

Service Parts



Industrial Generator Sets

Model:

200DSE
200DSEB

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

See MP-6009 Parts Catalog Industrial Controllers
for controller parts

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Introduction

This manual lists service replacement parts for 200 kW generator sets.

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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.

Specification Number 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. The product identification number located on the generator set nameplate. Specification 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 a 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.

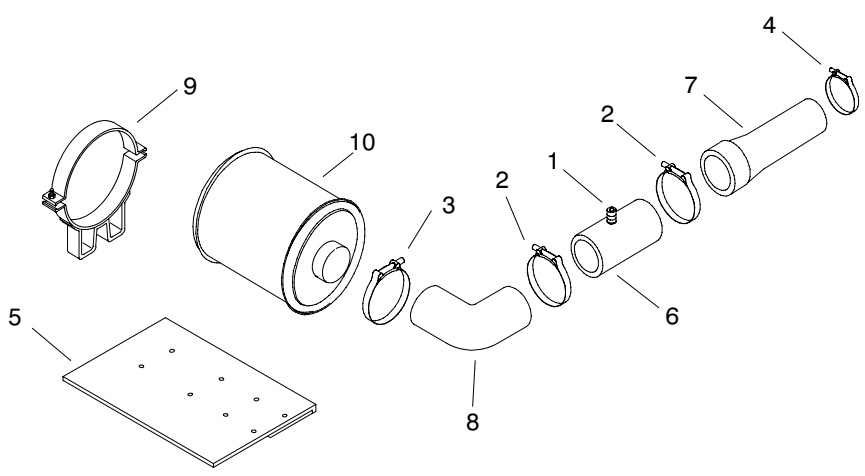
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Specification Number Index

Group Title	<i>Air Intake</i>	<i>Cooling System</i>	<i>Engine</i>	<i>Nameplates and Decals</i>	<i>Skid and Plant Mounting</i>	<i>Generator and Mounting</i>	<i>Controller and Mounting</i>	<i>Literature</i>
Group No.	101	104	105	107	109	201	301	701
Spec No.	Variation Number							
200DSE								
PA-192927	*	*	11	GR1S	*	*	†	19
GM19608-GA1S	*	*	GR1S	GR1S	*	*	†	19
200DSEB								
GM19608-GA1S	*	*	GR1S	GR1S	*	*	†	33

- * 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 MP-6009 P/C Controllers for controller parts lists.

Group 101: Air Intake

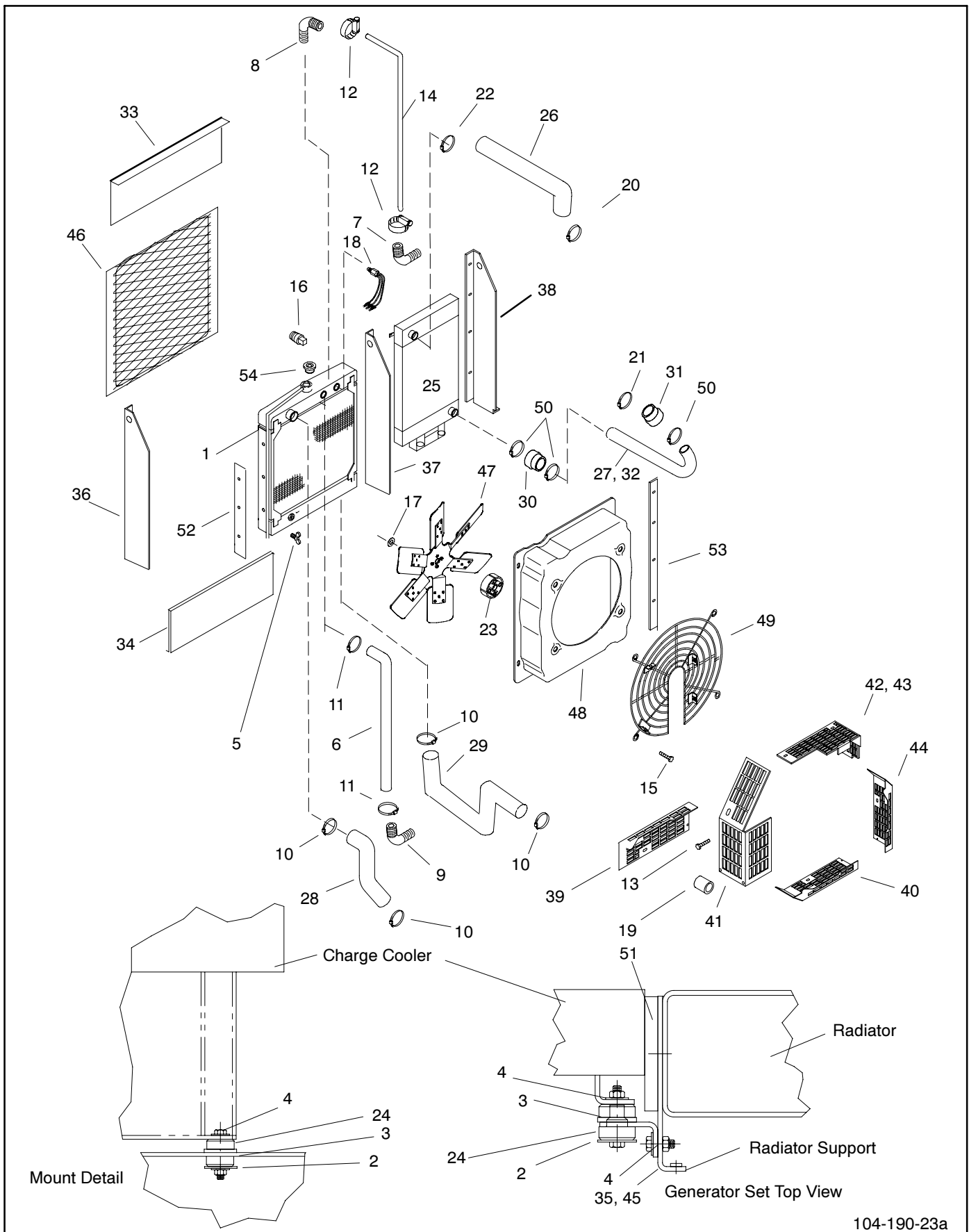


324905

Item	Part Number	Description	Quantity		
			Module Number		
			324905	324965*	324966*
1	X-75-1	Plug, pipe, 1/8	1	1	1
2	254344	Clamp, hose, 5.43/5.74 in.	2	2	2
3	254013	Clamp, hose, 6.56/6.87 in.	1	1	1
4	274545	Clamp, hose, 4.31/4.62 in.	1	1	1
5	324882	Bracket, air cleaner	1	1	1
6	324953	Tube	1	1	1
6	GM11916	Hose, reducer insert (not shown)		1	1
7	324970	Hose, air intake	1		
7	324969	Hose, air intake		1	1
8	343217	Hose, elbow, 90°, molded, 6 in. ID	1	1	1
9	343218	Clamp	2		
9	254012	Band, mounting		2	2
10	343219	Air cleaner, industrial	1		
10	A-343258	Air cleaner, industrial (includes item 11)		1	1
11	343259	Element, air cleaner, heavy-duty		1	1
11	343260	Element, air cleaner, secondary		1	1
12	254010	Cap, rain		1	

* Heavy-duty air cleaner module.

