

Service Parts

Commercial Mobile Generator Sets



Models:

7ER

6EFR



KOHLER[®]
POWER SYSTEMS

Specification Series 199

TP-6036 6/99

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Introduction

This manual lists service replacement parts for 7ER/6EFR generator sets.

At the time of print this manual applied to the generator set specification (spec) numbers listed in the Specification Number Index. On occasion this manual may apply to specs not listed in the Specification Number Index.

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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.

Index. Lists the generator set specs and groups.

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

Kit Sections. List modules and accessories and their parts.

Appendices. Include Abbreviations, Common Hardware Application Guidelines, General Torque Specifications, Common Hardware Identification, and Common Hardware List.

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Numbering System Significance

This manual uses the following numbering systems:

Specification Number. A six-digit number with a PA-prefix. The Specification Number Index does not show the prefix. Spec numbers break down into groups.

Group Number. A unique number representing a parts group needed to assemble a generator set function. For example, Group 101 is the Air Intake group.

Variation or Module Number. A group might have several variations. Each variation performs the same function with different parts lists. For example, a 50 Hz generator alternator and 60 Hz generator alternator both perform the same function, however, with different parts. Each difference requires a group variation or module number.

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

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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 use illustrations for assembly or disassembly instructions.

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How to Find Part Numbers

Use the following steps to locate a service replacement part.

1. Locate the generator set nameplate to **identify the generator set spec number**.
2. Locate a second generator set nameplate listing accessories to **identify installed modules**. On some models the accessory nameplate is mounted inside the generator junction box.
3. **Turn to the Specification Number Index.** The first column lists the generator set spec numbers. The headings identify the groups of parts that make up the generator set.
4. **Identify the group** most likely to include the service part number.
5. **Find the group variation number** at the intersection of the spec number row and the group column. Note the variation number.
6. **Page forward to locate the group** identified in step 4 or find the appropriate page in the Table of Contents.
7. **Find the part on the illustration** and note the item number of the part or **find the part description in the parts list**.
8. Select **the part number that corresponds to your group variation**. The first column lists the illustration item number. Find the variation identified in the Specification Number Index or the module number found on the generator set nameplate in the appropriate column on the right side of the parts list table. Find the quantity used at the intersection of the item number row and the variation column. A blank space at the intersection means the variation/module does not use that part number.

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Hardware References

Many common hardware items do not appear in parts manuals or will appear as common hardware entries. A common hardware entry lists the size of the hardware. For example, an item that appears as "Hardware, 3/8-16" in the text means that the piece is 3/8-16 size. Obtain common hardware locally or, if contacting the factory, use the Common Hardware List in the appendix to identify the common hardware part number and specifications. See Common Hardware Application Guidelines in the appendix for mating hardware instructions.

Some hardware items require a specific size or some other characteristic. In that case, use the part number listed in the text.

When replacing hardware, do not substitute inferior grade hardware. Replacement hardware grade should be equal to or better than the grade of the manufacturer's original hardware. Use the Common Hardware List in the appendix to identify the common hardware hardness.

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Specification Number Index

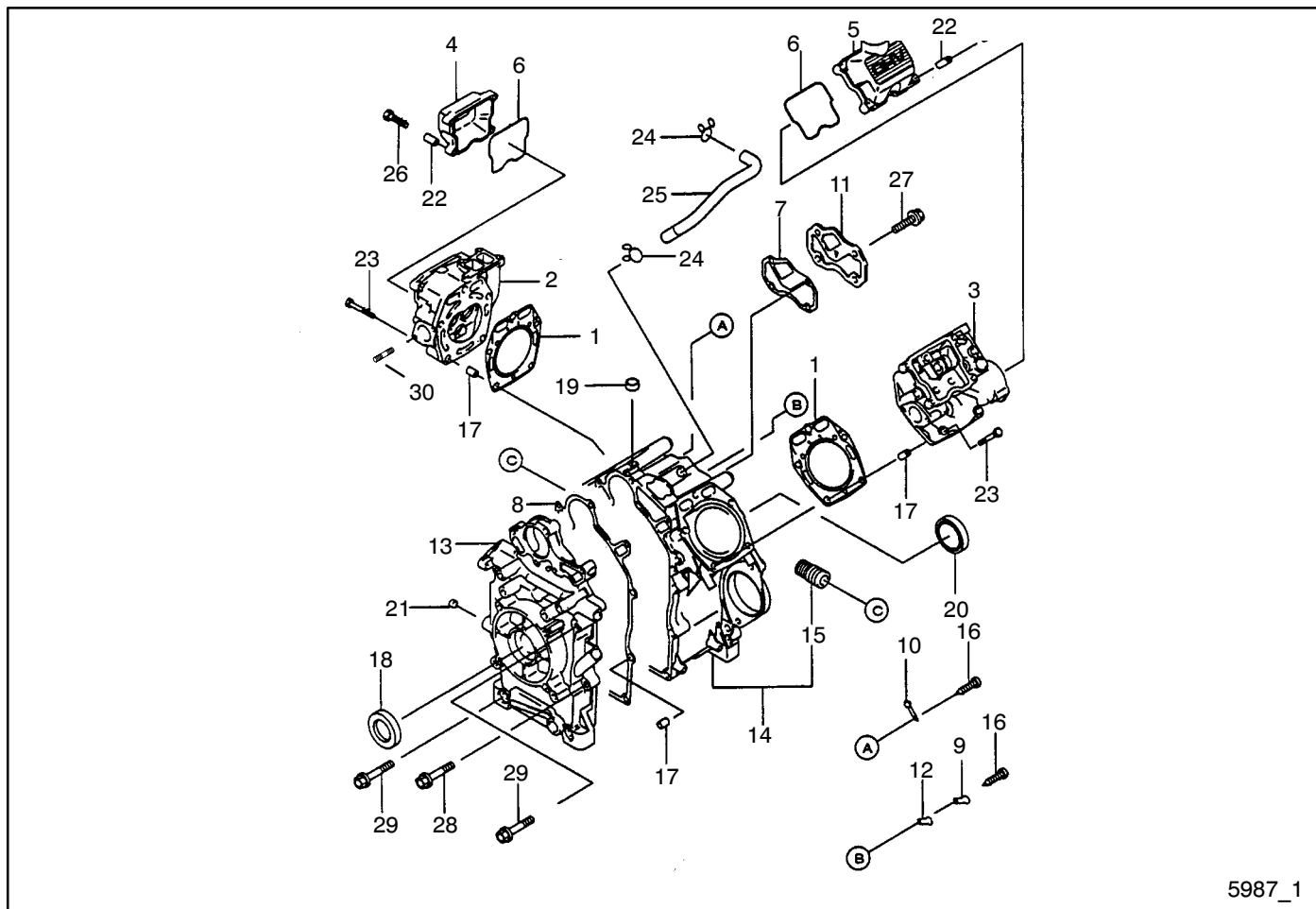
GROUP TITLE AND NUMBER	<i>Cylinder and Crankcase</i>	<i>Piston and Crankshaft</i>	<i>Valves and Camshaft</i>	<i>Lubrication and Oil Filter</i>	<i>Ignition</i>	<i>Governor</i>	<i>Carburetor</i>	<i>Muffler</i>	<i>Starter</i>	<i>Engine Cooling</i>			
GROUP NO.	1	2	3	4	5	6	7	8	9	10	VARIATION NUMBER		

19950	1	1	1	1	1	1	1	1	1	1			
19951	1	1	1	1	1	1	1	1	1	1			
19954	1	1	1	1	1	1	1	1	1	1			
19955	1	1	1	1	1	1	1	1	1	1			

GROUP TITLE AND NUMBER	<i>Air Intake</i>	<i>Fuel System</i>	<i>Cooling System</i>	<i>Engine</i>	<i>Nameplates and Decals</i>	<i>Skid and Plant Mounting</i>	<i>Exhaust System</i>	<i>Generator and Mounting</i>	<i>Controller and Mounting</i>	<i>Literature</i>			
GROUP NO.	101	103	104	105	107	109	116	201	301	701	VARIATION NUMBER		

19950	—	2	—	3	2	2	2	2	5	3			
19951	—	2	—	3	2	2	2	3	5	3			
19954	—	2	—	4	2	2	2	2	8	3			
19955	—	2	—	4	2	2	2	3	8	3			

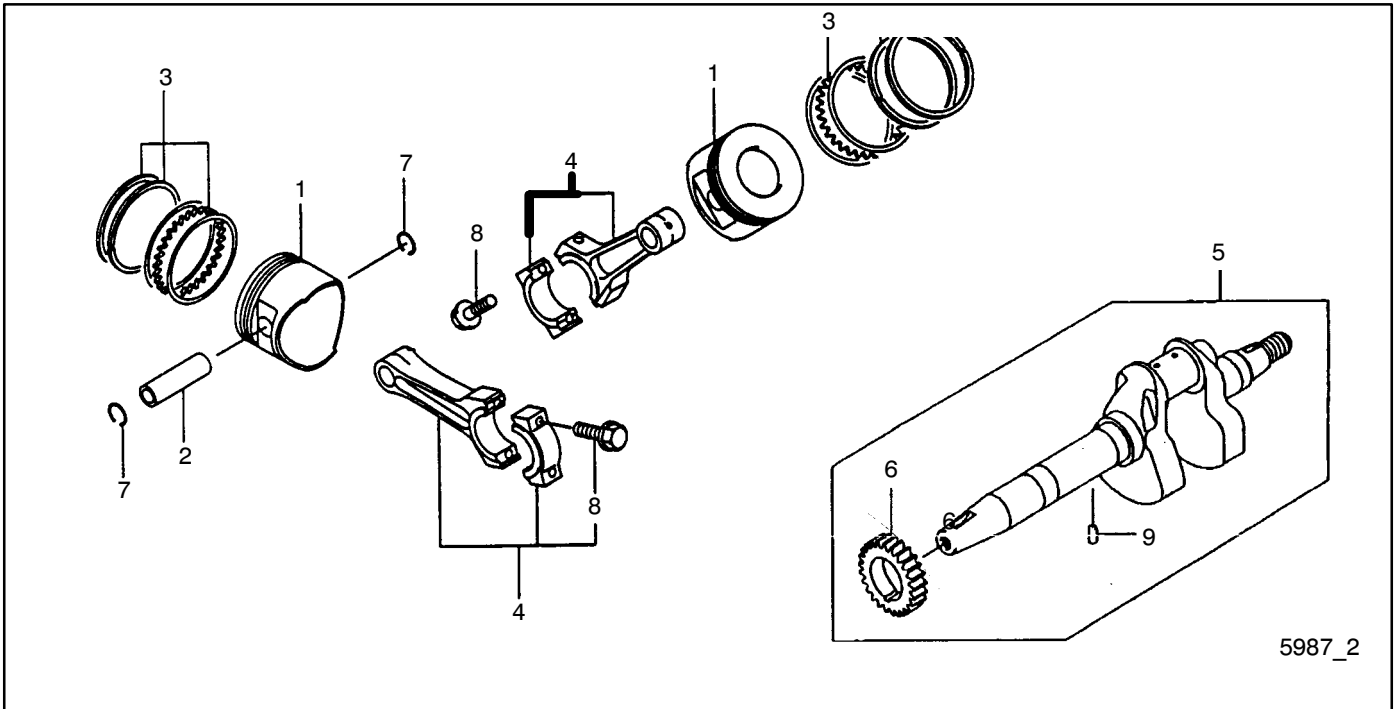
Group 1: Cylinder and Crankcase



5987_1

Item	Part No.	Description	Qty.	Var.
1	359701	Head Gasket	2	1
2	359981	Complete Cylinder Head	1	
3	359982	Complete Cylinder Head	1	
4	359704	Rocker Case	1	
5	359705	Rocker Case	1	
6	359706	Rocker Case Gasket	2	
7	359707	Gasket	1	
8	359708	Crankcase Cover Gasket	1	
9	359709	Plate	1	
10	359710	Plate	1	
11	359711	Cover	1	
12	359712	Valve	1	
13	359714	Crankcase Cover	1	
14	359715	Complete Crankcase	1	
15	359716	Joint	1	
16	359719	Screw	2	
17	359720	Pin	6	
18	359721	Oil Seal	1	
19	359722	Oil Seal	1	
20	359723	Oil Seal	1	
21	359724	Plug	2	
22	359725	Collar	8	
23	359726	Bolt	10	
24	359727	Clamp	2	
25	359728	Tube	1	
26	359729	Flanged Bolt	8	
27	359730	Flanged Bolt	4	
28	359731	Flanged Bolt	3	
29	359732	Flanged Bolt	3	
30	359717	Stud	4	

