association	IEC	International Electrotechnical Commission
C	Celsius, centigrade	EIA	Electronic Industries Association	IEEE	Institute of Electrical and Electronics Engineers
cal.	calorie	EI/EO	end inlet/end outlet	IMS	improved motor starting
CAN	controller area network	EMI	electromagnetic interference	in.	inch
CARB	California Air Resources Board	emiss.	emission	in. H ₂ O	inches of water
CB	circuit breaker	eng.	engine	in. Hg	inches of mercury
cc	cubic centimeter	EPA	Environmental Protection Agency	in. lb.	inch pounds
CCA	cold cranking amps	EPS	emergency power system	Inc.	incorporated
ccw.	counterclockwise	ER	emergency relay	ind.	industrial
CEC	Canadian Electrical Code	ES	engineering special, engineered special	int.	internal
cert.	certificate, certification, certified	ESD	electrostatic discharge	int./ext.	internal/external
cfh	cubic feet per hour			I/O	input/output
				IP	iron pipe
				ISO	International Organization for Standardization
				J	joule
				JIS	Japanese Industry Standard

k	kilo (1000)	MTBO	mean time between overhauls	rms	root mean square
K	kelvin	mtg.	mounting	rnd.	round
kA	kiloampere	MTU	Motoren-und Turbinen-Union	ROM	read only memory
KB	kilobyte (2 ¹⁰ bytes)	MW	megawatt	rot.	rotate, rotating
KBus	Kohler communication protocol	mW	milliwatt	rpm	revolutions per minute
kg	kilogram	μF	microfarad	RS	right side
kg/cm ²	kilograms per square centimeter	N, norm.	normal (power source)	RTU	remote terminal unit
kgm	kilogram-meter	NA	not available, not applicable	RTV	room temperature vulcanization
kg/m ³	kilograms per cubic meter	nat. gas	natural gas	RW	read/write
kHz	kilohertz	NBS	National Bureau of Standards	SAE	Society of Automotive Engineers
kJ	kilojoule	NC	normally closed	scfm	standard cubic feet per minute
km	kilometer	NEC	National Electrical Code	SCR	silicon controlled rectifier
kOhm, kΩ	kilo-ohm	NEMA	National Electrical Manufacturers Association	s, sec.	second
kPa	kilopascal	NFPA	National Fire Protection Association	SI	<i>Système international d'unités</i> , International System of Units
kph	kilometers per hour	Nm	newton meter	SI/EO	side in/end out
kV	kilovolt	NO	normally open	sil.	silencer
kVA	kilovolt ampere	no., nos.	number, numbers	SN	serial number
kVAR	kilovolt ampere reactive	NPS	National Pipe, Straight	SNMP	simple network management protocol
kW	kilowatt	NPSC	National Pipe, Straight-coupling	SPDT	single-pole, double-throw
kWh	kilowatt-hour	NPT	National Standard taper pipe thread per general use	SPST	single-pole, single-throw
kWm	kilowatt mechanical	NPTF	National Pipe, Taper-Fine	spec	specification
kWth	kilowatt-thermal	NR	not required, normal relay	specs	specification(s)
L	liter	ns	nanosecond	sq.	square
LAN	local area network	OC	overcrank	sq. cm	square centimeter
L x W x H	length by width by height	OD	outside diameter	sq. in.	square inch
lb.	pound, pounds	OEM	original equipment manufacturer	SS	stainless steel
lbm/ft ³	pounds mass per cubic feet	OF	overfrequency	std.	standard
LCB	line circuit breaker	opt.	option, optional	stl.	steel
LCD	liquid crystal display	OS	oversize, overspeed	tach.	tachometer
ld. shd.	load shed	OSHA	Occupational Safety and Health Administration	TD	time delay
LED	light emitting diode	OV	overvoltage	TDC	top dead center
Lph	liters per hour	oz.	ounce	TDEC	time delay engine cooldown
Lpm	liters per minute	p., pp.	page, pages	TDEN	time delay emergency to normal
LOP	low oil pressure	PC	personal computer	TDES	time delay engine start
LP	liquefied petroleum	PCB	printed circuit board	TDNE	time delay normal to emergency
LPG	liquefied petroleum gas	pF	picofarad	TDOE	time delay off to emergency
LS	left side	PF	power factor	TDON	time delay off to normal
L _{wa}	sound power level, A weighted	ph., ∅	phase	temp.	temperature
LWL	low water level	PHC	Phillips® head Crimptite® (screw)	term.	terminal
LWT	low water temperature	PHH	Phillips® hex head (screw)	THD	total harmonic distortion
m	meter, milli (1/1000)	PHM	pan head machine (screw)	TIF	telephone influence factor
M	mega (10 ⁶ when used with SI units), male	PLC	programmable logic control	TIR	total indicator reading
m ³	cubic meter	PMG	permanent magnet generator	tol.	tolerance
m ³ /hr.	cubic meters per hour	pot	potentiometer, potential	turbo.	turbocharger
m ³ /min.	cubic meters per minute	ppm	parts per million	typ.	typical (same in multiple locations)
mA	milliampere	PROM	programmable read-only memory	UF	underfrequency
man.	manual	psi	pounds per square inch	UHF	ultrahigh frequency
max.	maximum	psig	pounds per square inch gauge	UL	Underwriter's Laboratories, Inc.
MB	megabyte (2 ²⁰ bytes)	pt.	pint	UNC	unified coarse thread (was NC)
MCCB	molded-case circuit breaker	PTC	positive temperature coefficient	UNF	unified fine thread (was NF)
MCM	one thousand circular mils	PTO	power takeoff	univ.	universal
meggar	megohmmeter	PVC	polyvinyl chloride	US	undersize, underspeed
MHz	megahertz	qt.	quart, quarts	UV	ultraviolet, undervoltage
mi.	mile	qty.	quantity	V	volt
mil	one one-thousandth of an inch	R	replacement (emergency)	VAC	volts alternating current
min.	minimum, minute	rad.	power source	VAR	voltampere reactive
misc.	miscellaneous	RAM	radiator, radius	VDC	volts direct current
MJ	megajoule	RDO	random access memory	VFD	vacuum fluorescent display
mJ	millijoule	ref.	relay driver output	VGA	video graphics adapter
mm	millimeter	rem.	reference	VHF	very high frequency
mOhm, mΩ	milliohm	Res/Coml	remote	W	watt
MOhm, MΩ	megohm	RFI	Residential/Commercial	WCR	withstand and closing rating
MOV	metal oxide varistor	RH	radio frequency interference	w/	with
MPa	megapascal	RHM	round head	w/o	without
mpg	miles per gallon	rfly.	round head machine (screw)	wt.	weight
mph	miles per hour		relay	xfrm	transformer
MS	military standard				
ms	millisecond				
m/sec.	meters per second				
MTBF	mean time between failure				

