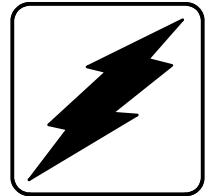


Service Parts

Industrial Generator Sets



Models:

33-45RZ

See Group 701: Literature, inside this manual for part numbers of engine and accessory parts catalogs

See TP-6009 Parts Catalog Industrial Controller for controller parts



KOHLER[®]
POWER SYSTEMS

Specification Series 183

TP-5613 3/00d

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Introduction

This manual lists service replacement parts for 33–45 kW 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.

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.

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.

xin:004:002

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.

xin:004:003

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.

xin:004:004

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.

xin:004:005

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.

xin:004:006

Specification Number Index

Group Title	<i>Air Intake</i>	<i>Fuel System</i>	<i>Cooling System</i>	<i>Engine</i>	<i>Nameplates and Decals</i>	<i>Oil Pressure Switch</i>	<i>Skid and Plant Mounting</i>	<i>Temperature Switch</i>	<i>Recommended Spare Parts</i>	<i>Generator and Mounting</i>	<i>Controller and Mounting</i>	<i>Literature</i>
Group No.	101	103	104	105	107	108	109	110	119	201	301	701
Spec No.	Variation Number											

33RZ												
183030	1	1	6	6	18	1	1	1	—	78	†	6
183031	1	1	3	1	18	2	1	2	—	83	3	6
183032	1	1	3	1	18	1	1	1	—	83	4	6
183033	1	2	6	6	18	1	1	1	—	78	†	6
183034	1	2	3	1	18	2	1	2	—	83	3	6
183035	1	2	3	1	18	1	1	1	—	83	4	6
183036	1	2	6	6	18	1	1	1	—	88	†	6
183039	1	4	7	7	18	1	1	1	—	78	†	6
183040	1	3	7	7	21	1	1	1	—	88	†	6
183041	1	3	7	7	18	1	1	1	—	78	†	6
35RZ												
183037	2	5	9	8	26	3	3	3	1	7	†	6
183038	2	*	*	8	26	3	3	3	2	7	†	6
183042	2	5	9	8	26	3	2	3	1	8	†	6
183043	2	*	*	8	26	3	2	3	2	7	†	6
183044	2	5	9	8	27	3	3	3	1	9	†	6
183045	2	*	*	8	27	3	3	3	2	9	†	6
183046	2	6	9	8	26	3	3	3	1	7	†	6
183047	2	6	9	8	26	3	2	3	1	8	†	6
183048	2	6	9	8	27	3	3	3	1	9	†	6

* Configured group. Refer to the generator set nameplate for the module number. Turn to the respective group on the following pages for parts breakdowns.

† Configured group. Refer to the generator set nameplate for the module number. See controller parts catalog TP-6009 for controller parts lists.

— Not applicable.

Specification Number Index

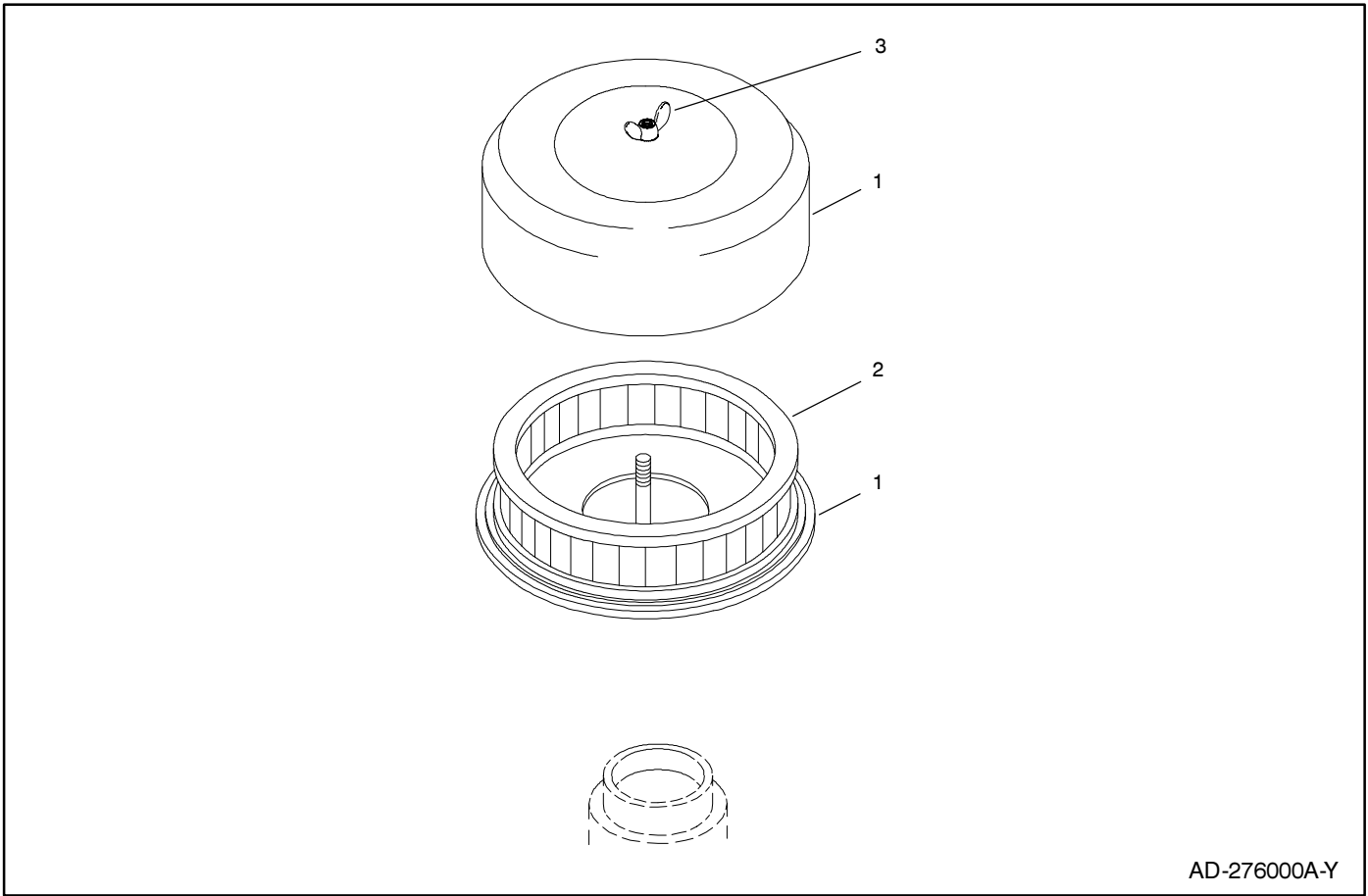
Group Title	<i>Air Intake</i>	<i>Fuel System</i>	<i>Cooling System</i>	<i>Engine</i>	<i>Nameplates and Decals</i>	<i>Oil Pressure Switch</i>	<i>Skid and Plant Mounting</i>	<i>Temperature Switch</i>	<i>Recommended Spare Parts</i>	<i>Generator and Mounting</i>	<i>Controller and Mounting</i>	<i>Literature</i>
Group No.	101	103	104	105	107	108	109	110	119	201	301	701
Spec No.	Variation Number											

45RZ												
183230	1	1	6	6	3	1	11	1	—	79	†	6
183231	1	1	3	1	3	2	1	2	—	84	3	6
183232	1	1	3	1	3	1	1	1	—	84	5	6
183233	1	2	6	6	3	1	1	1	—	79	†	6
183234	1	2	3	1	3	2	1	2	—	84	3	6
183235	1	2	3	1	3	1	1	1	—	84	5	6
183236	1	2	2	6	3	1	1	1	—	79	†	6
183237	1	2	6	6	3	1	1	1	—	89	†	6
183238	2	5	10	8	26	3	2	3	—	8	†	6
183239	2	*	*	8	26	3	2	3	1	8	†	6
183240	1	3	8	7	3	1	1	1	2	79	†	6
183241	1	3	7	7	22	1	1	1	—	89	†	6
183242	1	3	7	7	3	1	1	1	—	79	†	6
183243	1	4	7	7	3	1	1	1	—	79	†	6
183244	2	*	*	8	28	3	2	3	1	10	†	6
183245	2	*	*	8	28	3	2	3	2	10	†	6
183246	2	5	10	8	29	3	2	3	1	11	†	6
183247	2	*	7	8	29	3	2	3	2	11	†	6
183248	2	6	10	8	28	3	2	3	1	8	†	6
183249	2	6	10	8	28	3	2	3	1	10	†	6
183250	2	6	10	8	29	3	2	3	1	11	†	6

- * Configured group. Refer to the generator set nameplate for the module number. Turn to the respective group on the following pages for parts breakdowns.
- † Configured group. Refer to the generator set nameplate for the module number. See controller parts catalog TP-6009 for controller parts lists.
- Not applicable.

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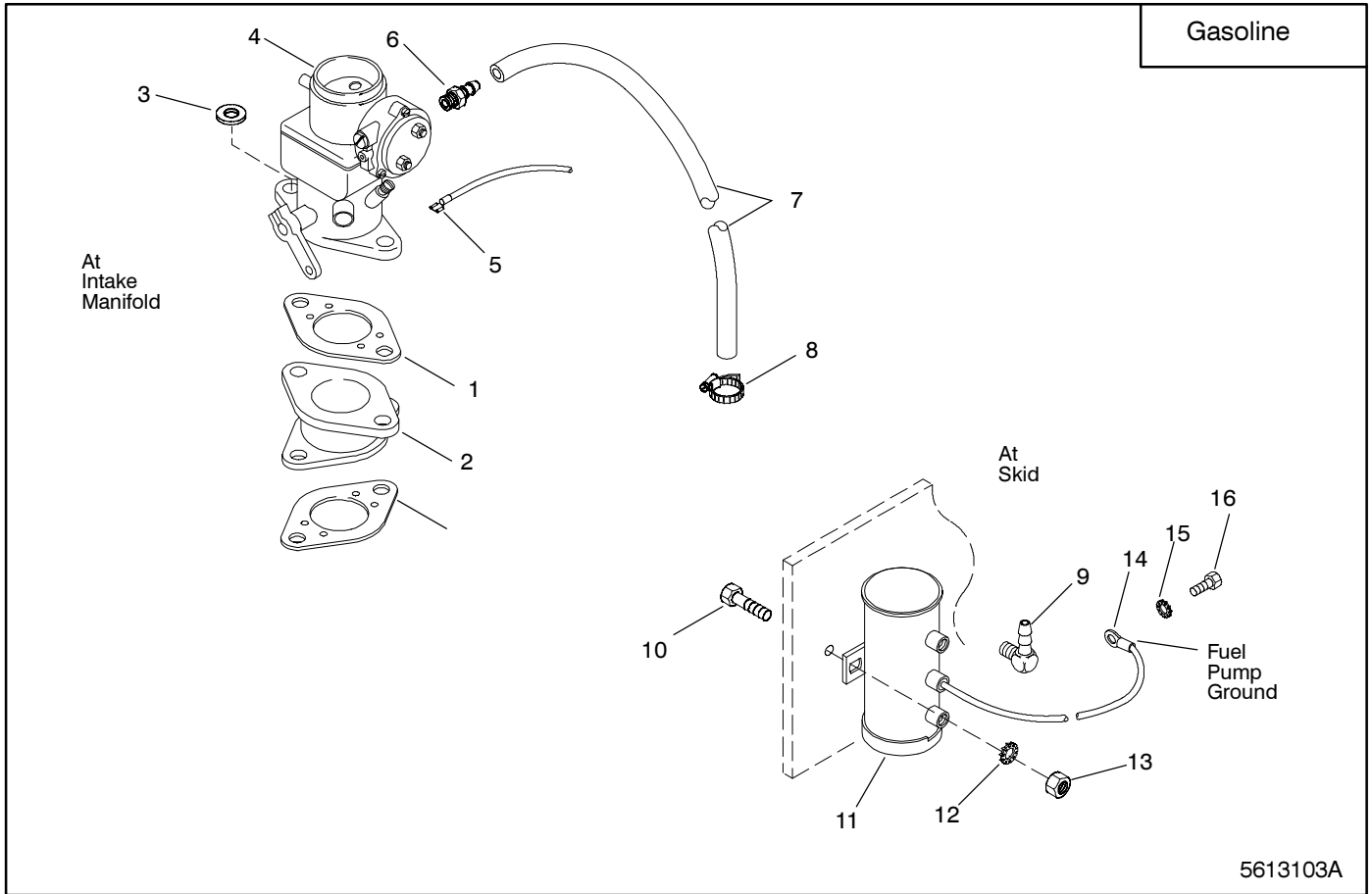
Group 101: Air Intake



AD-276000A-Y

Item	Part Number	Description	Quantity	
			Variation 1	Number 2
1	A-269441	Air cleaner (includes 3 and 4)	1	
1	A-326051	Air cleaner (includes item 3)		1
2	258423	Element, air cleaner	1	
2	326099	Element, air cleaner		1
3	254457	Nut, wing	1	1

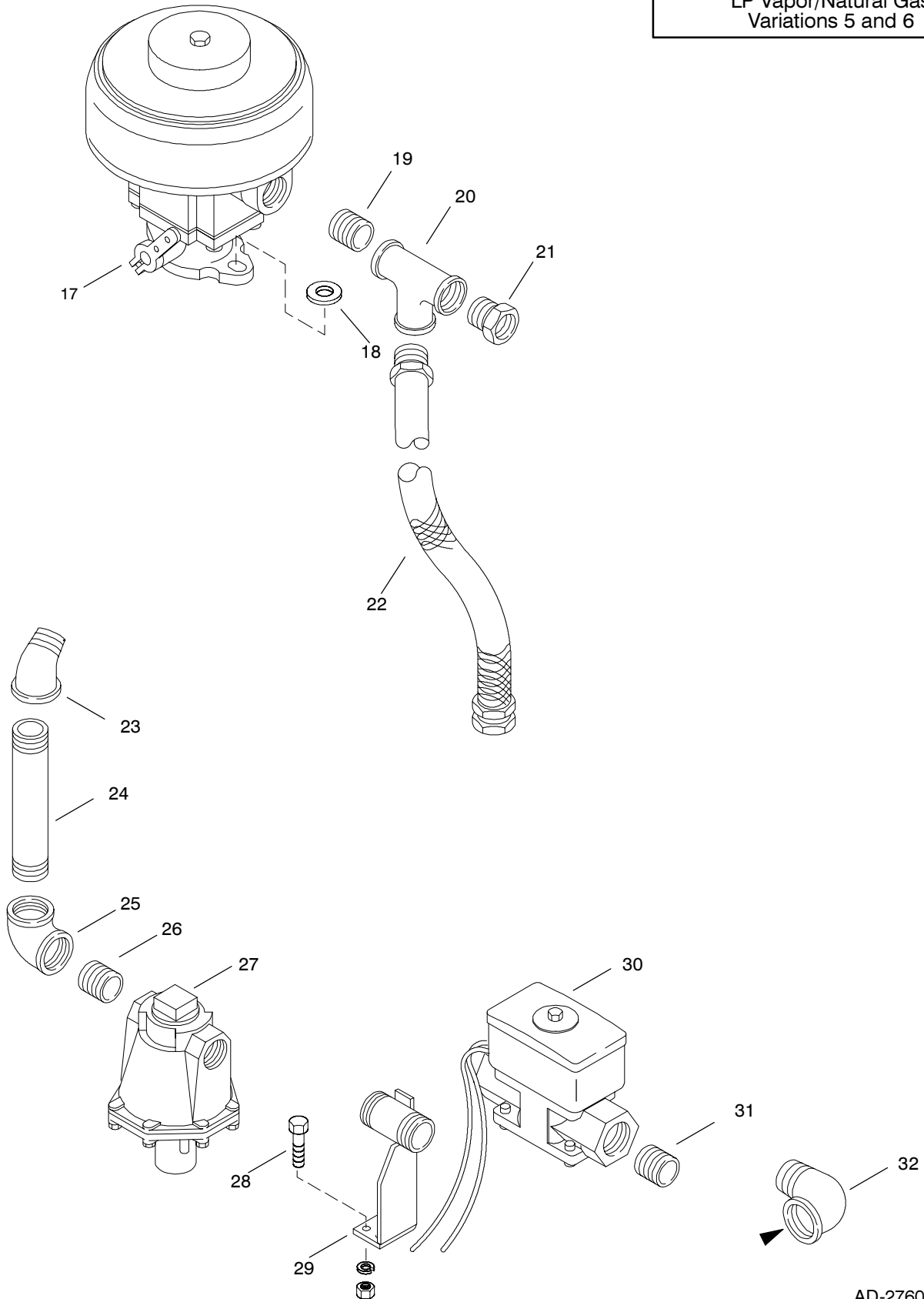
Group 103: Fuel System



Item	Part Number	Description	Quantity	
			1	4
1	280494	Gasket, carburetor	2	2
2	279013	Adapter, carburetor	1	1
3	X-25-82	Washer, plain	2	2
4	A-291440	Carburetor, gasoline	1	1
5	X-367-1	Terminal	1	1
6	X-380-1	Connector, hose	1	
7	X-386-35	Fuel line, flexible	1	
7	X-386-56	Fuel line, flexible		1
8	X-426-9	Clamp, hose	2	2
9	X-391-1	Connector, hose	1	
9	X-391-1	Connector, hose		2
10	X-465-7	Screw, hex cap	2	2
11	247076	Pump, fuel - electric	1	1
12	X-22-12	Washer, shakeproof	2	2
13	X-81-1	Nut, hex	2	2
14	X-283-5	Terminal	1	1
15	X-22-12	Washer	1	1
16	X-125-23	Screw, hex cap	1	1

