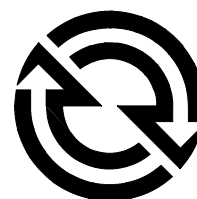


Service Parts

SPECTRUM[®]

DETROIT DIESEL



Generator Sets

Models:

600DSM

900DSM/1000DSM

2000DSM

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

See MP-6009 Parts Catalog Industrial Controller
for controller parts



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Introduction

This manual lists service replacement parts for 600, 900, 1000, 2000 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. The manufacturer of Spectrum® products 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.

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.

xin:004:002

Numbering System Significance

This manual uses the following numbering systems:

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

xin:004:003:a

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.

xin:004:004a

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	Air Intake	Cooling System	Engine	Nameplates and Decals	Skid and Plant Mounting	Generator and Mounting	Controller and Mounting	Literature
Group No.	101	104	105	107	109	201	301	701
Spec No.	Variation Number							

600DSM								
GM13277-GA1S	*	*	1	GR1S	*	*	†	157
GM16981-GA1S	*	*	2	GR1S	*	*	†	157
900DSM								
PA-111201	*	*	3	GR1S	*	*	†	150
PA-111202	*	*	4	GR1S	*	*	†	150
GM16982-GA1S	*	*	5	GR1S	*	*	†	150
GM16982-GA2S	*	*	6	GR1S	*	*	†	150
1000DSM								
PA-111203	*	*	4	GR1S	*	*	†	148
PA-111204	*	*	3	GR1S	*	*	†	148
GM16983-GA1S	*	*	5	GR1S	*	*	†	148
GM16983-GA2S	*	*	6	GR1S	*	*	†	148
2000DSM								
GM16647-GA1S	*	*	7	GR1S	*	*	†	162
GM16647-GA2S	*	*	8	GR1S	*	*	†	162

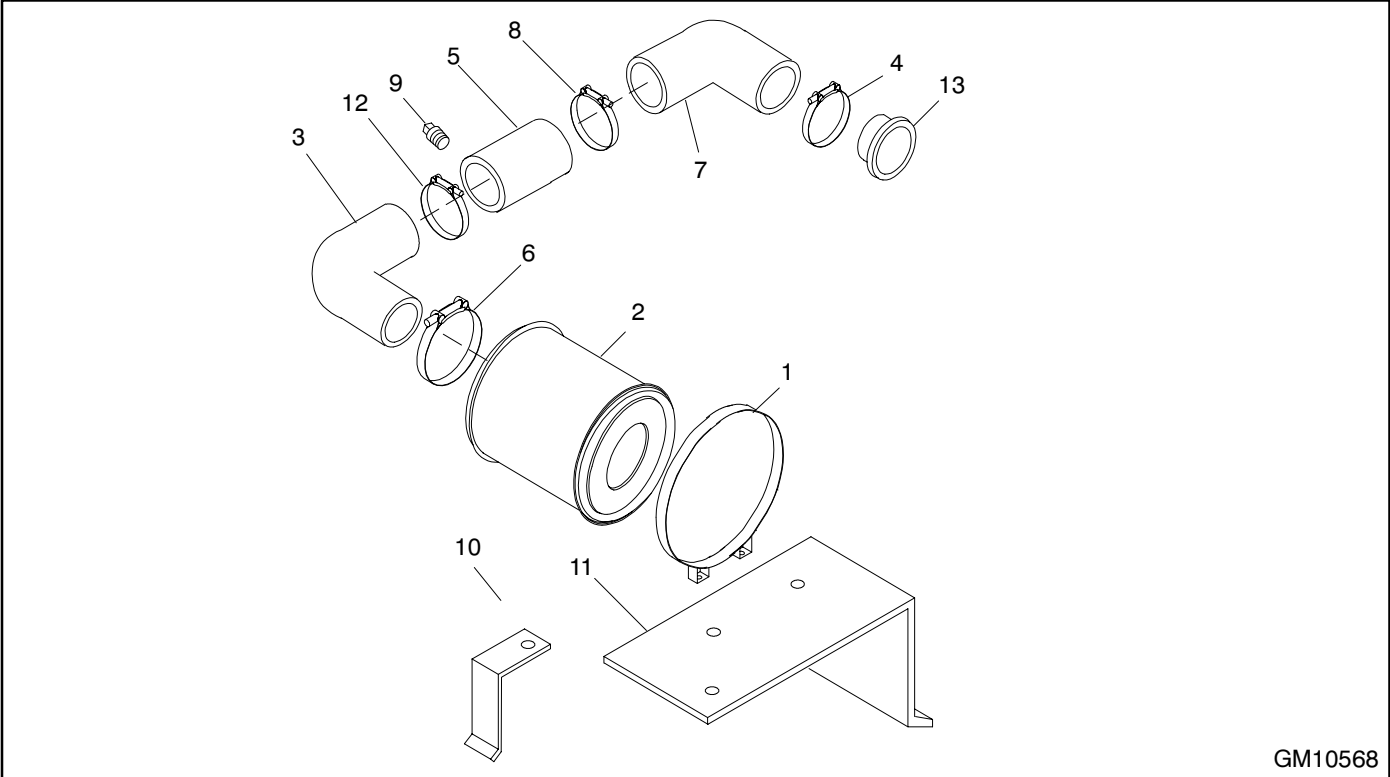
- * Configured group. Refer to the generator set nameplate for the module number.
Turn to the respective group on the following pages for parts breakdowns.
- † Configured group. Refer to the generator set nameplate for the module number.
See controller parts catalog MP-6009 P/C Controllers for controller parts lists.

Recommended Spare Parts

This table provides recommended spare part numbers for modular specs with a 16-light controller and a unit-mounted radiator.

Item	Part Number	Description	Quantity 900/1000 kW
1	291207	Fuse, 1.5 A, 250 V	5
2	A-336415	PC board, main controller	1
3	291740	Lamp, 125 V, .33 W	5
4	328725	Voltage regulator, Marathon DVR2000	1
5	A-336432	PC board, indicator controller	1
6	283420	Lamp, 28 V, 4.8 W	5
7	X-507-7	Hose, radiator, straight, 3 in. ID	1
8	X-6014-92	Hose, radiator, straight, 4 in. ID	1
9	GM13948	Belt	2
10	GM13944	Thermostat	1
11	GM13942	Element, oil filter	26
12	GM13945	Gasket, thermostat	4
13	272981	Air cleaner, industrial	12
14	GM13947	Filter, fuel	12
15	GM13943	Element, bypass oil	40
16	GM13946	Tip, injector	12
17	254832	Sensor, low fluid	1