Group 2: Piston and Crankshaft

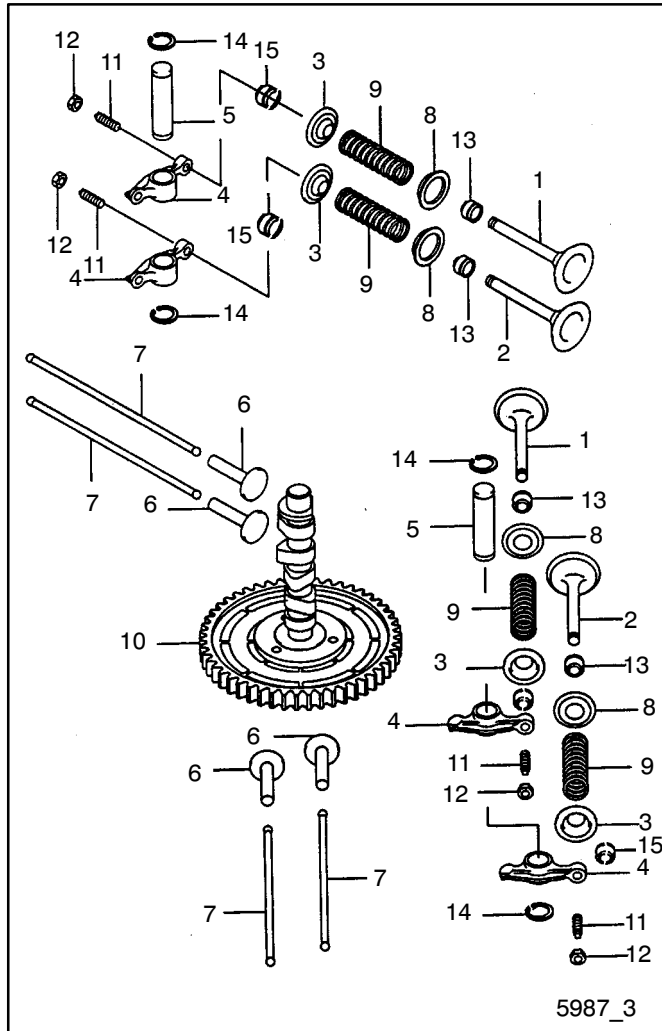


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Item	Part No.	Description	Qty.
			Var.
1	359734	Piston	2
1	359739	Piston, 0.25 OS	AR
1	359740	Piston, 0.50 OS	AR
2	359735	Piston Pin	2
3	359736	Piston Ring Set	2
3	359737	Piston Ring Set, 0.025 OS	AR
3	359738	Piston Ring Set, 0.50 OS	AR
4	359741	Connecting Rod Assembly	2
5	359742	Crankshaft Assembly	1
6	359743	Gear Spur	1
7	359746	Snap Ring	4
8	359748	Connecting Rod Bolt	4
9	359749	Dowel Pin	1

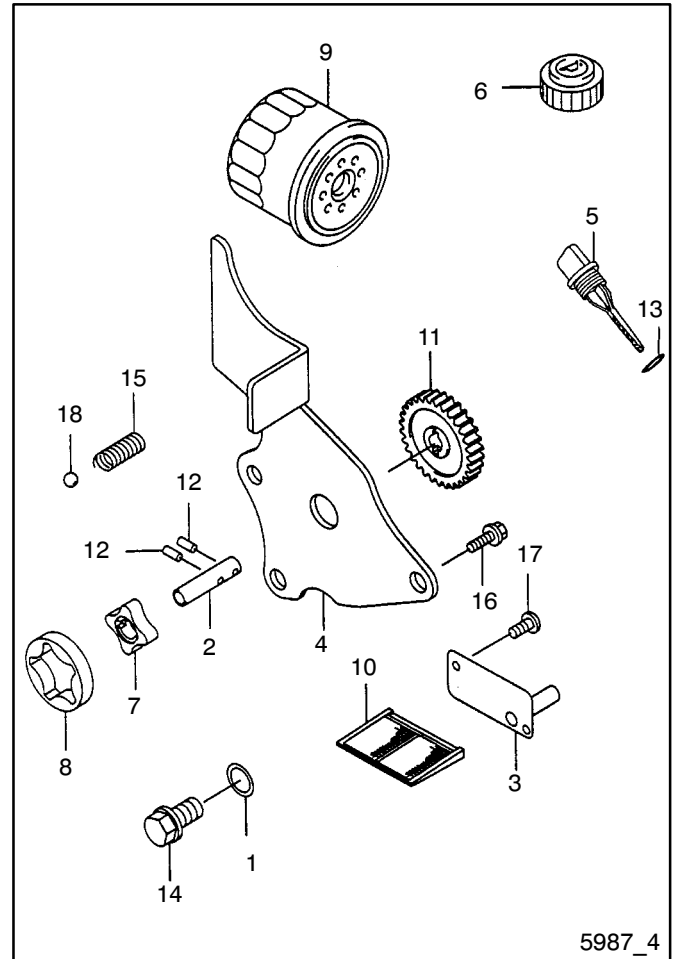
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Group 3: Valves and Camshaft



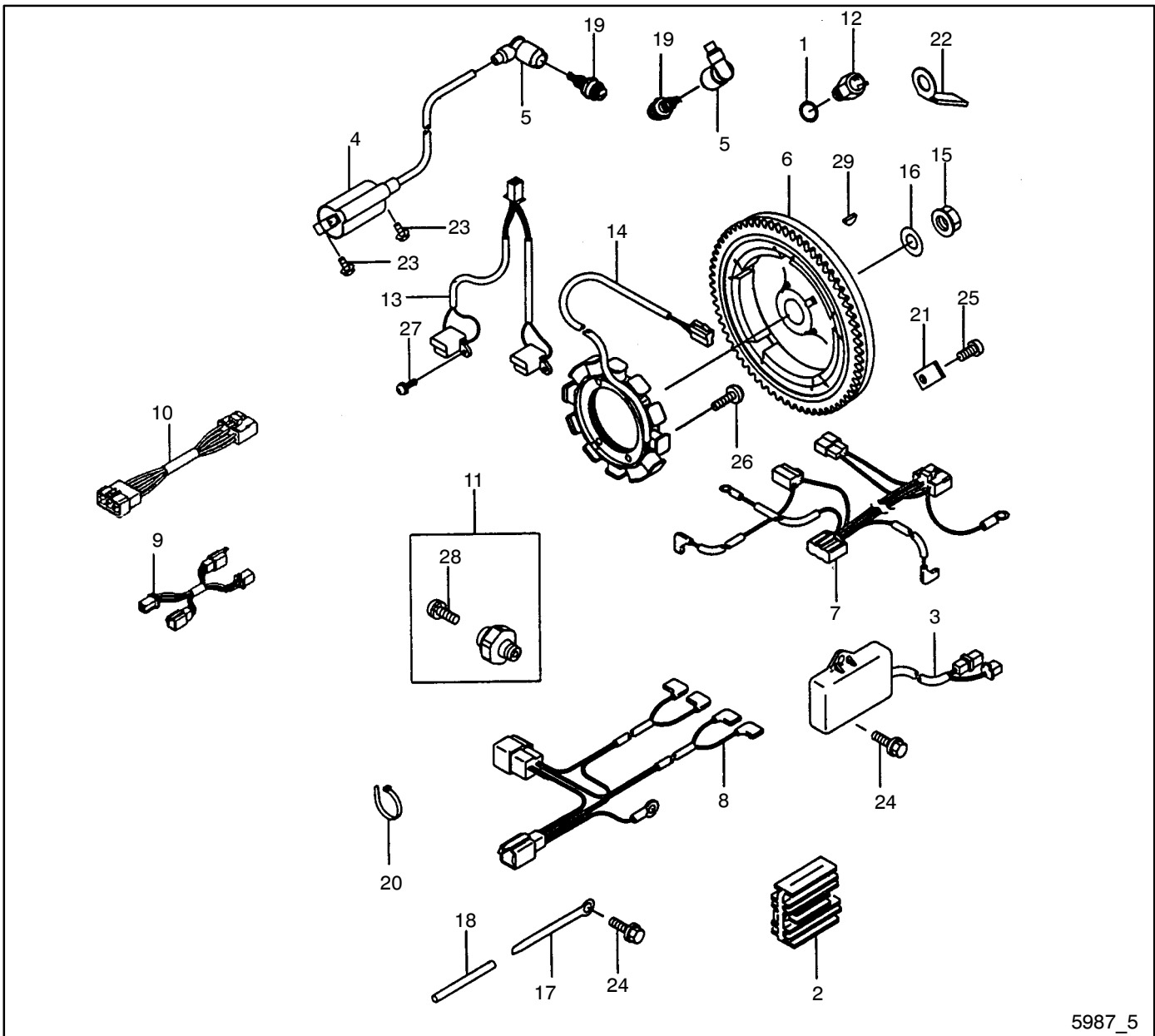
Item	Part No.	Description	Qty.
			Var. 1
1	359983	Intake Valve	2
2	359984	Exhaust Valve	2
3	359985	Valve Spring Retainer	4
4	359753	Rocker Arm	4
5	359754	Rocker Shaft	2
6	359755	Tappet	4
7	359756	Push Rod	4
8	359757	Spring Seat	4
9	359986	Engine Valve Spring	4
10	359759	Complete Camshaft	1
11	359760	Screw	4
12	359761	Nut	4
13	359762	Oil Seal	4
14	359763	Circlip	4
15	359987	Collet	8

Group 4: Lubrication and Oil Filter



Item	Part No.	Description	Qty.
			Var. 1
1	359764	Drain Plug Gasket	1
2	359765	Oil Pump Shaft	1
3	359766	Plate	1
4	359767	Cover	1
5	359773	Oil Gauge	1
6	359768	Oil Fill Cap	1
7	359769	Oil Pump Rotor (in)	1
8	359770	Oil Pump Rotor (out)	1
9	359771	Oil Filter	1
10	359772	Oil Filter	1
11	359774	Gear Spur	1
12	359775	Pin	2
13	359902	Ring, 0.20 mm	1
14	359776	Drain Plug	1
15	359777	Spring	1
16	359778	Flanged Bolt	3
17	359779	Pan Screw	2
18	359780	Steel Ball	1

Group 5: Ignition

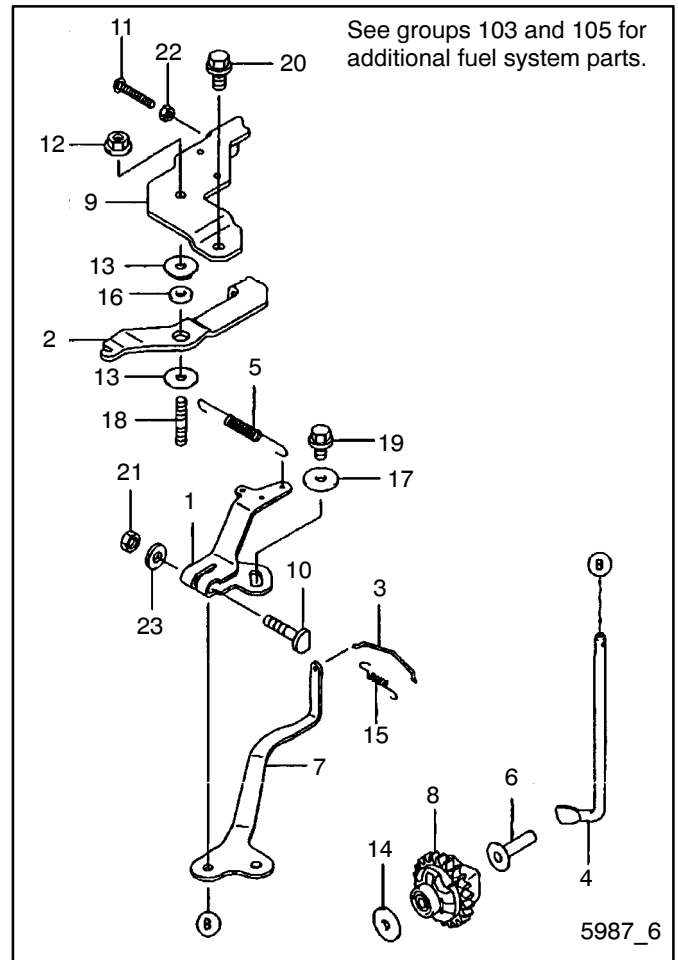


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Item	Part No.	Description	Qty.	Var.
1	359781	Gasket	1	1
2	359782	Voltage Regulator	1	1
3	359783	Igniter	1	1
4	359784	Ignition Coil	2	1
5	359785	Spark Plug Cap	2	1
6	359786	Flywheel Assembly	1	1
7	359787	Harness	1	1
8	359788	Harness	1	1
9	359903	Harness	1	1
10	359904	Harness	1	1
11	359789	Oil Pressure Switch	1	1
12	359790	Temperature Switch	1	1
13	359791	Pulsing Coil	1	1
14	359792	Charging Coil	1	1
15	359807	Hex Nut	1	1