Group 104: Cooling System

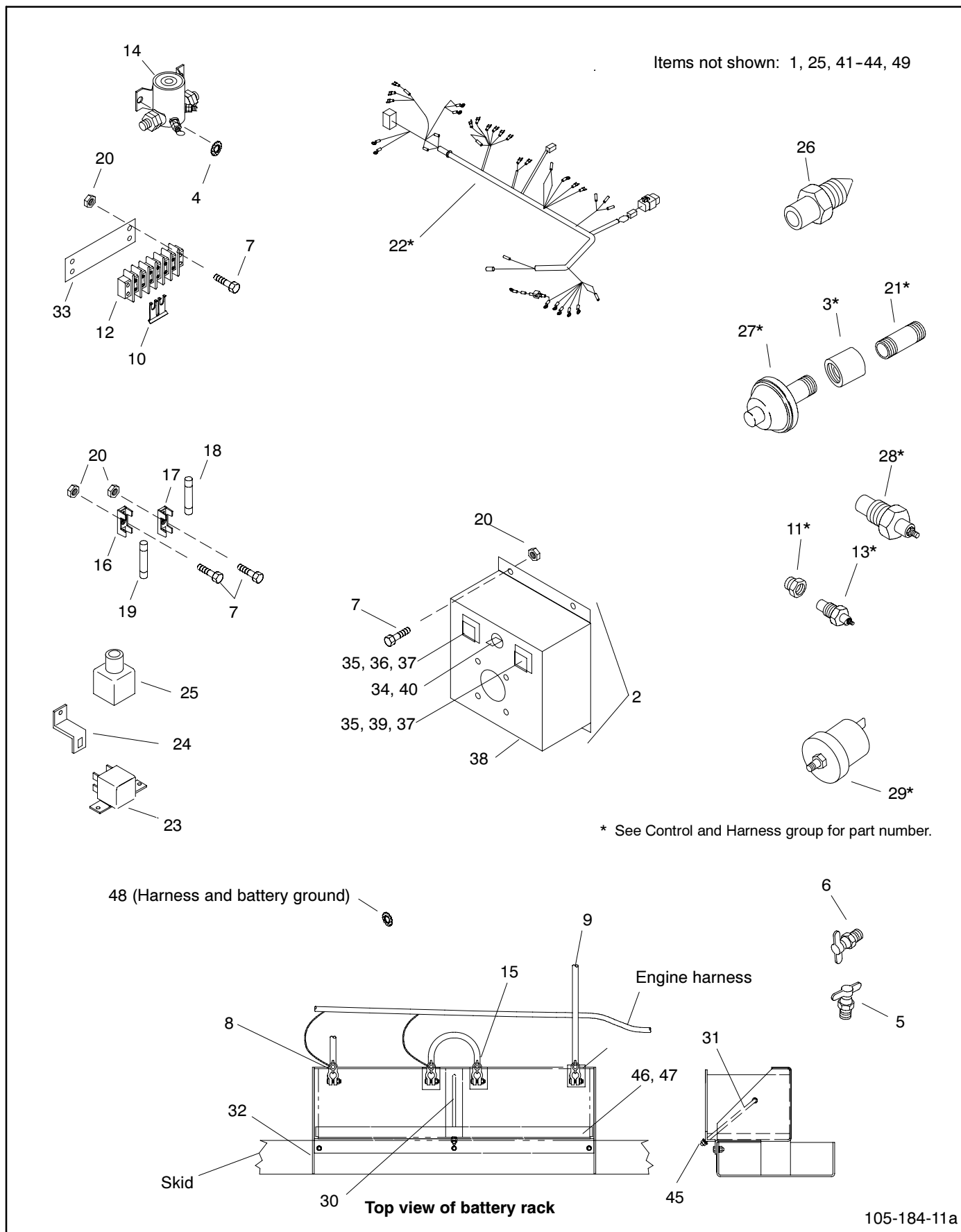


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Group 104: Cooling System

Item	Part Number	Description	Quantity	
			Module Number	
			324907	324928
1	A-343033	Radiator assembly	1	1
2	X-25-143	Washer, plain, .32 ID x 1.5 in. OD	4	4
3	X-25-144	Washer, plain, .781 ID x 1.5 in. OD	4	4
4	X-25-75	Washer, plain, .344 ID x .875 in. OD	14	14
5	X-256-3	Valve, drain, 1/4 in. NPT	1	1
6	X-356-33	Hose, radiator, straight, 1 in. ID	1	1
7	X-391-1	Fitting, hose connector 90°	1	1
8	X-391-20	Fitting, hose connector 90°	1	1
9	X-391-24	Fitting, hose connector 90°	1	1
10	X-426-2	Clamp, hose, 2.31/3.25 in.	4	4
11	X-426-8	Clamp, hose, .81/1.75 in.	2	2
12	X-426-9	Clamp, hose, .25/.70 in.	2	2
13	X-6216-1	Screw, Phillips hex crimpite	14	14
14	X-6359-9	Hose, rubber, straight, .25 in. ID	1	1
15	X-6365-1	Insert, threaded, 5/16-18 in.	6	6
16	X-75-54	Plug, pipe, brass	1	1
17	X-801-3	Washer, hardened, .406 ID x .812 in. OD	6	6
18	254832	Sensor, low fluid	1	1
19	X-400-199	Spacer, .375 ID x .75 OD x .56 in.	1	1
20	274824	Clamp, hose, 3.68/4 in.	1	1
21	328800	Clamp, hose, 2.5/2.81 in.	1	1
22	291542	Clamp, hose, 3.25/3.56 in.	1	1
23	324318	Spacer, fan, 5 in.	1	1
24	324433	Vibromount	4	4
25	324873	Cooler, charge air	1	1
26	324874	Hose, charge cooler	1	1
27	324875	Tube, charge cooler	1	1
28	324876	Hose, radiator	1	1
29	324877	Hose, radiator	1	1
30	324878	Hose, hump	1	1
31	324879	Hose, step	1	1
32	324880	Bracket, mounting	1	1
33	324883	Guard, radiator, top	1	1
34	324888	Guard, radiator, bottom	1	1
35	324896	Bracket, mounting	2	2
36	324897	Support, radiator	1	1
37	324898	Support, radiator	1	1
38	324899	Support, charge cooler	1	1
39	324914	Guard, belt, front	1	1
40	324915	Guard, belt, bottom	1	1
41	324916	Guard, belt, RS middle	1	1
42	324917	Guard, belt, RS top	1	1
43	324918	Guard, belt, top	1	1
44	324919	Guard, belt, LS	1	1
45	324960	Bracket, charge cooler	1	1
46	343014	Guard, radiator	1	1
47	343027	Fan, pusher	1	1
48	343054	Shroud, fan	1	1
49	343062	Guard, wire fan	1	1
50	343175	Clamp, hose, 3.06/3.38 in.	3	3
51	343193	Insulation, acoustic, 46 x 4.40 in.	1	1
52	343288	Spacer, radiator	2	2
53	343422	Bracket, fan shroud	2	2
54	GM25833	Cap, radiator	1	1

Group 105: Engine



Group 105: Engine

Item	Part Number	Description	Quantity	
			Variation Number 11	GR1
1	GM17421	Engine assembly	1	1
2	A-343591	Box assembly, engine light (includes items 34-40)	1	1
3	*	Coupling, pipe, 1/8 x 1 3/16 in.	1	1
4	X-22-12	Washer, lock, .262 ID x .743 in. OD	5	4
5	X-256-3	Valve, drain, 1/4 in. NPT	1	1
6	X-256-5	Valve, drain	1	1
7	X-51-11	Screw, cross recess round head machine	11	11
8	X-545-15	Lead, battery cable, 36 in.	1	
8	X-545-164	Lead, battery cable		1
9	X-545-24	Lead, battery cable, 28 in.	1	
9	X-545-170	Lead, battery cable		1
9	GM22350	Boot, starter terminal (not shown)		1
10	X-6073-2	Jumper	2	2
11	*	Bushing, reducing, 1/2 x 3/4 in. NPT	1	1
12	246114	Block, terminal	1	1
13	*	Sender, water temperature	1	1
14	268371	Relay	1	1
14	X-6214-2	Cap (not shown)	1	1
15	280133	Lead, battery cable, 8.5 in.	1	
15	X-545-73	Lead, battery cable		1
16	X-6129-7	Block, fuse	1	1
17	X-6129-8	Block, fuse	1	1
18	X-6134-13	Fuse, 30 A, 250 V	1	1
19	X-6134-14	Fuse, 5 A, 250 V	1	1
20	X-70-12	Nut, hex machine screw, 8-32	11	11
21	*	Nipple, pipe, 1/8 x 1 1/2 in.	1	1
22	*	Harness, engine wiring (includes items 41-44)	1	1
23	324951	Relay	1	1
24	324952	Bracket, mtg. (b.a.p.s.)	1	1
25	324954	Sensor, barometric air	1	1
26	324955	Sensor, air temperature	1	1
27	*	Switch assembly, pressure	1	1
28	*	Switch, high temperature shutoff	1	1
29	*	Sender, oil pressure	1	1
30	286316	Bolt, angle	1	1
31	254674	Bolt, angle	2	2
32	354352	Rack, battery	1	1
33	354483	Strip, marker	1	1
34	151511	Ring, lock switch	1	1
35	264513	Lamp	2	2
36	295972	Lens	1	1
37	297977	Socket	2	2
38	343590	Box, silkscreened	1	1
39	343593	Lens, yellow	1	1
40	354151	Switch, toggle, 2-pole	1	1
41	*	Diode, 6 A	4	4
42	*	Connector, 24-position	1	1
43	*	Connector kit	1	1
44	*	Connector kit, 60 pin EMC155	1	1
45	X-101-4	Nut, elastic stop, 5/16-24	3	3
46	272815	Clamp, battery	1	1
47	274398	Insulator, insulating pad	1	1
48	X-22-26	Washer, lock, .521 ID x 1.24 in. OD	2	2
49	GM20745	Boot, battery lug		3