Group 101: Air Intake
600/900/1000 kW



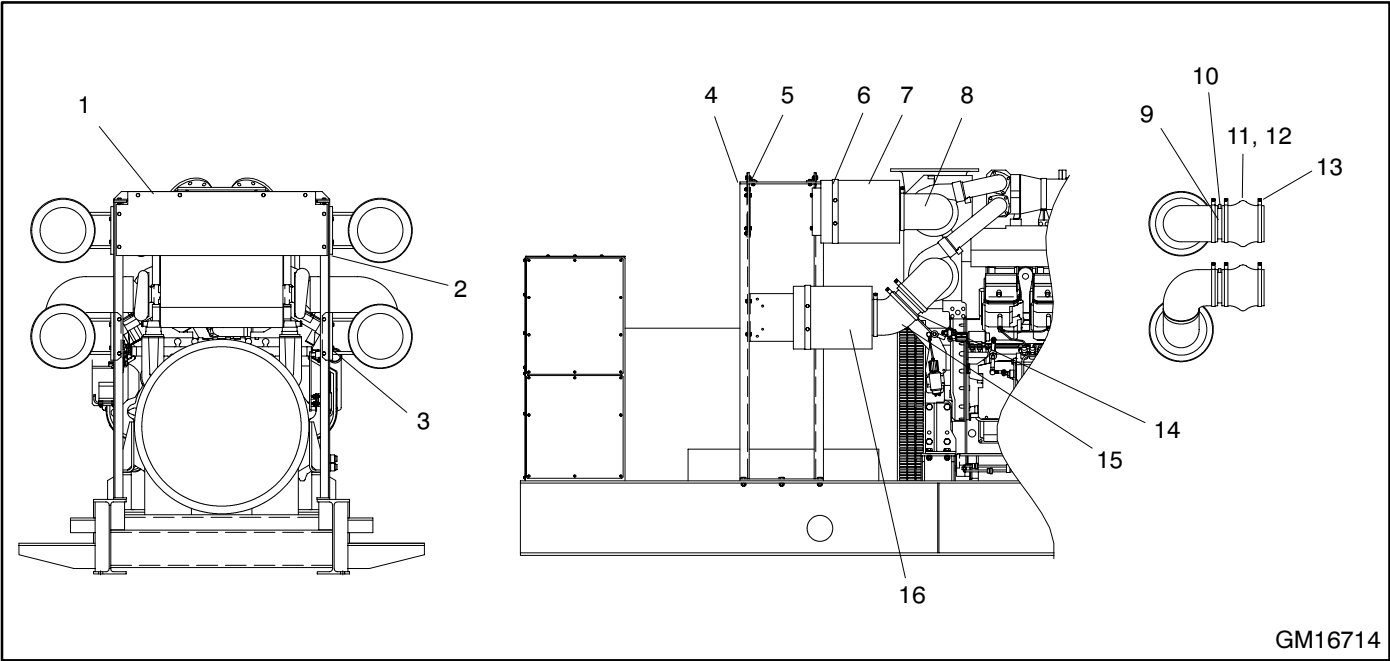
GM10568

Group 101: Air Intake

600/900/1000 kW

Item	Part Number	Description	Quantity							
			Module							
			GM10568-MA1	GM10655-MA1	GM12004-MA1	GM12052-MA1	GM23329-MA1	GM23330-MA1	GM30609-MA1	GM30610-MA1
1	272983	Clamp	2		1	2	2		1	2
1	279715	Bracket, air cleaner		4		2		4		
2	354842	Air cleaner, industrial			1				1	
2	272981	Air cleaner, industrial	2				2			
2	A-361366	Air cleaner		2				2		
2	A-279714	Air cleaner				1				1
2	279738	Element, air cleaner (heavy-duty air cleaner)		2		1		2		1
2	GM28622	Element, air cleaner (inner)		2		1		2		1
2	279722	Cap, rain (not shown)		2		1		2		1
3	272663	Hose, elbow, 90°, molded, 7 in. ID	2	2			2	2		
3	279716	Hose, elbow, 90°, 8 x 7 in. ID				1				1
3	X-522-95	Tube, steel, 177.8 OD x 165 long (not shown)		2				2		
3	279720	Hose, hump, straight, 7 in. ID (not shown)		2				2		
3	361847	Hose, hump (not shown)			1					
3	279743	Clamp, hose, 8.38/8.69 in. (not shown)		2				2		
3	GM16083	Hose, hump, 7 in. ID (not shown)							1	1
3	343587	Clamp, hose, 7.38/7.69 in. (not shown)		2	1			2	2	2
4	272960	Clamp, hose, 6.56/6.87 in.	2	2	1	1				
4	280998	Clamp, hose, 7.5/7.81 in.					2	2		
5	274623	Tube assembly	2				2			
5	GM10757	Tube assembly		2				2		
5	X-522-96	Tube, steel				1				1
6	280998	Clamp, hose, 7.5/7.81 in.	2	2			2	2		
6	279717	Clamp, hose, 8.63/8.94 in.				1				1
7	272627	Fitting, elbow, 90°	2	2						
7	GM23198	Hose, 90 deg. reducer (7 to 6 in.)					2	2		
7	361847	Hose, hump				1				
8	254013	Clamp, hose, 6.25/6.56 in.	2	2			2	2		
8	343587	Clamp, hose, 7.38/7.69 in.				1				
9	X-268-7	Cap, pipe	2	2			2	2		
10	GM10519	Bracket, air cleaner	2				2			
10	GM10651	Bracket, air cleaner, heavy-duty (not shown)		2				2		
10	GM10652	Bracket, air cleaner, heavy-duty (not shown)		2				2		
11	GM10518	Bracket, air cleaner	2				2			
11	GM11994	Bracket, air cleaner			1				1	
11	GM10654	Bracket, air cleaner, heavy-duty (not shown)		2				2		
11	GM10653	Bracket, air cleaner, heavy-duty		2				2		
11	GM12034	Bracket, air cleaner, heavy-duty				1				1
12	272960	Clamp, hose, 6.56/6.87 in.	2	2			2	2		
12	280998	Clamp, hose, 6.75/7.81 in.				1				1
13	GM16748	Insert, reducer (7 to 6.25 in.)					2	2		