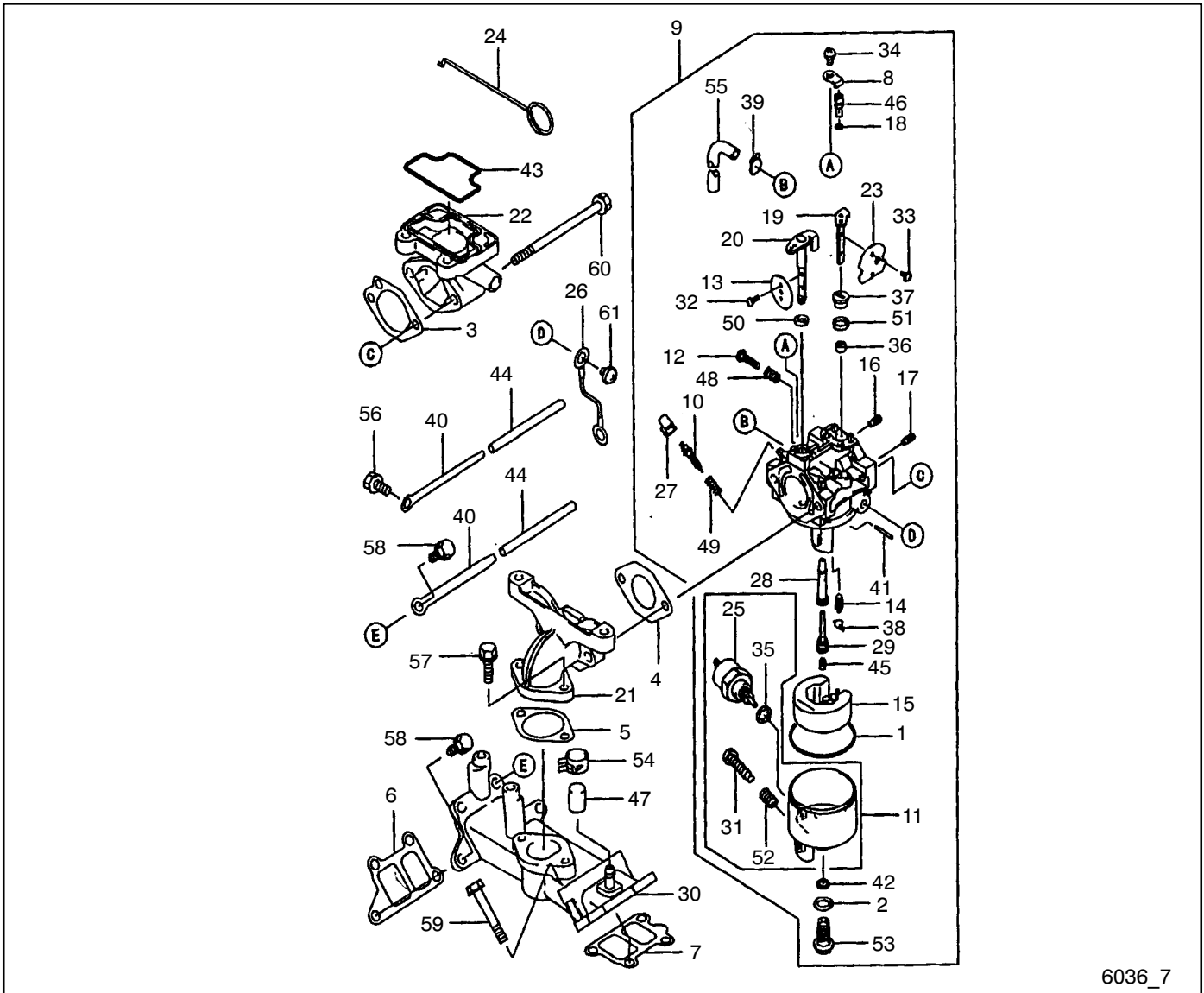
Item	Part No.	Description	Qty.	Var.
16	359793	Washer	1	1
17	359794	Clamp	2	1
18	359795	Tube	2	1
19	359979	Spark Plug	2	1
20	359797	Band	3	1
21	359798	Clamp	1	1
22	359799	Clamp	2	1
23	359800	Flanged Bolt	4	1
24	359801	Flanged Bolt	4	1
25	359803	Pan Screw	1	1
26	359804	Pan Screw	4	1
27	359805	Pan Screw	4	1
28	359806	Pan Screw	1	1
29	359808	Woodruff Key	1	1

Group 6: Governor



Item	Part No.	Description	Qty.
			Var.
1	359809	Bracket	1
2	359810	Lever	1
3	359813	Link	1
4	359814	Pivot Arm	1
5	359815	Governor Spring	1
6	359816	Sleeve	1
7	359818	Governor Arm	1
8	359818	Governor Assembly	1
9	359819	Control Panel	1
10	359820	Bolt	1
11	359821	Screw	2
12	359822	Nut	1
13	359823	Washer	3
14	359905	Spacer	1
15	359825	Spring	1
16	359826	Collar	1
17	359832	Washer	1
18	359833	Stud	1
19	359889	Bolt	1
20	359835	Bolt	2
21	359836	Hex Nut	1
22	359837	Hex Nut	2
23	359838	Washer	1

Group 7: Carburetor



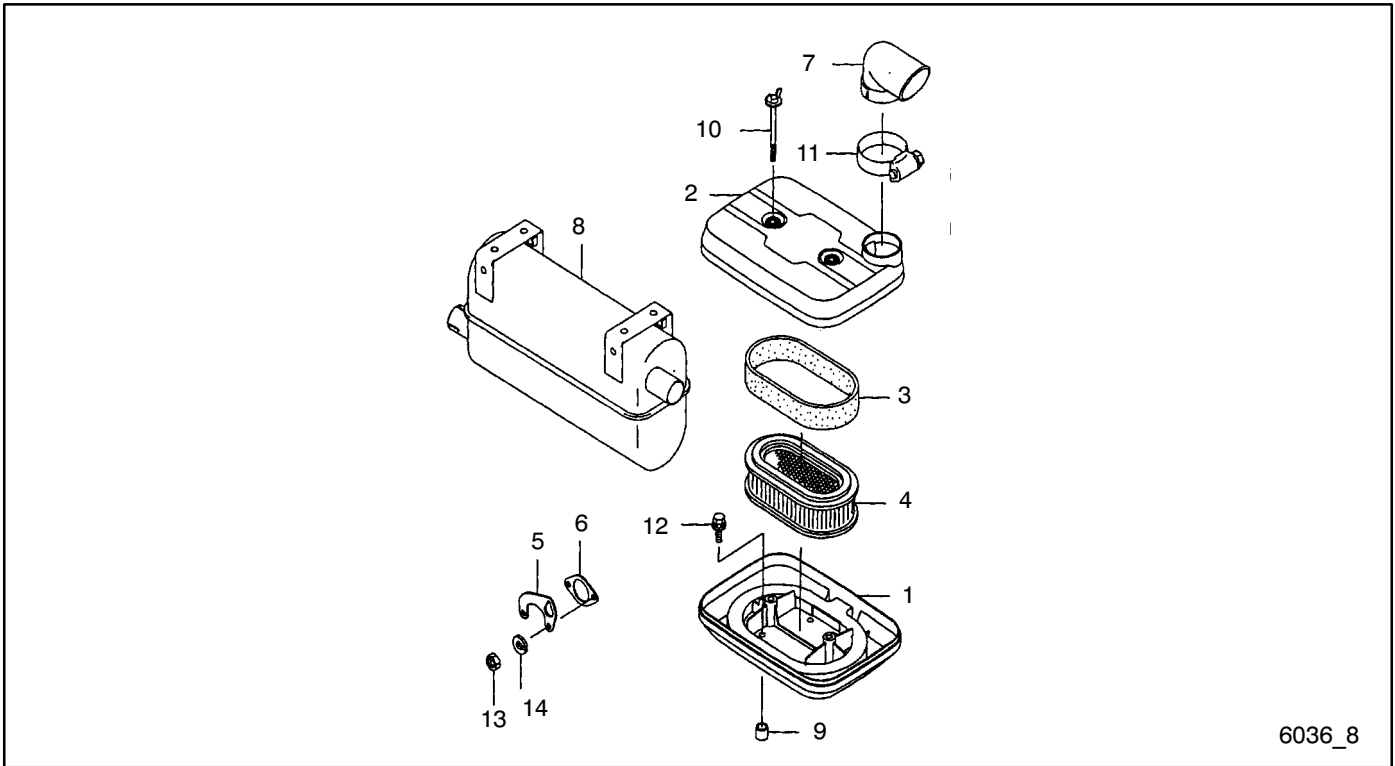
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Group 7: Carburetor

Item	Part No.	Description	Qty. Var. 1
1	359839	Gasket	1
2	359840	Gasket	1
3	359841	Air Filter Gasket	1
4	359842	Carburetor Gasket	1
5	359843	Intake Pipe Gasket	1
6	359844	Intake Manifold Gasket	1
7	359845	Intake Manifold Gasket	1
8	359846	Plate	1
9	GM10704	Carburetor Assembly	1
10	359848	Pilot Air Screw	1
11	359849	Float Chamber	1
12	359850	Throttle Stop Screw	1
13	GM10705	Throttle Valve	1
14	359852	Float Valve	1
15	359853	Float	1
17	359854	Air Jet 1.2	1
16	GM10706	Air Jet 1.0	1
18	359856	Gasket	1
19	359857	Carburetor Choke Shaft	1
20	359858	Carburetor Shaft	1
21	GM10707	Intake Pipe	1
22	GM10708	Intake Pipe	1
23	359861	Choke Valve	1
24	GM10709	Choke Link	1
25	359862	Solenoid	1
26	359907	Wire Lead	1
27	359863	Limiter	1
28	GM10710	Main Nozzle	1
29	359865	Main Jet Holder	1
30	359866	Intake Manifold	1

Item	Part No.	Description	Qty. Var. 1
31	359867	Screw	1
32	359868	Screw	2
33	359869	Screw	2
34	359870	Screw	1
35	359871	Washer	1
36	359872	Collar	1
37	359873	Collar	1
38	359874	Snap Ring	1
39	359875	Clamp	1
40	359794	Clamp	2
41	359876	Pin	1
42	359877	O-ring	1
43	359878	O-ring	1
44	359795	Tube	1
45	GM10711	Main Jet	1
46	GM10712	Pilot Jet	1
47	359911	Plug	1
48	359881	Spring	1
49	359882	Spring	1
50	359883	Seal	1
51	359884	Seal	1
52	359885	Spring	1
53	359912	Bolt	1
54	359914	Clamp	1
55	GM10713	Tube	1
56	359801	Flanged Bolt	1
57	359889	Flanged Bolt	2
58	359889	Flanged Bolt	5
59	359890	Flanged Bolt	3
60	359891	Flanged Bolt	2
61	359915	Screw	1

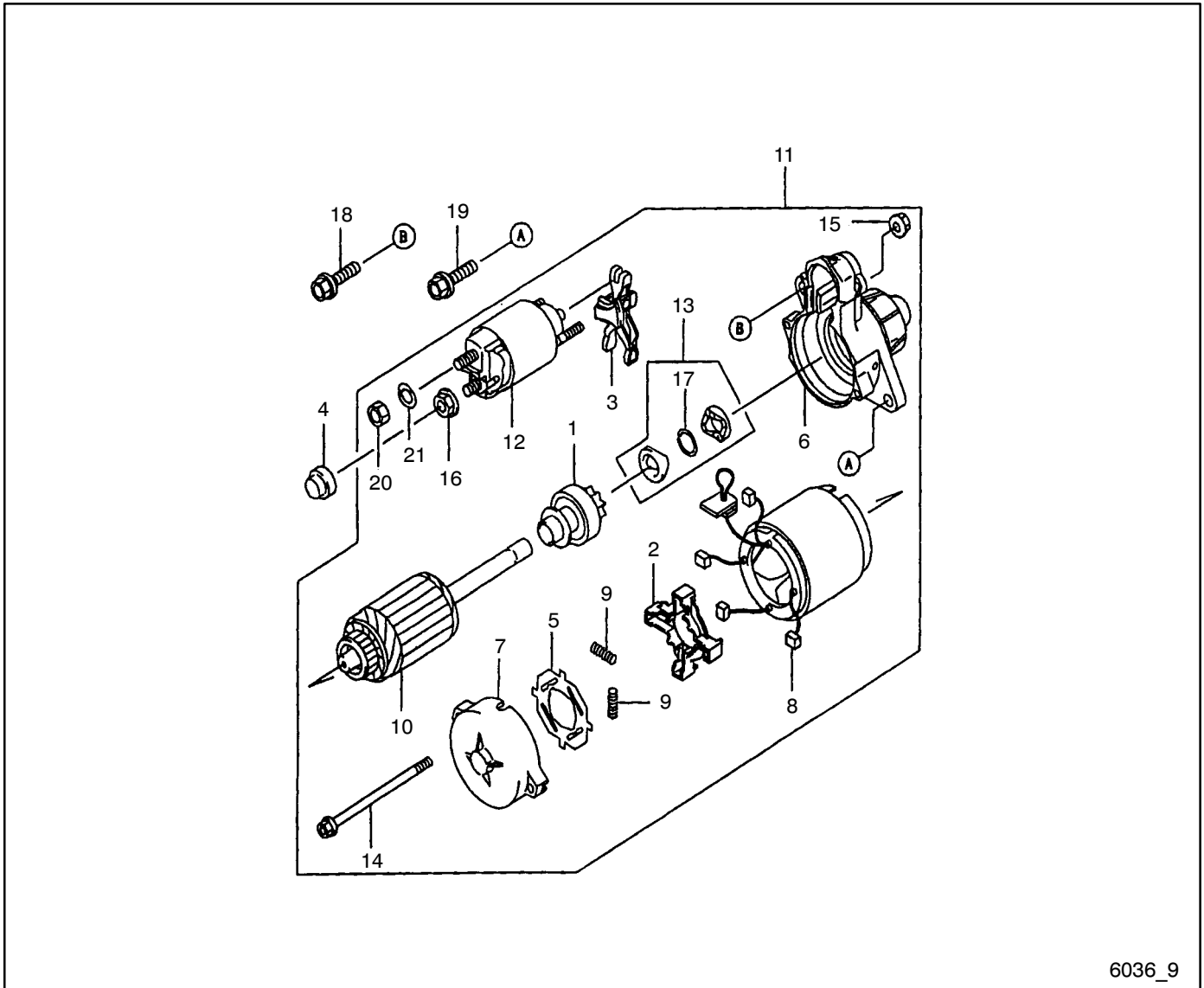
Group 8: Air Filter and Muffler



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Item	Part No.	Description	Qty.
			Var.
1	359892	Air Filter Case	1
2	359893	Air Filter Case	1
3	359894	Air Filter Element	1
4	359895	Air Filter Element	1
5	359896	Bracket	1
6	359897	Muffler Gasket	2
7	359898	Intake Pipe	1
8	359899	Complete Muffler	1
9	359900	Collar	6
10	359901	Bolt	2
11	GM10714	Clamp	1
12	GM10715	Bolt	6
13	GM10716	Hex Nut	5
14	GM10717	Spring Washer	5