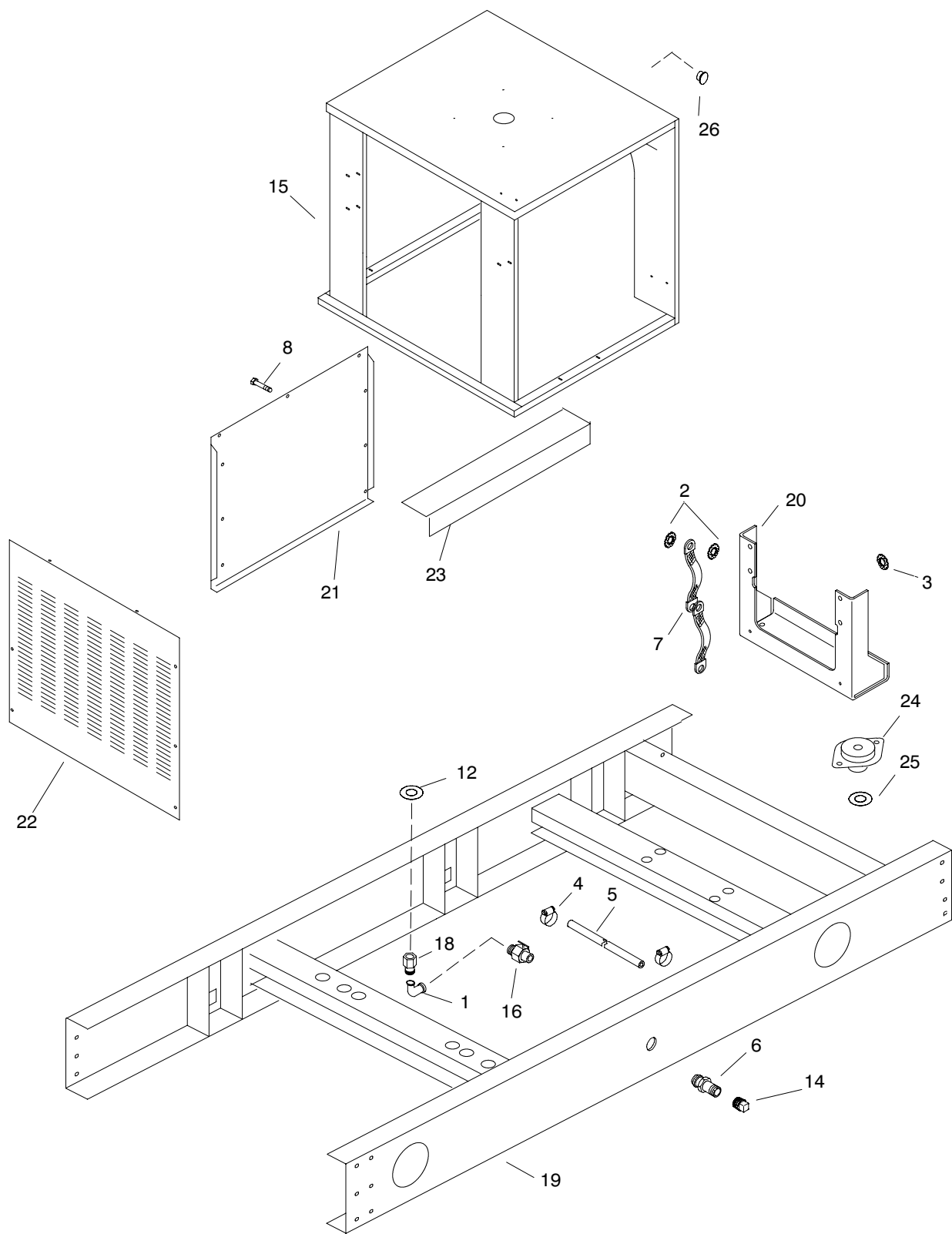
* See Control and Harness group for part number.

Notes

Group 107: Nameplates and Decals

Item	Part Number	Description	Quantity
			Variation Number GR1S
1	238402	Decal, caution positive terminal only	1
2	249808	Decal, warning rotating parts	1
3	249809	Decal, Caution hot engine	1
4	249810	Decal, warning hot coolant	1
5	273780	Decal, warning explosion	1
6	343165	Decal, caution not a step	1
7	364116	Decal, caution welding disconnect	2
8	GM15300	Decal, exhaust piping	1
9	GM19296	Decal, fuel type	1
10	257438	Decal, danger moving rotor	3
11	257441	Decal, warning lifting eye	1
12	258815	Decal, warning voltage backfeed	1
13	324069	Nameplate	1
14	GM13776	Decal, FRII reconnection	1
15	X-6301-3	Decal, DDC/MTU logo	2
16	X-6302-1	Decal, DDC/MTU symbol, 3.14 in. diameter	2

Group 109: Skid and Plant Mounting



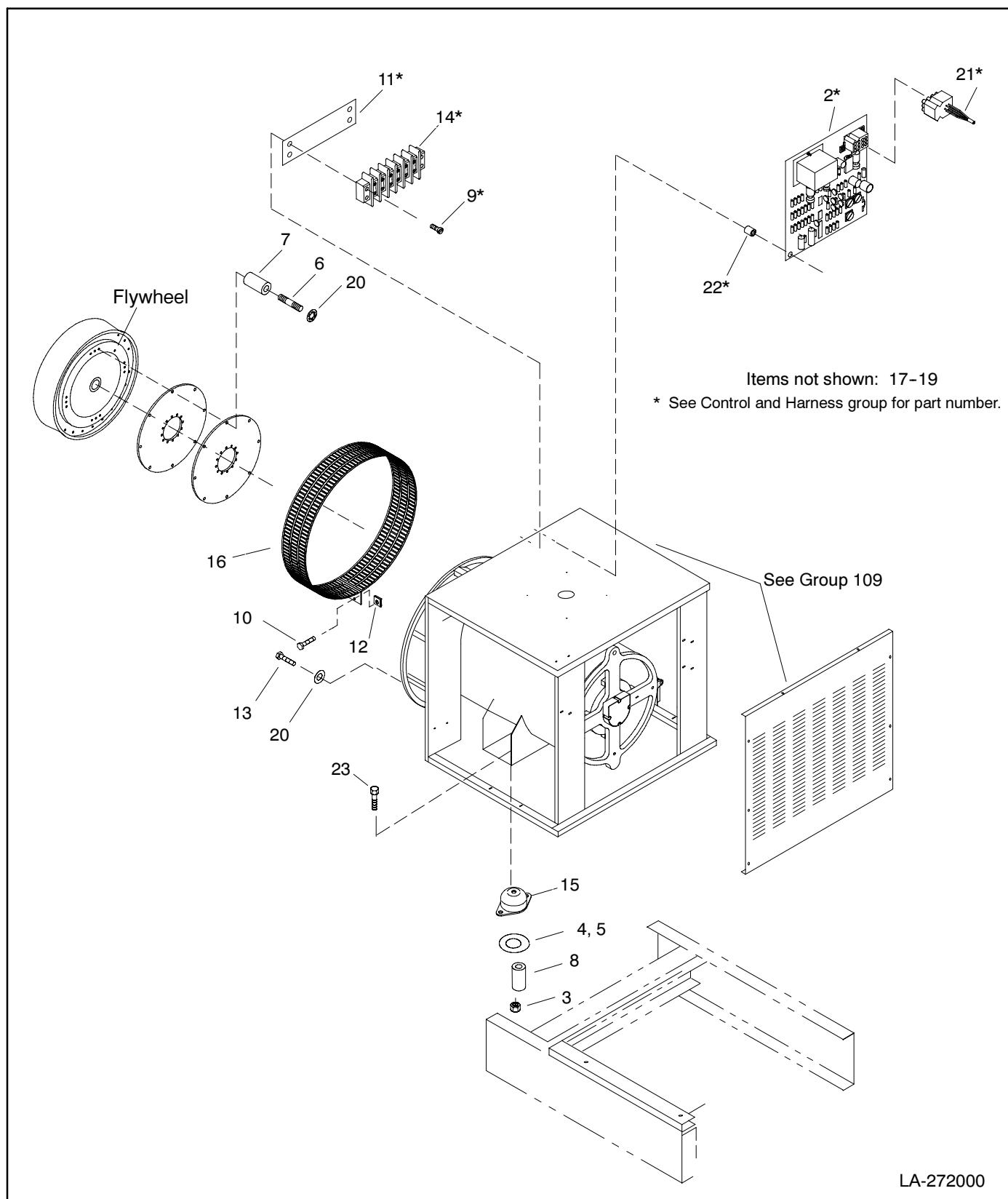
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Group 109: Skid and Plant Mounting