Group 101: Air Intake
1600/2000 kW

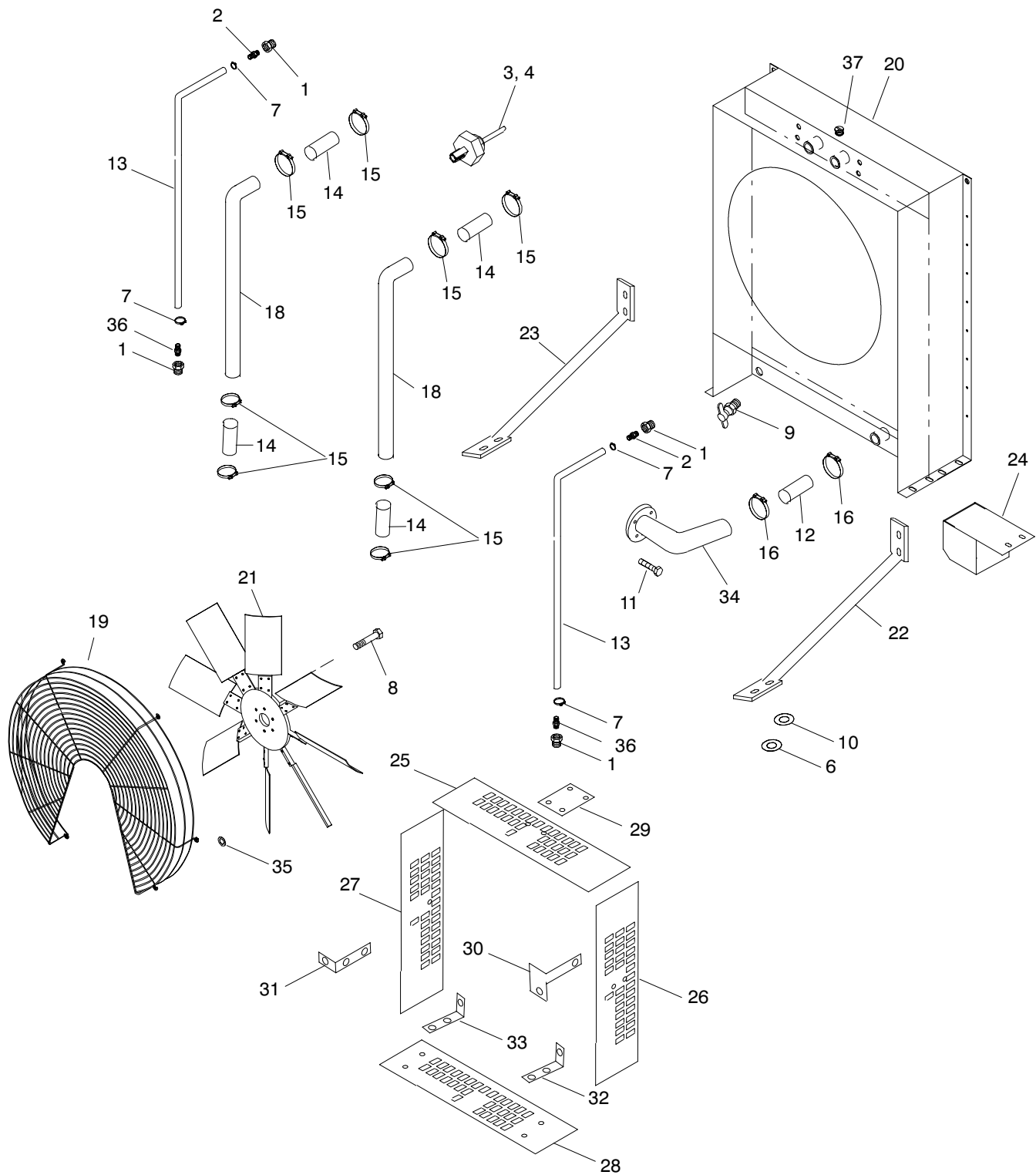


Group 101: Air Intake

1600/2000 kW

Item	Part Number	Description	Quantity	
			Module Number	
			GM16714-MA1	GM16761-MA1
1	GM16694	Plate, air cleaner support	2	2
2	GM18403	Bracket, air cleaner	2	
3	GM16693	Bracket, air cleaner	2	2
4	GM16709	Support, air cleaner	2	2
5	GM16712	Support, air cleaner, top	2	2
6	272983	Clamp	4	
6	291666	Bracket, air cleaner		8
7	272981	Air cleaner, industrial	2	
7	A-279713	Air cleaner		2
7	279736	Element, air cleaner		2
7	272674	Cap, rain		2
8	291678	Hose, 90° elbow, 7 in. x 7 in. ID	4	
8	GM16760	Hose, hump, 152.4 mm ID		2
8	272627	Hose, 90° elbow, 6 in. x 6 in. ID		4
8	X-522-59	Tube, steel		2
9	274664	Tube assembly	4	
9	274623	Tube assembly		4
10	X-75-1	Plug, pipe, 1/8 in. NPT	4	
10	X-268-1	Cap, pipe, 1/8 in. NPT		4
11	291679	Hose, hump, 7 in. ID	4	
11	279744	Hose, hump, 7 in. to 6 in. ID		4
12	GM16748	Hose, reducer insert	4	4
13	280998	Clamp, hose, 7.5/7.81 in.	20	4
13	254013	Clamp, hose, 6.25/6.56 in.		20
14	X-522-66	Tube, steel	2	
14	X-522-86	Tube, steel, 6 in. OD x 12 in.		2
15	347958	Hose, elbow, molded, 7 in. ID	2	
15	347806	Hose, elbow, molded, 6 in. ID		2
16	272981	Air cleaner, industrial	2	
16	A-354106	Air cleaner		2
16	279736	Element, air cleaner		2
16	272674	Cap, rain		2