Group 9: Starter

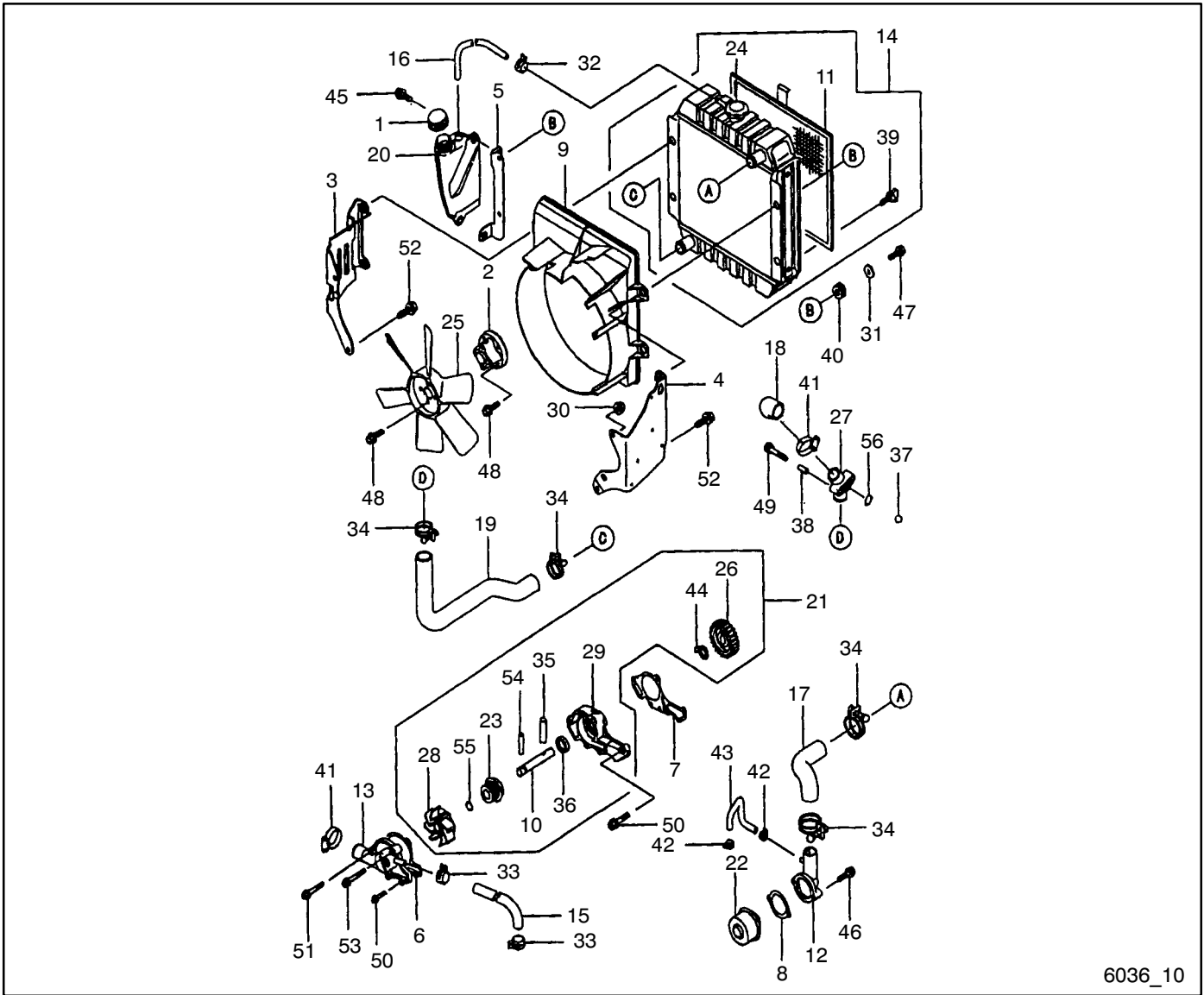


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Item	Part No.	Description	Qty. Var.
1	GM10718	Clutch Assembly	1
2	GM10719	Brush Holder	1
3	GM10720	Shift Lever	1
4	GM10721	Cover	1
5	GM10722	Insulator	1
6	GM10723	Cover Assembly	1
7	GM10724	Cover Assembly	1
8	GM10725	Brush	4
9	GM10726	Brush Spring	4
10	GM10727	Armature	1

Item	Part No.	Description	Qty. Var.
11	GM10728	Starter, electric	1
12	GM10729	Switch	1
13	GM10730	Stopper	1
14	GM10731	Bolt	2
15	GM10732	Nut	2
16	GM10733	Nut	1
17	GM10734	Snap Ring	1
18	359937	Bolt	1
19	359938	Flanged Bolt	1
20	GM10735	Hex Nut	2
21	GM10736	Spring Washer	2

Group 10: Engine Cooling



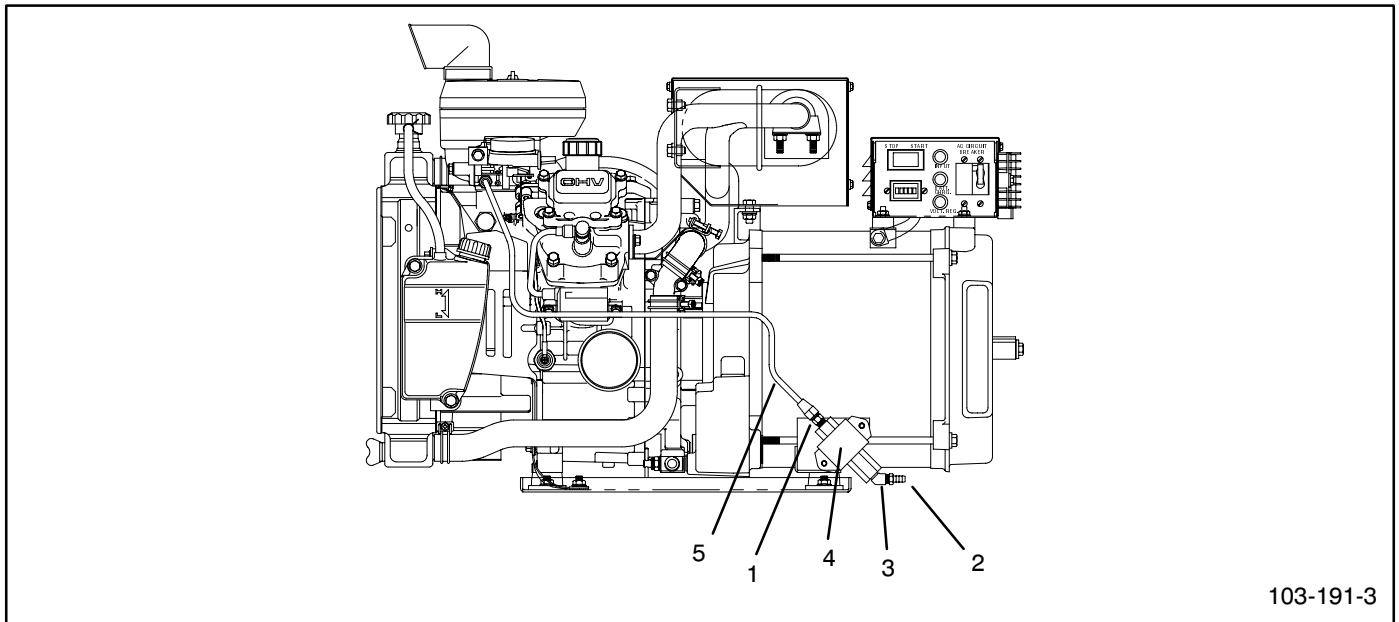
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Group 10: Engine Cooling

Item	Part No.	Description	Qty. Var. 1
1	359939	Cap	1
2	GM10737	Bracket, cooling fan	1
3	359940	Bracket	1
4	359941	Bracket	1
5	GM10738	Bracket	1
6	359942	Water Pump Gasket	1
7	359943	Water Pump Gasket	1
8	359944	Thermostat Cover Gasket	1
9	GM10739	Cooling Fan Guide	1
10	359945	Impeller Shaft	1
11	GM10740	Radiator Screen	1
12	359946	Thermostat Cover	1
13	359947	Pump Cover	1
14	GM10741	Radiator Assembly	1
15	359948	Cooling Hose	1
16	GM10742	Cooling Hose	1
17	359949	Cooling Hose	1
18	359950	Cooling Hose	1
19	GM10743	Cooling Hose	1
20	359951	Reservoir	1
21	359952	Water Pump	1
22	GM10744	Thermostat	1
23	359953	Mechanical Seal	1
24	GM10745	Pressure Cap Assembly	1
25	GM10746	Cooling Fan	1
26	359954	Spur Gear	1
27	359955	Joint	1
28	359956	Impeller	1
29	359957	Pump Case	1
30	359958	Nut	1

Item	Part No.	Description	Qty. Var. 1
31	GM10747	Collar	4
32	GM10748	Clamp	1
33	359959	Clamp	2
34	359960	Clamp	2
35	359961	Pin	1
36	359962	Oil Seal	1
37	359963	Ball	1
38	359964	Collar	2
39	GM10749	Bolt	1
40	GM10750	Damper	4
41	359965	Clamp	2
42	359966	Clamp	2
43	359967	Tube	1
44	359968	Washer	1
45	GM10751	Flanged Bolt	2
46	359969	Flanged Bolt	2
47	GM10752	Flanged Bolt	3
48	359802	Flanged Bolt	1
49	359970	Flanged Bolt	3
50	359971	Flanged Bolt	1
51	359972	Flanged Bolt	1
52	359973	Flanged Bolt	1
53	359974	Flanged Bolt	1
54	359975	Dowel Pin	1
55	359976	O-ring	1
56	359977	O-ring	1

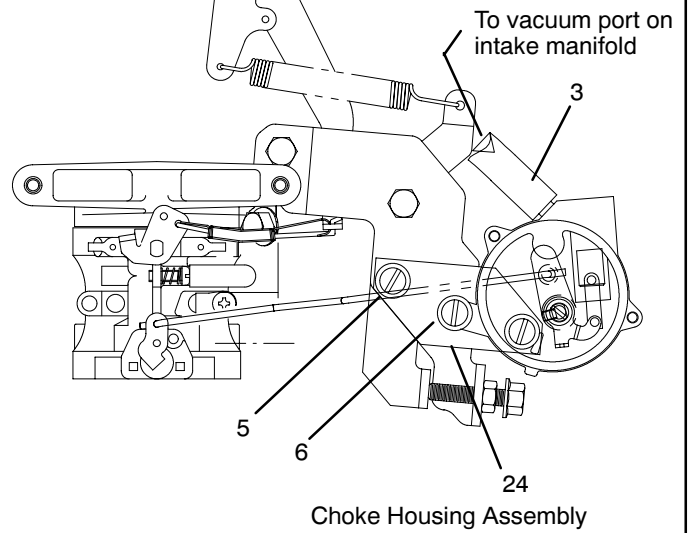
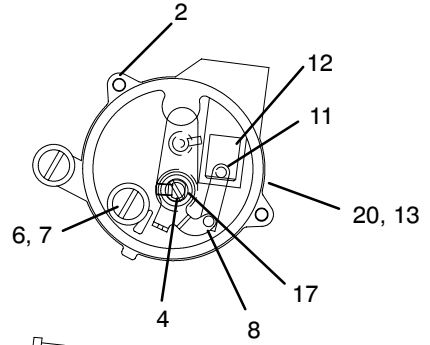
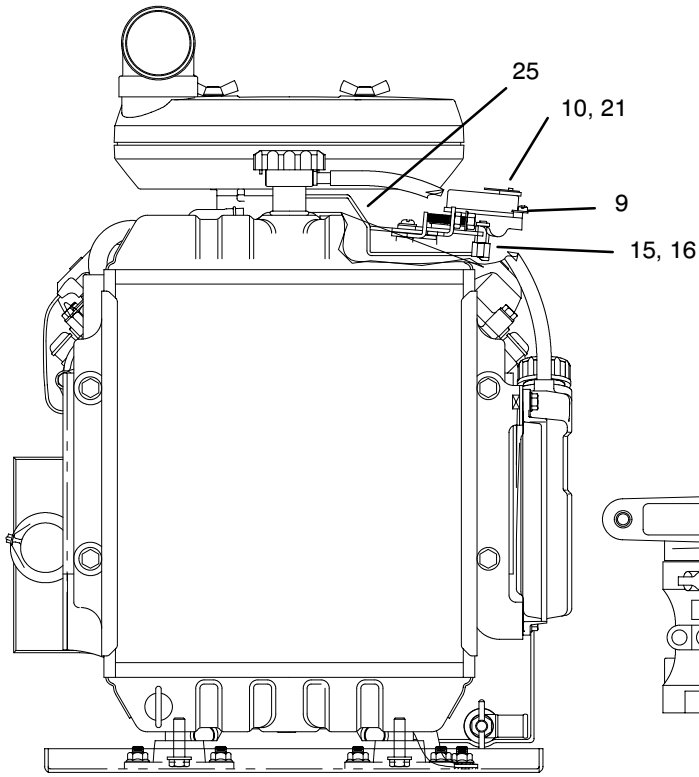
Group 103: Fuel System