Group 103: Fuel System, continued

LP Vapor/Natural Gas
Variations 5 and 6



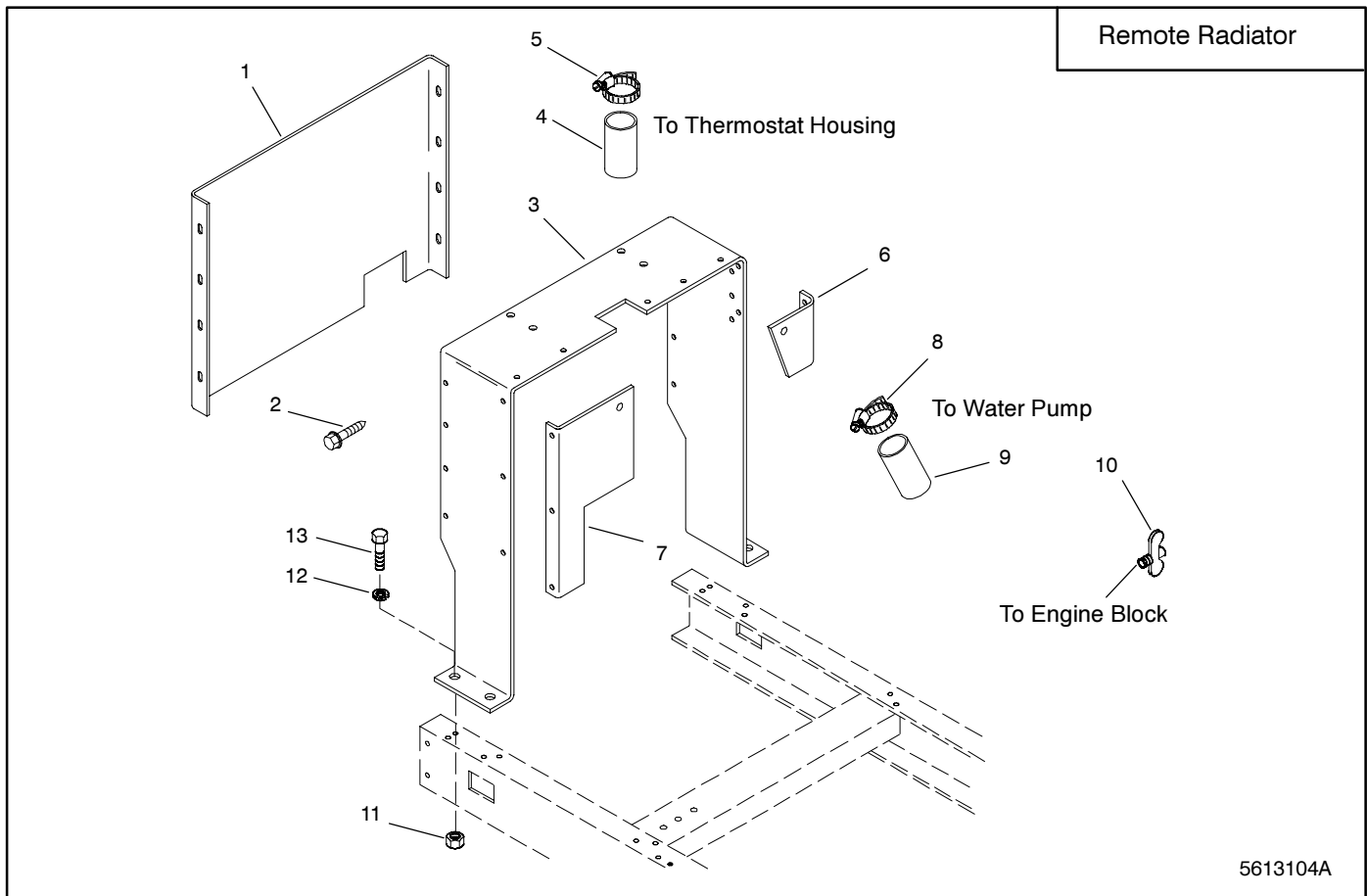
AD-276000

Group 103: Fuel System, continued

Item	Part Number	Description	Quantity			
			Variation Number			
			2	3	5	6
17	A-291429	Carburetor	1	1		
17	A-326217	Carburetor, natural gas			1	
17	A-326216	Carburetor, LP gas				1
18	X-25-82	Washer, plain			1	1
19	X-209-11	Nipple, pipe	1	1		
19	X-206-9	Nipple, pipe			1	1
19	X-211-1	Elbow, street (not shown)		2		
20	X-215-2	Elbow, pipe			1	1
21	153659	Bushing, reducer 3/4 x 1/2	1	1		
22	X-504-18	Line, flexible fuel	1	1		
22	276395	Line, flexible fuel			1	1
23	X-274-2	Elbow	1	1		
23	X-225-8	Elbow, 3/4"			1	1
24	X-206-16	Nipple, pipe	1	1	1	1
25	X-215-2	Elbow, pipe	1	1	1	1
26	X-206-4	Nipple, pipe			1	1
27	291259	Regulator, pressure	1	1	1	1
28	#	Hardware, 5/16-18	2	2	2	2
29	254456	Bracket, fuel valve	1	1	1	1
30	244621	Valve, gas	1	1		
30	326223	Valve, gas solenoid			1	1
31	X-206-9	Nipple, pipe			1	1
32	SA-472	Elbow, pipe	1	1		
32	X-215-2	Elbow, pipe 3/4"			1	1

Common hardware. Procure locally.

Group 104: Cooling System



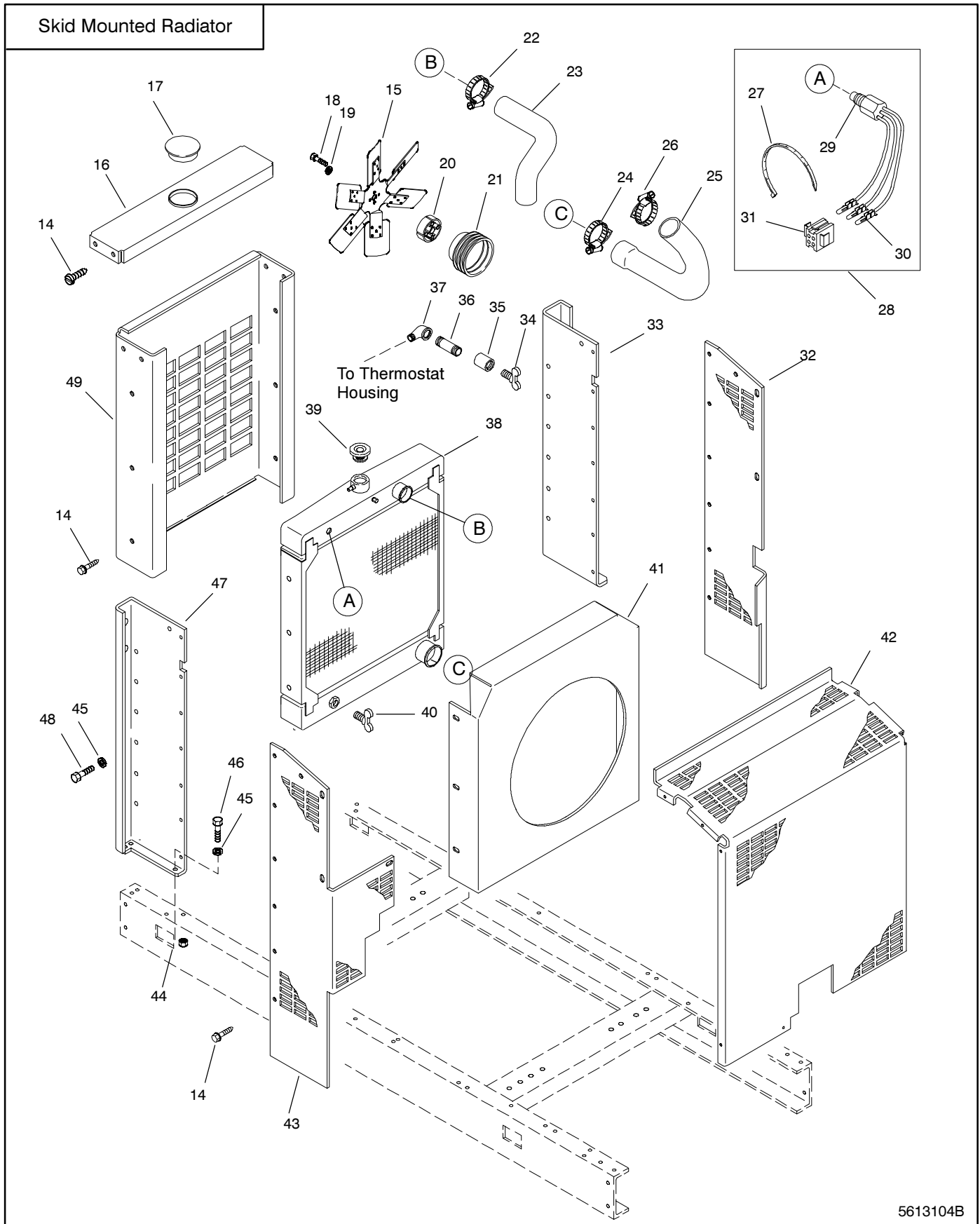
5613104A

Item	Part Number	Description	Quantity	
			2	8
1	255326	Guard, belt	1	1
2	X-794-1	Screw, drill	13	13
3	255325	Bracket, expansion	1	1
4	X-311-7	Hose	1	1
5	X-426-4	Clamp, hose	2	2
6	255004	Guard, belt (right side)	1	
6	256474	Guard, belt (right side)		1
7	255005	Guard, belt (left side)	1	
7	256475	Guard, belt (left side)		1
7	255006	Guard, belt	1	1
8	X-426-6	Clamp, hose	2	2
9	X-6014-8	Hose	1	1
10	X-256-3	Valve, drain	1	1
11	#	Nut, hex 3/8-16	4	4
12	#	Washer, lock 3/8	4	4
13	#	Screw, hex cap 3/8-16	4	4

Common hardware. Procure locally.

Notes

Group 104: Cooling System, continued



5613104B

Group 104: Cooling System, continued

Item	Part Number	Description	Quantity				
			Variation Number				
			3	6	7	9	10
14	X-794-1	Screw, drill	30	30	30		
14	#	Hardware, 1/4-20				8	8
15	276170	Fan, pusher		1	1		
15	326011	Fan, pusher				1	1
16	253071	Cover, radiator	1	1	1		
17	253268	Plug	1	1	1		
18	X-125-39	Screw, hex cap		4	4		
18	X-125-44	Screw, hex cap				4	4
19	#	Washer, lock 5/16		4	4		
20	276154	Spacer, pulley-to-fan		1	1		
20	326010	Spacer, pulley-to-fan				1	1
21	276157	Pulley, water pump		1	1	1	1
22	X-426-4	Clamp, hose	2	2	2		
23	226715	Hose, radiator (upper)	1	1	1		
23	273417	Hose, radiator (upper)				1	1
24	250081	Clamp, hose	1	1	1		
24	X-426-6	Clamp, hose				2	2
25	226715	Hose, radiator (lower)	1	1	1		
25	326003	Hose, radiator (lower)				1	1
26	X-426-6	Clamp, hose	1	1	1		
27	X-468-2	Tie, cable	2	2	2		
27	X-468-1	Tie, cable			1		
28	See Chart Below	Switch assembly, coolant level (includes items 29-31)			1	1	1
29	273520	Sensor, low coolant			1	1	1
30	239516	Pin			3	3	3
31	239411	Connector, jack			1	1	1
32	255228	Guard, belt (right-hand)	1	1	1		
32	326008	Guard, belt (right-hand)				1	1
33	253538	Support, radiator left side	1	1	1		
33	326001	Support, radiator left side				1	1
33	273911	Spacer, radiator support (not shown)				4	4
33	X-125-3	Screw, hex cap (not shown)				4	4
34	X-256-1	Valve, drain (early models without manifold)			1	1	1
35	X-216-23	Coupling, pipe			1		
35	X-202-23	Bushing, reducer (early models without manifold)				1	1
36	X-204-6	Nipple, pipe			1		
37	X-211-8	Elbow, street			1		
38	A-255604	Radiator assembly (includes item 26)	1	1	1		
38	A-326023	Radiator assembly (includes item 26)				1	
38	A-326018	Radiator assembly (includes item 26)					1
39	224365	Cap, radiator (14 psi)	1	1	1		
40	X-256-3	Valve, drain	1	1	1	1	1
41	255032	Shroud, fan	1	1	1		
41	324039	Shroud, fan (fiberglass)				1	1
41	X-25-73	Washer, plain (not shown)				4	4
41	X-465-2	Screw, hex cap (not shown)				4	4
41	326006	Guard, wire fan (not shown)				1	1
41	X-125-23	Screw, hex cap (not shown)				4	4
42	255229	Guard, fan (top)	1	1			
42	256469	Guard, fan (top)			1		
42	326009	Guard, fan (top)				1	1
43	255227	Guard, fan (left-hand)	1	1	1		
43	326007	Guard, fan (left-hand)				1	1
44	#	Nut, hex 5/16-18	6	6	6		
45	#	Washer, lock 5/16 in10	10	10	10		
46	#	Screw, hex cap 5/16-18	6	6	6		
47	253539	Support, radiator right side	1	1	1		
47	326002	Support, radiator right side				1	1
48	X-125-3	Screw, hex cap	4	4	4		
49	326005	Guard, radiator				1	1

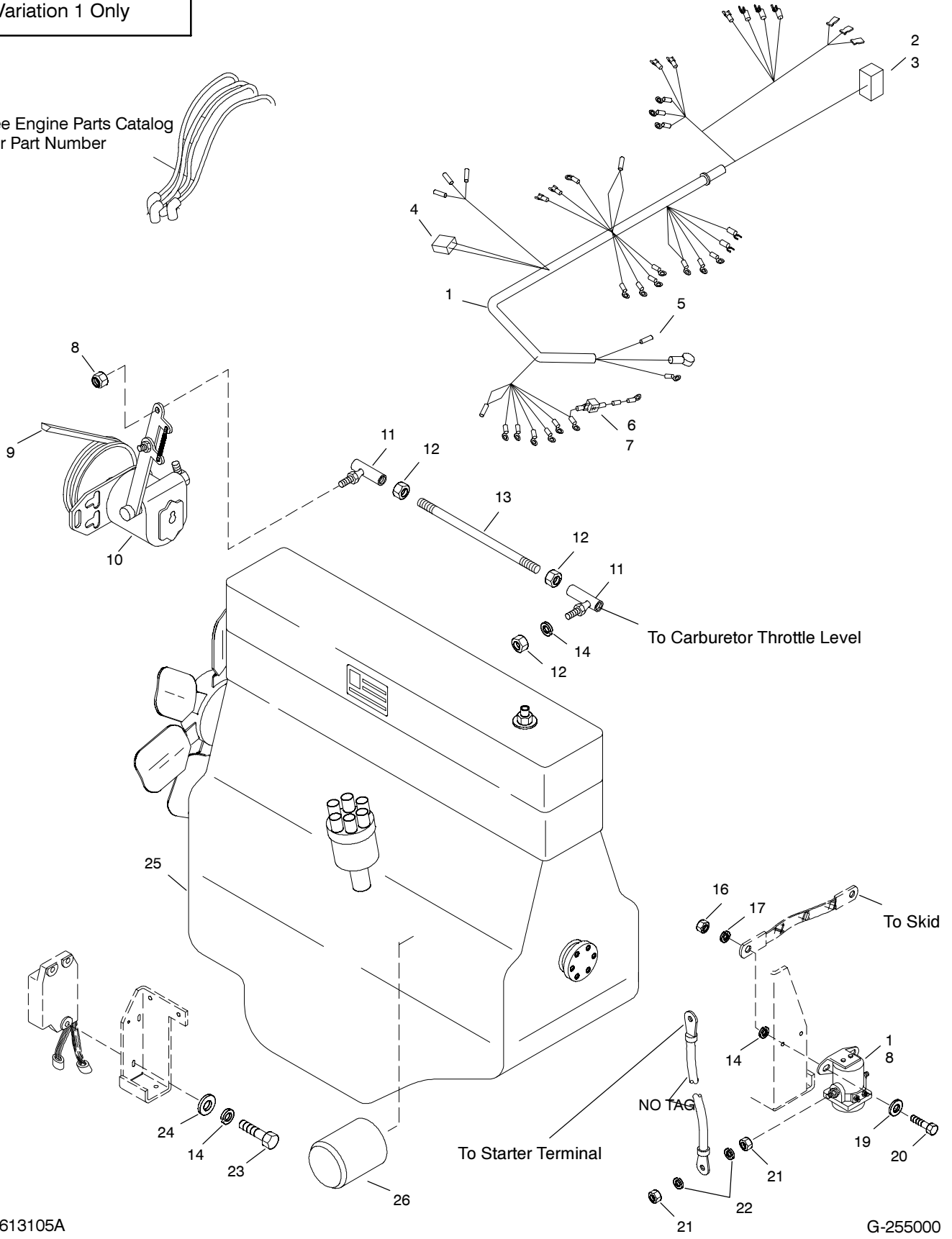
Common hardware. Procure locally.