Group 104: Cooling System



Items not shown: 5, 17

GM10569

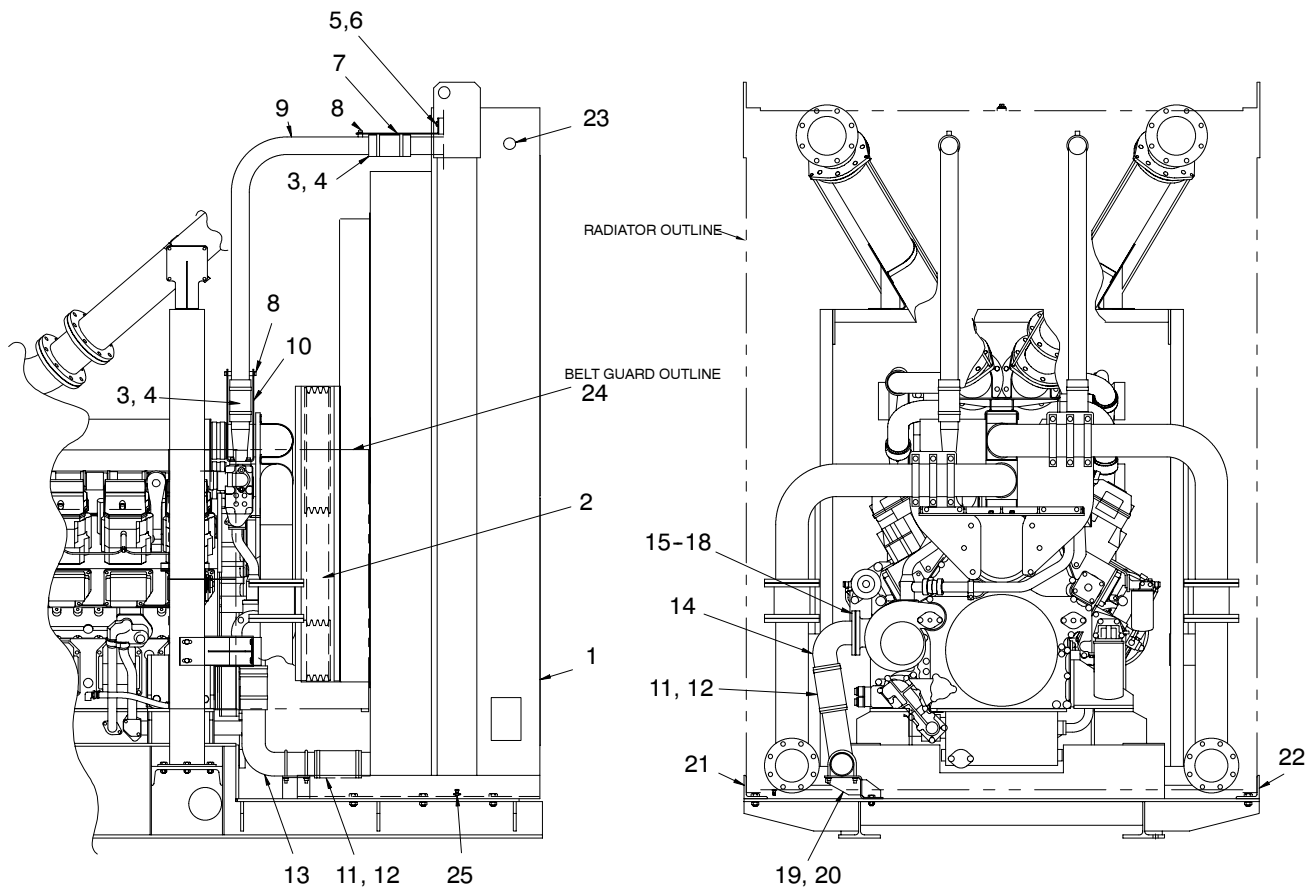
Group 104: Cooling System

600/900/1000 kW

Item	Part Number	Description	Quantity	
			Module Number	
			GM12013-MA1 600 kW	GM10569-MA1 900/1000 kW
1	X-202-30	Bushing, reducing, 1/4 x 3/8 in. NPT		4
2	X-652-3	Connector, hose		2
3	254832	Sensor, low fluid	1	1
4	X-6003-120	Conduit, convoluted	1	1
5	X-468-7	Cable tie		6
6	X-801-9	Washer, hardened, .688 ID x 1.373 in. OD		8
7	X-426-9	Clamp, hose, .25/.70 in., GM-NRP		4
8	M961-12040-82	Screw, HC		8
9	X-256-5	Valve, drain	1	1
10	X-6011-3	Washer, beveled, .68 ID x 1.5 in. OD	4	4
11	M961-16040-60	Screw, hex cap		4
12	X-6014-31	Hose, radiator, straight, 4 in. ID		1
13	X-6359-9	Hose, rubber, straight, .25 in. ID		2
14	X-507-7	Hose, radiator, straight, 3 in. ID		4
15	275527	Clamp, hose, 2.81/3.12 in.	1	
15	291542	Clamp, hose, 3.25/3.56 in.	1	8
16	291537	Clamp, hose, 3.75/4.06 in.	2	
16	343287	Clamp, hose, 4.14/4.44 in.		2
17	225127	Bushing, adapter, 3/8-18 x M16 x 1.5 in.		2
18	GM11965	Hose, upper radiator	1	
18	GM11962	Flange, water connection outlet	1	
18	M961-10030-60	Screw, hex cap	4	
18	GM10396	Tube, upper radiator		2
19	GM10379	Guard, wire fan		1
20	GM11938	Radiator assembly	1	
20	GM10376	Radiator assembly		1
21	GM11890	Fan, pusher	1	
21	GM10378	Fan, pusher		1
22	354532	Support, radiator, RS	1	
22	GM10384	Support, radiator, RS		1
23	354533	Support, radiator, LS	1	
23	GM10385	Support, radiator, LS		1
24	GM11966	Support, radiator	2	
24	GM10383	Support, radiator		4
25	GM12347	Guard, belt, top	1	
25	GM10539	Guard, belt, top		1
26	GM12350	Guard, belt, RS	1	
26	GM10540	Guard, belt, RS		1
27	GM12348	Guard, belt, LS	1	
27	GM10541	Guard, belt, LS		1
28	GM12349	Guard, belt, bottom	1	
28	GM10542	Guard, belt, bottom		1
29	GM12352	Bracket, belt guard mounting	1	
29	GM10543	Bracket, belt guard mounting		1
30	GM12351	Bracket, belt guard mounting	1	
30	GM12355	Bracket, belt guard mounting	1	
30	GM10544	Bracket, belt guard mounting		1
31	GM12353	Bracket, belt guard mounting	1	
31	GM10545	Bracket, belt guard mounting		1
32	GM10546	Bracket, belt guard mounting		1
32	GM12354	Bracket, belt guard mounting	2	
33	GM10547	Bracket, belt guard mounting		1
34	GM13749	Flange, water connection inlet	1	
34	M961-12030-60	Screw, hex cap	3	
34	GM11964	Hose, lower radiator	1	
34	GM10382	Tube, lower radiator		1
35	X-25-75	Washer, plain, .344 ID x .875 in. OD		12
36	X-391-20	Connector, 90°, 1/4 in. ID hose		2
37	GM16641	Cap, radiator	1	
37	GM23500	Cap, radiator	1	1

Group 104: Cooling System, continued

2000 kW Water Piping



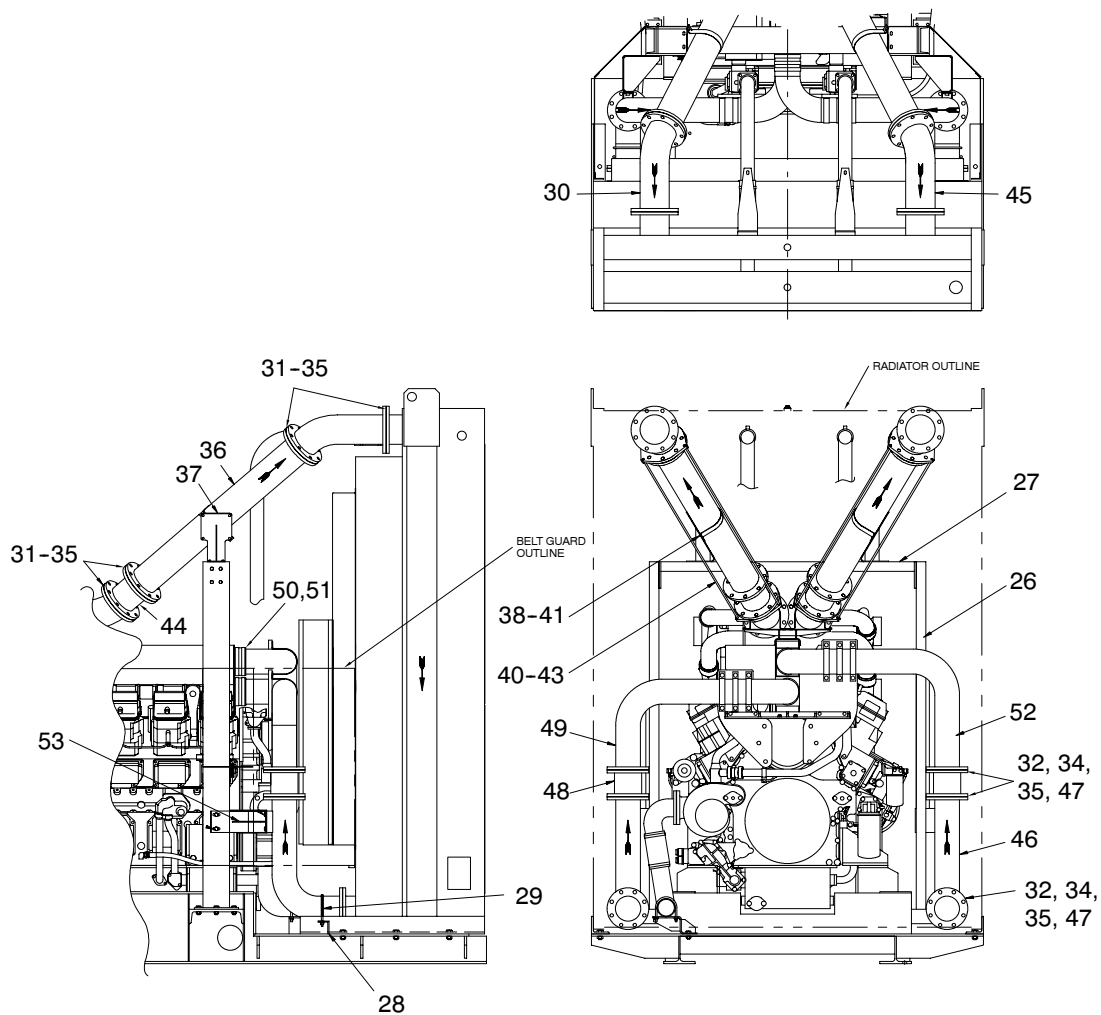
Group 104: Cooling System, continued

2000 kW

Item	Part Number	Description	Quantity
			Module Number GM17019-MA1
1	GM16929	Radiator, 60 Hz, S16R-PTAA2	1
2	GM21122	V-belt	1
3	GM21150	Hose, rubber	4
4	GM21136	Clamp	8
5	GM15180	Washer, spring	4
6	GM15111	Bolt	4
7	GM21144	Stay, pipe	2
8	GM15153	Bolt with washer	6
9	GM21132	Pipe, water	2
10	GM21143	Stay, pipe	4
11	GM21142	Hose, rubber	2
12	GM21135	Clamp	8
13	GM21131	Pipe, water	1
14	GM21130	Pipe, water	1
15	GM21133	Gasket	1
16	GM15963	Bolt	4
17	GM21149	Washer	4
18	GM15182	Washer, spring	4
19	GM17018	Support, tube	1
20	X-397-11	Bolt, 1/2-13 x 6 in.	2
21	GM17403	Bracket, radiator mounting, RS	1
22	GM17402	Bracket, radiator mounting, LS	1
23	254832	Sensor, low fluid	1
24	GM17660	Belt guard subassembly	1
25	X-256-5	Valve, drain, 1/2 in. NPT	1
26	GM16833	Support, radiator tube	2
27	GM16834	Support, radiator tube top	1
28	GM16942	Support, tube	2
29	X-722-11	Clamp, muffler, 5.62 in.	2
30	GM21124	Duct, air	1
31	GM21146	Gasket	8
32	GM21148	Bolt	112
33	GM21149	Washer	112
34	GM15182	Washer, spring	112
35	GM15984	Nut	112
36	GM21123	Duct, air	2
37	GM21139	Stay, air duct	2
38	GM21137	Clamp, air duct	2
39	GM21147	Bolt	4
40	GM15174	Washer	64
41	GM15164	Nut	54
42	GM21128	Turnbuckle	6
43	GM15179	Washer, spring	64
44	GM21141	Joint, flexible	2
45	GM21125	Duct, air	1
46	GM21129	Duct, air	2
47	GM21145	Gasket	6
48	GM21138	Joint, flexible	2
49	GM21126	Duct, air	1
50	GM21140	Hose, rubber	4
51	GM21134	Clamp	8
52	GM21127	Duct, air	1
53	GM19871	Bracket, air tube	2