Appendix B Common Hardware Application Guidelines

Use the information below and on the following pages to identify proper fastening techniques when no specific reference for reassembly is made.

Bolt/Screw Length: When bolt/screw length is not given, use Figure 1 as a guide. As a general rule, a minimum length of one thread beyond the nut and a maximum length of 1/2 the bolt/screw diameter beyond the nut is the preferred method.

Washers and Nuts: Use split lock washers as a bolt locking device where specified. Use SAE flat washers with whiz nuts, spirallock nuts, or standard nuts and preloading (torque) of the bolt in all other applications.

See Appendix C, General Torque Specifications, and other torque specifications in the service literature.

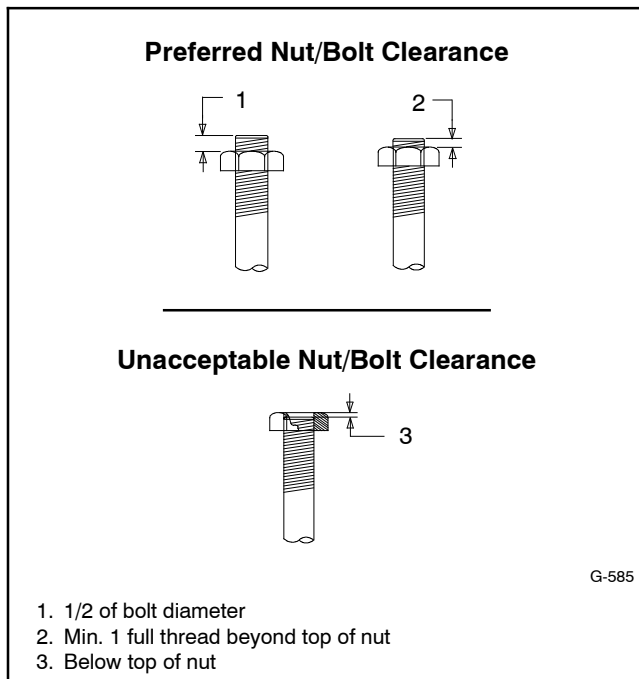


Figure 1 Acceptable Bolt Lengths

Steps for common hardware application:

1. Determine entry hole type: round or slotted.
2. Determine exit hole type: fixed female thread (weld nut), round, or slotted.

For round and slotted exit holes, determine if hardware is greater than 1/2 inch in diameter, or 1/2 inch in diameter or less. Hardware that is *greater than 1/2 inch* in diameter takes a standard nut and SAE washer. Hardware *1/2 inch or less* in diameter can take a properly torqued whiz nut or spirallock nut. See Figure 2.