Part Description	Part Number	
	Before Serial Number 363369	Serial Numbers 363369 and after
Switch assembly, coolant level (includes items 29-31)	273404	365289

Group 105: Engine

Variation 1 Only

See Engine Parts Catalog
For Part Number



5613105A

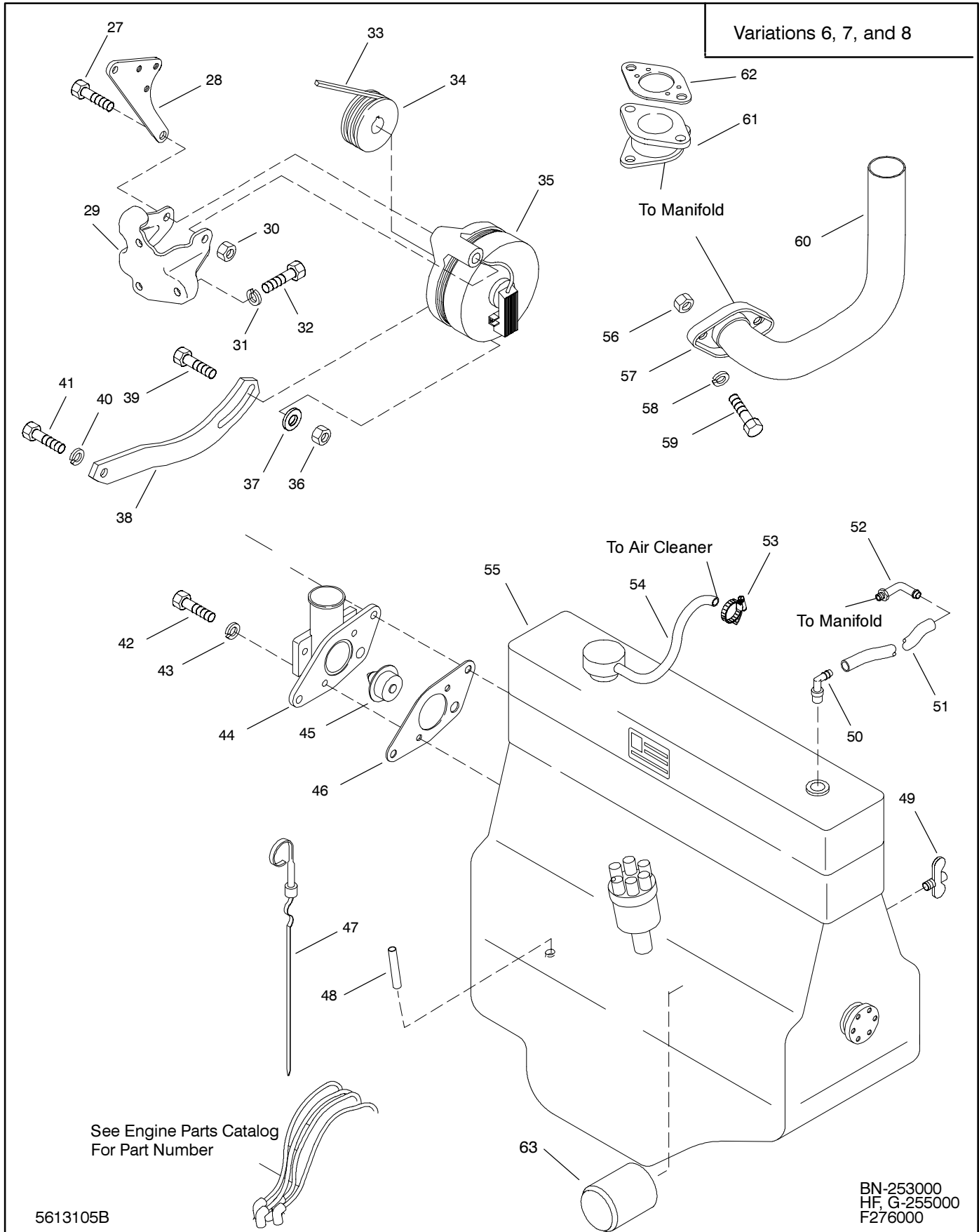
G-255000

Group 105: Engine

Item	Part Number	Description	Quantity	
			Variation Number	1
1	255042	Harness, wiring (includes items 2-7)		1
2	287850	Connector, 24 position (to controller board)		1
2	287850	Connector, 24 position (to controller board)		1
3	287851	Connector, cable		1
4	269165	Terminal, 2 position		1
5	277563	Terminal		1
6	233959	Diode		1
7	292970	Diode assembly		1
8	X-101-7	Nut, lock		1
9	290554	V-belt		1
10	279046	Governor		1
11	271097	Ball joint		2
12	X-81-2	Nut, hex 1/4-28		3
13	X-352-50	Stud		1
14	X-20-1	Washer, lock		6
15	X-545-29	Cable, battery		1
16	X-81-1	Nut, hex 1/4-20		2
17	X-22-16	Washer, lock 5/16		1
18	291891	Solenoid, starter		1
19	X-25-52	Washer, plain		2
20	X-465-16	Screw, hex 1/4-20 x .75		2
21	X-70-3	Nut, hex 10-32		2
22	X-19-1	Washer, lock		2
23	X-465-6	Screw, hex 1/4-20 x .50		3
24	X-25-40	Washer, .281 x .625 x .065		2
25	B-279020	Engine, (Ford CSG-649)		1
26	279449	Oil filter		1

See Group 701: Literature for Ford engine part catalog part number.

Group 105: Engine, continued



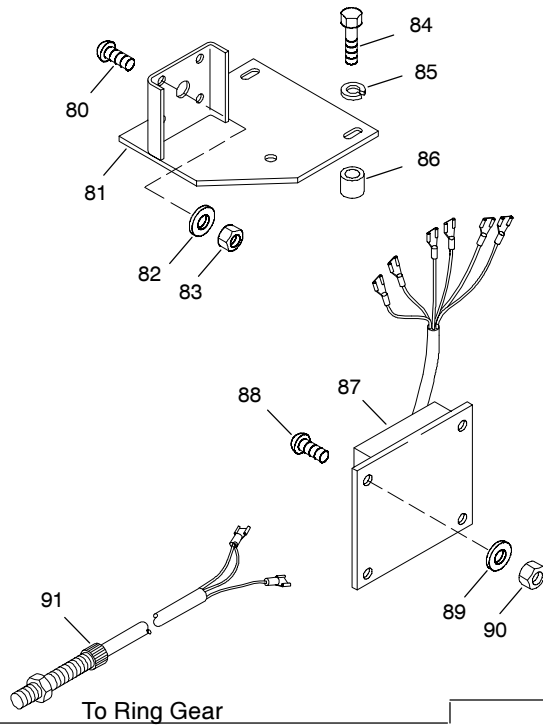
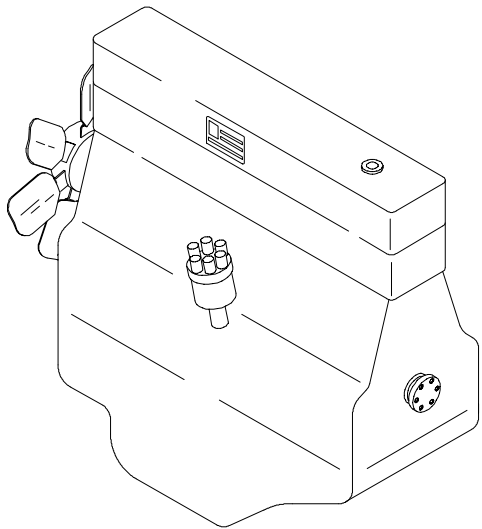
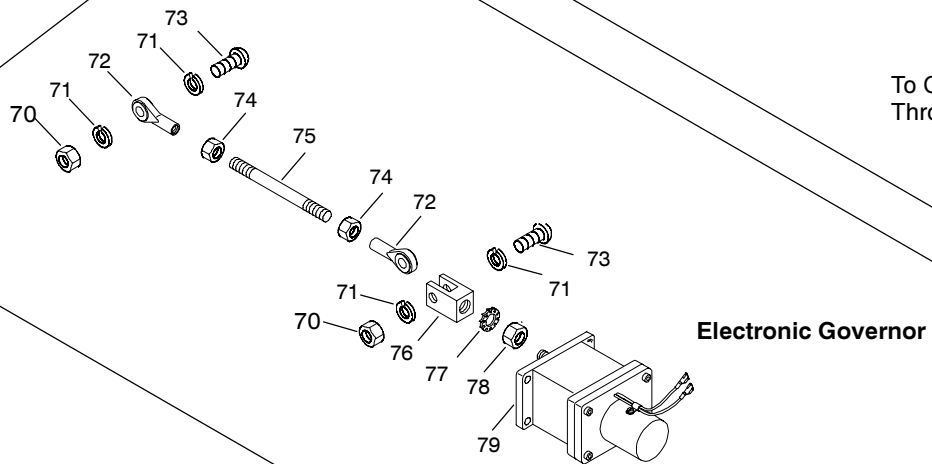
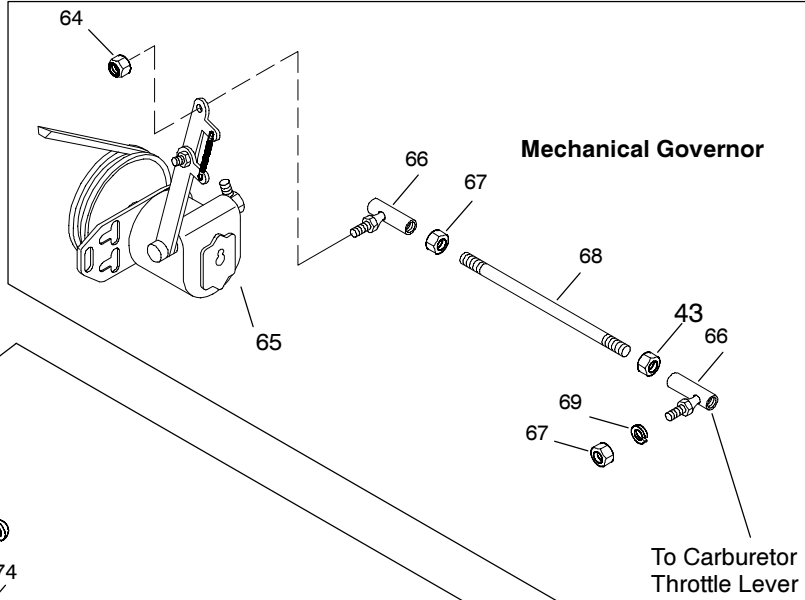
Group 105: Engine, continued

Item	Part Number	Description	Quantity		
			Variation Number		
			6	7	8
27	X-6024-10	Screw, hex cap	1	1	1
28	276150	Bracket, alternator mounting	1	1	
29	276143	Bracket, alternator mounting	1	1	1
30	#	Nut, hex 7/16-14	1	1	1
31	#	Washer, lock 3/8 in.	3	3	3
32	#	Screw, hex, cap 3/8-16	3	3	3
33	276142	Belt, drive	2	2	2
34	276144	Hub, alternator pulley	1	1	1
35	276182	Alternator		1	1
36	#	Nut, hex 5/16-18	1	1	1
37	X-25-1	Washer, plain	4		
37	X-25-1	Washer, plain		1	1
38	276145	Arm, alternator adjusting	1	1	1
39	#	Screw, hex cap 3/8-16	1	1	1
40	#	Washer, lock 3/8 in.	1	1	1
41	#	Screw, hex cap 3/8-16	1	1	1
42	X-125-31	Screw, hex cap	2	2	2
43	#	Washer lock 5/16 in.	2	2	2
44	276161	Connector, water outlet	1	1	
44	326014-S	Connector, water outlet			1
45	276162	Thermostat, water			1
46	276160	Gasket, water outlet			1
47	276181	Indicator, oil level			1
48	276180	Tube, oil level indicator			1
49	X-256-3	Valve, drain 1/4			1
50	276179	Regulator, crankcase vent			1
51	276177	Hose, crankcase vent			1
52	276176	Tube, crankcase vent			1
53	X-426-10	Clamp, hose		2	2
54	276178	Hose, crankcase vent		1	1
55	A-276201	Engine (Ford CSG-649)	1	1	
55	A-326275	Engine (Ford CSG-649)			1
56	#	Nut, hex 7/16-14	2	2	2
57	276163	Flange, muffler pipe	1	1	1
58	#	Washer, lock 7/16 in.	2	2	2
59	#	Screw, hex cap 7/16-14	2	2	2
60	276165	Pipe, exhaust	1	1	1
61	276146	Adapter, carburetor	1	1	1
62	276147	Gasket, carburetor to adapter	1	1	1
63	279449	Oil filter	1	1	1

Common hardware. Procure locally.

Group 105: Engine, continued

Variations 6, 7, and 8
Continued



5613105C

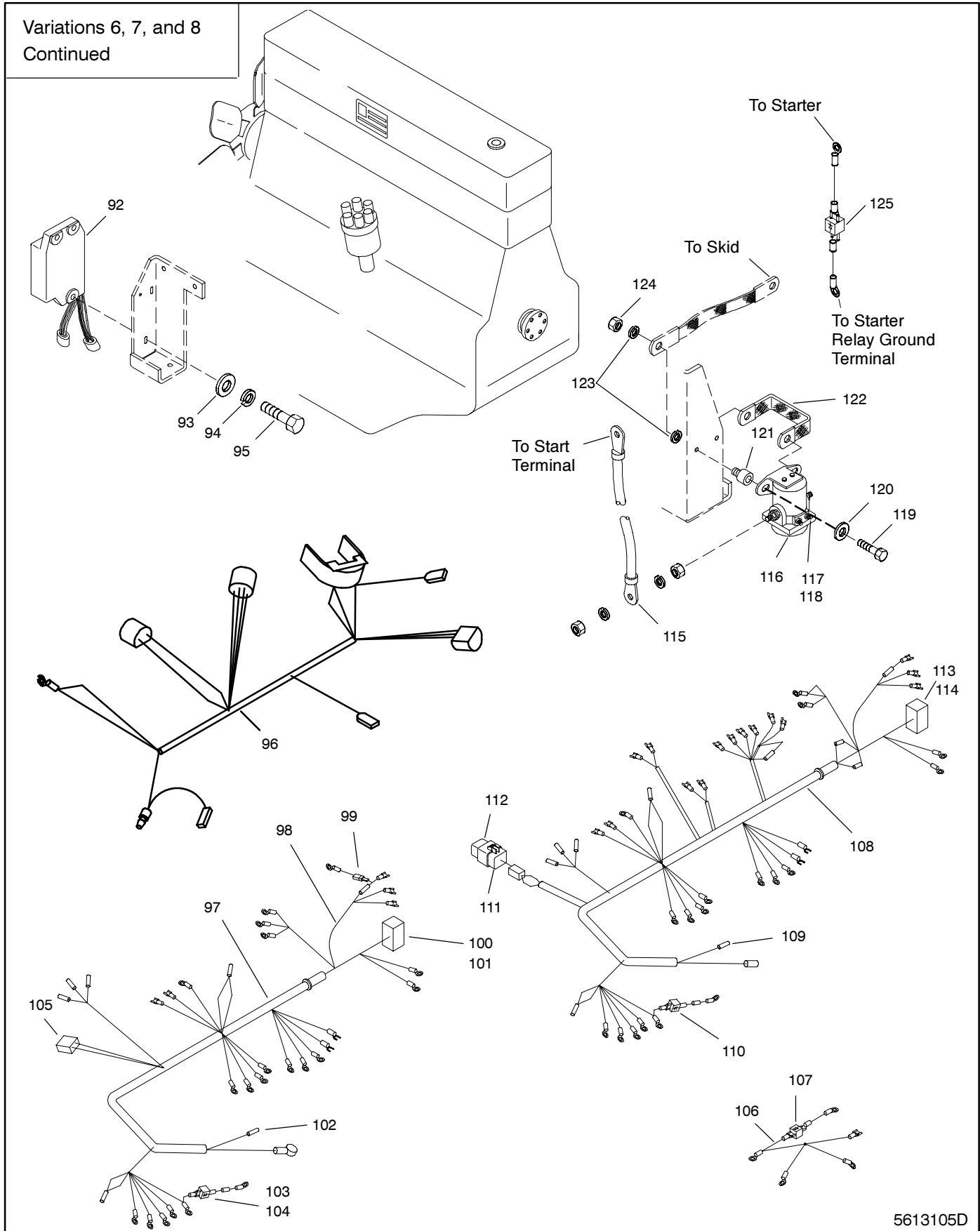
Group 105: Engine, continued

Item	Part Number	Description	Quantity			
			Variation		Number	
			6	7	8	
64	X-101-7	Nut, lock	1			
65	279046	Governor	1			
66	271097	Ball joint	2			
67	X-81-2	Nut, hex	3			
68	X-352-50	Stud	1			
69	X-20-1	Washer, lock	1			
70	X-101-11	Nut, lock		2	2	
71	#	Washer, lock #10		4	4	
72	272456	Link, ball		2	2	
73	X-50-70	Screw, RHM		2	2	
74	X-70-11	Nut, jam		2	2	
75	X-352-73	Stud		1	1	
76	273751	Yoke		1	1	
77	X-22-11	Washer, lock		1	1	
78	X-6053-1	Nut, hex		1	1	
79	273748	Actuator, linear		1	1	
80	#	Screw, hex cap 1/4-20		4	4	
81	256470	Bracket, actuator		1	1	
82	#	Washer, lock 1/4 in.		4	4	
83	#	Nut, hex 1/4-20		4	4	
84	X-125-25	Screw, hex cap		4	4	
85	#	Washer, lock 5/16 in.		4	4	
86	265693	Spacer		4	4	
87	A-246045	Governor assembly		1	1	
88	X-50-6	Screw, RHM		4	4	
89	#	Washer, lock #10		4	4	
90	#	Nut, hex 10-32		4	4	
91	246040	Pick-up, magnetic		1		
91	276404	Pick-up, magnetic			1	

Common hardware. Procure locally.

Group 105: Engine, continued

Variations 6, 7, and 8
Continued



5613105D

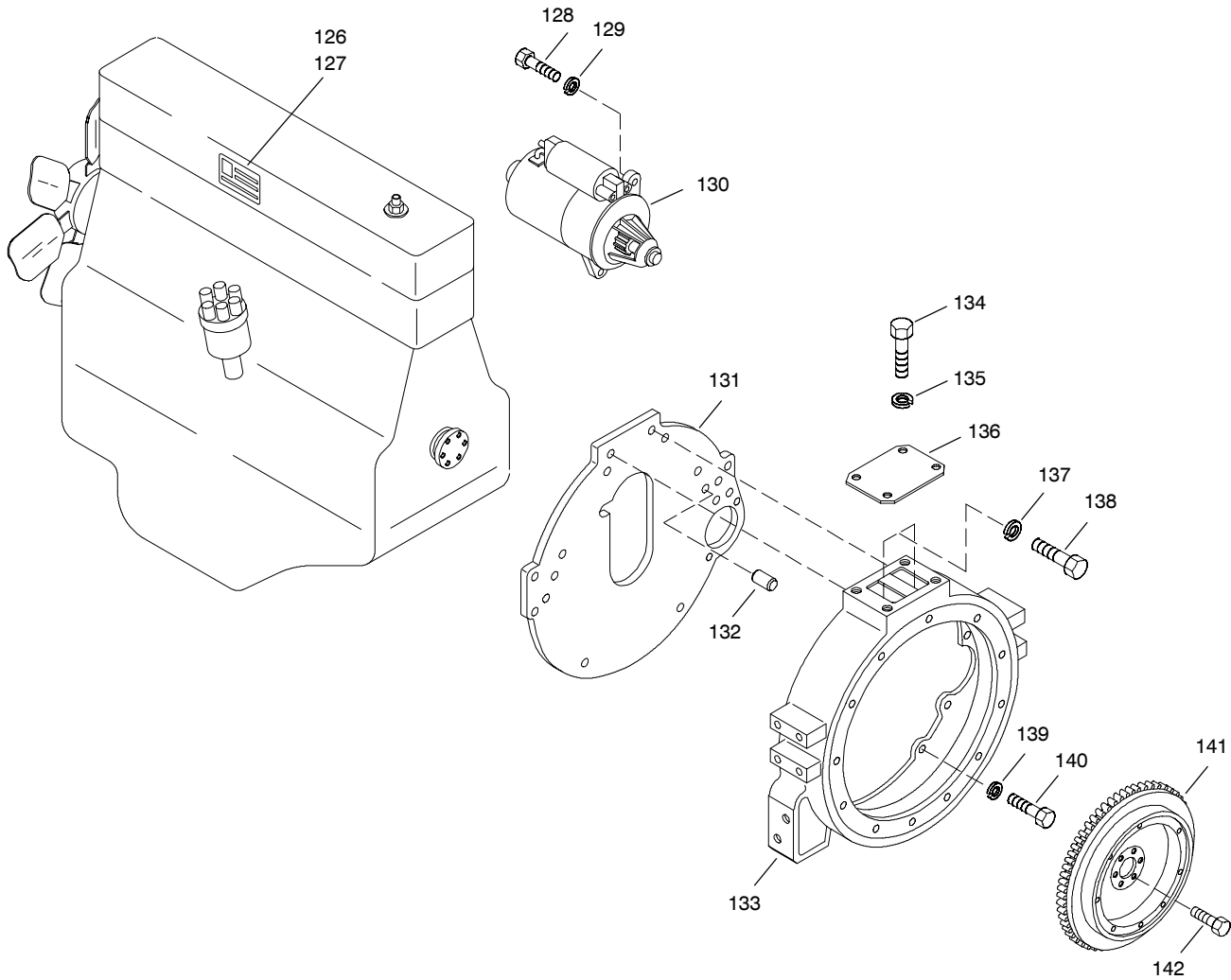
Group 105: Engine, continued

Item	Part Number	Description	Quantity			
			Variation Number			
			6	7	8	
92	276077	Module, ignition			1	
93	#	Washer, plain 1/4 in.			3	
94	#	Washer, lock 1/4 in.			3	
95	X-465-6	Screw, hex cap, ref.		3		
95	#	Hardware, 1/4-20			3	
96	276094	Harness, wiring (voltage regulator)	1	1		
97	255877	Harness, wiring (DC) (includes items 74-81)	1			
98	258854	Harness, speed sensor (includes item 75)	1			
99	233868	Diode	1			
100	295145	Connector, 24 position (to controller board)	1			
101	292800	Connector, cable	1			
102	277563	Terminal	1			
103	292970	Diode assembly	1			
104	233959	Diode, 6A 100V	1			
105	269165	Terminal, 2 position	1			
106	276340	Harness, wiring (starter) (includes item 83)		1		
107	233959	Diode, 6A 100V		1		
108	276328	Harness, wiring, (DC) (includes 85-90)		1		
108	326013	Harness, wiring, (DC) before serial number 363369 (includes 85-90)			1	
108	326614	Harness, wiring, (DC) serial numbers 363369 and after			1	
109	277563	Terminal		1	1	
110	253798	Lead assembly		1	1	
111	239408	Connector, 4 position		1	1	
112	241606	Terminal		1		
113	292800	Connector, cable		1	1	
114	295145	Connector, 24 position (to controller board)		1	1	
115	X-545-29	Cable, battery	1	1		
116	291891	Solenoid, starter		1	1	
117	#	Nut, hex #10-32		2		
118	X-6214-2	Cap, plastic		1	1	
119	X-465-6	Screw, hex cap		2		
120	#	Washer, plain 1/4 in.		2		
121	259632	Bumper		2		
122	223033	Strap, ground		1		
123	X-22-12	Washer, shakeproof 1/4"	1			
123	X-22-12	Washer, shakeproof 1/4"		7		
124	#	Nut, hex 1/4-20		2		
125	256416	Diode assembly	1			

Common hardware. Procure locally.