Item	Part Number	Description	Quantity	
			Kit Number	
			324929	GM34437-MA1
1	X-211-1	Fitting, elbow, street, 1/2 in.	1	1
2	X-22-16	Washer, lock, .326 ID x .883 in. OD	3	8
3	X-22-17	Washer, lock, .782 ID x 1.233 in. OD	4	4
4	X-426-3	Clamp, hose, .56/1.06 in.	2	2
5	X-577-34	Hose, rubber, straight, .62 in. ID	1	1
6	X-582-1	Coupling, hose	1	1
7	X-6046-6	Strap, ground	2	2
8	X-6216-1	Screw, Phillips hex crimp-tite	12	12
12	X-6278-5	Washer, nylon, 1 ID x 1.25 OD x .062 in	1	1
14	X-75-3	Plug, pipe 1/2	1	1
15	222844	Box, junction	1	
15	GM10555	Box, junction		1
16	272701	Valve, oil drain	1	1
18	324720	Adapter, bushing	1	1
19	324881	Skid	1	
19	GM34438	Skid		1
20	324903	Bracket, mounting	1	1
21	336001	Cover, side	2	2
22	336004	Cover, rear	1	1
23	336085	Bracket, junction box	2	
23	GM34439	Bracket, junction box mtg.		4
24	336813	Vibromount	2	2
25	X-25-112	Washer, plain	2	2
26	X-301-45	Plug, button	1	1

Group 201: Generator and Mounting

Permanent Magnet-Excited Alternators



LA-272000

Group 201: Generator and Mounting

Permanent Magnet-Excited Alternators

Item	Part Number	Description	Qty.
1	See chart below	Alternator assembly (see items 1-34 on following pages)	1
2	*	PCB assembly, V/Hz regulator, FRII	1
3	X-101-23	Nut, hex elastic stop, 1/2-13	2
4	X-25-103	Washer, plain, .531 ID x 2.75 in. OD	2
5	X-25-30	Washer, plain, .562 ID x 1.25 in. OD	2
6	X-352-63	Stud, 3/8-16 x 4 in.	8
7	X-400-132	Spacer, .406 ID x .625 OD x 2.531 in	8
8	X-400-197	Spacer, .532 ID x .75 OD x 2.88 in.	2
9	*	Screw, cross recess round head machine	2
10	X-67-125	Screw, hex washer, thread-forming	4
11	*	Marker, strip	1
12	257442	Clip, speed	4
13	270158	Screw, 3/8-1 x 1 1/2	12
14	*	Block, terminal	1
15	324393	Vibromount	2
16	347268	Guard, generator fan	2
17	X-750-14	Marker, wire (not shown)	1
18	X-750-15	Marker, wire (not shown)	1
19	X-750-16	Marker, wire (not shown)	1
20	X-801-3	Washer, hardened, .406 ID x .812 in. OD	20
21	*	Wiring harness, CT harness, FRII	1
22	*	Standoff, circuit board	4
23	X-129-30	Screw, hex head	2

* See Control and Harness group for part number.

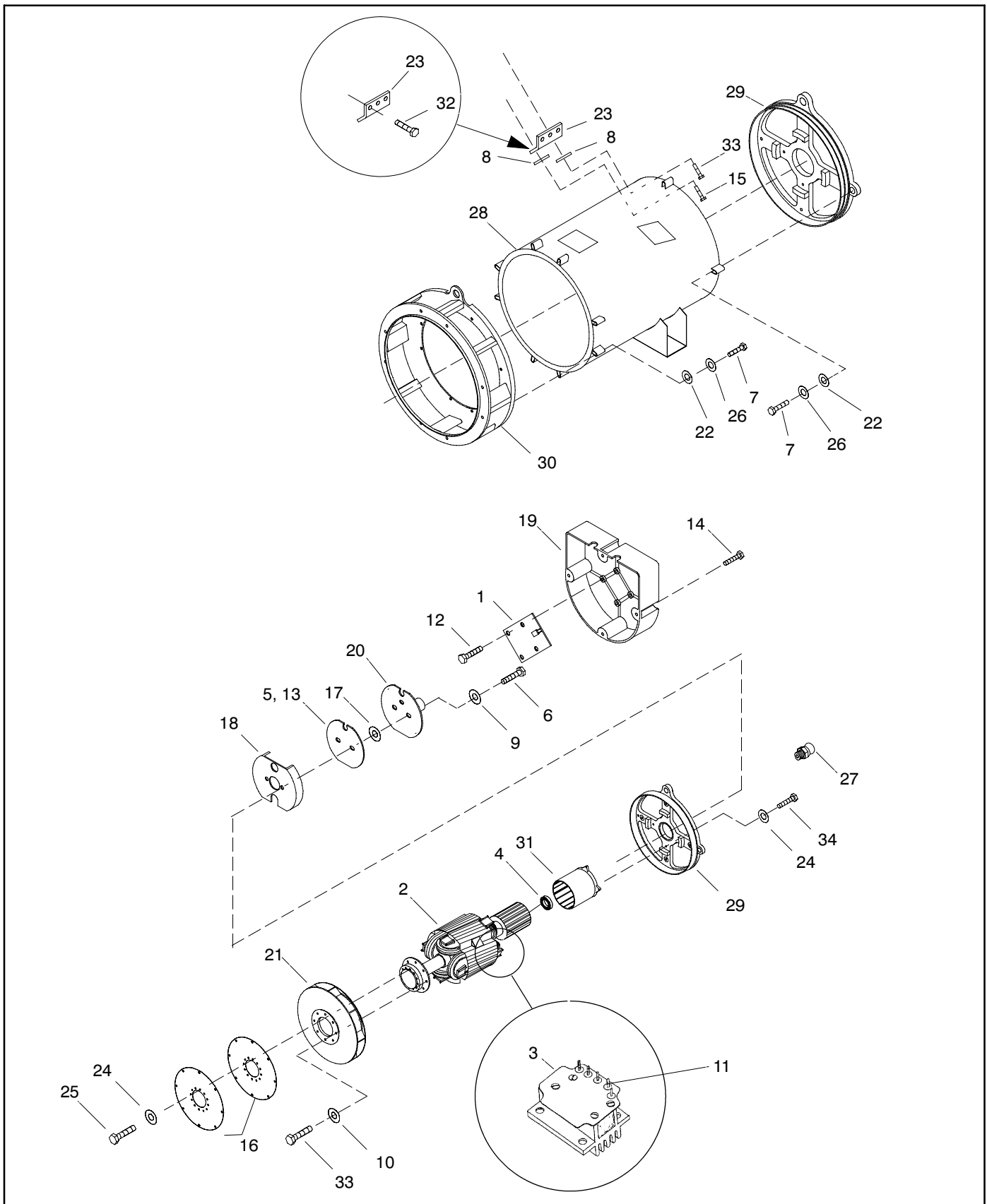
Alternator Part Number and Mount Type

Use this table to identify the module number's alternator part number.