3. Follow these SAE washer rules after determining exit hole type:
 - a. Always use a washer between hardware and a slot.
 - b. Always use a washer under a nut (see 2 above for exception).
 - c. Use a washer under a bolt when the female thread is fixed (weld nut).
4. Refer to Figure 2, which depicts the preceding hardware configuration possibilities.

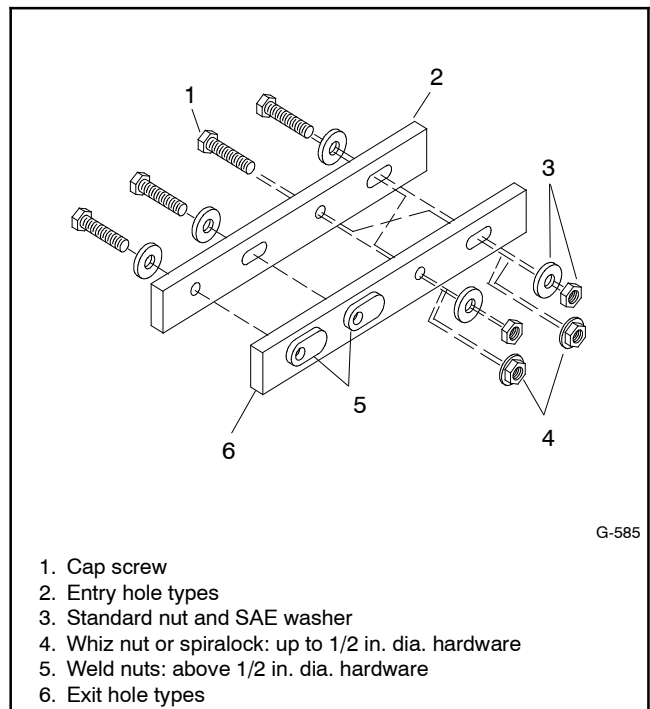


Figure 2 Acceptable Hardware Combinations

Appendix C General Torque Specifications

American Standard Fasteners Torque Specifications					
Size	Assembled into Cast Iron or Steel			Assembled into Aluminum	
	Grade 2		Grade 5		
8-32	2.0 Nm	(18 in. lb.)	3.1 Nm	(27 in. lb.)	-
10-24	3.2 Nm	(28 in. lb.)	4.9 Nm	(43 in. lb.)	-
10-32	3.6 Nm	(32 in. lb.)	5.5 Nm	(49 in. lb.)	-
12-24	5.0 Nm	(44 in. lb.)	7.7 Nm	(68 in. lb.)	-
1/4-20	7.6 Nm	(67 in. lb.)	11.6 Nm	(103 in. lb.)	16.5 Nm (146 in. lb.)
1/4-28	8.6 Nm	(76 in. lb.)	13.2 Nm	(117 in. lb.)	18.8 Nm (166 in. lb.)
5/16-18	15.5 Nm	(137 in. lb.)	24.0 Nm	(212 in. lb.)	33.9 Nm (300 in. lb.)
5/16-24	17.1 Nm	(151 in. lb.)	26.4 Nm	(234 in. lb.)	40 Nm (28 ft. lb.)
3/8-16	27 Nm	(243 in. lb.)	42 Nm	(31 ft. lb.)	60 Nm (44 ft. lb.)
3/8-24	31 Nm	(274 in. lb.)	47 Nm	(35 ft. lb.)	68 Nm (50 ft. lb.)
7/16-14	43 Nm	(32 ft. lb.)	68 Nm	(50 ft. lb.)	96 Nm (71 ft. lb.)
7/16-20	49 Nm	(36 ft. lb.)	76 Nm	(56 ft. lb.)	107 Nm (79 ft. lb.)
1/2-13	66 Nm	(49 ft. lb.)	103 Nm	(76 ft. lb.)	146 Nm (108 ft. lb.)
1/2-20	75 Nm	(55 ft. lb.)	117 Nm	(86 ft. lb.)	164 Nm (121 ft. lb.)
9/16-12	96 Nm	(71 ft. lb.)	149 Nm	(110 ft. lb.)	210 Nm (155 ft. lb.)
9/16-18	107 Nm	(79 ft. lb.)	165 Nm	(122 ft. lb.)	235 Nm (173 ft. lb.)
5/8-11	133 Nm	(98 ft. lb.)	206 Nm	(152 ft. lb.)	290 Nm (214 ft. lb.)
5/8-18	150 Nm	(111 ft. lb.)	232 Nm	(171 ft. lb.)	328 Nm (242 ft. lb.)
3/4-10	-		365 Nm	(269 ft. lb.)	515 Nm (380 ft. lb.)
3/4-16	-		405 Nm	(299 ft. lb.)	572 Nm (422 ft. lb.)
1-8	-		881 Nm	(650 ft. lb.)	1245 Nm (918 ft. lb.)
1-12	-		961 Nm	(709 ft. lb.)	1357 Nm (1001 ft. lb.)