Group 105: Engine, continued

Variations 6, 7, and 8 Continued



5613105E

BN-253000
HF, G-255000
F276000

Group 105: Engine, continued

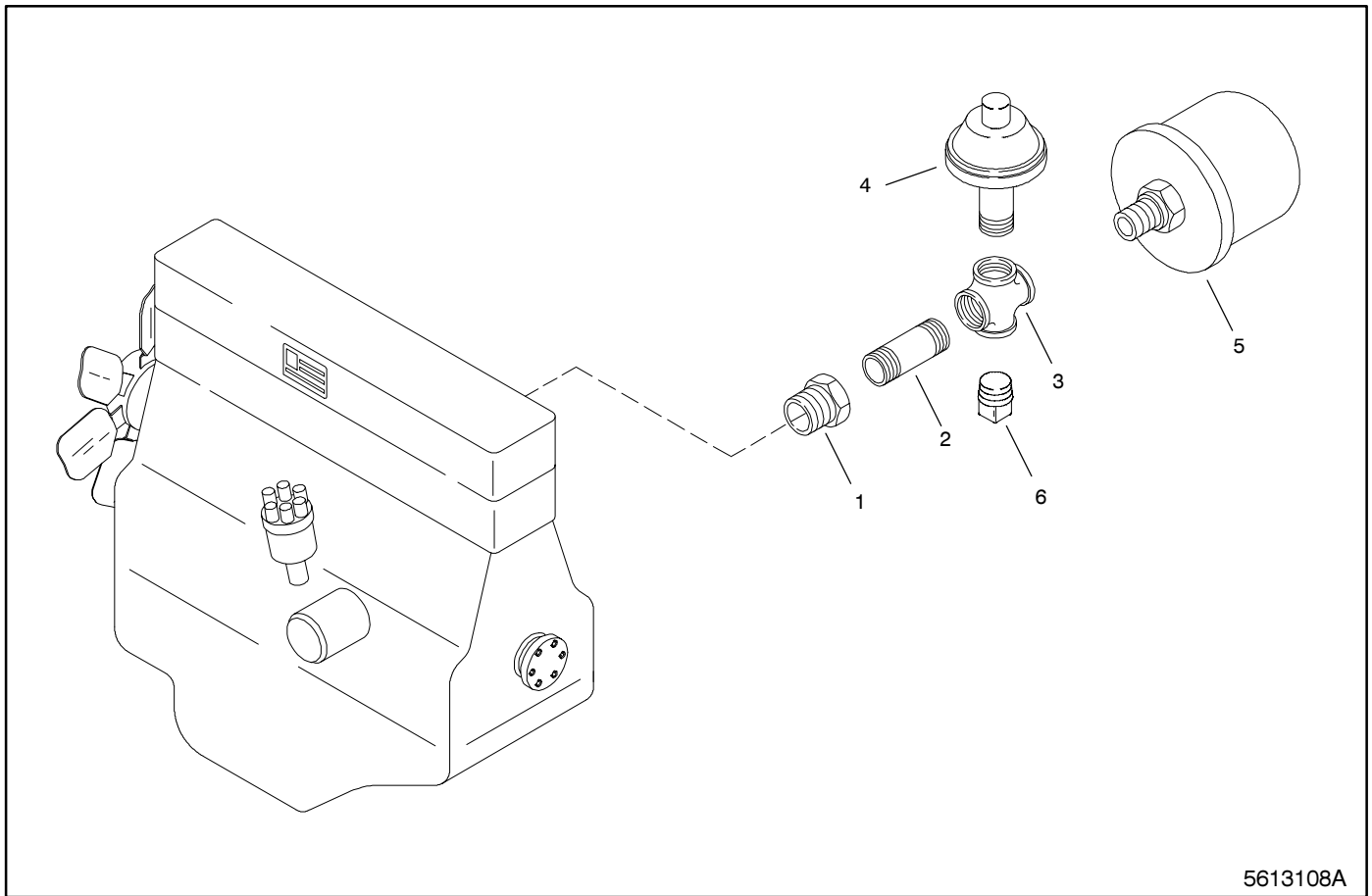
Item	Part Number	Description	Quantity		
			Variation Number		
			6	7	8
126	246066	Adhesive, neoprene	1	1	1
127	276133	Nameplate, engine	1	1	1
128	X-6238-4	Screw, hex cap		2	2
129	#	Washer, lock 3/8 in.		2	2
130	276175	Starter assembly		1	1
131	276172	Plate, engine cover rear	1	1	
131	326101	Cover, starter (not shown)			1
131	X-67-133	Screw, self-tapping (not shown)			2
132	276171	Pin, dowel	1	1	
133	276174	Housing, flywheel		1	
133	326078	Adaptor, generator			1
134	X-125-31	Screw, hex cap		4	
135	X-21-1	Washer, lock		4	
136	276173	Plate, cover housing		1	
137	X-23-1	Washer, lock		2	
137	#	Washer, 7/16			2
138	X-6024-3	Screw, hex cap		2	
138	X-6024-8	Screw, hex cap			2
139	X-23-1	Washer, lock		10	
140	X-6024-2	Screw, hex cap		10	
140	X-55-37	Screw, hex cap			4
141	276168	Flywheel	1	1	
141	326095	Flywheel			1
142	276169	Bolt, locking	6	6	6

Common hardware. Procure locally.

Group 107: Nameplates and Decals

Item	Part Number	Description	Quantity							
			Variation Number							
			3	18	21	22	26	27	28	29
	X-6232-1	Decal, stripes 24"	2	2	2	2				
	X-6232-5	Decal, stripes 28"					3	3	3	3
	X-6247-3	Decal, 33 kW		2	2					
	X-6298-11	Decal, 35 kW					2	2		
	X-6247-5	Decal, 45 kW	2			2				
	X-6298-12	Decal, 45 kW							2	2
	255084	Decal, "Fast Response"	2	2	2	2				
	273739	Decal, "Fast Response"					1	1	1	1
	257438	Decal, danger, haz. volt./Moving rotor					2	2	2	2
	258815	Decal, warning, haz. volt./backfeed						1	1	1
	259365	Decal, backfeed					1		1	
	249808	Decal, warning, rotating parts					1	1	1	1
	280561	Decal, water drain	2	2	2	2				
	291168	Nameplate, generator			1	1				
	327004	Nameplate, generator					1	1	1	1
	282904	Nameplate, generator, 50Hz	1	1						
	282905	Nameplate, generator 60Hz	1	1						
	X-781-1	Rivet, pop	4	4	4	4				
	241541	Nameplate, Kohler Power System	2	2	2	2				
	X-6246-1	Nameplate, Kohler Power System					2	2	2	2
	X-6275-3	Logo, Kohler					1	1	1	1
	246055	Tag, warning	1	1	1	1	1	1	1	1
	238402	Decal, positive terminal					1	1	1	1
	257437	Decal, warning, unbalanced weight/sling method	1	1	1	1	1	1	1	1
	257441	Decal, warning, unbalanced weight/lifting method					1	1	1	1
	239776	Decal, lifting support		1	1	1	1		1	
	255882	Decal, standby service		1	1	1	1		1	
	259954	Nameplate, electrical equipment			1	1				
	279958	Decal, 600 volt connection						1		1
	249809	Decal, warning, hot engine	1	1	1	1	1	1	1	1
	249810	Decal, warning					1	1	1	1
	224233	1-800 number	1	1	1	1	1	1	1	1

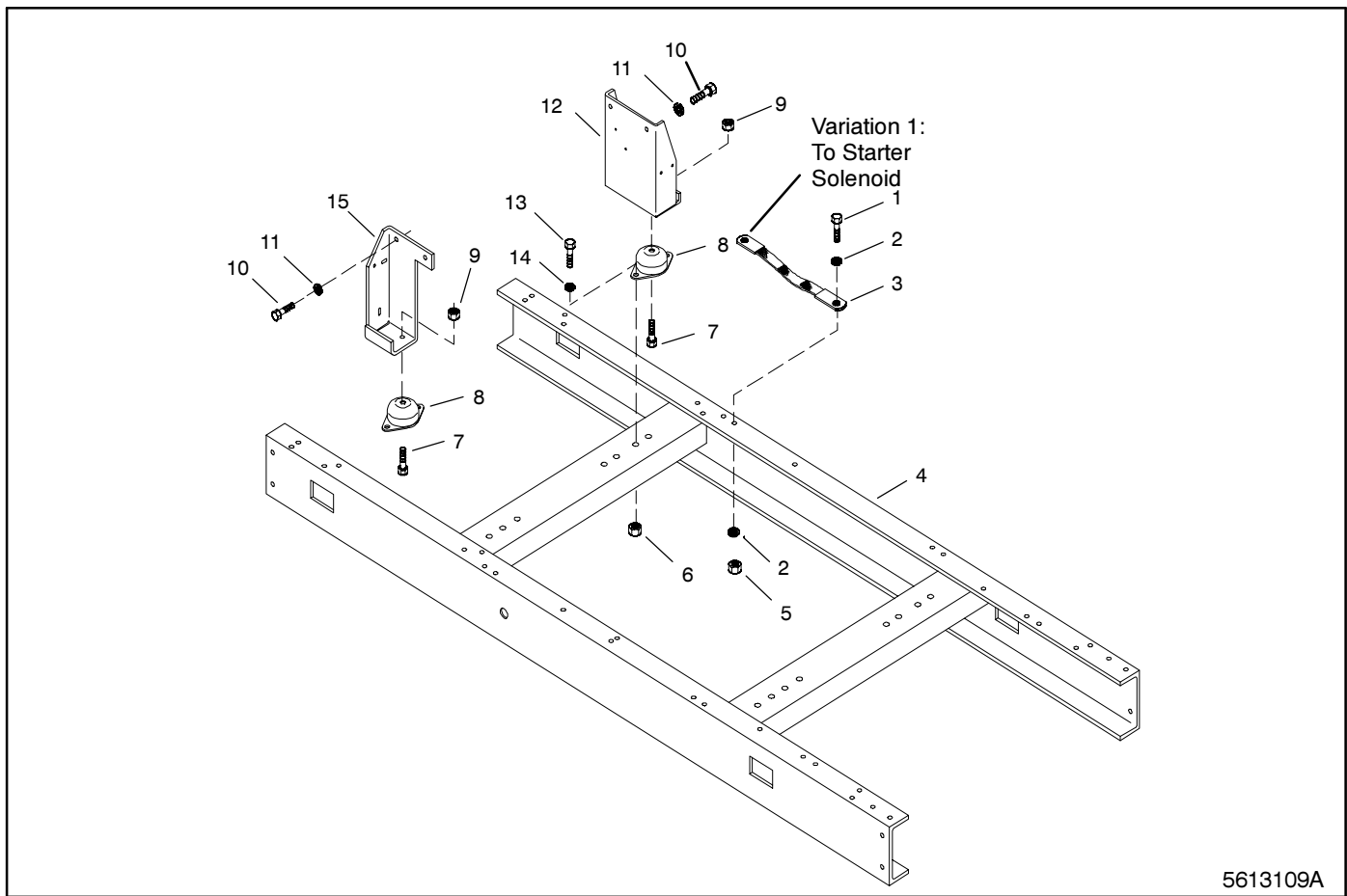
Group 108: Oil Pressure Switches



5613108A

Item	Part Number	Description	Quantity		
			Variation Number		
			1	2	3
1	X-202-27	Bushing, reducer	1	1	1
2	289055	Nipple, pipe	1		1
2	X-217-7	Nipple, pipe		1	
3	164037	Cross, pipe 1/8 in. NPT	1	1	1
4	328309	Switch, oil pressure	1	1	1
5	264390	Sender, oil pressure	1		1
6	X-75-1	Plug, pipe	1	1	1

Group 109: Skid and Plant Mounting

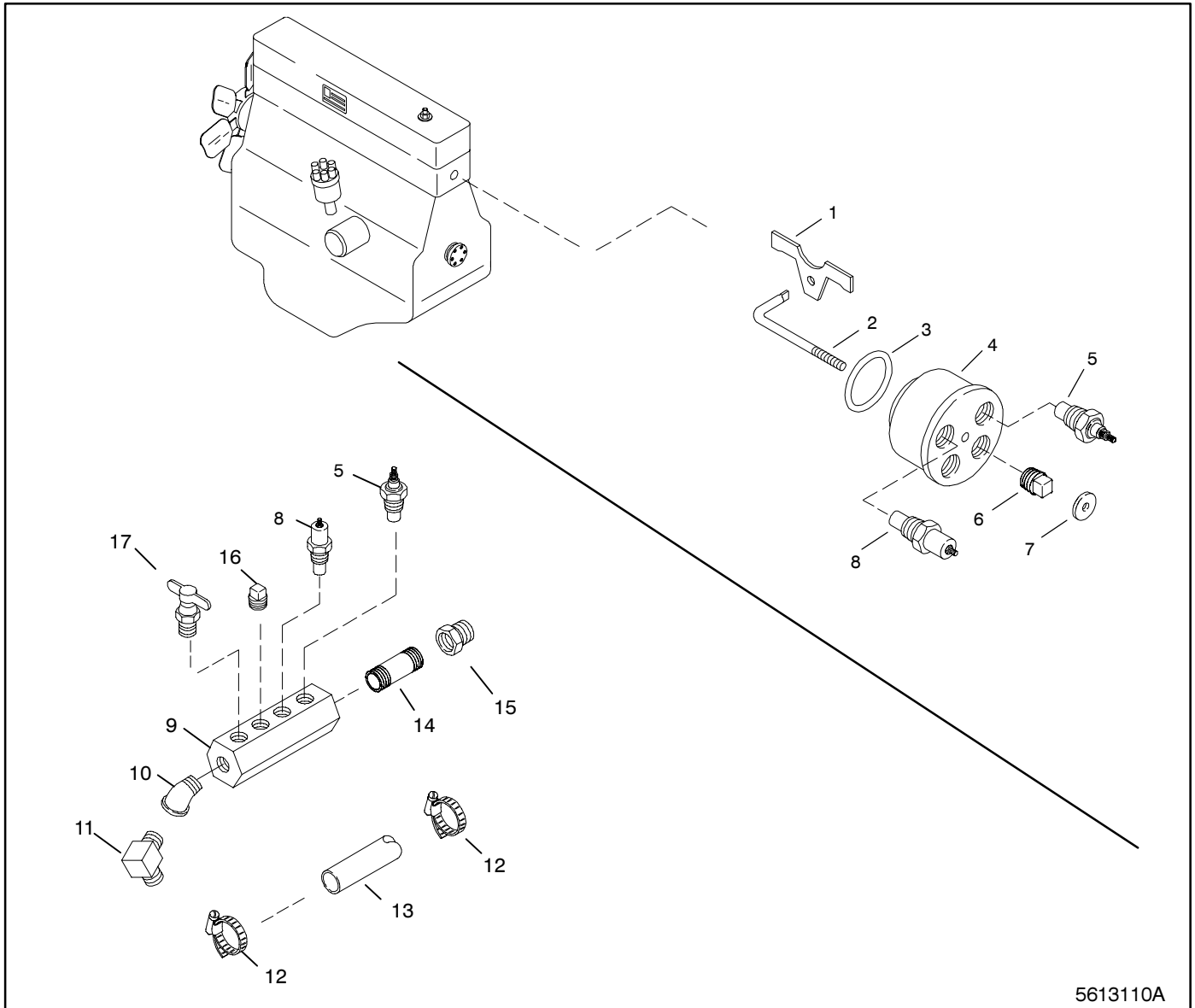


5613109A

Item	Part Number	Description	Quantity		
			1	2	3
1	#	Screw, hex head 5/16-18	1		
1	#	Screw, hex head 5/16-18		2	2
2	X-22-16	Washer, lock 5/16"	2		
2	X-22-16	Washer, lock 5/16"		4	4
3	290418	Strap, ground	1	1	1
4	255037	Skid, engine mounting	1		
4	326015	Skid, engine mounting		1	1
5	#	Nut, hex 5/16-18	2		
5	#	Nut, hex 5/16-18		2	2
6	#	Nut, hex 1/2-13	8	8	8
7	#	Screw, hex head 1/2-13	4	4	4
8	244210	Mount, vibro	4		
8	276309	Mount, vibro (engine end)			2
8	324073	Mount, vibro (engine end)		2	
8	324073	Mount, vibro (generator end)		2	2
8	X-25-140	Washer, plain (not shown)		4	4
9	X-101-23	Nut, hex stop	4	4	4
10	X-6024-2	Screw, hex head 1/2-13	4	4	4
11	X-22-15	Washer, lock 7/16"	1	1	1
12	279374	Support, engine (right side)	1		
12	326017	Support, engine (right side)		1	1
13	#	Screw, hex head 1/2-13	8		
13	#	Hardware, 3/8-16		8	8
14	#	Washer, lock 1/2"	8		
14	#	Hardware, 3/8-16		8	8
15	255192	Support, engine (left side)	1		
15	326016	Support, engine (left side)		1	1

Common hardware. Procure locally.