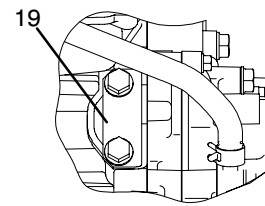
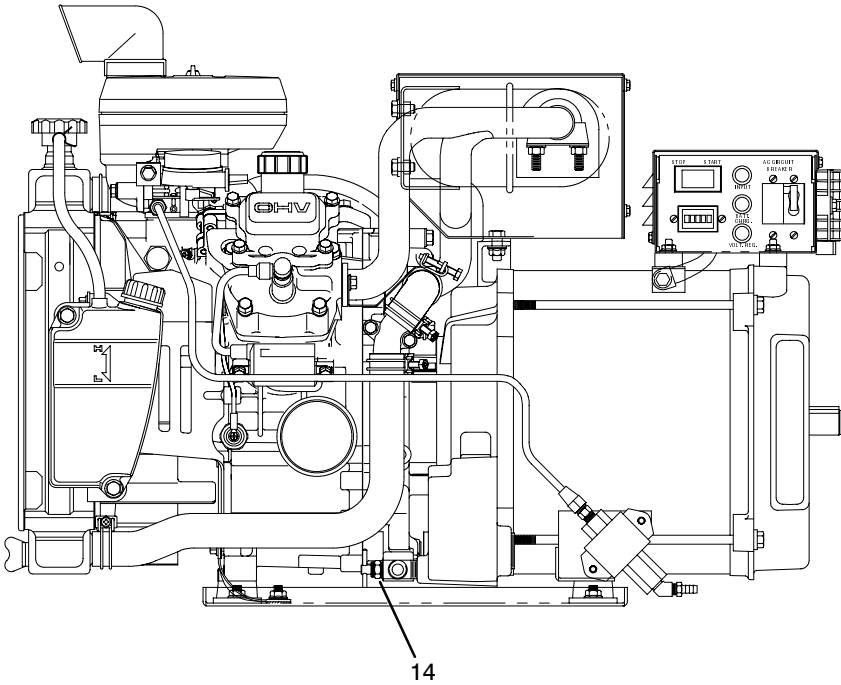
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Item	Part No.	Description	Qty. Var. 3
1	X-296-1	Connector, 7/16-20 x 1/8"	1
2	X-380-1	Connector, hose, 1/8" x 1/4"	1
3	267428	Elbow, 45° street	1
4	278490	Pump, fuel	1
5	359338	Line, fuel	1

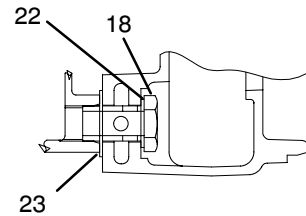
Group 105: Engine



Choke Housing Assembly



Lifting Eye View



105-191-3

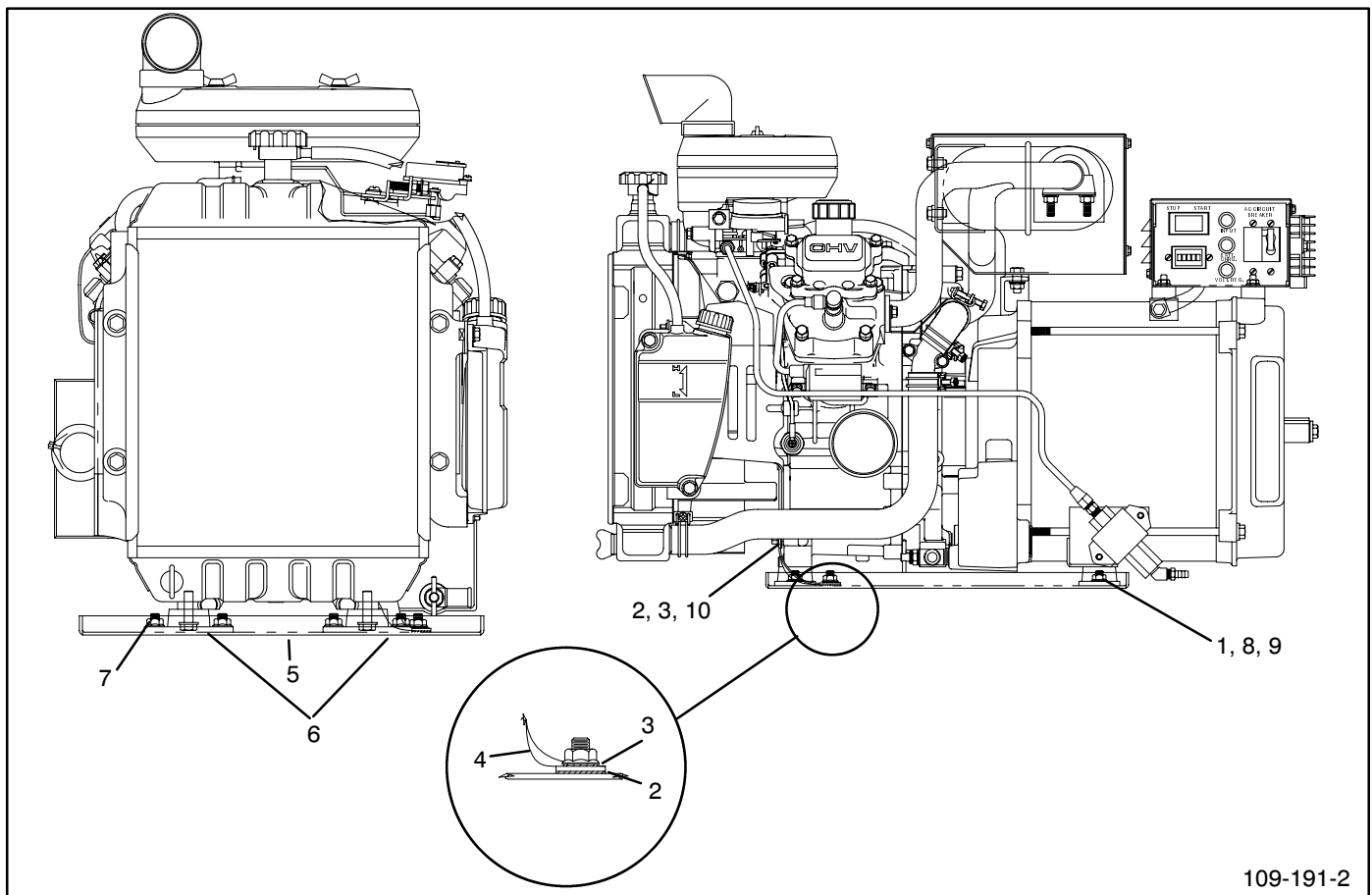
Group 105: Engine

Item	Part No.	Description	Qty. Var.	
			3	4
1	A-359464	Engine Assembly (see Groups 1-9 for parts)	1	1
2	X-14-6	Screw, f.h.m., 8-32 x 0.25	2	2
3	X-386-68	Fuel line, flexible	2	2
4	X-49-25	Screw, p.h.m., 6-32 x 0.25" slot	1	1
5	X-6284-1	Screw, pan head metric	1	1
6	X-6284-5	Screw, machine metric	2	2
7	X-6351-7	Nut, hex	1	1
8	277272	Lever Assembly, choke	1	1
9	277275	Retainer, thermostat coil	2	2
10	277281	Gasket	1	1
11	277285	Pin	1	1
12	277288	Piston, choke	1	1
13	277297	Plate, baffle	1	1
14	359653	Valve, oil drain	1	1
15	337017	Coupling, stepper motor	1	1
16	337358	Bushing	1	1
17	359312	Shaft, choke	1	1
18	359333	Bolt, banjo	1	1
19	359354-BLK	Eye, lifting	1	1
20	359355	Housing Assembly, choke	1	1
21	359356	Heater Assembly, choke	1	1
22	359421	Washer, pressure sealing	1	1
23	359422	Washer, pressure sealing	1	1
24	359454	Bracket, choke mounting	1	1
25	359455	Linkage, choke	1	1

Group 107: Nameplate and Decals

Item	Part No.	Description	Qty. Var. 2
1	X-6246-11	Decal, Kohler Power System	1
2	224233	Decal, 1-800 number	1
3	229831	Decal, reconnection	1
4	238162	Marker, adhesive (pos. batt. connection)	1
5	239796	Decal, warning (carbon monoxide)	1
6	249808	Decal, warning (moving parts)	1
7	249809	Decal, warning (hot engine)	1
8	249810	Decal, warning (hot coolant)	1
9	344285	Decal, oil drain	1
10	344295	Decal, equipment ground	1
11	241655	Decal, negative battery connection	1
12	359629	Tag, hang	1

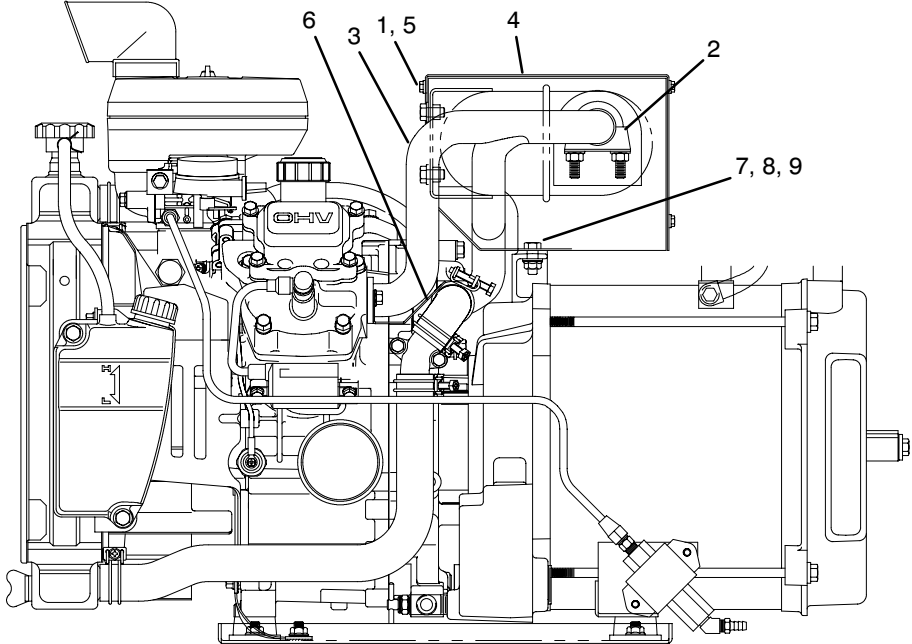
Group 109: Skid and Plant Mounting



Item	Part No.	Description	Qty. Var. 2
1	X-101-16	Nut, elastic stop, 5/16-18"	2
2	X-22-16	Washer, lock, 5/16" int.-ext. tooth	2
3	X-22-5	Washer, lock, 5/16" int. tooth	2
4	245297	Strap, ground	1
5	359325	Tray, drip	1
6	359578	Vibromount	4
7	X-6210-7	Nut spirallock	2
8	X-125-24	Screw, HC	2
9	X-25-85	Washer, plain	2
10	X-6054-17	Stud	1

Group 116: Exhaust

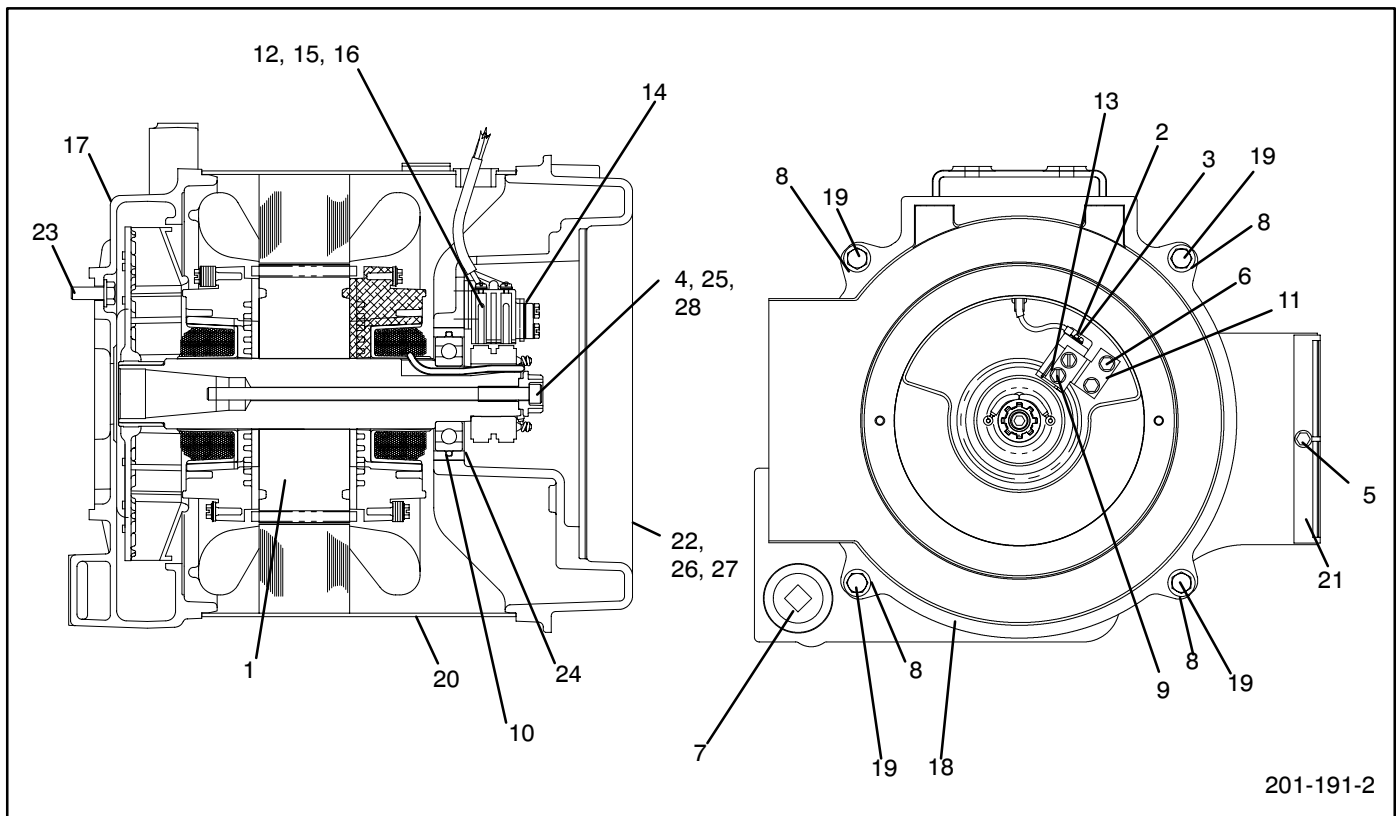
See Group 8—Muffler for additional exhaust system parts.