See Note 3

Metric Fasteners Torque Specifications, Measured in Nm (ft. lb.)					
Size (mm)	Assembled into Cast Iron or Steel				Assembled into Aluminum
	Grade 5.8	Grade 8.8	Grade 10.9	Grade 12.9	
Mxxx-04xxx-xx	1.9 (1.4)	2.9 (2.1)	4.3 (3.2)	4.3 (3.2)	
Mxxx-05xxx-xx	3.8 (2.8)	5.8 (4.3)	8.5 (6.3)	8.5 (6.3)	
Mxxx-06xxx-xx	6.5 (4.8)	10.4 (7.7)	14.7 (11)	17.6 (13)	
Mxxx-08xxx-xx	16 (12)	25 (17)	36 (26)	43 (31)	
Mxxx-08xxx-xxF	17 (13)	27 (20)	38 (28)	46 (34)	
Mxxx-10xxx-xx	31 (23)	50 (37)	70 (52)	85 (62)	
Mxxx-10xxx-xxF	33 (24)	53 (39)	74 (55)	89 (66)	
Mxxx-12xxx-xx	55 (40)	87 (64)	123 (91)	147 (109)	
Mxxx-12xxx-xxF	60 (44)	95 (70)	134 (99)	161 (119)	
Mxxx-14xxx-xx	87 (64)	135 (103)	196 (145)	236 (174)	
Mxxx-14xxx-xxF	94 (69)	151 (111)	212 (156)	254 (188)	
Mxxx-16xxx-xx	135 (100)	217 (160)	305 (225)	365 (270)	
Mxxx-16xxx-xxF	145 (107)	231 (171)	325 (240)	390 (288)	
Mxxx-18xxx-xx	187 (138)	299 (221)	421 (310)	505 (373)	
Mxxx-18xxx-xxF	210 (155)	336 (248)	473 (349)	567 (419)	
Mxxx-20xxx-xx	264 (195)	423 (312)	595 (439)	714 (526)	
Mxxx-20xxx-xxF	293 (216)	469 (346)	660 (487)	792 (584)	
Mxxx-22xxx-xx	360 (266)	576 (425)	811 (598)	973 (718)	
Mxxx-22xxx-xxF	396 (292)	633 (467)	890 (657)	1068 (788)	
Mxxx-24xxx-xx	457 (337)	731 (539)	1028 (758)	1233 (910)	
Mxxx-24xxx-xxF	498 (367)	797 (588)	1121 (827)	1345 (992)	
Mxxx-27xxx-xx	-	1072 (790)	1507 (1112)	1809 (1334)	
Mxxx-27xxx-xxF	-	1156 (853)	1626 (1199)	1952 (1439)	
Mxxx-30xxx-xx	-	1453 (1072)	2043 (1507)	2452 (1809)	

See Note 3

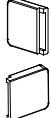
Notes:

1. The torque values above are general guidelines. Always use the torque values specified in the service manuals and/or assembly drawings when they differ from the above torque values.
2. The torque values above are based on new plated threads. Increase torque values by 15% if non-plated threads are used.
3. At minimum, hardware threaded into aluminum must have two diameters of thread engagement. Hardware threaded into steel and cast iron must have 1.25 diameters of thread.
4. Torque values are calculated as equivalent stress loading on American hardware with an approximate preload of 75% of proof strength and a friction coefficient of 0.2.

Appendix D Common Hardware Identification

Screw/Bolts/Studs	
Head Styles	
Hex Head or Machine Head	
Hex Head or Machine Head with Washer	
Flat Head (FHM)	
Round Head (RHM)	
Pan Head	
Hex Socket Head Cap or Allen™ Head Cap	
Hex Socket Head or Allen™ Head Shoulder Bolt	
Sheet Metal Screw	
Stud	
Drive Styles	
Hex	
Hex and Slotted	
Phillips®	
Slotted	
Hex Socket	

Nuts	
Nut Styles	
Hex Head	
Lock or Elastic	
Square	
Cap or Acorn	
Wing	
Washers	
Washer Styles	
Plain	
Split Lock or Spring	
Spring or Wave	
External Tooth Lock	
Internal Tooth Lock	
Internal-External Tooth Lock	

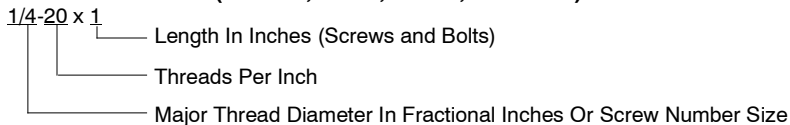
Hardness Grades	
American Standard	
Grade 2	
Grade 5	
Grade 8	
Grade 8/9 (Hex Socket Head)	
Metric	
Number stamped on hardware; 5.8 shown	
Hose Clamp Covers	
Black, EPDM rubber used on worm gear clamps	

Allen™ head screw is a trademark of Holo-Krome Co.