Group 110: Water Temperature Switches



5613110A

Item	Part Number	Description	Quantity		
			1	2	3
1	255175	Bracket	1	1	1
2	255176	Stud	1	1	1
3	255174	O-Ring	1	1	1
4	255170	Sensor, manifold	1	1	1
5	268298	Sender, water temperature	1		1
6	X-75-3	Plug, pipe	2		2
6	X-75-3	Plug, pipe		3	
7	297001	Gasket, washer	1	1	1
8	241308	Switch, high temperature	1	1	1
9	273659	Manifold, temperature switch			1
10	X-211-1	Elbow			1
11	X-391-33	Elbow, hose			1
12	X-426-3	Clamp, hose			2
13	X-312-23	Hose			1
14	X-209-2	Nipple, pipe 1/2 x 1 3/16			1
15	X-202-41	Bushing, reducer			1
16	X-75-1	Plug, pipe			1
17	X-256-5	Valve, drain			1

Group 119: Recommended Spare Parts

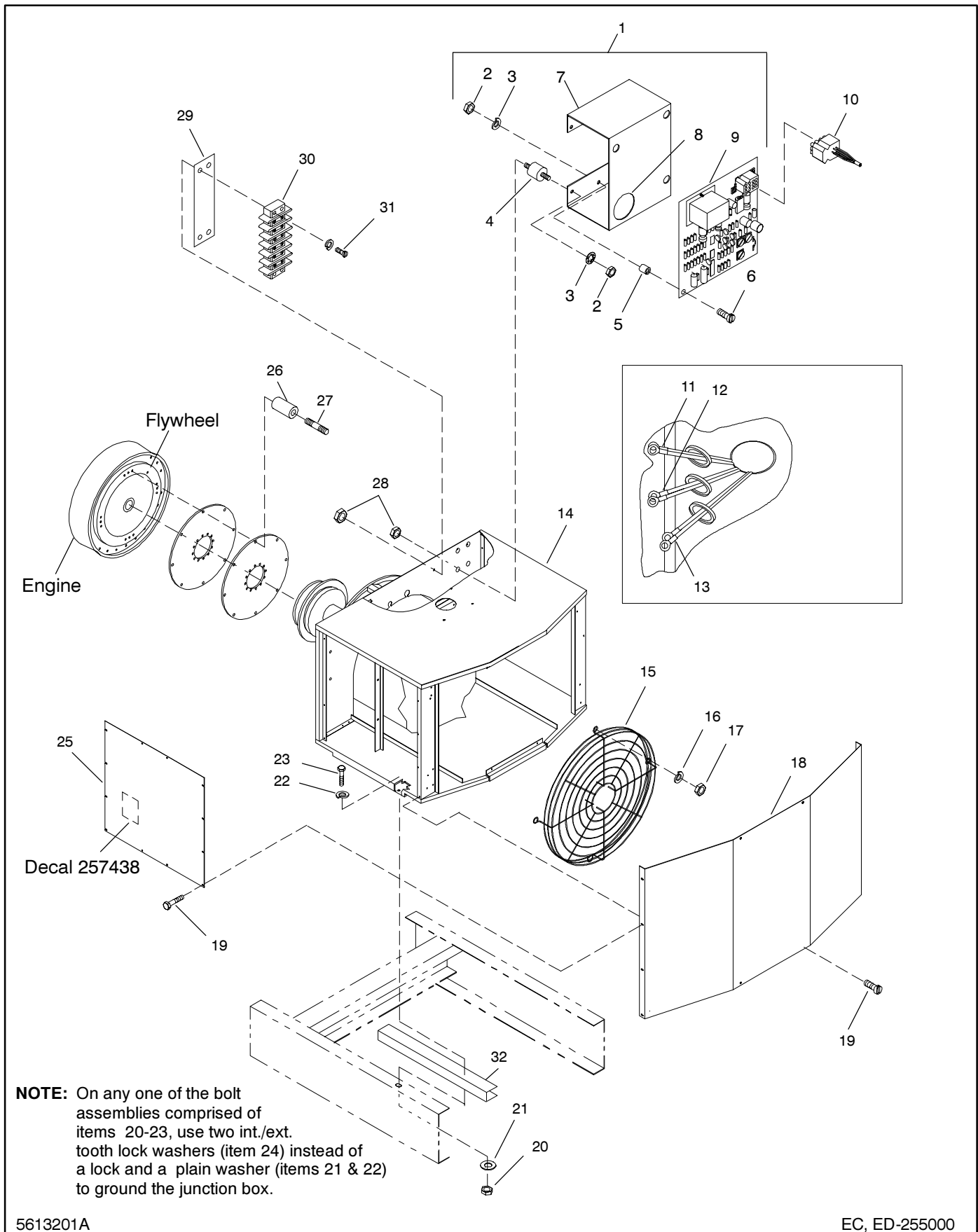
Item	Part Number	Description	Quantity		
			Module Number		
			1	2	
1	291207	Fuse, 1.5 amp	5		
2	243273	Fuse, 3 amp	5		
3	283645	Fuse, 15 amp	5		
4	See Chart Below	Main circuit board	1		
5	B-292902	Photo board	1	1	
6	B-258545	Split activator	1	1	
7	A-257099	LED board	1	1	
8	C-255670	Voltage regulator	1	1	
9	See Chart Below	Indicator board	1		
10	241927	Speed sensor	1	1	
11	255126	Bulb	5	5	
12	273417	Upper radiator hose	1		
13	326003	Lower radiator hose	1		
14	276162	Thermostat	1	1	
15	276142	Fan belt	1	1	
16	326099	Air filter	4	4	
17	279449	Oil filter	10	10	

Serial Number-Contingent Spare Parts

Part Description	Part Number	
	Before Serial Number 363369	Serial Numbers 363369 and after
Main Circuit Board	G-292806	A-336415
Indicator Board	B-292357	A-336432

Notes

Group 201: Generator and Mounting



5613201A

EC, ED-255000

Group 201: Generator and Mounting

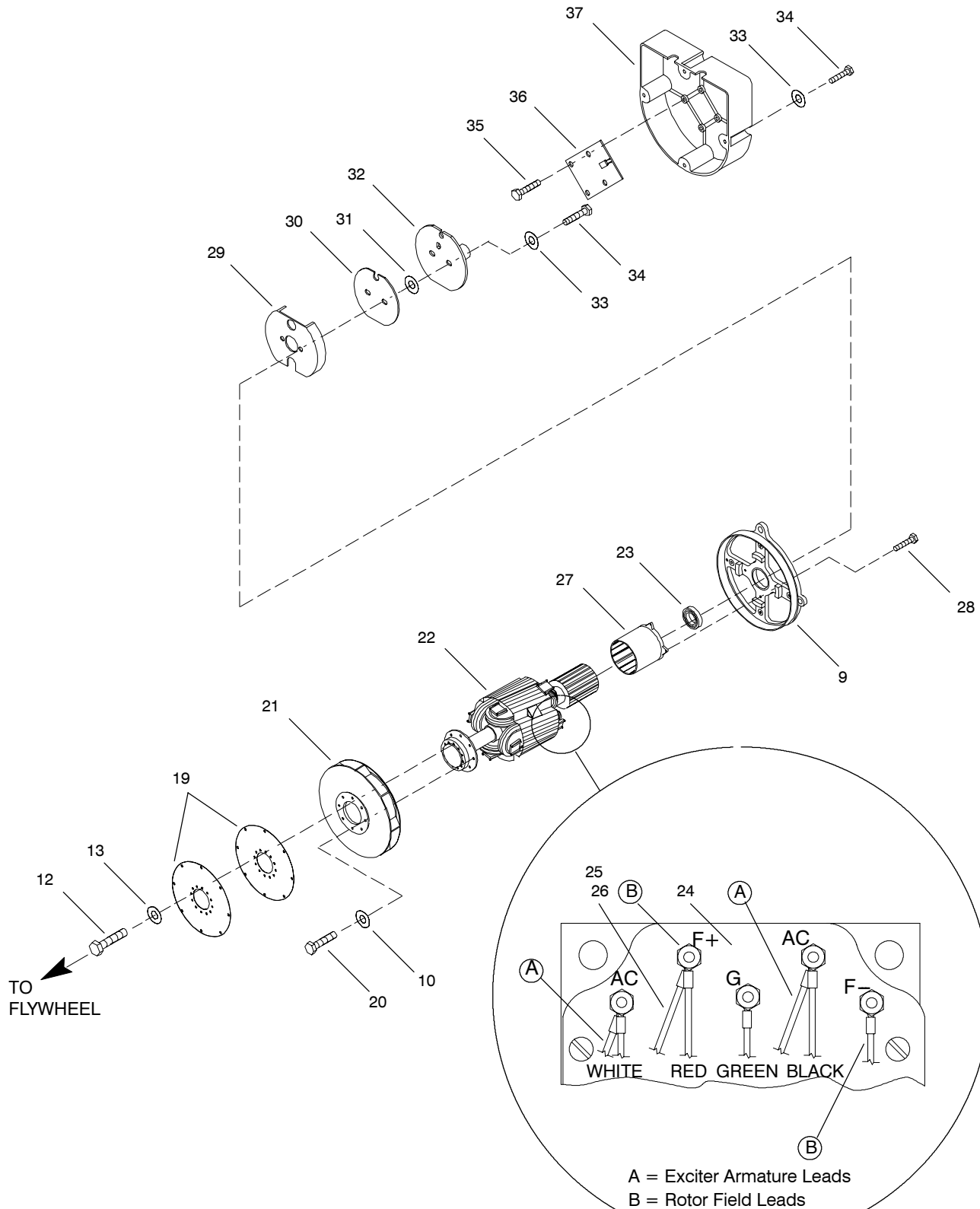
Item	Part Number	Description	Quantity										
			Variation Number										
			7	8	9	10	11	78	79	83	84	88	89
1	B-292789	Regulator assembly, voltage (includes items 2-9)						1	1	1	1	1	1
1	#	Nut, hex #8-32	5	5	5	5	5						
2	X-72-4	Nut, hex						5	5	5	5	5	5
3	X-22-20	Washer, shakeproof						5	5	5	5	5	5
4	259919	Vibro mount						3	3	3	3	3	3
4	360459	Standoff, circuit board	4	4	4	4	4						
5	239513	Bushing, insulating	5	5	5	5	5	5	5	5	5	5	5
6	X-51-11	Screw, round head machine						5	5	5	5	5	5
7	282832	Bracket, regulator						1	1	1	1	1	1
8	X-634-16	Bushing						1	1	1	1	1	1
9	C-255670	Circuit board, voltage regulator	1	1	1	1	1	1	1	1	1	1	1
10	255481	Harness, wiring	1	1	1	1	1	1	1			1	1
11	X-750-14	Tag, lead - L1	1	1	1	1	1	1	1	1	1	1	1
12	X-150-15	Tag, lead - L2	1	1	1	1	1	1	1	1	1	1	1
13	X-750-16	Tag, lead - L3	1	1	1	1	1	1	1	1	1	1	1
14	255020	Box, junction						1	1	1	1	1	1
14	222823	Box, junction	1	1	1	1	1						
15	274596	Guard, generator										1	1
16	X-22-10	Washer, lock										4	4
17	X-83-2	Nut, hex 3/8-16										4	4
18	273430	Cover, rear						1	1			1	1
18	255022	Cover, rear								1	1		
18	222834	Cover, rear											
19	X-794-1	Screw, drill hex	16	16	16	16	16	16	16	16	16	16	16
20	#	Nut, hex 5/16-18	4	4	4	4	4	4	4	4	4	4	4
21	#	Washer, lock 5/16 in. split	3	3	3	3	3	3	3	3	3	3	3
22	#	Washer, steel 11/32 x 3/4 x 1	3	3	3	3	3	3	3	3	3	3	3
23	#	Screw, hex cap 5/16-18 x 1	4	4	4	4	4	4	4	4	4	4	4
24	X-22-16	Washer, lock (see note)						2	2	2	2	2	2
24	X-22-14	Washer, lock (see note)	2	2	2	2	2						
25	273429	Cover, side						2	2			2	2
25	255021	Cover, side								2	2		
25	222833	Cover, side	2	2	2	2	2						
26	X-400-75	Spacer	8	8	8	8	8						
27	X-352-63	Stud						8	8	8	8	8	8
28	#	Nut, hex 8-32	5	5	5	5	5	5	5	5	5	5	5
29	255080	Marker, strip	1	1	1	1	1	1	1	1	1	1	1
30	295314	Block, terminal	1	1	1	1	1	1	1	1	1	1	1
31	X-51-11	Screw, round head machine	2	2	2	2	2	2	2	2	2	2	2
32	326281	Bracket, junction box	2	2	2	2	2						

Common hardware. Procure locally.

Group 201: Generator and Mounting, continued

Item	Part Number	Description	Quantity												
			Variation Number												
			7	8	9	10	11	78	79	83	84	88	89		
1	X-6234-1	Nut, hex	6	6	6	6	6	6	6	6	6	6	6	6	6
2	X-25-136	Washer	5	5	5	5	5	5	5	5	5	5	5	5	5
3	X-6086-16	Washer, spring	5	5	5	5	5	5	5	5	5	5	5	5	5
4	X-465-23	Screw, hex cap	3	3	3	3	3	3	3	3	3	3	3	3	3
5	X-22-44	Washer	2	2	2	2	2	2	2	2	2	2	2	2	2
6	257986	Lead, LO	1	1	1	1	1	1	1	1	1	1	1	1	1
7	X-791-8	Screw, hex cap	1	1	1	1	1	1	1	1	1	1	1	1	1
8	X-465-22	Screw, hex cap	1	1	1	1	1	1	1	1	1	1	1	1	1
9	257984	Bracket, end	1	1	1	1	1	1	1	1	1	1	1	1	1
10	X-25-93	Washer, plain	14	14	14	14	14	14	14	14	14	14	14	14	14
11	X-6238-6	Screw, hex cap	6	6		6		6	6	6	6	6	6		
11	273736	Screw, special			8		8							8	8
12	270956	Screw, hex head						8	8	8	8	8	8	8	8
13	X-801-3	Washer, hardened						2	2	2	2	2	2	2	2
14	257019	Adapter, generator						1	1	1	1	1	1	1	1
15	257046	Guard, generator fan						1	1	1	1	1	1	1	1
15	326143	Guard, generator fan	1	1	1	1	1								
16	X-67-125	Screw, self-tapping	2	2	2	2	2	2	2	2	2	2	2	2	2
17	257442	Clip, speed	2	2	2	2	2	2	2	2	2	2	2	2	2
18	326085	Stator assembly	1												
18	326086	Stator assembly		1											
18	326091	Stator assembly			1										
18	326087	Stator assembly				1									
18	326092	Stator assembly					1								
18	257766	Stator assembly						1		1					
18	257768	Stator assembly							1		1				
18	257771	Stator assembly											1		
18	257773	Stator assembly													1

Group 201: Generator and Mounting, continued



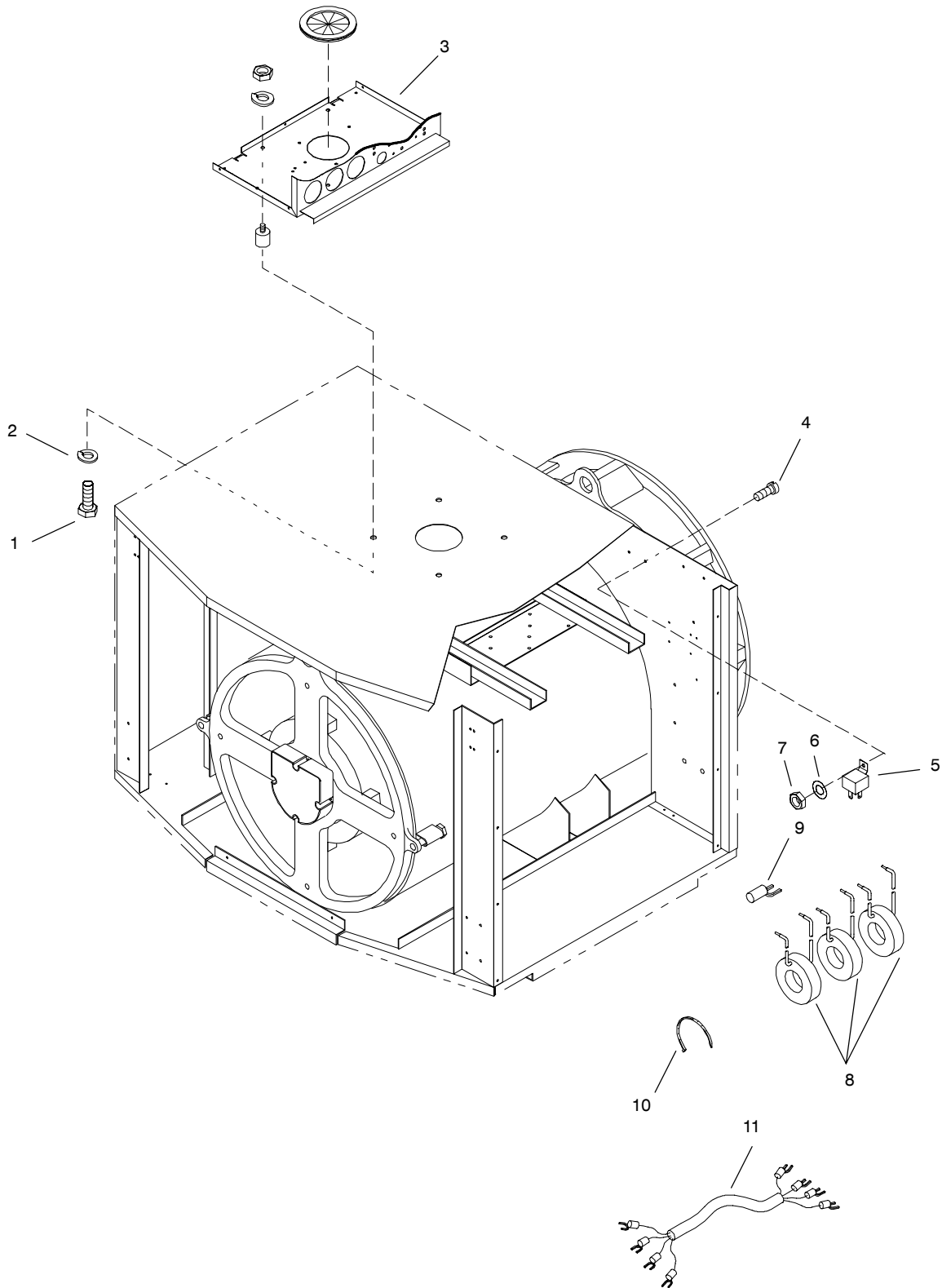
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Group 201: Generator and Mounting, continued