Group 104: Cooling System, continued

2000 kW Air Piping



Group 104: Cooling System, continued

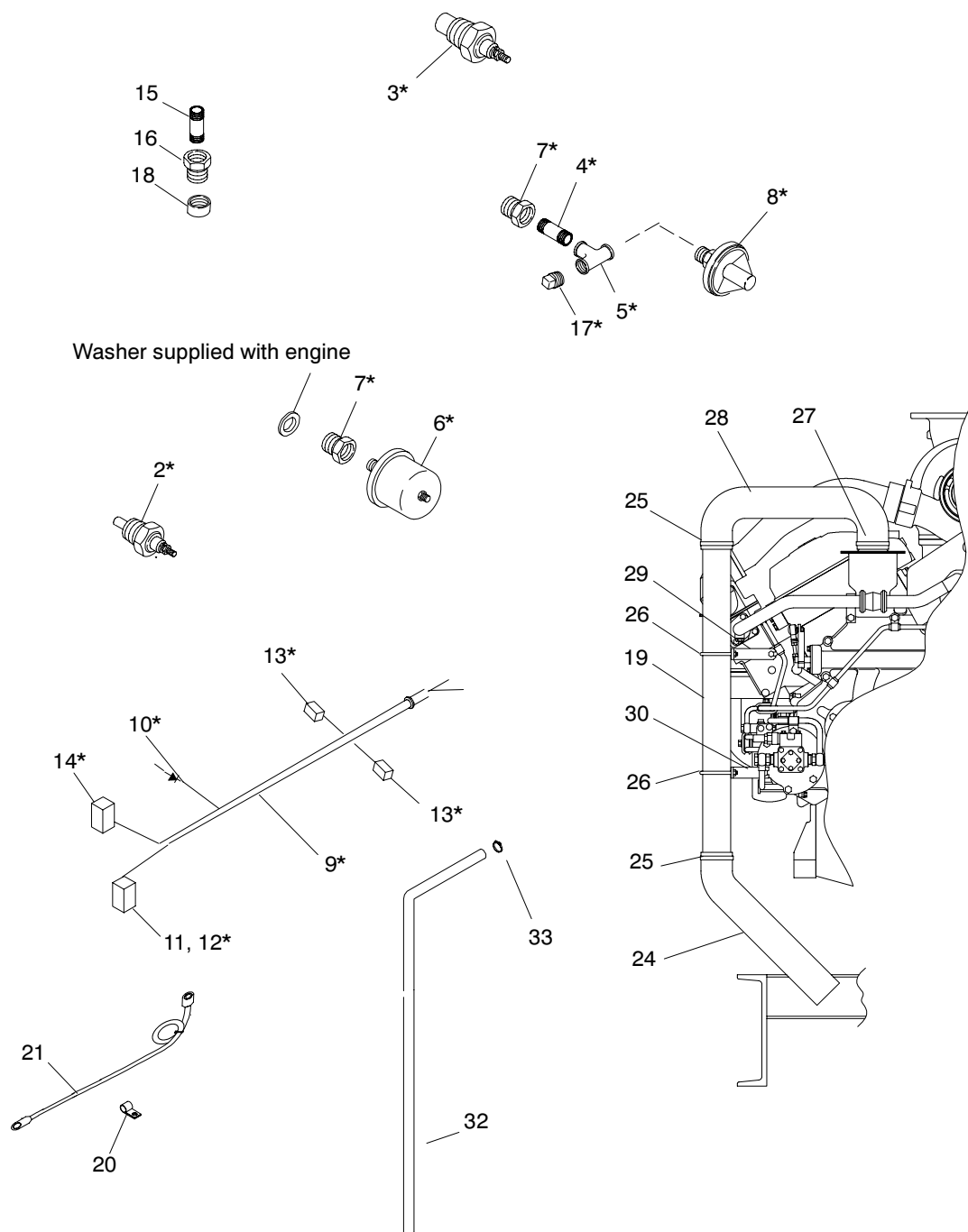
2000 kW

Item	Part Number	Description	Quantity
			Module Number GM17019-MA1
1	GM16929	Radiator, 60 Hz, S16R-PTAA2	1
2	GM21122	V-belt	1
3	GM21150	Hose, rubber	4
4	GM21136	Clamp	8
5	GM15180	Washer, spring	4
6	GM15111	Bolt	4
7	GM21144	Stay, pipe	2
8	GM15153	Bolt with washer	6
9	GM21132	Pipe, water	2
10	GM21143	Stay, pipe	4
11	GM21142	Hose, rubber	2
12	GM21135	Clamp	8
13	GM21131	Pipe, water	1
14	GM21130	Pipe, water	1
15	GM21133	Gasket	1
16	GM15963	Bolt	4
17	GM21149	Washer	4
18	GM15182	Washer, spring	4
19	GM17018	Support, tube	1
20	X-397-11	Bolt, 1/2-13 x 6 in.	2
21	GM17403	Bracket, radiator mounting, RS	1
22	GM17402	Bracket, radiator mounting, LS	1
23	254832	Sensor, low fluid	1
24	GM17660	Belt guard subassembly	1
25	X-256-5	Valve, drain, 1/2 in. NPT	1
26	GM16833	Support, radiator tube	2
27	GM16834	Support, radiator tube top	1
28	GM16942	Support, tube	2
29	X-722-11	Clamp, muffler, 5.62 in.	2
30	GM21124	Duct, air	1
31	GM21146	Gasket	8
32	TBD	Bolt	112
33	GM21149	Washer	112
34	GM15182	Washer, spring	112
35	GM15984	Nut	112
36	GM21123	Duct, air	2
37	GM21139	Stay, air duct	2
38	GM21137	Clamp, air duct	2
39	TBD	Bolt	4
40	GM15174	Washer	64
41	GM15164	Nut	54
42	GM21128	Turnbuckle	6
43	GM15179	Washer, spring	64
44	GM21141	Joint, flexible	2
45	GM21125	Duct, air	1
46	GM21129	Duct, air	2
47	GM21145	Gasket	6
48	GM21138	Joint, flexible	2
49	GM21126	Duct, air	1
50	GM21140	Hose, rubber	4
51	GM21134	Clamp	8
52	GM21127	Duct, air	1
53	GM19871	Bracket, air tube	2

Group 105: Engine

Items not shown: 1, 22, 23, 31

* See Control and Harness group for part number.



6057_105

Group 105: Engine

Item	Part Number	Description	Quantity							
			Variation Number							
1	2	3	4	5	6	7	8	9	10	11
1	GM10524	Engine assembly, Mitsubishi			1		1			
1	GM10523	Engine assembly, Mitsubishi				1		1		
1	GM11874	Engine assembly, Mitsubishi	1	1						
1	GM16631	Engine assembly, Mitsubishi							1	
1	GM17888	Engine assembly, Mitsubishi								1
2	*	Sender, water temperature	1		1	1				
3	*	Switch, high temperature shutoff	1		1	1				
4	*	Nipple, pipe, 1/8 x 3/4 in.	1		1	1				
5	*	Fitting, pipe tee, 1/8 x 1/8 x 1/8 in.	1		1	1				
6	*	Sender, oil pressure	1		1	1				
7	*	Adapter bushing			2	2				
7	*	Adapter bushing	2							
7	*	Fitting, 45° street elbow	2							
8	*	Switch pressure assembly	1		1	1				
9	*	Harness, engine			1	1				
9	*	Harness, engine	1							
10	*	Diode, 6 A	4		5	5				
11	*	Connector, cable	1		1	1				
12	*	Connector, 24-position	1		1	1				
13	*	Connector	2		3	3				
14	*	Connector	1		1	1				
15	X-209-5	Nipple, pipe, 1/2 x 1 1/2 in.			2	2	2	2		
15	X-206-9	Nipple, pipe	2						2	2
15	X-204-9	Pipe, 3/8 in. NPT x 1 in.		2						
16	168848	Bushing, reducing, 1/2 x 1 in. NPT			2	2	2	2		
16	X-202-23	Bushing, reducing, 3/8 x 3/4 in. NPT	2	2						
16	GM10841	Adapter bushing	2	2						
17	*	Plug, pipe, 1/8	1		1	1				
18	X-268-4	Cap, pipe			2	2	2	2		
18	X-268-1	Cap, pipe, 3/4 in.	2						2	2
19	GM10579	Tube, breather			1	1	1	1		
20	X-672-32	Clamp, insulated			4	4	4	4		
20	X-672-3	Clamp, insulated			2	2	2	2		
20	X-672-13	Clamp, insulated, .88 in.	1	1						
20	X-672-37	Clamp	4	4						
21	X-545-145	Cable, battery, 1575mm, No. 2/0 wire, type 5			1	1	1	1		
22	X-22-15	Washer, lock, .456 ID x 1.058 in. OD			3	3				
23	226917	Decal, negative battery connection			1	1	1	1		
24	X-6014-57	Hose, radiator, straight, 3 in. ID			1	1	1	1		
25	291542	Clamp, hose, 3.25/3.56 in.			2	2	2	2		
26	286283	Clamp, muffler, 3.12 in.			2	2	2	2		
27	324342	Clamp, hose, 3.43/3.75 in.			1	1	1	1		
28	GM10964	Hose, breather			1	1	1	1		
29	GM10965	Bracket, breather tube			1	1	1	1		
30	GM10966	Bracket, breather tube			1	1	1	1		
31	X-6214-4	Cap			1	1	1	1		
32	X-6014-97	Hose, straight, 1 in. ID							2	2
33	X-426-8	Clamp, hose, .81/1.75 in.							2	2