Module/Kit No.	Alternator Description	Item 1, Alternator Assembly
324908	4UA9	B-347218
324920	4UA9, 600 V	B-347120
324921	4UA13	B-365221
324922	4UA13, 600 V	B-365234
GM19585-MA1	4UA9	B-347218
GM19585-MA2	4UA9, 600 V	B-347120
GM19585-MA3	4UA13	B-365221
GM19585-MA4	4UA13, 600 V	B-365234
GM19673-MA38	4UA9 (left side leads)	GM24411-11
GM19673-MA39	4UA9, 600 V (left side leads)	GM24411-12
GM19673-MA40	4UA13 (left side leads)	GM24411-15
GM19673-MA41	4UA13, 600 V (left side leads)	GM24411-16

Group 201: Generator and Mounting, continued

Permanent Magnet-Excited Alternators



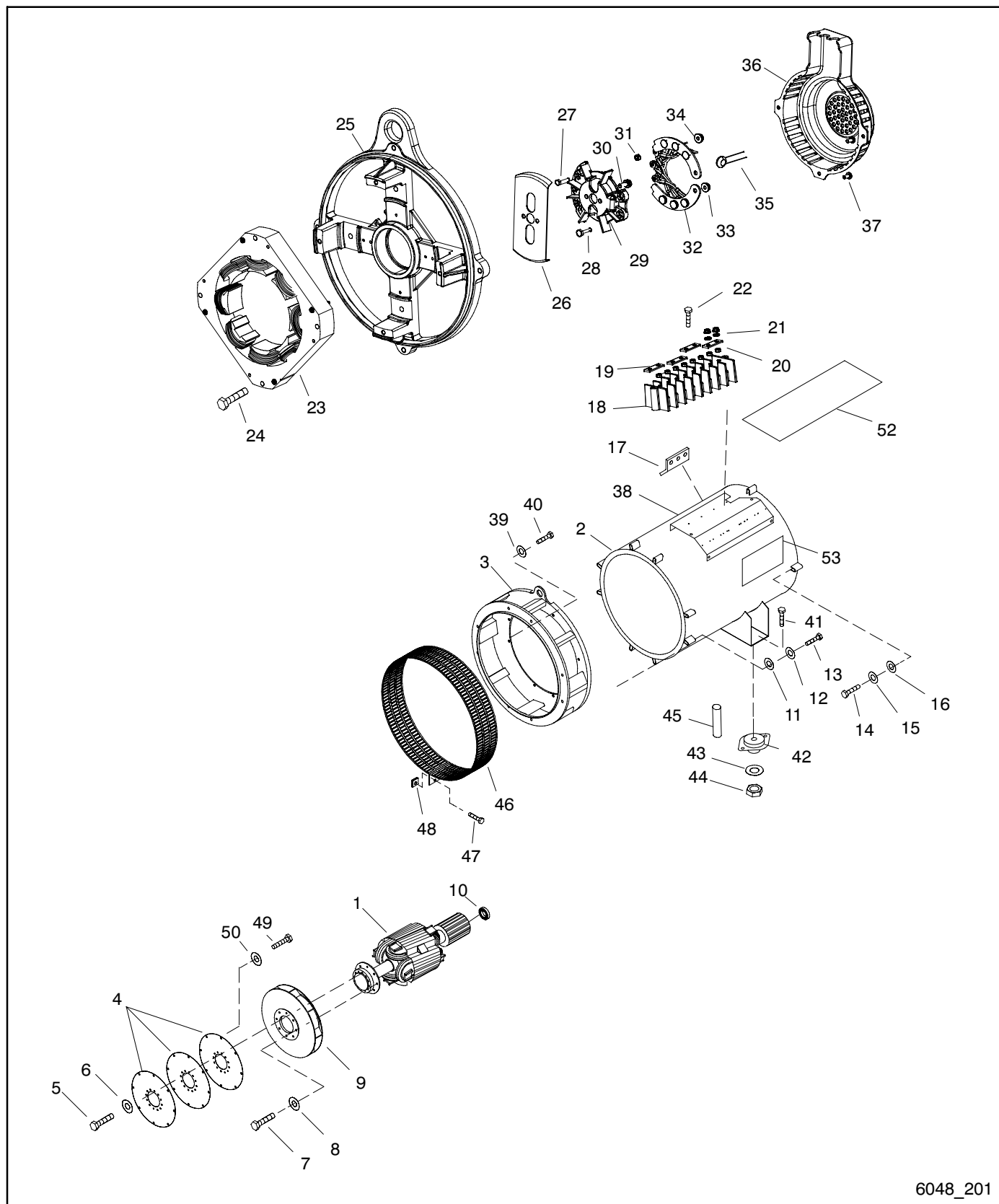
Group 201: Generator and Mounting, continued

Permanent Magnet-Excited Alternators

Item	Part Number	Description	Quantity							
			Alternator Assembly Number							
			B-347218	GM24411-11	B-347120	GM24411-12	B-365221	GM24411-15	B-365234	GM24411-16
1	A-257099	PCB assembly, LED, FRII	1	1	1	1	1	1	1	1
2	A-347191	Rotor assembly	1	1	1	1				
2	A-365222	Rotor assembly					1	1	1	1
3	A-354299	Heatsink	1	1	1	1	1	1	1	1
4	X-758-9	Bearing, ball	1	1	1	1	1	1	1	1
5	B-360418	PCB assembly, photo receiver	1	1	1	1	1	1	1	1
6	X-117-5	Screw, hex head machine	2	2	2	2	2	2	2	2
7	X-129-25	Screw, hex head machine	12	12	12	12	12	12	12	12
8	X-22-46	Washer, lock, .391 ID x .975 in. OD	2	2	2	2	2	2	2	2
9	X-22-9	Washer, lock, .20 ID x .373 in. OD	2	2	2	2	2	2	2	2
10	X-25-93	Washer, plain, .406 ID x .75 in. OD	8	8	8	8	8	8	8	8
11	X-431-25	Terminal, fast-on, female, 18-22 AWG	4	4	4	4	4	4	4	4
12	X-6071-1	Screw, Phillips pan head, thread-forming	4	4	4	4	4	4	4	4
13	X-6093-8	Sleeve	2	2	2	2	2	2	2	2
14	X-67-133	Screw, hex washer, thread-forming	3	3	3	3	3	3	3	3
15	X-791-6	Screw, hex head machine	1	1	1	1	1	1	1	1
16	222881	Lamination, armature drive	4	4	4	4	4	4	4	4
17	243321	Washer, insulating, .195 ID x .5 in. OD	2	2	2	2	2	2	2	2
18	257077	Actuator, magnetic cup	1	1	1	1	1	1	1	1
19	257258	Cover, FR LED circuit board	1	1	1	1	1	1	1	1
20	257850	Insulator	1	1	1	1	1	1	1	1
21	257855	Fan, generator	1	1	1	1	1	1	1	1
22	257951	Washer, special, .562 ID x 1.13 in. OD	12	12	12	12	12	12	12	12
23	257978	Bus	1	1	1	1				
23	257979	Connector					1	1	1	1
24	X-801-3	Washer, hardened, .406 ID x .812 in. OD	16	16	16	16	16	16	16	16
25	270158	Screw, cylinder head, 3/8-16 x 1 1/2	12	12	12	12	12	12	12	12
26	290945	Washer, hardened, .531 ID x 1.06 in. OD	12	12	12	12	12	12	12	12
27	347119	Fitting, grease	1	1	1	1	1	1	1	1
28	347197	Stator assembly	1							
28	GM24409-2	Stator assembly		1						
28	347203	Stator assembly			1					
28	GM24410-2	Stator assembly				1				
28	347199	Stator assembly					1			
28	GM24409-4	Stator assembly						1		
28	347205	Stator assembly							1	
28	GM24410-4	Stator assembly								1
29	347236	End bracket	1	1	1	1	1	1	1	1
30	347241	Adapter, generator	1	1	1	1	1	1	1	1
31	347707	Exciter field assembly	1	1	1	1	1	1	1	1
32	X-6238-5	Screw, hex head	3	3	3	3	6	6	6	6
33	X-6238-11	Screw, hex head	9	9	9	9	9	9	9	9
34	X-6238-17	Screw, hex head	4	4	4	4	4	4	4	4