Item	Part Number	Description	Quantity											
			Variation Number											
			7	8	9	10	11	78	79	83	84	88	89	
19	257015	Disc, armature drive	2	2	2	2	2	2	2	2	2	2	2	2
20	X-6238-11	Screw, hex cap	4	4	4	4	4	4	4	4	4	4	4	4
21	257020	Fan, generator	1	1	1	1	1	1	1	1	1	1	1	1
22	A-326088	Rotor assembly (includes items 23 and 24)	1		1									
22	A-326089	Rotor assembly (includes items 23 and 24)		1			1							
22	A-326090	Rotor assembly (includes items 23 and 24)				1								
22	A-258979	Rotor assembly (includes items 23 and 24)						1		1		1		1
22	A-258977	Rotor assembly (includes items 23 and 24)							1		1		1	1
23	X-758-2	Bearing	1	1	1	1	1	1	1	1	1	1	1	1
24	A-258545	SCR assembly	1	1	1	1	1	1	1	1	1	1	1	1
25	X-101-24	Nut	5	5	5	5	5	5	5	5	5	5	5	5
26	X-283-7	Terminal	4	4	4	4	4	4	4	4	4	4	4	4
27	257080	Exciter assembly	1		1	1	1	1	1	1	1	1	1	1
27	257081	Exciter assembly		1				1		1		1		1
28	X-125-34	Screw, hex cap	4	4	4	4	4	4	4	4	4	4	4	4
29	257077	Actuator, magnetic	1	1	1	1	1	1	1	1	1	1	1	1
30	257850	Insulator	1	1	1	1	1	1	1	1	1	1	1	1
31	243321	Washer, insulating	2	2	2	2	2	2	2	2	2	2	2	2
32	B-292902	Circuit board, split activator	1	1	1	1	1	1	1	1	1	1	1	1
33	X-22-9	Washer, lock	6	6	6	6	6	6	6	6	6	6	6	6
34	X-117-5	Screw, hex cap	6	6	6	6	6	6	6	6	6	6	6	6
35	X-6071-1	Screw, washer head	4	4	4	4	4	4	4	4	4	4	4	4
36	A-257099	Circuit board, FR-II activator	1	1	1	1	1	1	1	1	1	1	1	1
37	257258	Cover, circuit board	1	1	1	1	1	1	1	1	1	1	1	1

Group 301: Controller and Mounting

Variations 3, 4, and 5



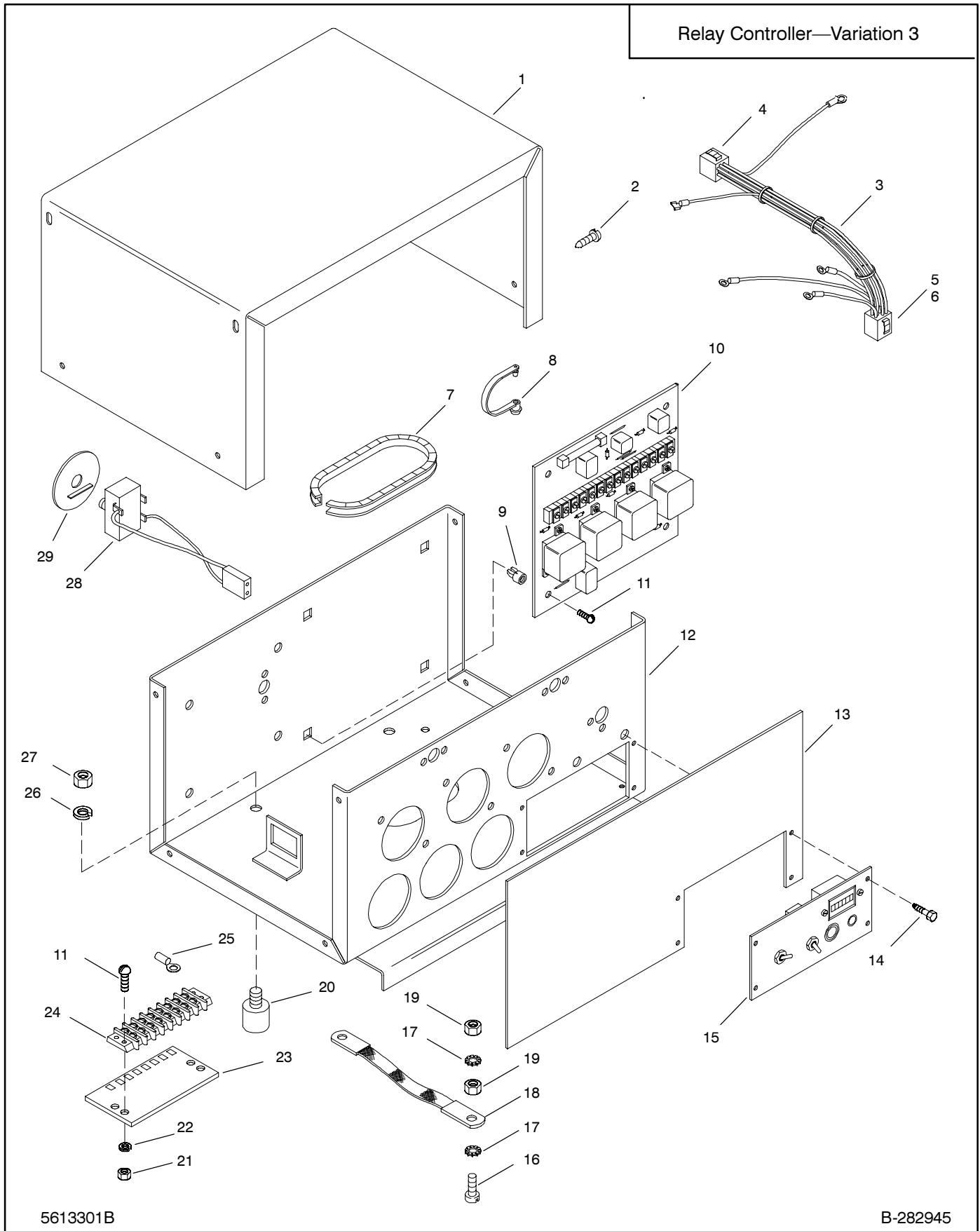
5613201A

D, DG, EC-255000

Group 301: Controller and Mounting

Item	Part Number	Description	Quantity			
			Module Number			
			3	4	5	
1	X-6-12	Screw, hex cap 5/16 - 18 x 5/8	4	4	4	
2	X-21-1	Washer, lock 5/16	3	3	3	
2	X-22-16	Washer, lock 5/16	1	1	1	
3	B-282945	Box assembly, relay control (see page 40)	1			
3	B-282943	Box assembly, meter (see page 42)		1		
3	B-282943	Box assembly, meter (see page 42)			1	
4	X-117-5	Screw, round head machine	2	2	2	
5	241600	Relay	1	1	1	
6	X-19-1	Washer, lock	2	2	2	
7	X-70-2	Nut, hex	2	2	2	
8	246886	Transformer		3		
8	246887	Transformer			3	
9	X-285-1	Terminal		3		
9	X-285-3	Terminal			3	
9	X-285-7	Terminal			1	
9	X-285-11	Terminal		1		
10	X-468-1	Tie, cable		3		
11	255040	Harness, wiring (transformer)		1	1	

Group 301: Controller and Mounting, continued

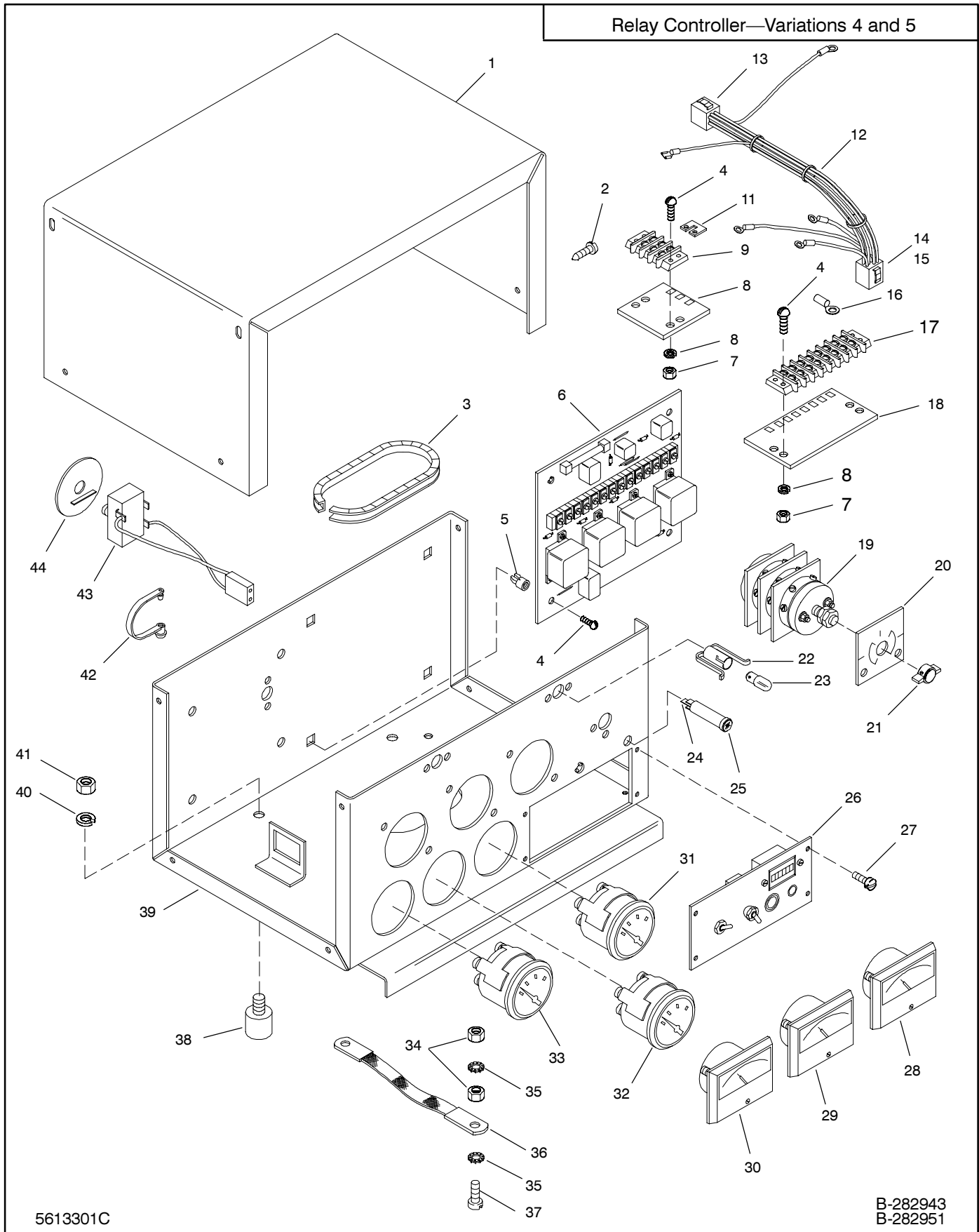


Group 301: Controller and Mounting, continued

Item	Part Number	Description	Quantity	
			Variation Number	
			1	3
1	269380	Cover, controller		1
2	X-6216-1	Screw, Phil hex crim		8
3	255859	Harness, wiring (includes items 4-6)		1
4	259689	Connector, 9 position		1
5	287849	Connector, 24 position		1
6	287540	Terminal	1	
7	X-6033-2	Grommet, nylon		1
8	X-526-2	Strap, wire		1
8	X-526-3	Strap, wire		1
9	X-593-3	Grommet, plastic		4
10	A-255658	Circuit board, FR-II relay		1
11	X-51-9	Screw, round head machine		6
12	258241	Box, controller		1
13	282944	Plate		1
14	X-794-2	Screw, drill head		4
15	B-282946	Panel assembly (see page 44)		1
16	X-50-7	Screw, round head machine		1
17	X-22-13	Washer, shakeproof		2
18	241611	Strap, ground		1
19	X-70-2	Nut, hex		8
20	292834	Bumper		4
21	X-72-4	Nut, hex		2
22	X-18-2	Washer, lock		2
23	282824	Marker, strip		1
24	246115	Block, terminal		1
25	238898	Terminal		1
26	X-21-1	Washer, lock		4
27	X-82-2	Nut, hex		4
28	A-255041	Potentiometer assembly		1
29	201534	Plate, instruction		1

Group 301: Controller and Mounting, continued

Relay Controller—Variations 4 and 5



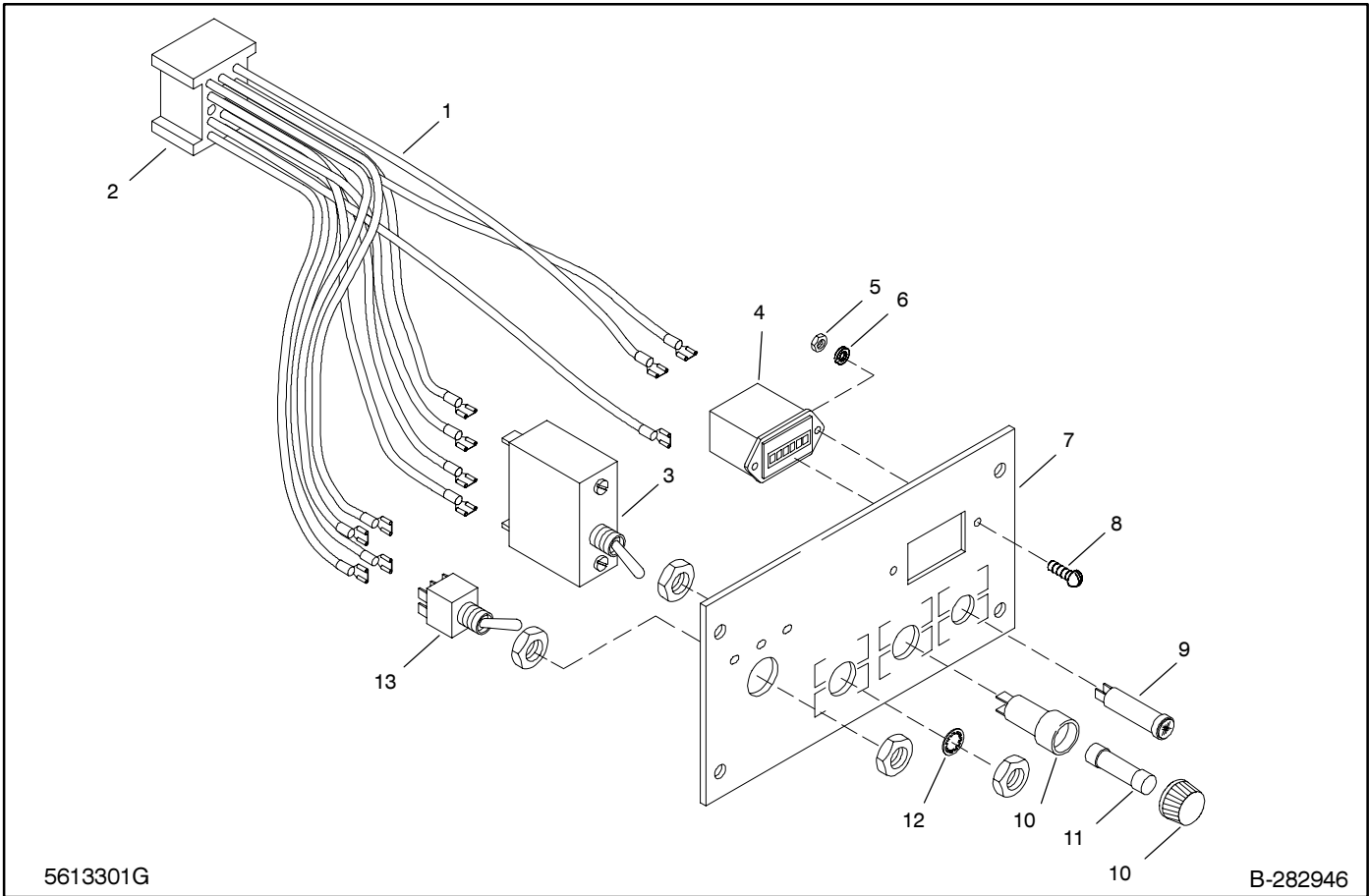
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B-282943
B-282951

Group 301: Controller and Mounting, continued

Item	Part Number	Description	Quantity			
			Variation		Number	
			4	5		
1	269380	Cover, controller	1	1		
2	X-6216-1	Screw, Phil hex crim	8	8		
3	X-6033-2	Grommet, nylon	1	1		
4	X-51-53	Screw, round head machine	8	8		
5	X-593-3	Grommet, plastic	4	4		
6	A-255658	Circuit board, FR-II relay	1	1		
7	X-72-4	Nut, hex	4	4		
8	X-18-2	Washer, lock	4	4		
9	282823	Marker, strip	1	1		
10	223096	Strip, terminal	1	1		
11	X-6048-2	Jumper	1	1		
12	255859	Harness, wiring (includes items 13-15)	1	1		
13	259689	Connector, 9-position	1	1		
14	287849	Connector, 24-position	1	1		
15	287540	Terminal	1	1		
16	238898	Terminal	1	1		
17	246115	Block, terminal	1	1		
18	282824	Marker, strip	1	1		
19	259821	Switch, selector	1	1		
20	282941	Nameplate	1	1		
21	269356	Knob, pointer	1	1		
22	284990	Socket, lamp	2	2		
23	268310	Bulb, light	2	2		
24	236830	Terminal	1	1		
25	291740	Lamp	2	2		
26	B-282946	Panel assembly (see page 44)	1	1		
27	X-794-2	Screw, drill head	4	4		
28	295337	Ammeter, AC	1			
28	295338	Ammeter, AC		1		
29	282814	Voltmeter	1	1		
30	295069	Meter, frequency	1	1		
31	253329	Voltmeter	1	1		
32	282898	Gauge, water temperature	1	1		
33	282897	Gauge, oil pressure	1	1		
34	X-70-25	Nut, hex	2			
35	X-22-13	Washer, shakeproof	2	2		
36	241611	Strap, ground	1	1		
37	X-50-7	Screw, round head machine	1	1		
38	292834	Bumper	4	4		
39	258241	Box, controller	1	1		
40	X-21-1	Washer, lock	4	4		
41	X-82-2	Nut, hex	4	4		
42	X-526-2	Strap, wire	1	1		
42	X-526-3	Strap, wire	1	1		
43	A-255041	Potentiometer assembly	1	1		
44	201534	Plate, instruction	1	1		

Group 301: Controller and Mounting, continued



Item	Part Number	Description	Quantity		
			3	4	5
--	B-282946	Panel assembly (includes item 1-13)	1	1	1
1	255944	Harness, wiring (includes item 2)	1	1	1
2	269366	Connector, plug	1	1	1
3	250512	Breaker, magnetic TD	1	1	1
4	238736	Meter, hour	1	1	1
5	X-71-2	Nut, hex	2	2	2
6	X-18-1	Washer, lock	2	2	2
7	255659	Panel, silkscreen	1	1	1
8	X-49-26	Screw, round head machine	2	2	2
9	269373	Lamp	1	1	1
10	238426	Holder, fuse	1	1	1
11	283645	Fuse, 15 amp	1	1	1
12	X-22-26	Washer, shakeproof	1	1	1
13	287812	Switch, toggle	1	1	1

Group 701: Literature

Item	Part Number	Description	Quantity	
			Variation Number	6
1	TP-5700	Installation Manual		1
2	TP-5151	Operation Manual, Ford engine		1
3	TP-5185	Service Manual, Ford engine		1
4	TP-5186	Parts Catalog, Ford engine		1
5	TP-5750	Operation Manual, Generator		1
6	TP-5353	Service Manual, Generator		1
7	TP-5613	Parts Catalog, Generator		1
8	TP-5708	Parts Catalog, Accessories		1
9	TP-5719	Wiring Diagram Manual		1
10	TP-5829	Operation Manual, Decision-Maker 340™ Controller		1
11	TP-5851	Wiring Diagram Manual, Decision-Maker 340™ Controller		1
12	TP-6009	Parts Catalog, Controllers		1

Kit List

This section lists the part numbers of modules/kits not listed in the Group Parts Lists. Refer to the generator set nameplate or the list below to identify the module/kit

number installed on your generator set. See the sections following this page for the parts list of the module/kit.