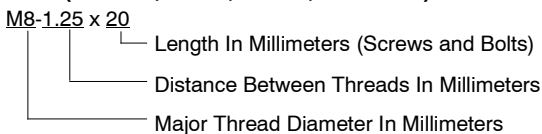
Phillips® screw is a registered trademark of Phillips Screw Company.

Sample Dimensions

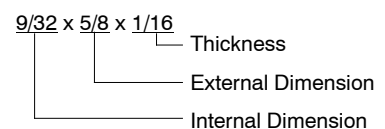
American Standard (Screws, Bolts, Studs, and Nuts)



Metric (Screws, Bolts, Studs, and Nuts)



Plain Washers



Lock Washers



Appendix E Common Hardware List

The Common Hardware List lists part numbers and dimensions for common hardware items.

American Standard

Part No. Dimensions Hex Head Bolts (Grade 5)

X-465-17	1/4-20 x .38
X-465-6	1/4-20 x .50
X-465-2	1/4-20 x .62
X-465-16	1/4-20 x .75
X-465-18	1/4-20 x .88
X-465-7	1/4-20 x 1.00
X-465-8	1/4-20 x 1.25
X-465-9	1/4-20 x 1.50
X-465-10	1/4-20 x 1.75
X-465-11	1/4-20 x 2.00
X-465-12	1/4-20 x 2.25
X-465-14	1/4-20 x 2.75
X-465-21	1/4-20 x 5.00
X-465-25	1/4-28 x .38
X-465-20	1/4-28 x 1.00

X-125-33	5/16-18 x .50
X-125-23	5/16-18 x .62
X-125-3	5/16-18 x .75
X-125-31	5/16-18 x .88
X-125-5	5/16-18 x 1.00
X-125-24	5/16-18 x 1.25
X-125-34	5/16-18 x 1.50
X-125-25	5/16-18 x 1.75
X-125-26	5/16-18 x 2.00
230578	5/16-18 x 2.25
X-125-29	5/16-18 x 2.50
X-125-27	5/16-18 x 2.75
X-125-28	5/16-18 x 3.00
X-125-22	5/16-18 x 4.50
X-125-32	5/16-18 x 5.00
X-125-35	5/16-18 x 5.50
X-125-36	5/16-18 x 6.00
X-125-40	5/16-18 x 6.50

X-125-43	5/16-24 x 1.75
X-125-44	5/16-24 x 2.50
X-125-30	5/16-24 x .75
X-125-39	5/16-24 x 2.00
X-125-38	5/16-24 x 2.75

X-6238-2	3/8-16 x .62
X-6238-10	3/8-16 x .75
X-6238-3	3/8-16 x .88
X-6238-11	3/8-16 x 1.00
X-6238-4	3/8-16 x 1.25
X-6238-5	3/8-16 x 1.50
X-6238-1	3/8-16 x 1.75
X-6238-6	3/8-16 x 2.00
X-6238-17	3/8-16 x 2.25
X-6238-7	3/8-16 x 2.50
X-6238-8	3/8-16 x 2.75
X-6238-9	3/8-16 x 3.00
X-6238-19	3/8-16 x 3.25
X-6238-12	3/8-16 x 3.50
X-6238-20	3/8-16 x 3.75
X-6238-13	3/8-16 x 4.50
X-6238-18	3/8-16 x 5.50
X-6238-25	3/8-16 x 6.50

Part No. Dimensions Hex Head Bolts, cont.

X-6238-14	3/8-24 x .75
X-6238-16	3/8-24 x 1.25
X-6238-21	3/8-24 x 4.00
X-6238-22	3/8-24 x 4.50

X-6024-5	7/16-14 x .75
X-6024-2	7/16-14 x 1.00
X-6024-8	7/16-14 x 1.25
X-6024-3	7/16-14 x 1.50
X-6024-4	7/16-14 x 2.00
X-6024-11	7/16-14 x 2.75
X-6024-12	7/16-14 x 6.50

X-129-15	1/2-13 x .75
X-129-17	1/2-13 x 1.00
X-129-18	1/2-13 x 1.25
X-129-19	1/2-13 x 1.50
X-129-20	1/2-13 x 1.75
X-129-21	1/2-13 x 2.00
X-129-22	1/2-13 x 2.25
X-129-23	1/2-13 x 2.50
X-129-24	1/2-13 x 2.75
X-129-25	1/2-13 x 3.00
X-129-27	1/2-13 x 3.50
X-129-29	1/2-13 x 4.00
X-129-30	1/2-13 x 4.50
X-463-9	1/2-13 x 5.50
X-129-44	1/2-13 x 6.00