Group 201: Generator and Mounting, continued

Wound Field Alternators



6048_201

Group 201: Generator and Mounting, continued

Wound Field Alternators

Item	Part No.	Description	Qty.	Item	Part No.	Description	Qty.
1	See chart below	Rotor assembly	1	26	GM31967	Actuator, magnetic	1
2	See chart below	Stator assembly	1	27	M933-05020-60	Screw, hex cap	3
3	GM32012	Adapter, generator	1	28	M933-06020-60	Screw, hex cap	2
4	GM31971	Disc, drive	4	29	GM31960	Hub, rotating diode assembly	1
5	M933-12040-82	Screw, hex cap	12	30	M933-06016-60	Screw, hex cap	2
6	290945	Washer, .531 ID x 1.06 in. OD	12	31	M934-05-50	Nut, hex, 5 mm	3
7	M933-10025-60	Screw, hex cap	8	32	GM31963	Plates, diode assembly	1
8	X-25-93	Washer, .406 ID x .75 in. OD	8	33	M982-06-80	Nut, hex, elastic stop	2
9	257855	Fan, generator	1	34	M982-05-60	Nut, hex, elastic stop	3
10	X-758-9	Bearing, ball	1	35	228061	Varistor, 250 V	1
11	257951	Washer, .562 ID x 1.13 in. OD	8	36	GM31968	Cover, rotating diode assembly	1
12	290945	Washer, .531 ID x 1.06 in. OD	8	37	M7500D-05010-81	Screw, thread forming metric	3
13	M931-12095-60	Screw, hex cap	8	38	344295	Decal, equipment ground	1
14	M931-12095-60	Screw, hex cap	4	39	X-801-6	Washer, .469 ID x .922 in. OD	8
15	290945	Washer, .531 ID x 1.06 in. OD	4	40	X-6024-14	Screw, hex head	8
16	257951	Washer, .562 ID x 1.13 in. OD	4	41	M931-12110-60	Screw, hex cap	2
17	257978	Bus	1	42	324392	Vibromount	2
18	GM31969	Block, terminal	1	43	X-25-103	Washer, plain, .531 ID x 2.75 in. OD	2
19	See chart below	Link, terminal block		44	M982-12-80	Nut, hex, elastic stop	2
20	See chart below	Nut, hex, 10 mm		45	X-400-197	Spacer, .532 ID x .75 OD x 2.88 in.	2
21	See chart below	Washer, plain		46	347268	Guard, generator fan	2
22	M7500D-06020-81	Screw	2	47	X-67-125	Screw, hex washer, thread-forming	4
23	GM32518-1	Exciter field	1	48	257442	Clip, speed	4
23	GM32518-2	Exciter field (4UA13W alternators)	1	49	X-129-59	Bolt, hex cap	8
24	M931-08060-60	Screw, hex head	4	50	290945	Washer, hardened, .531 ID x 1.06 in. OD	8
24	M931-08085-60	Screw, hex head (4UA13W alternators)	4	51	See chart below	Alternator assembly (includes items 1-38)	1
25	GM31973	Bracket, end	1	52	See chart below	Decal, terminal board	1
				53	See chart below	Decal, board reconnection	

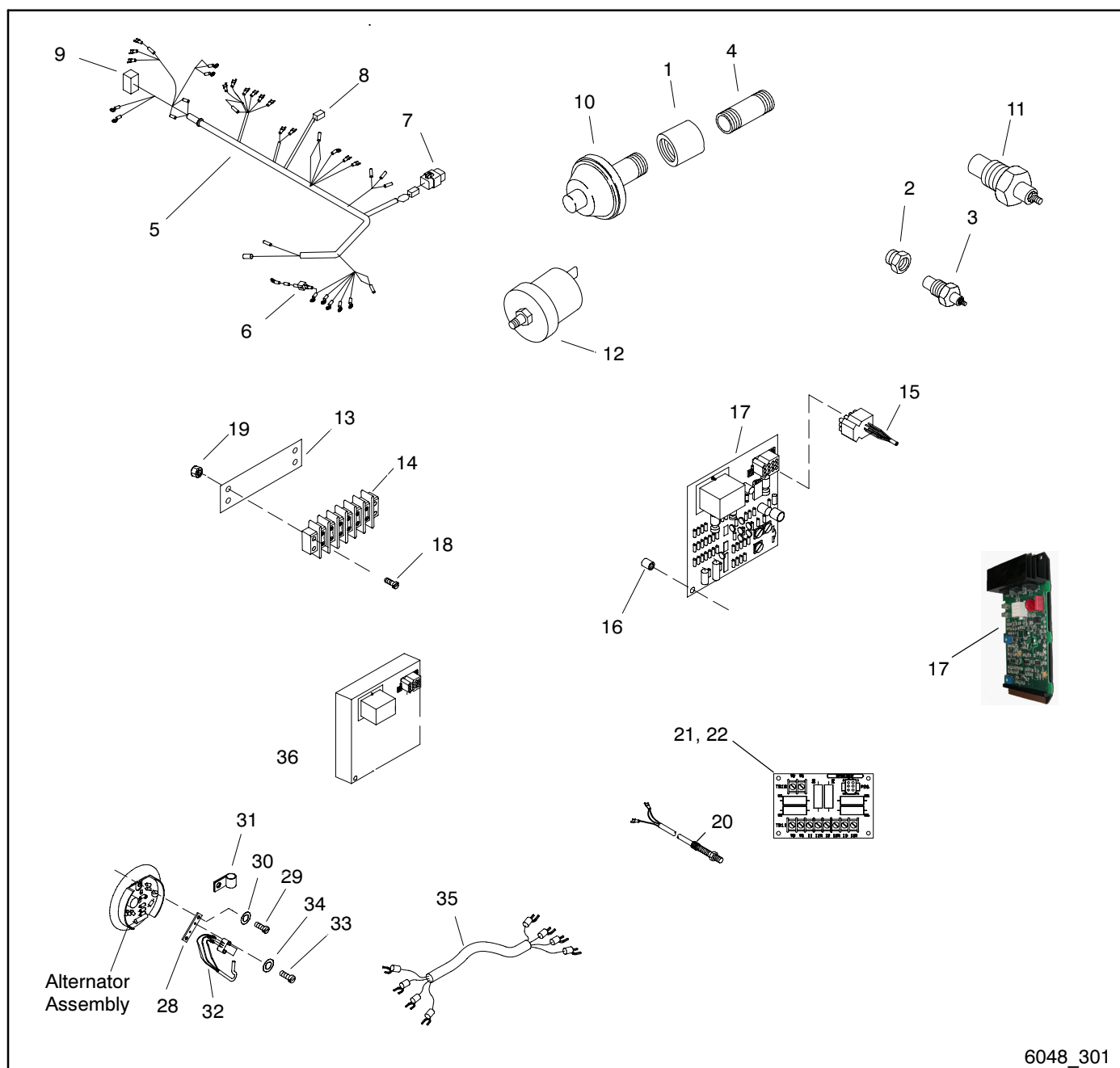
Alternator Part Number and Type

Use this table to identify the module number's alternator, rotor, and stator part numbers.