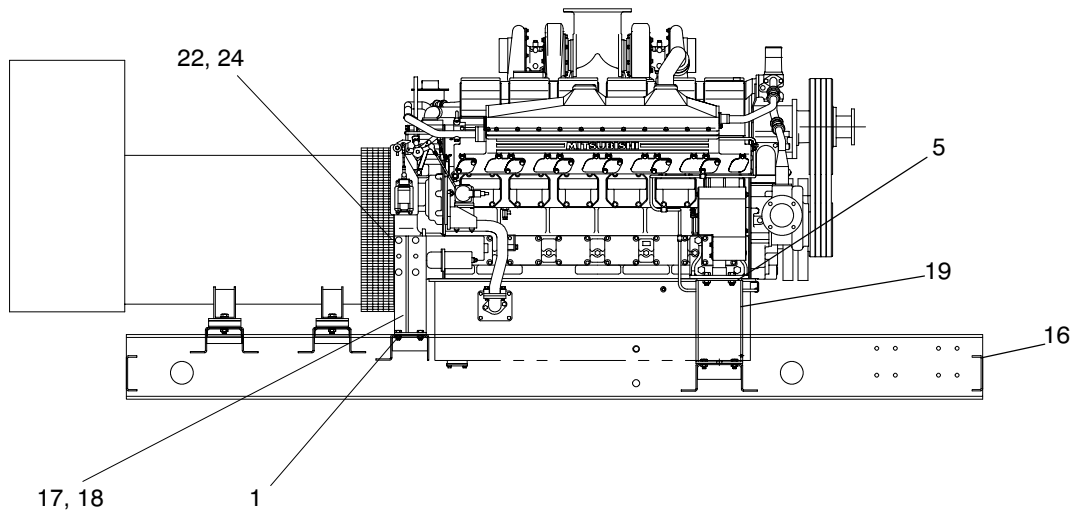
* See Control and Harness group for part number.

Group 107: Nameplates and Decals

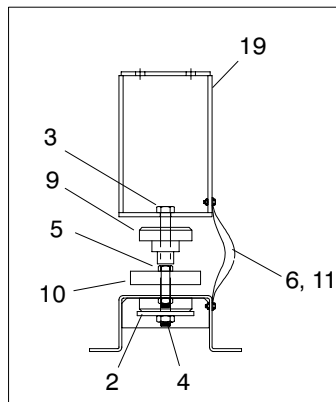
Item	Part Number	Description	Quantity
			Variation Number GR1S
1	X-6301-2	Decal, Spectrum	1
2	226917	Decal, negative battery connection	1
3	238402	Decal, caution positive terminal only	2
4	249808	Decal, warning rotating parts	1
5	249809	Decal, caution hot engine	1
6	249810	Decal, warning hot coolant	1
7	255882	Decal, caution standby service connect	1
8	257438	Decal, danger moving rotor	2
9	294520	Decal, danger high voltage	1
10	327004	Nameplate, model/ratings, Spectrum	1
11	347166	Decal, electrical equipment	1
12	GM13227	Decal, warning generator fan force	1
13	GM13228	Decal, warning lifting support	1
14	364116	Decal, caution welding disconnect	2