X-129-51	1/2-20 x .75
X-129-45	1/2-20 x 1.25
X-129-52	1/2-20 x 1.50

X-6021-3	5/8-11 x 1.00
X-6021-4	5/8-11 x 1.25
X-6021-2	5/8-11 x 1.50
X-6021-1	5/8-11 x 1.75
273049	5/8-11 x 2.00
X-6021-5	5/8-11 x 2.25
X-6021-6	5/8-11 x 2.50
X-6021-7	5/8-11 x 2.75
X-6021-12	5/8-11 x 3.75
X-6021-11	5/8-11 x 4.50
X-6021-10	5/8-11 x 6.00

X-6021-9	5/8-18 x 2.50
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X-6239-1	3/4-10 x 1.00
X-6239-8	3/4-10 x 1.25
X-6239-2	3/4-10 x 1.50
X-6239-3	3/4-10 x 2.00
X-6239-4	3/4-10 x 2.50
X-6239-5	3/4-10 x 3.00
X-6239-6	3/4-10 x 3.50

X-792-1	1-8 x 2.25
X-792-5	1-8 x 3.00
X-792-8	1-8 x 5.00

Part No. Dimensions Type

Hex Nuts

X-6009-1	1-8	Standard
X-6210-3	6-32	Whiz
X-6210-4	8-32	Whiz
X-6210-5	10-24	Whiz
X-6210-1	10-32	Whiz

X-6210-2	1/4-20	Spiralock
X-6210-6	1/4-28	Spiralock
X-6210-7	5/16-18	Spiralock
X-6210-8	5/16-24	Spiralock
X-6210-9	3/8-16	Spiralock
X-6210-10	3/8-24	Spiralock
X-6210-11	7/16-14	Spiralock
X-6210-12	1/2-13	Spiralock
X-6210-15	7/16-20	Spiralock
X-6210-14	1/2-20	Spiralock

X-85-3	5/8-11	Standard
X-88-12	3/4-10	Standard
X-89-2	1/2-20	Standard

Washers

Part No.	ID	OD	Thick.	Bolt/ Screw
X-25-46	.125	.250	.022	#4
X-25-9	.156	.375	.049	#6
X-25-48	.188	.438	.049	#8
X-25-36	.219	.500	.049	#10
X-25-40	.281	.625	.065	1/4
X-25-85	.344	.687	.065	5/16
X-25-37	.406	.812	.065	3/8
X-25-34	.469	.922	.065	7/16
X-25-26	.531	1.062	.095	1/2
X-25-15	.656	1.312	.095	5/8
X-25-29	.812	1.469	.134	3/4
X-25-127	1.062	2.000	.134	1

Hose Clamp Covers

Part No.	Clamp Size
GM102674-1	13 mm (1/2 in.)
GM102674-2	8 mm (5/16 in.)

Metric

Hex head bolts are hardness grade 8.8 unless noted.

Part No. Dimensions Hex Head Bolts (Partial Thread)

M931-05055-60	M5-0.80 x 55
M931-06040-60	M6-1.00 x 40
M931-06055-60	M6-1.00 x 55
M931-06060-60	M6-1.00 x 60
M931-06060-SS	M6-1.00 x 60
M931-06070-60	M6-1.00 x 70
M931-06070-SS	M6-1.00 x 70
M931-06075-60	M6-1.00 x 75
M931-06090-60	M6-1.00 x 90
M931-06145-60	M6-1.00 x 145
M931-06150-60	M6-1.00 x 150
M931-08035-60	M8-1.25 x 35
M931-08040-60	M8-1.25 x 40
M931-08045-60	M8-1.25 x 45
M931-08050-60	M8-1.25 x 50
M931-08055-60	M8-1.25 x 55
M931-08055-82	M8-1.25 x 55*
M931-08060-60	M8-1.25 x 60
M931-08070-60	M8-1.25 x 70
M931-08070-82	M8-1.25 x 70*
M931-08075-60	M8-1.25 x 75
M931-08080-60	M8-1.25 x 80
M931-08090-60	M8-1.25 x 90
M931-08095-60	M8-1.25 x 95
M931-08100-60	M8-1.25 x 100
M931-08110-60	M8-1.25 x 110
M931-08120-60	M8-1.25 x 120
M931-08130-60	M8-1.25 x 130
M931-08140-60	M8-1.25 x 140
M931-08150-60	M8-1.25 x 150
M931-08200-60	M8-1.25 x 200
M931-10040-82	M10-1.25 x 40*
M931-10040-60	M10-1.50 x 40
M931-10045-60	M10-1.50 x 45
M931-10050-60	M10-1.50 x 50
M931-10050-82	M10-1.25 x 50*
M931-10055-60	M10-1.50 x 55
M931-10060-60	M10-1.50 x 60
M931-10065-60	M10-1.50 x 65
M931-10070-60	M10-1.50 x 70
M931-10080-60	M10-1.50 x 80
M931-10080-82	M10-1.25 x 80*
M931-10090-60	M10-1.50 x 90
M931-10090-82	M10-1.50 x 90*
M931-10100-60	M10-1.50 x 100
M931-10110-60	M10-1.50 x 110
M931-10120-60	M10-1.50 x 120
M931-10130-60	M10-1.50 x 130
M931-10140-60	M10-1.50 x 140
M931-10180-60	M10-1.50 x 180
M931-10235-60	M10-1.50 x 235
M931-10260-60	M10-1.50 x 260
M960-10330-60	M10-1.25 x 330
M931-12045-60	M12-1.75 x 45
M960-12050-60	M12-1.25 x 50
M960-12050-82	M12-1.25 x 50*
M931-12050-60	M12-1.75 x 50
M931-12050-82	M12-1.75 x 50*
M931-12055-60	M12-1.75 x 55
M931-12060-60	M12-1.75 x 60
M931-12060-82	M12-1.75 x 60*
M931-12065-60	M12-1.75 x 65
M931-12075-60	M12-1.75 x 75
M931-12080-60	M12-1.75 x 80
M931-12090-60	M12-1.75 x 90
M931-12100-60	M12-1.75 x 100
M931-12110-60	M12-1.75 x 110