Module No.	Alternator Description	Item 51, Alternator assembly	Item 1, Rotor assembly	Item 2, Stator assembly	Item 19, Bus	Item 20, Nut	Item 21, Washer
GM19673-MA79	4UA9W	GM33000-5	GM32424-3	GM32996-2	GM31970	M6923-10-80	M125A-10-80
GM19673-MA80	4UA9W, 600 V	GM33000-7	GM32424-3	GM32997-2	GM31970	M6923-10-80	M125A-10-80
GM19673-MA81	4UA13W	GM33000-13	GM32424-7	GM39830	GM31970	M6923-10-80	M125A-10-80
GM19673-MA82	4UA13W, 600 V	GM33000-15	GM32424-7	GM32997-4	GM31970	M6923-10-80	M125A-10-80
GM19673-MA144	4UA9W	GM39945-5	GM32424-3	GM32996-2	See Load Connection Kit for part number		
GM19673-MA145	4UA9W, 600 V	GM39945-7	GM32424-3	GM32997-2			
GM19673-MA146	4UA13W	GM39945-13	GM32424-7	GM39830			
GM19673-MA147	4UA13W, 600 V	GM39945-15	GM32424-7	GM32997-4			

Module No.	Item 52, Decal	Item 53, Decal
GM19673-MA79	GM38474	GM39793
GM19673-MA80	GM38474	GM39793
GM19673-MA81	GM38474	GM39793
GM19673-MA82	GM38474	GM39793
GM19673-MA144	GM38475	GM39792
GM19673-MA145	GM38475	GM39792
GM19673-MA146	GM38475	GM39792
GM19673-MA147	GM38475	GM39792

Control and Harness



6048_301

Control and Harness

Item	Part Number	Description	Quantity			
			Variation Number			
			GM19638-MA1	GM19638-MA2	GM19639-MA1	GM19639-MA2
1	X-216-24	Coupling, pipe, 1/8 x 1 3/16 in.	1	1	1	1
2	153659	Bushing, reducing, 1/2 x 3/4 in. NPT	1	1		
3	268298	Sender, water temperature	1	1		
4	289055	Nipple, pipe, 1/8 x 1 1/2 in.	1	1	1	1
5	324913	Harness, engine wiring (includes items 6-9)	1	1		
5	GM16869	Harness, engine wiring (includes items 6-9)			1	
5	GM35191	Harness, engine wiring (includes items 6-9)				1
6	233959	Diode, 6 A	4	4	4	4
7	295145	Connector, 24-position	1	1	1	1
8	324934	Connector kit	1	1	1	1
9	324935	Connector kit, 60 pin EMC155	1	1	1	1
10	328309	Switch assembly, pressure	1	1		
10	GM16788	Sensor, pressure, 1/8-27 NPT			1	1
11	336923	Switch, high temperature shutoff	1	1		
11	GM31045-1	Sensor, temperature			1	1
12	343473	Sender, oil pressure	1	1		
13	255080	Marker, strip	1	1		
14	295314	Block, terminal	1	1		
15	354118	Wiring harness, CT harness	1			
15	GM34978	Wiring harness, CT harness		1		
16	360459	Standoff, circuit board	4			
16	#	Hardware, M4		4		
17	A-354653	PCB assembly, regulator	1			
17	GM31850	PCB assembly, regulator		1		
18	M7985A-04020-20	Screw, pan head machine	2	2		
19	M934-04-50	Nut, hex, 4mm	2	2		
20	255750	Pickup, magnetic			1	1
21	282829	Vibromount			4	4
22	GM13980	PCB assembly, CT Burden Resistor			1	1
28	257070	Bracket, sensor mounting	1			
29	X-117-5	Screw, hex head machine	2			
30	X-22-9	Washer, lock, .20 ID x .373 in. OD	2			
31	X-672-15	Clamp, insulated, .25 in.	1			
32	241623	Sensor, ferromagnetic	1	1		
33	X-49-35	Screw, pan head, 4-40 x 7/8	2			
33	M7985A-03020-20	Screw, pan head		2		
34	X-22-24	Washer, lock, .119 ID x .263 in. OD	2	2		
35	GM35357	Harness, wiring (AC harness)		1		1
36	GM11718	PCB assembly, excitation interface				1

Common hardware. Procure locally.

Group 701: Literature

Item	Part Number	Description	Quantity	
			Variation Number 19	33
1	MP-5353	S/M 20-300 kW Industrial	1	1
2	MP-5700	I/M Industrial	1	1
3	MP-6116	P/C Accessories, 20-200 kW Diesel	1	1
4	TP-5711	P/C DDC Series 40	1	1
5	MP-5988	W/D 200-400DSE	1	
5	MP-6338	W/D 200DSEB, 350/400DSE, 450DSEB		1
6	MP-5750	O/M 20-2000 kW	1	
6	MP-6161	O/M Microprocessor-Plus w/comm.		1
8	MP-5829	O/M Digital Controller	1	
9	MP-6009	P/C Controllers	1	1
10	TP-6030	S/M DDC 40E 200 kW	1	1
11	TP-6031	O/M DDC 40E 200 kW	1	1
12	MP-6048	P/C 200DSE	1	1
13	MP-6083	O/M Digital 550 Controller	1	
14	MP-6140	O/I/M Controller Setup & Application, Digital 550	1	1
15	MP-6200	O/M Digital 550 Version 2.10	1	1

Controller Kits

See Parts Catalog MP-6009 P/C Controllers for 7-Light, 16-Light, Digital, and Digital 550 controller parts.

Cooling System Kits

Heater, Block, 110-120 V, 1800 W	324910
Heater, Block, 190-280/220-240 V, 2000 W	324911
Duct Flange, radiator	324924

Optional Kits

See Parts Catalog MP-6116 P/C Accessories for parts lists of optional kits.

Paint and Miscellaneous Parts

Generator Paint (Spray Can)	221331
Generator Paint (Gallon Can)	221332

Cooling System Kits

Qty.	Description	Part No.
------	-------------	----------

Heater, Block		324910
1	Fitting, tee, pipe, 1/4 in.	A-110
1	Fitting, tee, pipe, 1/2 in.	X-203-13
1	Nipple, pipe, 1/2 x 1 1/2 in.	X-209-5
1	Nipple, pipe, 1/4 x 7/8 in.	X-220-5
1	Hose, molded, .62 in. ID (2.33 ft.)	X-312-35
1	Hose, molded, .62 in. ID (4.067 ft.)	X-312-36
1	Fitting, hose connector, 90°	X-391-2
6	Clamp, hose, .5/1 in.	X-426-10
1	Coupling, hose	X-582-1
1	Coupling, hose	X-582-22
1	Tag, hang	279047
1	Plug, freeze	324094
1	Heater, block, 120 volt	324930
1	Bracket, block heater mounting	326219

Heater, Block		324911
1	Fitting, tee, pipe, 1/4 in.	A-110
1	Fitting, tee, pipe, 1/2 in.	X-203-13
1	Nipple, pipe, 1/2 x 1 1/2 in.	X-209-5
1	Nipple, pipe, 1/4 x 7/8 in.	X-220-5
1	Hose, molded, .62 in. ID (2.33 ft.)	X-312-35
1	Hose, molded, .62 in. ID (4.067 ft.)	X-312-36
1	Fitting, hose connector, 90°	X-391-2
6	Clamp, hose, .5/1 in.	X-426-10
1	Coupling, hose	X-582-1
1	Coupling, hose	X-582-22
1	Tag, hang	279047
1	Plug, freeze	324094
1	Heater, block, 240 volt	324931
1	Bracket, block heater mounting	326219

Qty.	Description	Part No.
------	-------------	----------

Duct Flange, Radiator		324924
8	Rivet, pop	X-781-11
2	Frame, air duct, top/bottom	324971
2	Frame, air duct, sides	324972