	33 kW	35 kW	45 kW
Controllers			
See Parts Catalog TP-6009 for parts lists for 7-light, 16-light, and Decision-Maker 340 controllers.			
Manual	N/A	327011	327016
Manual, 600 V	N/A	327026	327031
Cooling Systems			
City water	N/A	326102	326102
Radiator, 40 Ambient	N/A	326031	326032
Radiator, 50 Ambient	N/A	326032	326104
Remote Radiator Setup	N/A	326103	326103
Duct Flange, Radiator	255169	324205	324205
			255169
Heater, Block			
1500 W	276378	326232	326232
			276378
240 V, 1100/1500 W	276379	326233	326233
			276379
Fuel Systems			
Bypass, Manual Valve and Gas Solenoid	255638	326094	326094
			255638
Changeover, Automatic (Nat. Gas to LP Gas)	N/A	326064	326064
Changeover, Manual (LP Gas to Gasoline)	N/A	326068	326068
Fuel Line, Flexible	276285	276285	276285
Fuel Line, Flexible (additional)	PA-255177	PA-255177	PA-255177
Fuel Pump, Electric	PA-225208	PA-324405	PA-324405
			PA-225208
Gas Solenoid Valve (additional)	244621	PA-326127	PA-326127
			244621
Gasoline Fuel System	N/A	326093	326093
LP Gas Fuel System	N/A	326735	326735
			326226
LP Gas Liquid Withdrawal	N/A	326071	326071
Natural Gas Fuel System	N/A	326034	326034
Strainer, Gas	PA-290276	PA-290276	PA-290276

Optional Kits

See Parts Catalog TP-5708 for parts lists.

Paint and Miscellaneous Parts

Paint, Kohler Cream Beige

All models use 221338 Spray Can, 221337 Gallon

N/A Not Applicable

x:in:004:008:a

Manual Controller Kits

MANUAL CONTROLLER KIT PARTS							
Qty.	Description	Common	Kit Number/Unique Parts				
			327011	327016	327021	327026	327031
1	Controller assembly*		A-273380	A-273381	A-273383	A-273379	A-273382
4	Washer, lock 5/16	X-22-16					
1	Terminal	X-283-8					
1	Conduit, convoluted		N/A	N/A	N/A	X-6003-17	N/A
1	Screw, drill hex	X-794-1					
1	Harness, wiring	255040					
3	Transformer, current		259360	259414	255860	259793	259792
1	Bracket, CT mounting	276417					
1	Bushing, reducer 3/8	X-202-28					
1	Sensor, low coolant	336656					

MANUAL CONTROLLER KIT PARTS, CONTINUED							
Qty.	Description	Common	Kit Number/Unique Parts				
			327037	327042	327047	327052	327057
1	Controller assembly*		A-273384	A-273383	A-273385	A-273387	A-273390
4	Washer, lock 5/16	X-22-16					
1	Terminal	X-283-8					
1	Conduit, convoluted		N/A	N/A	N/A	X-6003-17	N/A
1	Screw, drill hex	X-794-1					
1	Harness, wiring	255040					
3	Transformer, current		259359	255860	253503	259414	272691
1	Bracket, CT mounting		276417	276417	276417	276417	325382
1	Bushing, reducer 3/8	X-202-28					
1	Sensor, low coolant	336656					

MANUAL CONTROLLER KIT PARTS, CONTINUED							
Qty.	Description	Common	Kit Number/Unique Parts				
			327062	327067	327072	327077	
1	Controller assembly*		A-273386	A-273393	A-273389	A-273391	
4	Washer, lock 5/16	X-22-16					
1	Terminal	X-283-8					
1	Conduit, convoluted		X-6003-17	N/A	N/A	X-6003-17	
1	Screw, drill hex	X-794-1					
1	Harness, wiring	255040					
3	Transformer, current		259360	273257	253610	279272	
1	Bracket, CT mounting		276417	299966	299966	325382	
1	Bushing, reducer 3/8	X-202-28					
1	Sensor, low coolant	336656					

* See Controller Assembly section for parts list.
 N/A Not Applicable

Manual Controller Assemblies

Qty.	Description	Common Parts	Manual Controller Assembly Number/Unique Parts					
			A-273379	A-273380	A-273381	A-273382	A-273383	A-273384
1	Potentiometer assembly	A-255041						
1	Overspeed circuit board	A-249812						
1	Main circuit board	F-239563						
1	Washer, shakeproof #10	X-22-13						
4	Washer, lock #6	X-22-6						
1	Grommet	X-284-31						
1	Plug, button	X-301-34						
2	Terminal	X-431-25						
2	Terminal	X-431-29						
2	Screw, RHM 6-32 x 3/8	X-49-2						
18	Screw, RHM 6-32 x 1/4	X-49-25						
2	Screw, pan head	X-49-39						
4	Screw, RHM 10-24 x 3/4	X-50-3						
1	Screw, RHM 10-24 x 1	X-50-7						
2	Screw, RHM 8-32 x 3/8	X-51-12						
2	Screw, RHM	X-51-53						
1	Strap, ground	X-6046-2						
1	Jumper	X-6048-2						
10	Screw, hex crimplite	X-6216-1						
2	Screw, thread forming	X-67-127						
1	Sleeve	X-696-5						
1	Tab, identification	201620-86						
1	Fuse, 10 amp	223316						
1	Holder, fuse	238426						
1	Meter, hour	238736						
1	Terminal	238898						
1	Block, terminal	246115						
1	Switch, rocker	249406						
1	Voltmeter	253329						
1	Lamp	269373						
2	Lamp	255126						
1	Lamp	269373						
1	Plate, hinge	273376						
1	Harness, Controller	274710						
1	Voltmeter, AC		282817	282816	282816	282817	282816	282817
1	Gauge, oil pressure	282897						
1	Gauge, water temperature	282898						
1	Ammeter, AC		282800	282801	282802	282801	282804	282802
2	Socket, lamp	284990						
8	Spacer, circuit board	287948						
3	Fuse, 1.5 amp	291207						
1	Decal	292347						
1	Resistor		292352	N/A	N/A	292352	N/A	292352
1	Decal	292361						
1	Switch, selector		292374	292373	292373	292374	292373	292374
1	Holder, fuse	292821						
1	Marker, strip	292823						
1	Bumper	292834						
1	Meter, frequency	282818						
1	Transformer, controller	295281						
1	Cover, controller	292818						
1	Nameplate		273374	273373	273373	273374	273373	273374
1	Box, controller	273375						

N/A Not Applicable

Manual Controller Assemblies, continued

Qty.	Description	Common Parts	Manual Controller Assembly Number/Unique Parts						
			A-273385	A-273386	A-273387	A-273389	A-273390	A-273391	A-273392
1	Potentiometer assembly	A-255041							
1	Overspeed circuit board	A-249812							
1	Main circuit board	F-239563							
1	Washer, shakeproof #10	X-22-13							
4	Washer, lock #6	X-22-6							
1	Grommet	X-284-31							
1	Plug, button	X-301-34							
2	Terminal	X-431-25							
2	Terminal	X-431-29							
2	Screw, RHM 6-32 x 3/8	X-49-2							
18	Screw, RHM 6-32 x 1/4	X-49-25							
2	Screw, pan head	X-49-39							
4	Screw, RHM 10-24 x 3/4	X-50-3							
1	Screw, RHM 10-24 x 1	X-50-7							
2	Screw, RHM 8-32 x 3/8	X-51-12							
2	Screw, RHM	X-51-53							
1	Strap, ground	X-6046-2							
1	Jumper	X-6048-2							
10	Screw, hex crimplite	X-6216-1							
2	Screw, thread forming	X-67-127							
1	Sleeve	X-696-5							
1	Tab, identification	201620-86							
1	Fuse, 10 amp	223316							
1	Holder, fuse	238426							
1	Meter, hour	238736							
1	Terminal	238898							
1	Block, terminal	246115							
1	Switch, rocker	249406							
1	Voltmeter	253329							
1	Lamp	269373							
2	Lamp	255126							
2	Lamp	291740							
1	Plate, hinge	273376							
1	Harness, controller	274710							
1	Voltmeter, AC		282816	282816	282817	282816	282816	282817	282816
1	Gauge, oil pressure	282897							
1	Gauge, water temperature	282898							
1	Ammeter, AC		282805	282805	282805	282807	282808	282806	282806
2	Socket, lamp	284990							
8	Spacer, circuit board	287948							
3	Fuse, 1.5 amp	291207							
1	Decal	292347							
1	Resistor		N/A	292352	292352	N/A	N/A	292352	N/A
1	Decal	292361							
1	Switch, selector		292373	292374	292374	292373	292373	292374	292373
1	Holder, fuse	292821							
1	Marker, strip	292823							
1	Bumper	292834							
1	Meter, frequency	282818							
1	Transformer, controller	295281							
1	Cover, controller	292818							
1	Nameplate		273373	273374	273374	273373	273373	273374	273373
1	Box, controller	273375							

N/A Not Applicable

Cooling System Kits

Qty.	Description	Kit/Part No.
Cooling, city water		
		326102
1	Elbow, street 1 1/2	A-27
1	Elbow, street	EH-2226
1	Nipple, pipe 3/8	X-204-8
1	Nipple, pipe	X-205-14
1	Nipple, pipe 1/2 x 3	X-209-11
1	Pipe	X-209-18
4	Nipple 1/2 x1 3/16	X-209-2
1	Nipple, pipe	X-210-5
2	Elbow, pipe 1/2	X-215-1
1	Coupling, pipe 1 1/2	X-216-21
1	Coupling, pipe 3/8 x 1	X-216-23
2	Valve, drain 3/8	X-256-1
1	Elbow, street 3/8	X-274-6
1	Clamp, hose 1/2	X-309-14
1	Valve, solenoid	X-350-7
1	Line, flexible fuel 5/16	X-386-36
2	Clamp, hose	X-426-4
2	Clamp, hose	X-426-6
1	Adapter	X-570-17
1	Hose, radiator	X-6014-10
1	Clamp, insulating	X-672-10
1	Hose, upper radiator	326004
1	Hose, radiator	255172
22	Screw, drill hex	X-794-1
4	Elbow, 90 degrees	151771
3	Nipple, pipe 1 1/2 x 1	155040
1	Bushing, 2 1/16 x 1 1/4	153016
2	Bushing, reducer 1/2	168848
2	Clamp, hose	276320
1	Cap, pressure	258037
1	Decal, water drain	280561
3	Adapter, hose	285685
1	Regulator, water	290176
2	Support, heat exchanger	290378
1	Tank, expansion	291457
1	Guard, belt	255326
1	Exchanger, heat	326160
2	Plate, heat exchanger	326166
1	Bracket, tank	255325
1	Guard, belt	326125
1	Guard, belt	326126
1	Guard, alternator	326255
2	Bracket, heat exchanger	326124
1	Guard, belt	326215

Qty.	Description	Kit/Part No.
Cooling, radiator		
		326031
1	Radiator assembly	A-326023
4	Washer, plain	X-25-73
1	Valve, drain 1/4	X-256-3
2	Clamp, hose 1.375 x 2.100	X-426-4
2	Clamp, hose 1 9/16 x 2	X-426-6
4	Screw, phil hex	X-6216-1
1	Plug, pipe 3/8	X-75-10
4	Washer, hardened	X-801-4
1	Switch assembly, level	273404
4	Spacer, radiator suport	273911
1	Shroud, fan	324039
1	Support, radiator (Left)	326001
1	Support, radiator (Right)	326002
1	Hose, radiator (Lower)	326003
1	Hose, radiator (Upper)	326004
1	Guard, radiator	326005
1	Guard, wire fan	326006
1	Guard, belt (LS)	326007
1	Guard, belt (RS)	326008
1	Guard, belt (Top)	326009
1	Spacer	326010
1	Fan, pusher	326011
1	Bracket, belt guard	326144

Cooling System Kits

Qty.	Description	Kit/Part No.
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Cooling, radiator		326032
1	Radiator assembly	A-326018
4	Washer, plain	X-25-73
1	Valve, drain 1/4	X-256-3
2	Clamp, hose 1.375 x 2.100	X-426-4
2	Clamp, hose 1 9/16 x 2	X-426-6
4	Screw, phil hex crim	X-6216-1
1	Plug, pipe 3/8	X-75-10
4	Washer, hardened	X-801-4
1	Switch assembly, level	273404
4	Spacer, radiator support	273911
1	Shroud, fan	324039
1	Support, radiator (L)	326001
1	Support, radiator (R)	326002
1	Hose, radiator (Lower)	326003
1	Hose, radiator (Upper)	326004
1	Guard, radiator	326005
1	Guard, wire fan	326006
1	Guard, belt (LS)	326007
1	Guard, belt (RS)	326008
1	Guard, belt (Top)	326009
1	Spacer	326010
1	Fan, pusher	326011
1	Bracket, belt guard	326144

Cooling, radiator		326104
1	Radiator assembly	A-326123
4	Washer, plain	X-25-73
1	Valve, drain 1/4	X-256-3
2	Clamp, hose 1.375 x 2.100	X-426-4
2	Clamp, hose 1 9/16 x 2	X-426-6
4	Screw, phil hex crim	X-6216-1
1	Plug, pipe 3/8	X-75-10
8	Washer, hardened	X-801-4
1	Switch assembly, level	273404
4	Spacer, radiator sup	273911
1	Spacer, fan	276114
1	Shroud, fan	324039
1	Support, radiator (L)	326001
1	Support, radiator (R)	326002
1	Hose, radiator (Lower)	326003
1	Hose, radiator (Upper)	326004
1	Guard, radiator	326005
1	Guard, wire fan	326006
1	Guard, belt (LS)	326007
1	Guard, belt (RS)	326008
1	Guard, belt (Top)	326009
1	Bracket, belt guard	326144
1	Fan, pusher	326158
1	Pulley, water pump	326159

Qty.	Description	Kit/Part No.
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Duct flange, radiator		255169
8	Rivet, pop	X-781-11
10	Screw, drill hex	X-794-2
2	Frame, air duct	292995
2	Frame, air duct	292996

Cooling, remote radiator set-up		326103
1	Hose, lower radiator	326003
1	Hose, radiator	X-6014-45
4	Hose 2" X 8"	X-6014-8
22	Screw, drill hex.	X-794-1
2	Clamp, hose	X-426-6
2	Clamp, hose	249888
1	Elbow, water outlet	280005
1	Guard, belt	255326
1	Bracket, tank	255325
1	Guard, belt	326125
1	Guard, belt	326126
1	Guard, belt	326215

Cooling System Kits, continued

Qty.	Description	Kit/Part No.
------	-------------	--------------

Duct flange, radiator

8	Rivet, pop	X-781-11
6	Screw, drill hex	X-794-1
2	Frame, air duct	324200
2	Frame, air duct	324201

Heater, block 110-120 Volt 1500 watts

		276378
1	Pipe	X-209-18
1	Elbow, pipe 1/2	X-215-1
4	Clamp, hose	X-426-10
2	Clamp, hose 1-9/16 x 2	X-426-6
1	Hose	X-577-41
1	Connector, hose	X-582-1
1	Clamp, insulating	X-672-3
1	Bushing, reducing	153659
1	Connector, hose	275581
1	Hose, molded	276206
1	Plug, freeze	276215
1	Bracket, mounting	276382
1	Heater, block	276691
1	Tag, hang	279047

Qty.	Description	Kit/Part No.
------	-------------	--------------

Heater, block 208-240 Volt

		276379
1100/1500 watts		
1	Pipe	X-209-18
1	Elbow, pipe 1/2	X-215-1
4	Clamp, hose	X-426-10
2	Clamp, hose 1-9/16x2	X-426-6
1	Hose	X-577-41
1	Connector, hose	X-582-1
1	Clamp, insulating	X-672-3
1	Bushing, reducing	153659
1	Connector, hose	275581
1	Hose, molded	276206
1	Plug, freeze	276215
1	Bracket, mounting	276382
1	Heater, block	276692
1	Tag, hang	279047