Part No. Dimensions Hex Head Bolts (Partial Thread), continued

M960-16090-60	M16-1.50 x 90
M931-16090-60	M16-2.00 x 90
M931-16100-60	M16-2.00 x 100
M931-16100-82	M16-2.00 x 100*
M931-16120-60	M16-2.00 x 120
M931-16150-60	M16-2.00 x 150
M931-20065-60	M20-2.50 x 65
M931-20090-60	M20-2.50 x 90
M931-20100-60	M20-2.50 x 100
M931-20120-60	M20-2.50 x 120
M931-20140-60	M20-2.50 x 140
M931-20160-60	M20-2.50 x 160
M931-22090-60	M22-2.50 x 90
M931-22120-60	M22-2.50 x 120
M931-22160-60	M22-2.50 x 160
M931-24090-60	M24-3.00 x 90
M931-24120-60	M24-3.00 x 120
M931-24160-60	M24-3.00 x 160
M931-24200-60	M24-3.00 x 200

Hex Head Bolts (Full Thread)

M933-04006-60	M4-0.70 x 6
M933-05030-60	M5-0.80 x 30
M933-05035-60	M5-0.80 x 35
M933-05050-60	M5-0.80 x 50
M933-06010-60	M6-1.00 x 10
M933-06012-60	M6-1.00 x 12
M933-06014-60	M6-1.00 x 14
M933-06016-60	M6-1.00 x 16
M933-06020-60	M6-1.00 x 20
M933-06025-60	M6-1.00 x 25
M933-06030-60	M6-1.00 x 30
M933-06040-60	M6-1.00 x 40
M933-06050-60	M6-1.00 x 50
M933-07025-60	M7-1.00 x 25
M933-08010-60	M8-1.25 x 10
M933-08012-60	M8-1.25 x 12
M933-08016-60	M8-1.25 x 16
M933-08020-60	M8-1.25 x 20
M933-08025-60	M8-1.25 x 25
M933-08030-60	M8-1.25 x 30
M933-08030-82	M8-1.25 x 30*
M933-10012-60	M10-1.50 x 12
M961-10020-60	M10-1.25 x 20
M933-10020-60	M10-1.50 x 20
M933-10025-60	M10-1.50 x 25
M961-10025-60	M10-1.25 x 25
M933-10025-82	M10-1.50 x 25*
M961-10030-60	M10-1.25 x 30
M933-10030-60	M10-1.50 x 30
M933-10030-82	M10-1.50 x 30*
M961-10035-60	M10-1.25 x 35
M933-10035-60	M10-1.50 x 35
M933-10035-82	M10-1.50 x 35*
M961-10040-60	M10-1.25 x 40