116-191-2

Item	Part No.	Description	Qty.
			Var.
1	X-6216-1	Screw, h.c.	6
2	X-722-9	Clamp, muffler	1
3	359457	Pipe, exhaust	1
4	359458	Bracket, exhaust mounting (bottom)	1
5	359459	Bracket, exhaust mounting (top)	1
6	359466	Shield, heat	1
7	X-125-31	Screw, h.c.	2
8	X-25-85	Washer, plain	2
9	X-6210-7	Nut, spiralock	2

Group 201: Generator and Mounting



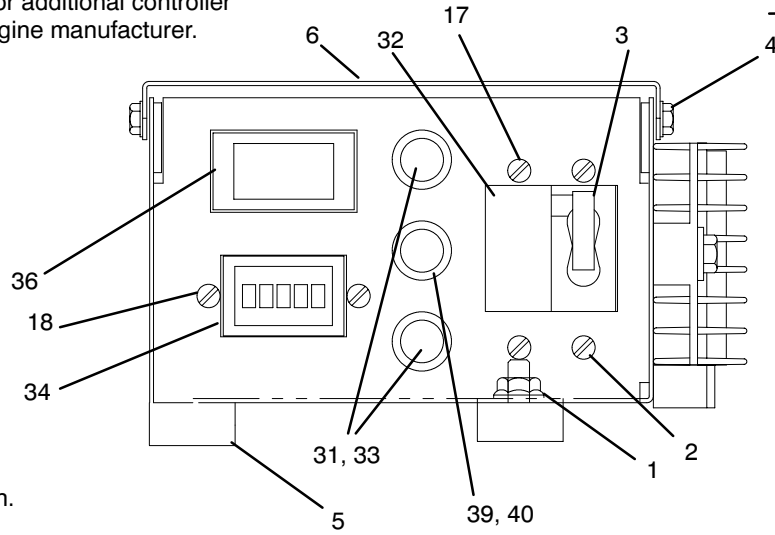
201-191-2

Item	Part No.	Description	Qty.	
			2	3
1	A-359441	Rotor Assembly (includes item 24)	1	
1	A-359565	Rotor Assembly (includes item 24)		1
2	X-22-6	Washer, lock #6 int. star	2	2
3	X-49-1	Screw, r.h.m. 6-32 x .312 slot	2	2
4	X-55-48	Screw, hex head 5/16-24	1	
4	359567	Bolt, thru		1
5	X-6216-1	Screw, hex head	2	2
6	X-67-113	Screw, self-tapping	2	2
7	X-75-50	Plug, pipe	1	1
8	X-801-4	Washer, hardened	4	4
9	X-97-13	Screw, hex head machine	2	2
10	229110	O-ring	1	1
11	229178	Bracket, brush holder	1	1
12	238150	Spring	2	2
13	238247	Retainer, wire	1	1
14	238248	Shim, brush holder	2	2
15	239247	Holder, brush	1	1
16	239282	Brush	2	2
17	359292	Adapter, generator	1	1
18	359293	Bracket, end	1	1
19	359310	Overbolt	4	4
20	359327	Stator Assembly	1	1
21	359403	Guard, fan	1	1
22	359477	Plate, end bracket	1	
22	359566	Plate, end bracket		1
23	X-125-47	Screw	4	4
24	X-758-15	Bearing, ball	1	1
25	X-400-74	Spacer	1	
25	X-25-75	Washer, plain		1
26	X-465-2	Screw, 1/4-20 x 5/8"	2	
26	X-55-2	Screw, hex socket head		4
27	X-25-40	Washer, plain	2	
28	X-286-6	Key, square		1

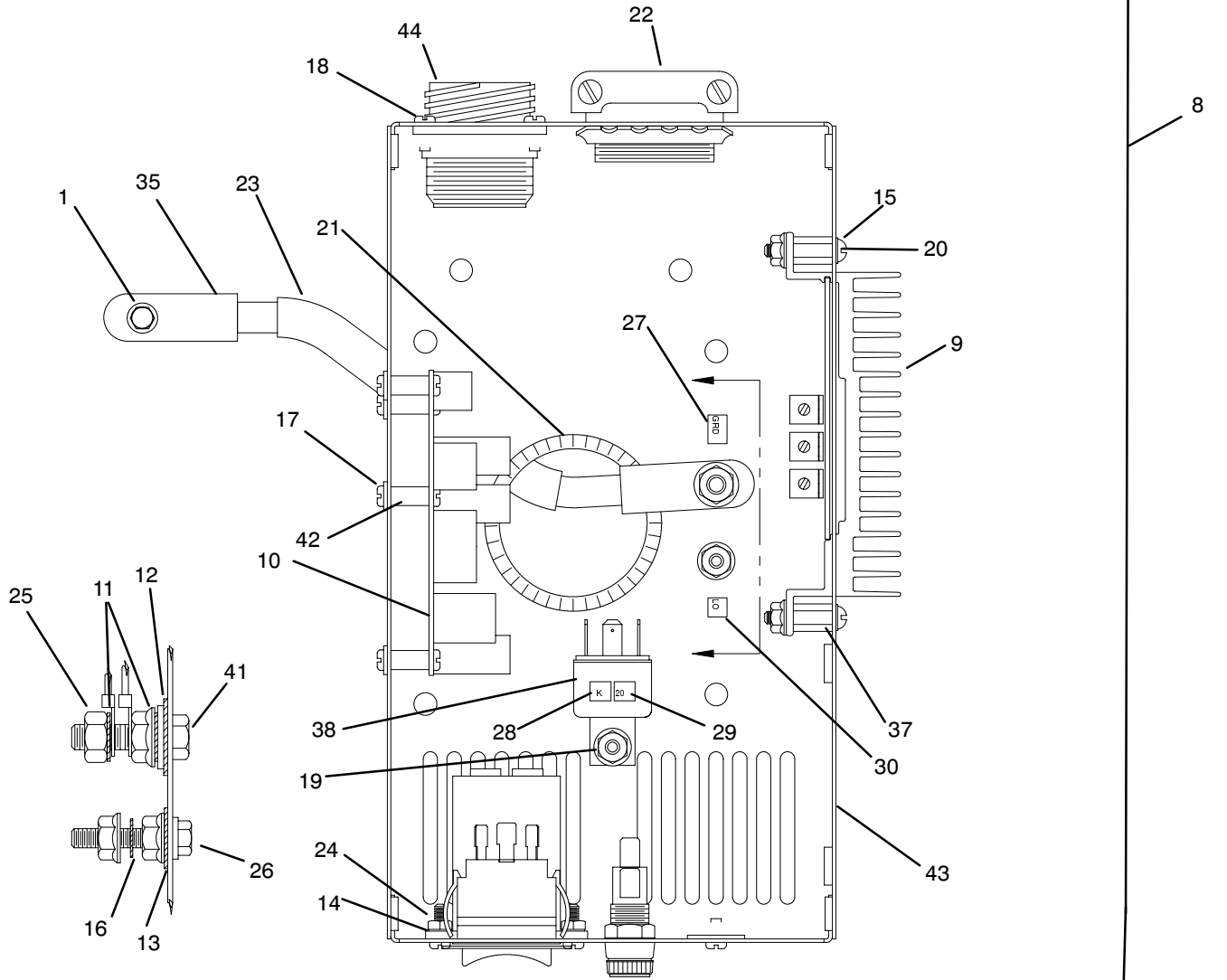
Notes

Group 301: Controller and Mounting

See Group 5—Ignition for additional controller parts supplied by the engine manufacturer.



Item 7 not shown.



See Group 2 for voltage regulator

A359337

Group 301: Controller and Mounting

Item	Part No.	Description	Qty.	
			5	8
1	X-22-12	Washer, lock, 1/4" int.-ext. tooth	5	5
2	X-49-21	Screw, r.h.m., 6-32-3/16	2	
3	X-506-51	Breaker, circuit (See Accessories for optional circuit breakers)	1	
4	X-67-52	Screw, hex head 10-24	4	4
5	241769	Mount, controller	4	4
6	359451	Cover, controller	1	6
7	359460	Harness, engine wiring (includes items 45-48)	1	1
8	A-359337	Controller Assembly	1	1
9	F-278598	PCB Assembly (PBIII E)	1	1
10	GM10516	PCB Assembly, lopcon w/trm	1	1
11	X-22-11	Washer, lock, 1/4" int. tooth	2	2
12	X-22-12	Washer, lock, 1/4" int.-ext. tooth	1	1
13	X-22-13	Washer, lock, #10, int.-ext. tooth	1	1
14	X-22-6	Washer, lock, #6, int.	2	2
15	X-22-7	Washer, lock, #8, int. tooth	4	4
16	X-22-9	Washer, lock, #10, int. tooth	1	1
17	X-49-25	Screw, p.h.m., 6-32 x 0.25 slot	12	12
18	X-49-26	Screw, p.h.m., 6-32 x 0.50 slot	6	6
19	X-50-15	Screw, r.h.m., 10-24 x 1/2	1	1
20	X-51-5	Screw, r.h.m., 8-32 x 7/16	4	4
21	X-6033-4	Grommet, nylon	1	1
22	X-6266-1	Connector, cable	1	1
23	X-696-2	Tube, vinyl	1	1
24	X-71-2	Nut, hex, 6-32 zinc	2	2
25	X-81-8	Nut, hex, 1/4-20 green	1	1
26	X-97-16	Screw, hex head machine	1	1
27	201620-152	Tab, id "grd"	1	1
28	201620-26	Tab, id "k"	1	1
29	201620-46	Tab, id "20"	1	1
30	201620-94	Tab, ident	1	1
31	223316	Fuse, 10 A, 250 V, 0.25 x 1.25	2	2
32	229183	Plate, cover	1	1
33	238426	Holder, fuse 0.25 x 1.25	2	2
34	238736	Hourmeter	1	1
35	246083	Strap, ground	1	1
36	249406	Switch, rocker white 1pm	1	1
37	249986	Spacer	4	4
38	259391	Relay tab, 20 A 12 VDC 1A/2B	1	1
39	262389	Fuse, 25A, 125 V, 0.25 x 1.25	1	1
40	263156	Holder, fuse	1	1
41	267491	Screw, special	1	1
42	287948	Spacer, aluminum, 0.25 x 0.50, 6-33 int.	5	5
43	359335	Box, silkscreened	1	1
44	359366	Harness, controller (includes items 49-54)	1	1
45	239493	Connector Plug, 22-position	1	1
46	292370	Connector Plug, 2-position	1	1
47	233959	Diode, 6 A, 100 V	1	1
48	359404	Connector, receptacle	1	1
49	239496	Connector Panel, 22-position	1	1
50	241616	Connector Plug, 6-position	1	1
51	259689	Connector Plug, 9-position	1	1
52	269366	Connector Plug, 15-position	1	1
53	239411	Connector Plug, 4-position	1	1
54	233959	Diode, 6 A, 100 V	1	1

Group 701: Literature

Item	Part No.	Description	Qty.
			Var. 3
1	TP-5251	Safety Precautions RV	1
2	TP-6001	Operation Manual, Kawaski FD501D	1
3	TP-6002	Service Manual, Kawaski FD501D	1
4	TP-6008	Service Manual Supplement, Kawaski FD501D	1
5	TP-6033	Operation Manual, 7ER Commercial Mobile	1
6	TP-6034	Installation Manual, 7ER Commercial Mobile	1
7	TP-6035	Service Manual, 7ER Commercial Mobile	1
8	TP-6036	Parts Catalog, 7ER Commercial Mobile	1

Accessories

Qty.	Description	Part No.
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Circuit Breaker Kits

Circuit Breaker		PA-225641
1	Instructions, installation	TT-875
4	Screw, r.h.m., 6-32-3/16	X-49-21
1	Breaker, circuit, 60 A	X-506-51
1	Plate, cover	229183
1	Decal, notice	246242

Circuit Breaker		PA-229185
1	Instructions, installation	TT-875
4	Screw, r.h.m., 6-32-3/16	X-49-21
1	Breaker, circuit, 55 A	X-506-47
1	Plate, cover	229183
1	Decal, notice	246242

Circuit Breaker		PA-229394
1	Instructions, installation	TT-875
4	Screw, r.h.m., 6-32-3/16	X-49-21
1	Breaker, circuit, 30 A	X-506-36
1	Terminal, jumper	249956

Circuit Breaker		PA-344052
1	Instructions, installation	TT-875
4	Screw, r.h.m., 6-32-3/16	X-49-21
1	Breaker, circuit, 30 A	X-506-36
1	Decal, notice	246242

Circuit Breaker		PA-359286
1	Instructions, installation	TT-875
4	Screw, r.h.m., 6-32-3/16	X-49-21
1	Breaker, circuit, 42 A	X-506-60
1	Decal, notice	246242

Circuit Breaker		PA-359618
1	Instructions, installation	TT-875
4	Screw, r.h.m., 6-32-3/16	X-49-21
1	Breaker, circuit, 27 A	X-506-58
1	Plate, cover	229183
1	Decal, notice	246242

Qty.	Description	Part No.
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Harness Kits