Appendix A Abbreviations

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

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

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

Appendix B Common Hardware Application Guidelines

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

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

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

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

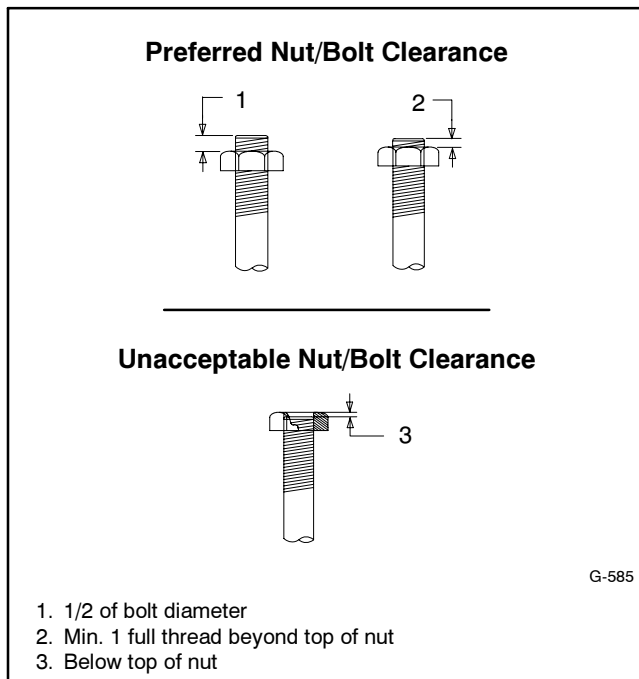


Figure 1 Acceptable Bolt Lengths

Steps for common hardware application:

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

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

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

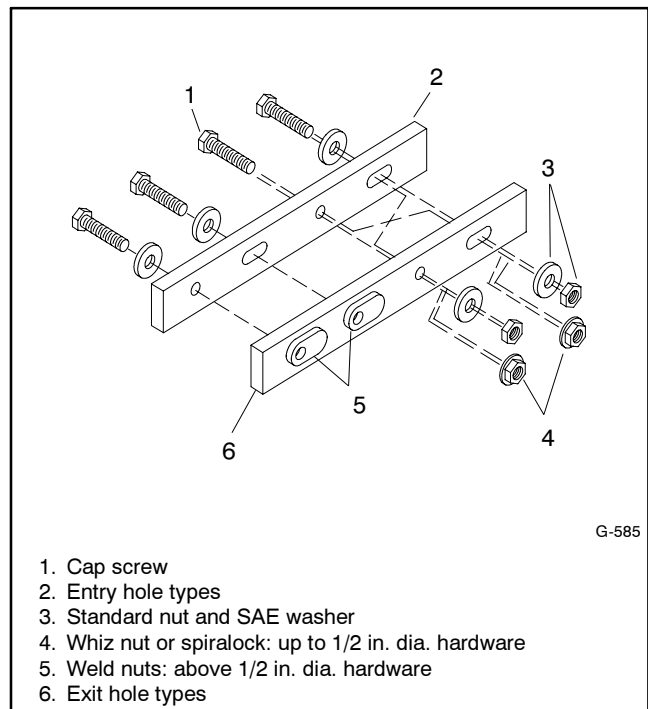


Figure 2 Acceptable Hardware Combinations

Appendix C General Torque Specifications

American Standard Fasteners Torque Specifications					
Size	Torque Measurement	Assembled into Cast Iron or Steel			Assembled into Aluminum Grade 2 or 5
		Grade 2	Grade 5	Grade 8	
8-32	Nm (in. lb.)	1.8 (16)	2.3 (20)	—	See Note 3
10-24	Nm (in. lb.)	2.9 (26)	3.6 (32)	—	
10-32	Nm (in. lb.)	2.9 (26)	3.6 (32)	—	
1/4-20	Nm (in. lb.)	6.8 (60)	10.8 (96)	14.9 (132)	
1/4-28	Nm (in. lb.)	8.1 (72)	12.2 (108)	16.3 (144)	
5/16-18	Nm (in. lb.)	13.6 (120)	21.7 (192)	29.8 (264)	
5/16-24	Nm (in. lb.)	14.9 (132)	23.1 (204)	32.5 (288)	
3/8-16	Nm (ft. lb.)	24.0 (18)	38.0 (28)	53.0 (39)	
3/8-24	Nm (ft. lb.)	27.0 (20)	42.0 (31)	60.0 (44)	
7/16-14	Nm (ft. lb.)	39.0 (29)	60.0 (44)	85.0 (63)	
7/16-20	Nm (ft. lb.)	43.0 (32)	68.0 (50)	95.0 (70)	
1/2-13	Nm (ft. lb.)	60.0 (44)	92.0 (68)	130.0 (96)	
1/2-20	Nm (ft. lb.)	66.0 (49)	103.0 (76)	146.0 (108)	
9/16-12	Nm (ft. lb.)	81.0 (60)	133.0 (98)	187.0 (138)	
9/16-18	Nm (ft. lb.)	91.0 (67)	148.0 (109)	209.0 (154)	
5/8-11	Nm (ft. lb.)	113.0 (83)	183.0 (135)	259.0 (191)	
5/8-18	Nm (ft. lb.)	128.0 (94)	208.0 (153)	293.0 (216)	
3/4-10	Nm (ft. lb.)	199.0 (147)	325.0 (240)	458.0 (338)	
3/4-16	Nm (ft. lb.)	222.0 (164)	363.0 (268)	513.0 (378)	
1-8	Nm (ft. lb.)	259.0 (191)	721.0 (532)	1109.0 (818)	
1-12	Nm (ft. lb.)	283.0 (209)	789.0 (582)	1214.0 (895)	

Metric Fasteners Torque Specifications, Measured in Nm (ft. lb.)				
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	6.2 (4.6)	9.5 (7)	13.6 (10)	See Note 3
M8 x 1.25	15.0 (11)	23.0 (17)	33.0 (24)	
M8 x 1.00	16.0 (11)	24.0 (18)	34.0 (25)	
M10 x 1.50	30.0 (22)	45.0 (34)	65.0 (48)	
M10 x 1.25	31.0 (23)	47.0 (35)	68.0 (50)	
M12 x 1.75	53.0 (39)	80.0 (59)	115.0 (85)	
M12 x 1.50	56.0 (41)	85.0 (63)	122.0 (90)	
M14 x 2.00	83.0 (61)	126.0 (93)	180.0 (133)	
M14 x 1.50	87.0 (64)	133.0 (98)	190.0 (140)	
M16 x 2.00	127.0 (94)	194.0 (143)	278.0 (205)	
M16 x 1.50	132.0 (97)	201.0 (148)	287.0 (212)	
M18 x 2.50	179.0 (132)	273.0 (201)	390.0 (288)	
M18 x 1.50	189.0 (140)	289.0 (213)	413.0 (305)	

Notes:

1. Do not use these values when the torque values are specified on the assembly drawing.
2. These values are based on new plates threads. Increase values by 15% if non-plated threads are used.
3. Hardware threaded into aluminum must have two diameters of thread engagement or may require 30% or more reduction in the torque.
4. Torques are calculated as equivalent stress loading to American hardware and approximately a preload of 90% of yield strength and friction coefficient of 0.125.

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)

1/4-20 x 1
 — Length In Inches (Screws and Bolts)
 — Threads Per Inch
 — Major Thread Diameter In Fractional Inches Or Screw Number Size

Metric (Screws, Bolts, Studs, and Nuts)

M8-1.25 x 20
 — Length In Millimeters (Screws and Bolts)
 — Distance Between Threads In Millimeters
 — Major Thread Diameter In Millimeters

Plain Washers

9/32 x 5/8 x 1/16
 — Thickness
 — External Dimension
 — Internal Dimension

Lock Washers

5/8
 — Internal Dimension

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

Washers

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

Metric

Hex head bolts are hardness grade 8.8 unless noted.

Part No. Dimensions Hex Head Bolts (Partial Thread)

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

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

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

Hex Head Bolts (Full Thread)

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

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

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

Pan Head Machine Screws

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

Flat Head Machine Screws

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

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

Metric, continued

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

Washers

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

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



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