Notes

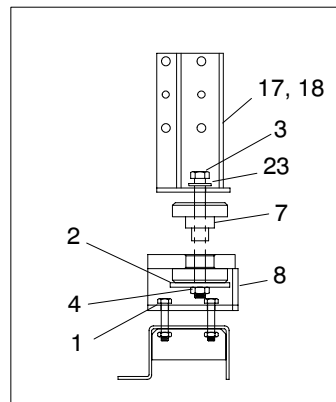
Group 109: Skid and Plant Mounting



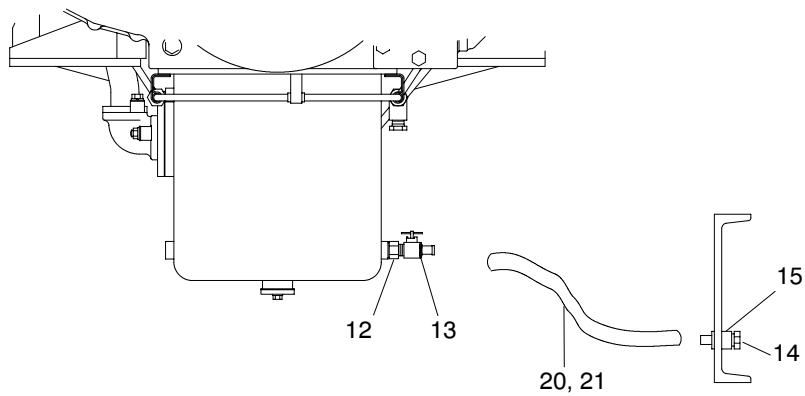
Isolation Mounting



Radiator End



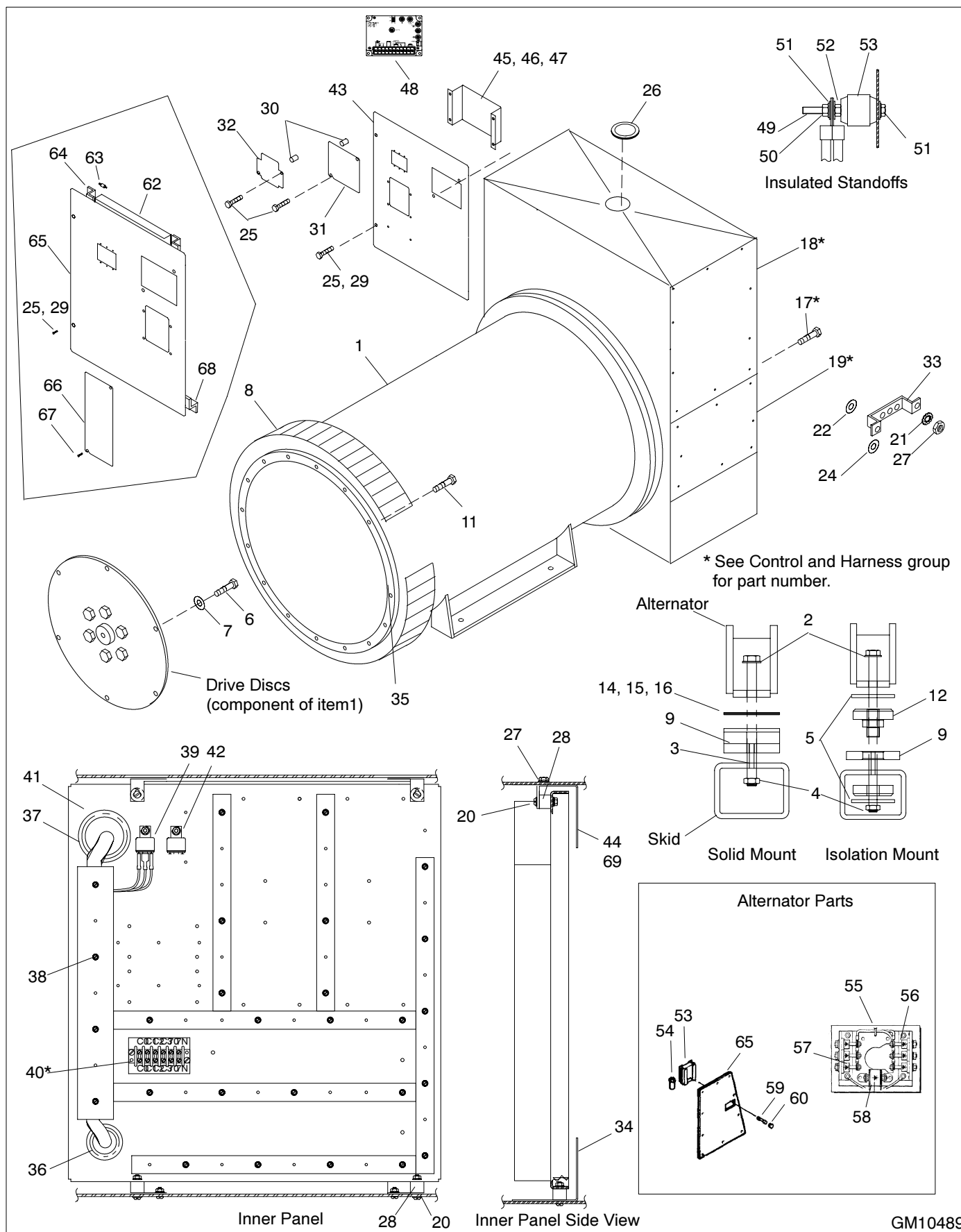
Generator End



Group 109: Skid and Plant Mounting

Item	Part Number	Description	Quantity Module						
			GM10566-MA1	GM10567-MA1	GM10659-MA1	GM10660-MA1	GM12012-MA1	GM12012-MA2	GM16648-MA1
1	X-6011-3	Washer, beveled, .68 ID x 1.5 in. OD	4	4	4	4			
2	X-25-152	Washer, plain, 1.06 ID x 5.25 in. OD	4		4				
2	X-25-155	Washer, plain					4	4	
3	M931-24160-60	Screw, hex cap	4		4				
3	M931-20120-60	Screw, hex cap					4	4	
3	M982-20-80	Nut, hex elastic stop					4	4	
4	M982-24-80	Nut, hex elastic stop	4		4				
5	M934-20-80	Nut, hex	12	8	12	8			
5	M125A-18-80	Washer, plain					12	12	12
5	M6797A-18-80	Washer, lock					12	12	
5	M933-18050-60	Screw, hex cap					12	12	
5	M933-18060-60	Screw, hex cap							12
5	M934-18-80	Nut, hex					12	12	12
6	X-22-16	Washer, lock, .326 ID x .883 in. OD	3		3		3	3	
7	361919	Vibromount	2		2				
7	365190	Vibromount					2	2	
8	361024	Mount, engine	2		2				
9	361179	Vibromount	2		2				
9	361734	Vibromount					2	2	
10	361039	Plate, generator mounting	2		2				
10	361733	Plate, engine mounting					4	4	
11	GM21085	Strap, ground (16 in.)	1		1		1	1	
12	X-202-41	Bushing, reducing, 1/2 x 3/4 in. NPT	1	1	1	1	1	1	1
12	GM10577	Adapter bushing					1	1	1
12	X-6278-4	Washer, nylon							1
12	X-274-2	Fitting, 45° street elbow					1	1	
12	X-211-1	Elbow, street, 90° x 1/2 in. NPT							1
13	272701	Valve, oil drain	1	1	1	1	1	1	1
14	241062	Plug, drain	1	1	1	1			
14	X-582-1	Coupling, hose					1	1	1
14	X-75-28	Plug, pipe, 1/2 in.					1	1	1
15	276552	Washer, nylon, .878 ID x 1.132 in. OD	1	1	1	1			
16	GM10658	Skid			1	1			
16	GM10427	Skid	1	1					
16	GM11967	Skid					1		
16	GM12024	Skid						1	
16	GM16624	Skid							1
17	GM10458	Support, rear engine, RS	1		1				
17	GM10521	Support, rear engine, RS		1		1			
18	GM10459	Support, rear engine, LS	1		1				
18	GM10522	Support, rear engine, LS		1		1			
19	GM10457	Support, front engine	2		2				
19	GM10520	Support, front engine		2		2			
19	GM11972	Mount, engine, front					4	4	
20	X-426-3	Clamp, hose, .56/1.06 in.	2	2	2	2	2	2	2
21	X-577-28	Hose, rubber, straight, .62 in. ID	1	1	1	1			
21	X-577-47	Hose, rubber, straight, .62 in. ID					1	1	1
22	M933-18035-60	Screw, hex cap	8	8	8	8			
23	X-801-10	Washer, hardened, 1.062 ID x 2 in. OD	2		2				
24	M6797A-18-80	Washer, lock	1	1	1	1			

Group 201: Generator and Mounting



Group 201: Generator and Mounting

600 kW

Item	Part Number	Description	Qty.
1	See chart	Alternator assembly	1
2	M931-20140-60	Screw, hex cap	2
3	M934-20-80	Nut, hex	8
4	M982-20-80	Nut, hex elastic stop, 600 kW	2
5	X-25-155	Washer, plain	4
6	M961-16030-82	Screw, hex cap	6
7	X-801-5	Washer, harden., .656 ID x 1.06 in.	6
8	328903	Screen	1
9	361733	Plate, generator mounting	2
10	X-400-241	Spacer	4
11	M960-12050-82	Screw, hex cap	16
12	361734	Vibromount	2
13	X-400-239	Spacer	4
14	365410	Shim	4
15	365411	Shim	4
16	365412	Shim	4
17	*	Screw, hex flange machine	12
18	*	Panel, junction box, front	1
19	*	Cover, louvered	1
20	X-22-12	Washer, lock, .262 ID x .743 in.	8
21	X-22-14	Washer, lock, .391 ID x .975 in.	4
22	X-25-118	Washer, plain, .406 ID x 1 in. OD	4
23	X-468-9	Cable tie, NRP	2
24	X-6086-6	Washer, spring, .39 ID x .81 in. OD	2
25	X-6217-10	Screw, hex flange machine	25
26	X-634-23	Bushing, 1.968 x 2.50 in. NPT	2
27	X-83-7	Nut, hex, zinc, 3/8-16	2
28	229353	Mount, controller	4
29	295009	Retainer	2
30	320828	Insert, threaded, 1/4-20 in.	4
31	361190	Cover, access	1
32	361191	Cover, DVR access	1
33	361271	Bus, ground	1
34	361478	Retainer, inner panel	2
35	GM10640	Guard, alternator	1
36	X-634-16	Bushing, 1.312 x 1.50 in. NPT	1
37	X-634-23	Bushing, 1.968 x 2.50 in. NPT	1
38	X-67-43	Screw, thread-cutting	27
39	272684	Relay	1
40	*	Terminal block	1
41	361186	Panel, junction box, inner	1
42	272684	Relay	1
43	361518	Door, junction box	1
44	365476	Bracket, inner panel	1
45	GM10429	Bracket, governor mounting	1
46	282829	Vibromount	4
47	X-22-18	Washer, lock, .172 ID x .595 in. OD	20
48	347841	Controller, governor	1

Item	Part Number	Description	Qty.
49	X-6274-7	Rod, threaded	3
50	X-6086-6	Washer, spring, .39 ID x .81 in. OD	6
51	X-25-118	Washer, plain, .406 ID x 1 in. OD	9
52	X-83-7	Nut, hex, 3/8-16, zinc	6
53	X-6128-29	Insulator, standoff, 3/8-16 x 2 in.	3
54	GM24876	Voltage regulator, DVR2000E	1
55	347071	Exciter rectifier assembly	1
56	279772	Diode, standard polarity	1
57	279774	Diode, reversing polarity	1
58	279776	Surge suppressor	1
59	347160	Capacitor	1
60	279778	Fuse, 5 amp	1
61	279779	Fuse cap	1
62	GM13563	Panel, inner door	1
63	282829	Vibromount	6
64	GM13562	Bracket, door panel mounting, top	2
65	GM13564	Door, junction box	1
66	GM13565	Cover, access	1
67	X-50-2	Screw, slotted pan head machine	6
68	GM13561	Bracket, door panel mtg, bottom	1
69	GM15336	Bracket, inner panel mounting	1

* See Control and Harness group for part number.