Harness, Remote 12" Pigtail		PA-249941
1	Harness, extension	249935

Harness for Remote Panel (15')		PA-249334
1	Strap, wire, 5/8"	X-526-3
1	Harness, extension	249334

Harness for Remote Panel (25')		PA-249336
1	Strap, wire, 5/8"	X-526-3
1	Harness, extension	249336

Panel and Meter Kits

Panel, Remote Start		PA-359581
1	Decal, warning	249494
1	Panel Assembly (includes the following)	A-226965
1	Panel, control	226964
1	Meter, run time, 10000 hour	238736
1	Switch, rocker, 1 pole	249406

Panel, Remote Start and 2 Meter (12 V)		PA-344040
1	Instructions, installation	TT-1072
1	Decal, warning	249494
1	Panel Assembly (includes the following)	A-344033
1	Panel	344029
1	Harness, wiring	344031
1	Gauge, water temperature	344035
1	Gauge, oil pressure	344036
1	Switch, rocker	344039

Panel, Remote Start and 4 Meter (12 V)		PA-344041
1	Instructions, installation	TT-1073
1	Decal, warning	249494
1	Panel Assembly (includes the following)	A-344034
1	Panel	344030
1	Harness, wiring	344032
1	Gauge, water temperature	344035
1	Gauge, oil pressure	344036
1	Voltmeter	344037
1	Hourmeter	344038
1	Switch, rocker	344039

Sender Kits

Sender Kit		359478
1	Terminal, ring, male, 22-16 AWG	X-283-7
1	Bushing, adapter, 3/8-18 x M16 x 1.5 in.	225127
1	Switch, sensor	249943
1	Sender, oil pressure	344305
1	Adapter, sender	359461

Lifting Eye Tool

Lifting Eye Kit		PA-359573
1	Eye, lifting	359573

Black Paint (aerosol can)	221292
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Notes

Appendix A. Abbreviations

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

A, amp	ampere	CG	center of gravity	F	Fahrenheit, female
ABDC	after bottom dead center	CID	cubic inch displacement	fglass.	fiberglass
AC	alternating current	CL	centerline	FHM	flat head machine (screw)
A/D	analog to digital	cm	centimeter	fl. oz.	fluid ounce
ADC	analog to digital converter	cmm	cubic meters per minute	flex.	flexible
adj.	adjust, adjustment	CMOS	complementary metal oxide substrate (semiconductor)	freq.	frequency
ADV	advertising dimensional drawing			FS	full scale
AHWT	anticipatory high water temperature	cogen.	cogeneration	ft.	foot, feet
AISI	American Iron and Steel Institute	COM	communications (port)	ft. lbs.	foot pounds (torque)
ALOP	anticipatory low oil pressure	conn.	connection	ft./min.	feet per minute
alt.	alternator	cont.	continued	g	gram
Al	aluminum	CPVC	chlorinated polyvinyl chloride	ga.	gauge (meters, wire size)
ANSI	American National Standards Institute (formerly American Standards Association, ASA)	crit.	critical	gal.	gallon
		CRT	cathode ray tube	gen.	generator
AO	anticipatory only	CSA	Canadian Standards Association	genset	generator set
API	American Petroleum Institute	CT	current transformer	GFI	ground fault interrupter
approx.	approximate, approximately	Cu	copper	gnd.	ground
AR	as required, as requested	cu. in.	cubic inch	gov.	governor
AS	as supplied, as stated, as suggested	cw.	clockwise	gph	gallons per hour
ASE	American Society of Engineers	CWC	city water-cooled	gpm	gallons per minute
ASME	American Society of Mechanical Engineers	cyl.	cylinder	gr.	grade, gross
assy.	assembly	D/A	digital to analog	gr. wt.	gross weight
ASTM	American Society for Testing Materials	DAC	digital to analog converter	H x W x D	height by width by depth
ATDC	after top dead center	dB	decibel	HC	hex cap
ATS	automatic transfer switch	dBA	decibel (A weighted)	HCHT	high cylinder head temperature
auto.	automatic	DC	direct current	HD	heavy duty
aux.	auxiliary	DCR	direct current resistance	HET	high exhaust temperature
A/V	audio/visual	deg., °	degree	hex	hexagon
avg.	average	dept.	department	Hg	mercury (element)
AVR	automatic voltage regulator	dia.	diameter	HH	hex head
AWG	American Wire Gauge	DI/EO	dual inlet/end outlet	HHC	hex head cap
AWM	appliance wiring material	DIN	Deutsches Institut fur Normung e. V. (also Deutsche Industrie Normenausschuss)	HP	horsepower
bat.	battery	DIP	dual inline package	hr.	hour
BBDC	before bottom dead center	DPDT	double-pole, double-throw	HS	heat shrink
BC	battery charger, battery charging	DPST	double-pole, single-throw	hsg.	housing
BCA	battery charging alternator	DS	disconnect switch	HVAC	heating, ventilation, and air conditioning
BCI	Battery Council International	DVR	digital voltage regulator	HWT	high water temperature
BDC	before dead center	E, emer.	emergency (power source)	Hz	hertz (cycles per second)
BHP	brake horsepower	EDI	electronic data interchange	IC	integrated circuit
blk.	black (paint color), block (engine)	EFR	emergency frequency relay for example (<i>exempli gratia</i>)	ID	inside diameter, identification
blk. htr.	block heater	EG	electronic governor	IEC	International Electrotechnical Commission
BMEP	brake mean effective pressure	EGSA	Electrical Generating Systems Association	IEEE	Institute of Electrical and Electronics Engineers
bps	bits per second	EIA	Electronic Industries Association	IMS	improved motor starting
br.	brass	EI/EO	end inlet/end outlet	in.	inch
BTDC	before top dead center	EMI	electromagnetic interference	in. H ₂ O	inches of water
Btu	British thermal unit	emiss.	emission	in. Hg	inches of mercury
Btu/min.	British thermal units per minute	eng.	engine	in. lbs.	inch pounds
C	Celsius, centigrade	EPA	Environmental Protection Agency	Inc.	incorporated
cal.	calorie	EPS	emergency power system	ind.	industrial
CARB	California Air Resources Board	ER	emergency relay	int.	internal
CB	circuit breaker	ES	engineering special, engineered special	int./ext.	internal/external
cc	cubic centimeter	ESD	electrostatic discharge	I/O	input/output
CCA	cold cranking amps	est.	estimated	IP	iron pipe
ccw.	counterclockwise	E-Stop	emergency stop	ISO	International Organization for Standardization
CEC	Canadian Electrical Code	etc.	et cetera (and so forth)	J	joule
cfh	cubic feet per hour	exh.	exhaust	JIS	Japanese Industry Standard
cfm	cubic feet per minute	ext.	external	k	kilo (1000)
				K	kelvin
				kA	kiloampere
				KB	kilobyte (2 ¹⁰ bytes)
				kg	kilogram

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

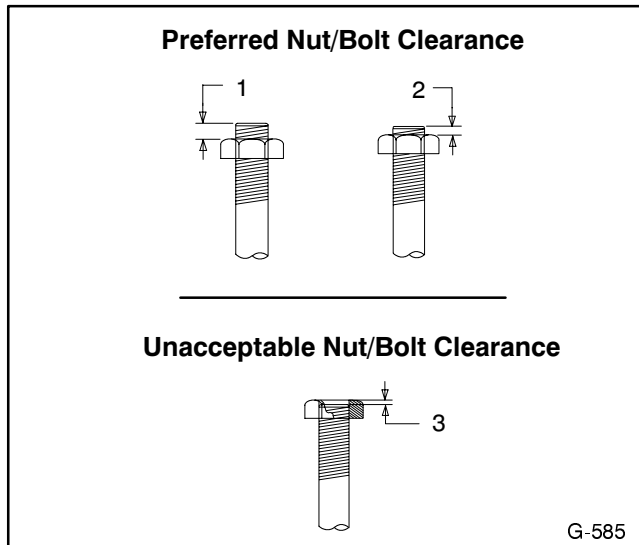
Appendix B. Common Hardware Application Guidelines

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, spiralock nuts, or standard nuts and preloading (torque) of the bolt in all other applications.

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



1. 1/2 of Bolt Diameter
2. Min. 1 Full Thread Beyond Top of Nut
3. Below Top of Nut

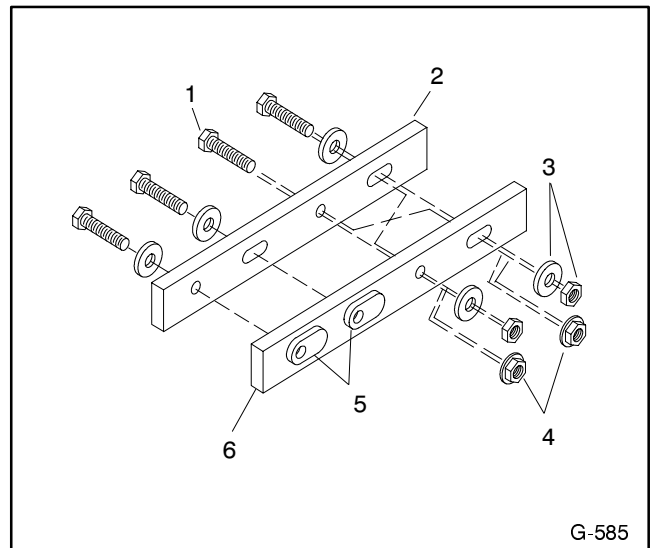
Figure 1. Acceptable Bolt Lengths

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 spiralock nut. See the diagram below.

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 the diagram below, which depicts the preceding hardware configuration possibilities.



1. Cap screw
2. Entry hole types
3. Standard nut and SAE washer
4. Whiz nut or spiralock: up to 1/2" dia. hardware
5. Weld nuts: above 1/2" dia. hardware
6. Exit hole types

Figure 2. Acceptable Hardware Combinations

Appendix C. General Torque Specifications

Use the following torque specifications when service literature instructions give no specific torque values. The charts list values for new plated, zinc phosphate, or

oiled threads. Increase values by 15% for nonplated threads. All torque values are +0%/-10%.















American Standard Fasteners Torque Specifications












Size	Torque Measurement	Assembled into Cast Iron or Steel			Assembled into Aluminum
		Grade 2	Grade 5	Grade 8	Grade 2 or 5
8-32	in. lbs. (Nm)	16 (1.8)	20 (2.3)	—	16 (1.8)
10-24	in. lbs. (Nm)	26 (2.9)	32 (3.6)	—	26 (2.9)
10-32	in. lbs. (Nm)	26 (2.9)	32 (3.6)	—	26 (2.9)
1/4-20	in. lbs. (Nm)	60 (6.8)	96 (10.8)	132 (14.9)	60 (6.8)
1/4-28	in. lbs. (Nm)	72 (8.1)	108 (12.2)	144 (16.3)	72 (8.1)
5/16-18	in. lbs. (Nm)	120 (13.6)	192 (21.7)	264 (29.8)	120 (13.6)
5/16-24	in. lbs. (Nm)	132 (14.9)	204 (23.1)	288 (32.5)	132 (14.9)
3/8-16	ft. lbs. (Nm)	18 (24)	28 (38)	39 (53)	18 (24)
3/8-24	ft. lbs. (Nm)	20 (27)	31 (42)	44 (60)	20 (27)
7/16-14	ft. lbs. (Nm)	29 (39)	44 (60)	63 (85)	—
7/16-20	ft. lbs. (Nm)	32 (43)	50 (68)	70 (95)	—
1/2-13	ft. lbs. (Nm)	44 (60)	68 (92)	96 (130)	—
1/2-20	ft. lbs. (Nm)	49 (66)	76 (103)	108 (146)	—
9/16-12	ft. lbs. (Nm)	60 (81)	98 (133)	138 (187)	—
9/16-18	ft. lbs. (Nm)	67 (91)	109 (148)	154 (209)	—
5/8-11	ft. lbs. (Nm)	83 (113)	135 (183)	191 (259)	—
5/8-18	ft. lbs. (Nm)	94 (128)	153 (208)	216 (293)	—
3/4-10	ft. lbs. (Nm)	147 (199)	240 (325)	338 (458)	—
3/4-16	ft. lbs. (Nm)	164 (222)	268 (363)	378 (513)	—
1-8	ft. lbs. (Nm)	191 (259)	532 (721)	818 (1109)	—
1-12	ft. lbs. (Nm)	209 (283)	582 (789)	895 (1214)	—






Metric Fasteners Torque Specifications, Measured in ft. lbs. (Nm)

Size (mm)	Assembled into Cast Iron or Steel			Assembled into Aluminum
	Grade 5.8	Grade 8.8	Grade 10.9	Grade 5.8 or 8.8
M6 x 1.00	4 (5.6)	7 (9.9)	10 (14)	4 (5.6)
M8 x 1.25	10 (13.6)	18 (25)	26 (35)	10 (13.6)
M8 x 1.00	16 (21)	18 (25)	26 (35)	16 (21)
M10 x 1.50	20 (27)	35 (49)	50 (68)	20 (27)
M10 x 1.25	29 (39)	35 (49)	50 (68)	29 (39)
M12 x 1.75	35 (47)	61 (83)	86 (117)	—
M12 x 1.50	48 (65)	65 (88)	92 (125)	—
M14 x 2.00	55 (74)	97 (132)	136 (185)	—
M14 x 1.50	74 (100)	103 (140)	142 (192)	—
M16 x 2.00	85 (115)	148 (200)	210 (285)	—
M16 x 1.50	104 (141)	155 (210)	218 (295)	—
M18 x 2.50	114 (155)	203 (275)	288 (390)	—
M18 x 1.50	145 (196)	225 (305)	315 (425)	—

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	

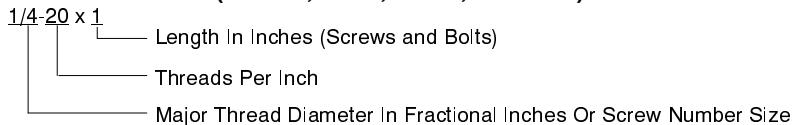
Nuts	
Nut Styles	
Hex Head	
Lock or Elastic	
Square	
Cap or Acorn	
Wing	
Washers	
Washer Styles	
Plain	
Split Lock or Spring	
Spring or Wave	
External Tooth Lock	
Internal Tooth Lock	
Internal-External Tooth Lock	

Hardness Grades	
American Standard	
Grade 2	
Grade 5	
Grade 8	
Grade 8/9 (Hex Socket Head)	
Metric	
Number stamped on hardware; 5.8 shown	

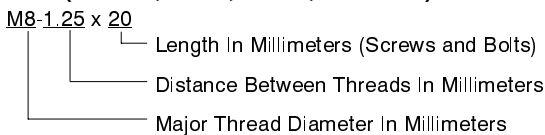
Allen™ head screw is a trademark of Holo-Krome Co.
Phillips® screw is a registered trademark of Phillips Screw Company.