Part No. Dimensions Hex Head Bolts (Full Thread), continued

M933-12016-60	M12-1.75 x 16
M933-12020-60	M12-1.75 x 20
M961-12020-60F	M12-1.50 x 20
M933-12025-60	M12-1.75 x 25
M933-12025-82	M12-1.75 x 25*
M961-12030-60	M12-1.25 x 30
M933-12030-82	M12-1.75 x 30*
M961-12030-82F	M12-1.50 x 30*
M933-12030-60	M12-1.75 x 30
M933-12035-60	M12-1.75 x 35
M961-12040-82	M12-1.25 x 40*
M933-12040-60	M12-1.75 x 40
M933-12040-82	M12-1.75 x 40*
M961-14025-60	M14-1.50 x 25
M933-14025-60	M14-2.00 x 25
M961-14050-82	M14-1.50 x 50*
M961-16025-60	M16-1.50 x 25
M933-16025-60	M16-2.00 x 25
M961-16030-82	M16-1.50 x 30*
M933-16030-82	M16-2.00 x 30*
M933-16035-60	M16-2.00 x 35
M961-16040-60	M16-1.50 x 40
M933-16040-60	M16-2.00 x 40
M961-16045-82	M16-1.50 x 45*
M933-16045-82	M16-2.00 x 45*
M933-16050-60	M16-2.00 x 50
M933-16050-82	M16-2.00 x 50*
M933-16060-60	M16-2.00 x 60
M933-16070-60	M16-2.00 x 70
M933-18035-60	M18-2.50 x 35
M933-18050-60	M18-2.50 x 50
M933-18060-60	M18-2.50 x 60
M933-20050-60	M20-2.50 x 50
M933-20055-60	M20-2.50 x 55
M933-24060-60	M24-3.00 x 60
M933-24065-60	M24-3.00 x 65
M933-24070-60	M24-3.00 x 70

Pan Head Machine Screws

M7985A-03010-20	M3-0.50 x 10
M7985A-03012-20	M3-0.50 x 12
M7985A-04010-20	M4-0.70 x 10
M7985A-04016-20	M4-0.70 x 16
M7985A-04020-20	M4-0.70 x 20
M7985A-04050-20	M4-0.70 x 50
M7985A-04100-20	M4-0.70 x 100
M7985A-05010-20	M5-0.80 x 10
M7985A-05012-20	M5-0.80 x 12
M7985A-05016-20	M5-0.80 x 16
M7985A-05020-20	M5-0.80 x 20
M7985A-05025-20	M5-0.80 x 25
M7985A-05030-20	M5-0.80 x 30
M7985A-05080-20	M5-0.80 x 80
M7985A-05100-20	M5-0.80 x 100
M7985A-06100-20	M6-1.00 x 100

Flat Head Machine Screws

M965A-04012-SS	M4-0.70 x 12
M965A-05012-SS	M5-0.80 x 12
M965A-05016-20	M5-0.80 x 16
M965A-06012-20	M6-1.00 x 12

* This metric hex bolt's hardness is grade 10.9.

Metric, continued

Part No.	Dimensions	Type
Hex Nuts		
M934-03-50	M3-0.50	Standard
M934-04-50	M4-0.70	Standard
M934-04-B	M4-0.70	Brass
M934-05-50	M5-0.80	Standard
M934-06-60	M6-1.00	Standard
M934-06-64	M6-1.00	Std. (green)
M6923-06-80	M6-1.00	Spiralock
M982-06-80	M6-1.00	Elastic Stop
M934-08-60	M8-1.25	Standard
M6923-08-80	M8-1.25	Spiralock
M982-08-80	M8-1.25	Elastic Stop
M934-10-60	M10-1.50	Standard
M934-10-60F	M10-1.25	Standard
M6923-10-80	M10-1.50	Spiralock
M6923-10-62	M10-1.50	Spiralock†
M982-10-80	M10-1.50	Elastic Stop
M934-12-60	M12-1.75	Standard
M934-12-60F	M12-1.25	Standard
M6923-12-80	M12-1.75	Spiralock
M982-12-80	M12-1.75	Elastic Stop
M982-14-60	M14-2.00	Elastic Stop
M6923-16-80	M16-2.00	Spiralock
M982-16-80	M16-2.00	Elastic Stop
M934-18-80	M18-2.5	Standard
M982-18-60	M18-2.50	Elastic Stop
M934-20-80	M20-2.50	Standard
M982-20-80	M20-2.50	Elastic Stop
M934-22-60	M22-2.50	Standard
M934-24-80	M24-3.00	Standard
M982-24-60	M24-3.00	Elastic Stop
M934-30-80	M30-3.50	Standard

Washers

Part No.	ID	OD	Thick.	Bolt/ Screw
M125A-03-80	3.2	7.0	0.5	M3
M125A-04-80	4.3	9.0	0.8	M4
M125A-05-80	5.3	10.0	1.0	M5
M125A-06-80	6.4	12.0	1.6	M6
M125A-08-80	8.4	16.0	1.6	M8
M125A-10-80	10.5	20.0	2.0	M10
M125A-12-80	13.0	24.0	2.5	M12
M125A-14-80	15.0	28.0	2.5	M14
M125A-16-80	17.0	30.0	3.0	M16
M125A-18-80	19.0	34.0	3.0	M18
M125A-20-80	21.0	37.0	3.0	M20
M125A-24-80	25.0	44.0	4.0	M24

† This metric hex nut's hardness is grade 8.

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