Heater, block 1500 watts

		326232
2	Bushing, reducer	X-202-41
1	Nipple, pipe 1/2 x 3	X-209-11
1	Nipple 1/2 x 2 1/2	X-209-3
2	Elbow, pipe 1/2	X-215-1
1	Hose	X-312-17
1	Hose	X-312-51
1	Spacer	X-400-201
4	Clamp, hose	X-426-10
2	Connector, hose	X-582-1
1	Clamp, insulated	X-672-20
1	Plug, freeze	276215
1	Bracket, support	276351
1	Tag, hang	279047
1	Bracket, block heater	326219
1	Heater, block	326228
1	Shield, heat	326236

Heater, block 240 Volt, 1500 watts

		326233
2	Bushing, reducer	X-202-41
1	Nipple, pipe 1/2 x 3	X-209-11
1	Nipple 1/2 x 2 1/2	X-209-3
2	Elbow, pipe 1/2	X-215-1
1	Hose	X-312-17
1	Hose	X-312-51
1	Spacer	X-400-201
4	Clamp, hose	X-426-10
2	Connector, hose	X-582-1
1	Clamp, insulated	X-672-20
1	Plug, freeze	276215
1	Bracket, support	276351
1	Tag, hang	279047
1	Bracket, block heater	326219
1	Heater, block	326229
1	Shield, heat	326236

Fuel System Kits

Qty.	Description	kit/Part No.
Bypass, manual valve & gas solenoid 255638		
1	Pipe, 3/4 x 4	A-107
2	Tee, pipe 3/4	A-108
3	Nipple, pipe	X-206-9
1	Elbow, pipe 3/4	X-215-2
1	Line, flexible fuel 3/4	X-504-2
1	Bracket, fuel valve	254456
1	Valve	255632
1	Elbow, 45 deg. 3/4 in.	X-225-8

Bypass, manual valve & gas solenoid 326094		
1	Pipe, 3/4x4	A-107
2	Tee, pipe 3/4	A-108
1	Nipple, pipe	X-206-4
3	Nipple, pipe	X-206-9
1	Elbow, pipe 3/4	X-215-2
1	U Bolt, 5/15-18 x 1 1/2	X-397-1
1	Line, flexible fuel 3/4	X-504-2
1	Bracket, fuel valve	254456
1	Valve	255632

Changeover, automatic (nat. gas to LP vapor) 326064		
3	Tee, pipe 3/4	A-108
1	Carburetor assembly	A-326217
2	Bushing, reducer 3/4 x 1	X-202-1
1	Bushing, reducer	X-202-56
1	Nipple, pipe 3/4 x 2	X-206-2
1	Nipple, pipe	X-206-4
7	Nipple, pipe	X-206-9
1	Elbow, pipe 3/4	X-215-2
1	Nipple, pipe 1/8 x 3/4	X-217-6
1	Elbow, 45 deg. 3/4 in.	X-225-8
1	Elbow, street 1/8 x 1/8	X-555-2
1	Terminal, adapter	233704
1	Relay	245748
1	Line, flexbile fuel	276395
1	Switch, vacuum	287387
1	Regulator, pressure	291259
1	Bracket, fuel	326065
2	Solenoid	32623
1	Label, "Nat. gas"	X-543-3
1	Label, "LP gas"	285623
1	Harness, wiring	326267
1	Valve, line load	326077

Qty.	Description	kit/Part No.
Changeover, manual (LP gas to gasoline) 326068		
1	Carburetor assembly	A-291440
1	Nipple, pipe 3/4 x 10 1/2	X-206-16
1	Nipple, pipe	X-206-4
7	Nipple, pipe	X-206-9
1	Elbow, pipe 3/4	X-215-2
1	Elbow, 45 deg. 3/4	X-225-8
1	Terminal	X-367-1
1	Connector, hose 1/8 x 1/4	X-380-1
1	Line, flexible fuel	X-386-35
1	Connector, hose 1/8 x 1/4	X-391-1
1	U Bolt, 5/15-18 x 1 1/2	X-397-1
2	Clamp, hose	X-426-10
2	Clamp, hose	X-426-15
2	Clamp, hose	X-426-9
1	Connector, hose	X-582-16
1	Switch, toggle	241911
1	Pump, fuel	247076
1	Bracket, fuel valve	254456
1	Adapter, mixer	256977
1	Mixer, gas	256987
1	Hose	256989
1	Bracket, fuel switch	256990
1	Decal	256991
1	Decal	256992
1	Adapter, carburetor	279013
1	Gasket, carburetor	280494
1	Regulator, pressure	291259
1	Solenoid	326233

Fuel line, flexible gasoline 276285		
1	Cap, pipe	X-268-3
1	Connector	X-296-1
1	Elbow, 7/16-20 x 1/8	X-447-10
1	Elbow, oil line connection	X-447-7
1	Tie, cable	X-468-1
1	Line, flexible fuel	273614

Fuel line, Flexible gasoline (Additional) PA-255177		
1	Bushing, reducer 3/4	X-202-1
1	Nipple, pipe 3/4 x 2	X-206-2
1	Elbow, pipe 1	X-215-15
1	Elbow	151385
1	Line, flexible fuel	276353

Fuel pump, electric PA-225208		
1	Pump, electric fuel	247076

Fuel pump, electric PA-324405		
1	Pump, electric fuel	324420

Gas solenoid valve (Additional) 244621		
1	Valve, gas	244621

Gas solenoid valve (Additional) 326127		
1	Valve, gas	244621

Fuel System Kits, continued

Qty.	Description	kit/Part No.
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Gasoline fuel kit		326093
1	Carburetor assembly	A-326216
1	Air cleaner assembly	A-269441
1	Fuel line	X-386-56
2	Connector, hose	X-391-1
2	Clamp, hose	X-426-9
1	Pump, electric fuel	247076
1	Adapter, carburetor	279013
2	Gasket, carburetor	280494

LP gas fuel kit		326226
1	Carburetor assembly	A-326216
2	Niple, pipe	X-206-4
2	Niple, pipe	X-206-9
1	Nipple, pipe 3/4 x 10 1/2	X-206-16
3	Elbow, pipe 3/4	X-215-2
1	Elbow, 45 deg. 3/4	X-225-8
1	Washer, plain	X-25-82
1	U Bolt, 5/15-18 x 1 1/2	X-397-1
1	Bracket, fuel valve	254456
1	Line, flexible fuel	276395
1	Regulator, pressure	291259
1	Solenoid	326223

LP gas liquid withdrawal fuel kit		326071
1	Carburetor assembly	A-326216
1	Elbow	SA-472
1	Bushing, reducer 3/4 x 1	X-202-1
1	Bushing, reducer	X-202-30
1	Tee, pipe 1/2	X-203-13
1	Nipple, pipe 3/4 x 10 1/2	X-206-16
1	Nipple, pipe 3/4 x 2	X-206-2
1	Nipple, pipe	X-206-4
1	Nipple, pipe 3/4 x 3 1/2	X-206-6
1	Pipe	X-209-18
2	Elbow, steet 1/4	X-211-6
1	Elbow, pipe 3/4	X-215-2
1	Niple, pipe 1/4 x 4	X-220-2
1	Elbow, 45 deg. 3/4	X-225-8
1	Hose	X-312-17
1	Hose	X-312-49
1	Connector, hose elbow	X-391-19
1	Connector, hose 5/8 x 3/8	X-391-2
4	Clamp, hose	X-426-10
1	Connector, hose	275581
1	Fuel line	276395
1	Converter	326067
1	Bracket, converter	326069
1	Solenoid	326070

Qty.	Description	kit/Part No.
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Natural gas fuel system		326034
1	Carburetor assembly	A-326217
2	Niple, pipe	X-206-4
2	Niple, pipe	X-206-9
1	Nipple, pipe 3/4 x 10 1/2	X-206-16
1	Elbow, steet 1/2	X-211-1
3	Elbow, pipe 3/4	X-215-2
1	Elbow, 45 deg. 3/4	X-225-8
1	Washer, plain	X-25-82
1	Elbow	X-274-2
1	U Bolt, 5/15-18 x 1 1/2	X-397-1
1	Bracket, fuel valve	254456
1	Line, flexible fuel	276395
1	Regulator, pressure	291259
1	Solenoid	326223

Strainer, gas		290276
1	Strainer, gas	292490

Appendix A. Abbreviations

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

A, amp	ampere	cm	centimeter	freq.	frequency
ABDC	after bottom dead center	cmm	cubic meters per minute	FS	full scale
AC	alternating current	CMOS	complementary metal oxide substrate (semiconductor)	ft.	foot, feet
A/D	analog to digital			ft. lbs.	foot pounds (torque)
ADC	analog to digital converter	cogen.	cogeneration	ft./min.	feet per minute
adj.	adjust, adjustment	COM	communications (port)	g	gram
ADV	advertising dimensional drawing	conn.	connection	ga.	gauge (meters, wire size)
AHWT	anticipatory high water temperature	cont.	continued	gal.	gallon
		CPVC	chlorinated polyvinyl chloride	gen.	generator
AISI	American Iron and Steel Institute	crit.	critical	genset	generator set
ALOP	anticipatory low oil pressure	CRT	cathode ray tube	GFI	ground fault interrupter
alt.	alternator	CSA	Canadian Standards Association	gnd.	ground
Al	aluminum	CT	current transformer	gov.	governor
ANSI	American National Standards Institute (formerly American Standards Association, ASA)	Cu	copper	gph	gallons per hour
		cu. in.	cubic inch	gpm	gallons per minute
AO	anticipatory only	cw.	clockwise	gr.	grade, gross
API	American Petroleum Institute	CWC	city water-cooled	gr. wt.	gross weight
approx.	approximate, approximately	cyl.	cylinder	H x W x D	height by width by depth
AR	as required, as requested	D/A	digital to analog	HC	hex cap
AS	as supplied, as stated, as suggested	DAC	digital to analog converter	HCHT	high cylinder head temperature
		dB	decibel	HD	heavy duty
ASE	American Society of Engineers	dba	decibel (A weighted)	HET	high exhaust temperature
ASME	American Society of Mechanical Engineers	DC	direct current	hex	hexagon
		DCR	direct current resistance	Hg	mercury (element)
assy.	assembly	deg., °	degree	HH	hex head
ASTM	American Society for Testing Materials	dept.	department	HHC	hex head cap
		dia.	diameter	HP	horsepower
ATDC	after top dead center	DI/EO	dual inlet/end outlet	hr.	hour
ATS	automatic transfer switch	DIN	Deutsches Institut fur Normung e. V. (also Deutsche Industrie Normenausschuss)	HS	heat shrink
auto.	automatic			hsg.	housing
aux.	auxiliary	DIP	dual inline package	HVAC	heating, ventilation, and air conditioning
A/V	audio/visual	DPDT	double-pole, double-throw	HWT	high water temperature
avg.	average	DPST	double-pole, single-throw	Hz	hertz (cycles per second)
AVR	automatic voltage regulator	DS	disconnect switch	IC	integrated circuit
AWG	American Wire Gauge	DVR	digital voltage regulator	ID	inside diameter, identification
AWM	appliance wiring material	E, emer.	emergency (power source)	IEC	International Electrotechnical Commission
bat.	battery	EDI	electronic data interchange	IEEE	Institute of Electrical and Electronics Engineers
BBDC	before bottom dead center	EFR	emergency frequency relay	IMS	improved motor starting
BC	battery charger, battery charging	e.g.	for example (<i>exempli gratia</i>)	in.	inch
BCA	battery charging alternator	EG	electronic governor	in. H ₂ O	inches of water
BCI	Battery Council International	EGSA	Electrical Generating Systems Association	in. Hg	inches of mercury
BDC	before dead center	EIA	Electronic Industries Association	in. lbs.	inch pounds
BHP	brake horsepower	EI/EO	end inlet/end outlet	Inc.	incorporated
blk.	black (paint color), block (engine)	EMI	electromagnetic interference	ind.	industrial
blk. htr.	block heater	emiss.	emission	int.	internal
BMEP	brake mean effective pressure	eng.	engine	int./ext.	internal/external
bps	bits per second	EPA	Environmental Protection Agency	I/O	input/output
br.	brass	EPS	emergency power system	IP	iron pipe
BTDC	before top dead center	ER	emergency relay	ISO	International Organization for Standardization
Btu	British thermal unit	ES	engineering special, engineered special	J	joule
Btu/min.	British thermal units per minute	ESD	electrostatic discharge	JIS	Japanese Industry Standard
C	Celsius, centigrade	est.	estimated	k	kilo (1000)
cal.	calorie	E-Stop	emergency stop	K	kelvin
CARB	California Air Resources Board	etc.	et cetera (and so forth)	kA	kiloampere
CB	circuit breaker	exh.	exhaust	KB	kilobyte (2 ¹⁰ bytes)
cc	cubic centimeter	ext.	external	kg	kilogram
CCA	cold cranking amps	F	Fahrenheit, female	kg/cm ²	kilograms per square centimeter
ccw.	counterclockwise	fglass.	fiberglass	kgm	kilogram-meter
CEC	Canadian Electrical Code	FHM	flat head machine (screw)	kg/m ³	kilograms per cubic meter
cfh	cubic feet per hour	fl. oz.	fluid ounce	kHz	kilohertz
cfm	cubic feet per minute	flex.	flexible		
CG	center of gravity				
CID	cubic inch displacement				
CL	centerline				

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

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.

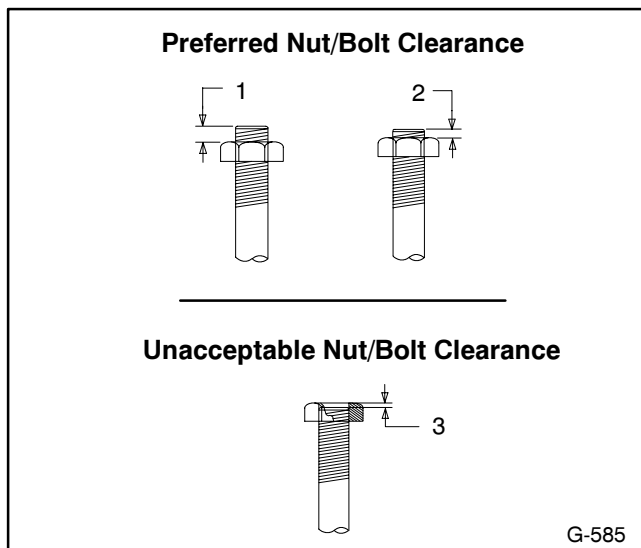
See General Torque Specifications and other torque specifications in the service literature.

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.

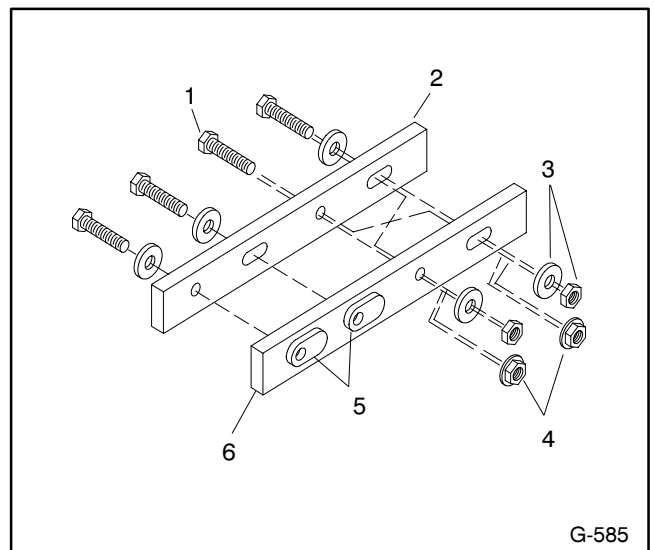
For round and slotted exit holes, determine if hardware is greater than 1/2 inch in diameter, or 1/2 inch in diameter or less. Hardware that is *greater than 1/2 inch* in diameter takes a standard nut and SAE washer. Hardware *1/2 inch or less* in diameter can take a properly torqued whiz nut or spirallock nut. See 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. 1/2 of Bolt Diameter
2. Min. 1 Full Thread Beyond Top of Nut
3. Below Top of Nut

Figure 1. Acceptable Bolt Lengths



1. Cap screw
2. Entry hole types
3. Standard nut and SAE washer
4. Whiz nut or spirallock: 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 or 5
		Grade 2	Grade 5	Grade 8	
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 or 8.8
	Grade 5.8	Grade 8.8	Grade 10.9	
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	

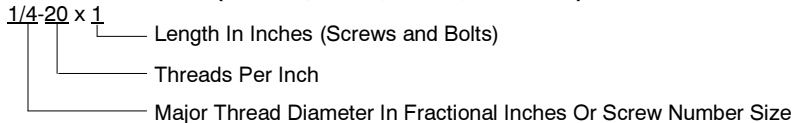
Nuts	
Nut Styles	
Hex Head	
Lock or Elastic	
Square	
Cap or Acorn	
Wing	
Washers	
Washer Styles	
Plain	
Split Lock or Spring	
Spring or Wave	
External Tooth Lock	
Internal Tooth Lock	
Internal-External Tooth Lock	

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

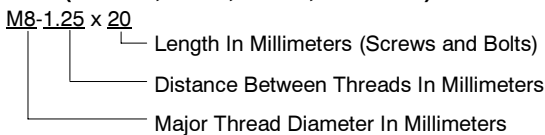
Allen™ head screw is a trademark of Holo-Krome Co.
Phillips® screw is a registered trademark of Phillips Screw Company.

Sample Dimensions

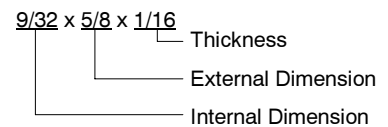
American Standard (Screws, Bolts, Studs, and Nuts)



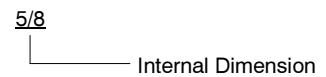
Metric (Screws, Bolts, Studs, and Nuts)



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 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
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		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

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					M7985A-03012-20	M3-0.50 x 12	
M931-20120-60	M20-2.50 x 120					M7985A-04020-20	M4-0.70 x 20	
M931-20160-60	M20-2.50 x 160					M7985A-05010-20	M5-0.80 x 10	
M931-22090-60	M22-2.50 x 90					M7985A-05012-20	M5-0.80 x 12	
M931-22120-60	M22-2.50 x 120					Flat Head Machine Screws		
M931-22160-60	M22-2.50 x 160					M965A-05016-20	M5-0.80 x 16	
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-5613 3/00d

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Phone 920-565-3381, Web site www.kohlergenerators.com
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Kohler[®] Power Systems
Asia Pacific Headquarters
7 Jurong Pier Road
Singapore 619159
Phone (65)264-6422, Fax (65)264-6455