Sample Dimensions

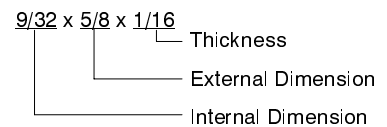
American Standard (Screws, Bolts, Studs, and Nuts)



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	Part No.	Dimensions	Part No.	Dimensions	Type
Hex Head Bolts (Grade 5)						
X-465-17	1/4-20 x .38	X-6238-14	3/8-24 x .75	X-6009-1	1-8	Standard
X-465-6	1/4-20 x .50	X-6238-16	3/8-24 x 1.25	X-6210-3	6-32	Whiz
X-465-2	1/4-20 x .62	X-6238-21	3/8-24 x 4.00	X-6210-4	8-32	Whiz
X-465-16	1/4-20 x .75	X-6238-22	3/8-24 x 4.50	X-6210-5	10-24	Whiz
X-465-18	1/4-20 x .88	X-6024-5	7/16-14 x .75	X-6210-1	10-32	Whiz
X-465-7	1/4-20 x 1.00	X-6024-2	7/16-14 x 1.00	X-6210-2	1/4-20	Spiralock
X-465-8	1/4-20 x 1.25	X-6024-8	7/16-14 x 1.25	X-6210-6	1/4-28	Spiralock
X-465-9	1/4-20 x 1.50	X-6024-3	7/16-14 x 1.50	X-6210-7	5/16-18	Spiralock
X-465-10	1/4-20 x 1.75	X-6024-4	7/16-14 x 2.00	X-6210-8	5/16-24	Spiralock
X-465-11	1/4-20 x 2.00	X-6024-11	7/16-14 x 2.75	X-6210-9	3/8-16	Spiralock
X-465-12	1/4-20 x 2.25	X-6024-12	7/16-14 x 6.50	X-6210-10	3/8-24	Spiralock
X-465-14	1/4-20 x 2.75	X-129-15	1/2-13 x .75	X-6210-11	7/16-14	Spiralock
X-465-21	1/4-20 x 5.00	X-129-17	1/2-13 x 1.00	X-6210-12	1/2-13	Spiralock
X-465-25	1/4-28 x .38	X-129-18	1/2-13 x 1.25	X-6210-15	7/16-20	Spiralock
X-465-20	1/4-28 x 1.00	X-129-19	1/2-13 x 1.50	X-6210-14		Spiralock
X-125-33	5/16-18 x .50	X-129-20	1/2-13 x 1.75	X-85-3	5/8-11	Standard
X-125-23	5/16-18 x .62	X-129-21	1/2-13 x 2.00	X-88-12	3/4-10	Standard
X-125-3	5/16-18 x .75	X-129-22	1/2-13 x 2.25	X-89-2	1/2-20	Standard
X-125-31	5/16-18 x .88	X-129-23	1/2-13 x 2.50			
X-125-5	5/16-18 x 1.00	X-129-24	1/2-13 x 2.75			
X-125-24	5/16-18 x 1.25	X-129-25	1/2-13 x 3.00			
X-125-34	5/16-18 x 1.50	X-129-27	1/2-13 x 3.50			
X-125-25	5/16-18 x 1.75	X-129-29	1/2-13 x 4.00			
X-125-26	5/16-18 x 2.00	X-129-30	1/2-13 x 4.50			
230578	5/16-18 x 2.25	X-463-9	1/2-13 x 5.50			
X-125-29	5/16-18 x 2.50	X-129-44	1/2-13 x 6.00			
X-125-27	5/16-18 x 2.75	X-129-51	1/2-20 x .75			
X-125-28	5/16-18 x 3.00	X-129-45	1/2-20 x 1.25			
X-125-22	5/16-18 x 4.50	X-129-52	1/2-20 x 1.50			
X-125-32	5/16-18 x 5.00	X-6021-3	5/8-11 x 1.00			
X-125-35	5/16-18 x 5.50	X-6021-4	5/8-11 x 1.25			
X-125-36	5/16-18 x 6.00	X-6021-2	5/8-11 x 1.50			
X-125-40	5/16-18 x 6.50	X-6021-1	5/8-11 x 1.75			
X-125-43	5/16-24 x 1.75	273049	5/8-11 x 2.00			
X-125-44	5/16-24 x 2.50	X-6021-5	5/8-11 x 2.25			
X-125-30	5/16-24 x .75	X-6021-6	5/8-11 x 2.50			
X-125-39	5/16-24 x 2.00	X-6021-7	5/8-11 x 2.75			
X-125-38	5/16-24 x 2.75	X-6021-12	5/8-11 x 3.75			
X-6238-2	3/8-16 x .62	X-6021-11	5/8-11 x 4.50			
X-6238-10	3/8-16 x .75	X-6021-10	5/8-11 x 6.00			
X-6238-3	3/8-16 x .88	X-6021-9	5/8-18 x 2.50			
X-6238-11	3/8-16 x 1.00	X-6239-1	3/4-10 x 1.00			
X-6238-4	3/8-16 x 1.25	X-6239-8	3/4-10 x 1.25			
X-6238-5	3/8-16 x 1.50	X-6239-2	3/4-10 x 1.50			
X-6238-1	3/8-16 x 1.75	X-6239-3	3/4-10 x 2.00			
X-6238-6	3/8-16 x 2.00	X-6239-4	3/4-10 x 2.50			
X-6238-17	3/8-16 x 2.25	X-6239-5	3/4-10 x 3.00			
X-6238-7	3/8-16 x 2.50	X-6239-6	3/4-10 x 3.50			
X-6238-8	3/8-16 x 2.75	X-792-1	1-8 x 2.25			
X-6238-9	3/8-16 x 3.00	X-792-5	1-8 x 3.00			
X-6238-19	3/8-16 x 3.25	X-792-8	1-8 x 5.00			
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					

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

Metric

Hex head bolts are hardness grade 8.8 unless noted.

Part No.	Dimensions	Part No.	Dimensions	Part No.	Dimensions	Type		
Hex Head Bolts (partial thread)			Hex Head Bolts (full thread)			Hex Nuts		
M931-06040-60	M6-1.00 x 40	M933-04006-60	M4-0.70 x 6	M934-03-50	M3-0.50	Standard		
M931-06055-60	M6-1.00 x 55	M933-05050-60	M5-0.80 x 50	M934-04-50	M4-0.70	Standard		
M931-06060-60	M6-1.00 x 60	M933-06010-60	M6-1.00 x 10	M934-05-50	M5-0.80	Standard		
M931-06070-60	M6-1.00 x 70	M933-06014-60	M6-1.00 x 14	M982-05-80	M5-0.80	Elastic Stop		
M931-06075-60	M6-1.00 x 75	M933-06016-60	M6-1.00 x 16	M6923-06-80	M6-1.00	Spiralock		
M931-06090-60	M6-1.00 x 90	M933-06020-60	M6-1.00 x 20	M934-06-64	M6-1.00	Std. (green)		
M931-08035-60	M8-1.25 x 35	M933-06025-60	M6-1.00 x 25	M982-06-80	M6-1.00	Elastic Stop		
M931-08040-60	M8-1.25 x 40	M933-06040-60	M6-1.00 x 40	M6923-08-80	M8-1.25	Spiralock		
M931-08040-82	M8-1.25 x 40*	M933-06050-60	M6-1.00 x 50	M934-08-60	M8-1.25	Standard		
M931-08045-60	M8-1.25 x 45	M933-08016-60	M8-1.25 x 16	M982-08-80	M8-1.25	Elastic Stop		
M931-08050-60	M8-1.25 x 50	M933-08020-60	M8-1.25 x 20	M6923-10-80	M10-1.50	Spiralock		
M931-08055-82	M8-1.25 x 55*	M933-08025-60	M8-1.25 x 25	M982-10-80	M10-1.50	Elastic Stop		
M931-08060-60	M8-1.25 x 60	M933-08030-60	M8-1.25 x 30	M6923-12-80	M12-1.75	Spiralock		
M931-08070-60	M8-1.25 x 70	M933-10012-60	M10-1.50 x 12	M982-12-80	M12-1.75	Elastic Stop		
M931-08070-82	M8-1.25 x 70*	M961-10020-60	M10-1.25 x 20	M982-14-80	M14-2.00	Elastic Stop		
M931-08075-60	M8-1.25 x 75	M933-10020-60	M10-1.50 x 20	M6923-16-80	M16-2.00	Spiralock		
M931-08080-60	M8-1.25 x 80	M933-10025-60	M10-1.50 x 25	M982-16-80	M16-2.00	Elastic Stop		
M931-08090-60	M8-1.25 x 90	M933-10030-60	M10-1.50 x 30	M982-18-80	M18-2.50	Elastic Stop		
M931-08095-60	M8-1.25 x 95	M933-10030-82	M10-1.50 x 30*	M934-20-80	M20-2.50	Standard		
M931-08100-60	M8-1.25 x 100	M961-10035-60	M10-1.25 x 35	M982-20-80	M20-2.50	Elastic Stop		
M931-10040-60	M10-1.50 x 40	M933-10035-60	M10-1.50 x 35	M934-22-80	M22-2.50	Standard		
M931-10045-60	M10-1.50 x 45	M933-12016-60	M12-1.75 x 16	M982-22-80	M22-2.50	Elastic Stop		
M931-10050-60	M10-1.50 x 50	M933-12020-60	M12-1.75 x 20	M934-24-80	M24-3.00	Standard		
M931-10055-60	M10-1.50 x 55	M933-12025-60	M12-1.75 x 25	M982-24-80	M24-3.00	Elastic Stop		
M931-10060-60	M10-1.50 x 60	M933-12025-82	M12-1.75 x 25*	Washers				
M931-10065-60	M10-1.50 x 65	M933-12030-60	M12-1.75 x 30	Part No.	ID	OD	Bolt/ Thick. Screw	
M931-10070-60	M10-1.50 x 70	M933-12040-60	M12-1.75 x 40	M125A-03-80	3.2	7.0	0.5 M3	
M931-10080-60	M10-1.50 x 80	M933-12040-82	M12-1.75 x 40*	M125A-04-80	4.3	9.0	0.8 M4	
M931-10090-60	M10-1.50 x 90	M961-14025-60	M14-1.50 x 25	M125A-05-80	5.3	10.0	1.0 M5	
M931-10100-60	M10-1.50 x 100	M933-14025-60	M14-2.00 x 25	M125A-06-80	6.4	12.0	1.6 M6	
M931-12045-60	M12-1.75 x 45	M961-16025-60	M16-1.50 x 25	M125A-08-80	8.4	16.0	1.6 M8	
M931-12050-60	M12-1.75 x 50	M933-16025-60	M16-2.00 x 25	M125A-10-80	10.5	20.0	2.0 M10	
M931-12055-60	M12-1.75 x 55	M933-16030-82	M16-2.00 x 30*	M125A-12-80	13.0	24.0	2.5 M12	
M931-12060-60	M12-1.75 x 60	M933-16035-60	M16-2.00 x 35	M125A-14-80	15.0	28.0	2.5 M14	
M931-12065-60	M12-1.75 x 65	M933-16040-60	M16-2.00 x 40	M125A-16-80	17.0	30.0	3.0 M16	
M931-12080-60	M12-1.75 x 80	M933-16050-60	M16-2.00 x 50	M125A-18-80	19.0	34.0	3.0 M18	
M931-12090-60	M12-1.75 x 90	M933-16050-82	M16-2.00 x 50*	M125A-20-80	21.0	37.0	3.0 M20	
M931-12100-60	M12-1.75 x 100	M933-16060-60	M16-2.00 x 60	M125A-24-80	25.0	44.0	4.0 M24	
M931-12110-60	M12-1.75 x 110	M933-18050-60	M18-2.50 x 50	Pan Head Machine Screws				
M931-16090-60	M16-2.00 x 90	M933-18060-60	M18-2.50 x 60	M7985A-03010-20	M3-0.50 x 10			
M931-20065-60	M20-2.50 x 65	Flat Head Machine Screws						
M931-20120-60	M20-2.50 x 120	M7985A-03012-20	M3-0.50 x 12	M7985A-04020-20	M4-0.70 x 20			
M931-20160-60	M20-2.50 x 160	M7985A-04020-20	M4-0.70 x 20	M7985A-05010-20	M5-0.80 x 10			
M931-22090-60	M22-2.50 x 90	M7985A-05012-20	M5-0.80 x 12	M7985A-05016-20	M5-0.80 x 16			
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							

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

TP-6036 6/99

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