Alternator Part Number and Mount Type

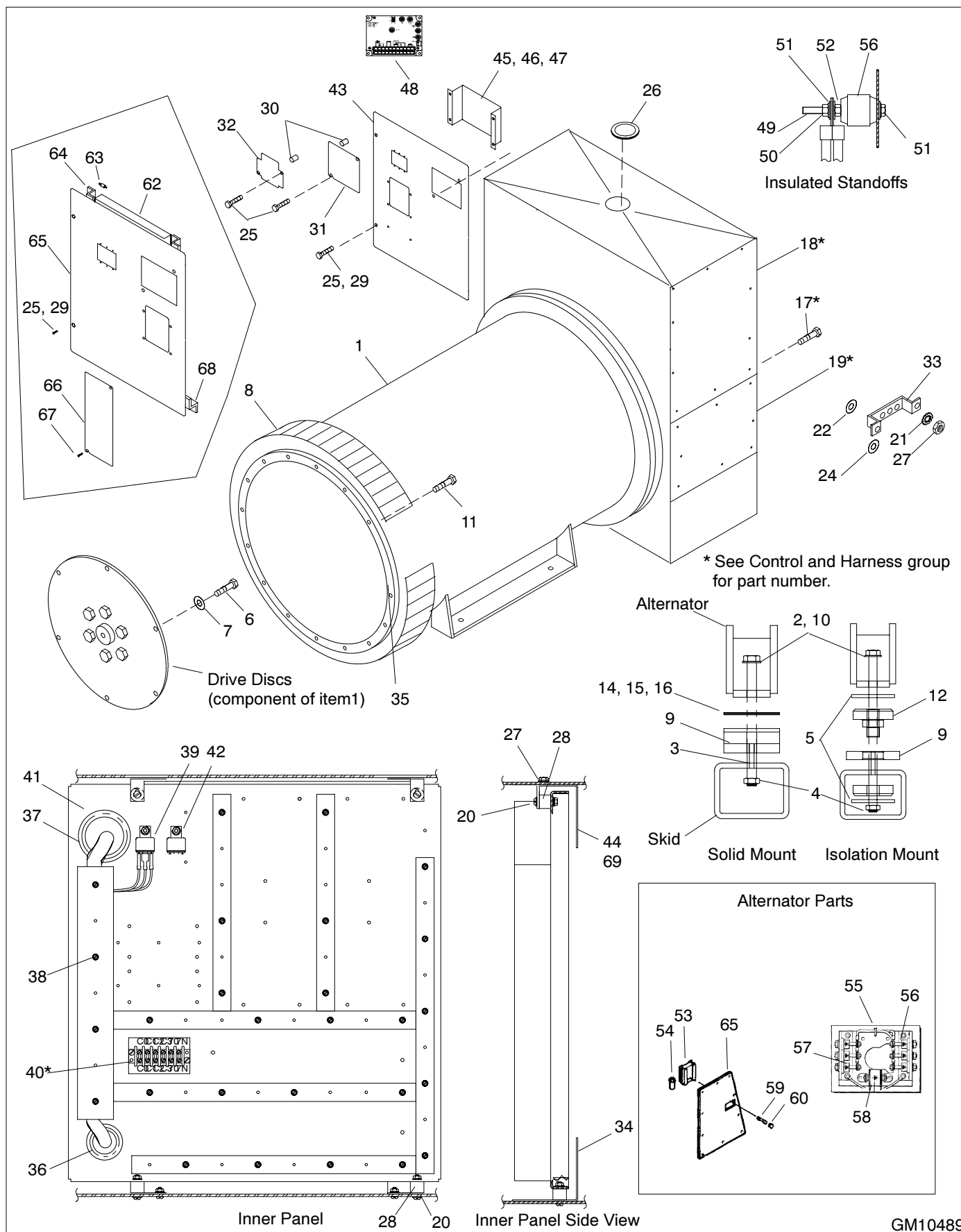
Use this table to identify the module number's alternator part number (item 1) and mount type.

Module Number	Alternator Part Number	Mount Type
GM12001-MA1S	GM11976	Isolation
GM12001-MA2S	GM12021	Isolation
GM12001-MA3S	A-361756	Isolation
GM12001-MA4S	GM12022	Isolation
GM12001-MA5S	GM12023	Isolation
GM12001-MA6S	A-361760	Isolation
GM17023-MA1†	GM12021	Isolation
GM17023-MA2†	GM11976	Isolation
GM17023-MA3†	A-361756	Isolation
GM17023-MA4†	GM12022	Isolation
GM17023-MA5†	GM12023	Isolation
GM17023-MA6†	A-361760	Isolation
GM30678-MA1††	GM12021	Isolation
GM30678-MA2††	GM11976	Isolation
GM30678-MA3††	A-361756	Isolation
GM30678-MA4††	GM12022	Isolation
GM30678-MA5††	GM12023	Isolation
GM30678-MA6††	A-361760	Isolation

† Module uses vibration isolate door-mounted component items 62-69.

†† Module does not use governor items 62-69.

Group 201: Generator and Mounting, continued



Group 201: Generator and Mounting, continued

900/1000/2000 kW

Item	Part Number	Description	Qty.
1	See chart	Alternator assembly	1
2	M931-20120-60	Screw, HC (5M frames, solid mt.)	4
2	M931-20160-60	Screw, HC (5M frames, iso. mt.)	4
2	M931-24160-60	Screw, HC (7M frames, iso. mt.)	4
2	M931-24120-60	Screw, HC (7M frames, solid mt.)	4
2	M933-24065-60	Screw, hex cap (2000 kW)	4
3	M934-20-80	Nut, hex (900/1000 kW)	8
4	M982-20-80	Nut, hex (5M frames, isolation mt.)	4
4	M934-20-80	Nut, hex (5M frames, solid mount)	4
4	M982-24-60	Nut, hex (7M frames, isolation mt.)	4
4	M934-24-80	Nut, hex (7M frames, solid mount)	4
5	X-25-152	Washer, plain, 1.06 ID x 5.25 in. OD	8
6	M933-16030-82	Screw, hex cap	6
6	M933-16045-82	Screw, hex cap (7M, 4-bus alt.)	6
6	M961-16045-82	Screw, hex cap (2000 kW)	12
7	X-801-5	Washer, hardened, .656 ID x 1.06 in. OD	6
8	GM10562	Screen (7M frames)	1
8	328903	Screen (5M frames)	1
8	328904	Screen (2000 kW)	1
9	361039	Plate, generator mtg. (iso. mt.)	4
9	361061	Plate, generator mtg. (900/1000 kW, solid mount)	4
10	X-400-241	Spacer (900/1000 kW, solid mount)	4
11	M960-12050-82	Screw, hex cap (5M frames)	16
11	M961-12040-82	Screw, hex cap (7M frames)	16
11	M961-14050-82	Screw, hex cap (2000 kW)	16
12	361919	Vibromount, isolation mount	4
13	X-400-239	Spacer	4
14	290743	Shim (16 ga.)	4
15	290744	Shim (7 ga.)	4
16	291191	Shim (spring)	4
17	*	Screw, hex flange machine	12
18	*	Panel, junction box, front	1
19	*	Cover, louvered	1
20	X-22-12	Washer, lock, .262 ID x .743 in. OD	8

Common hardware. Procure locally.

* See Control and Harness group for part number.

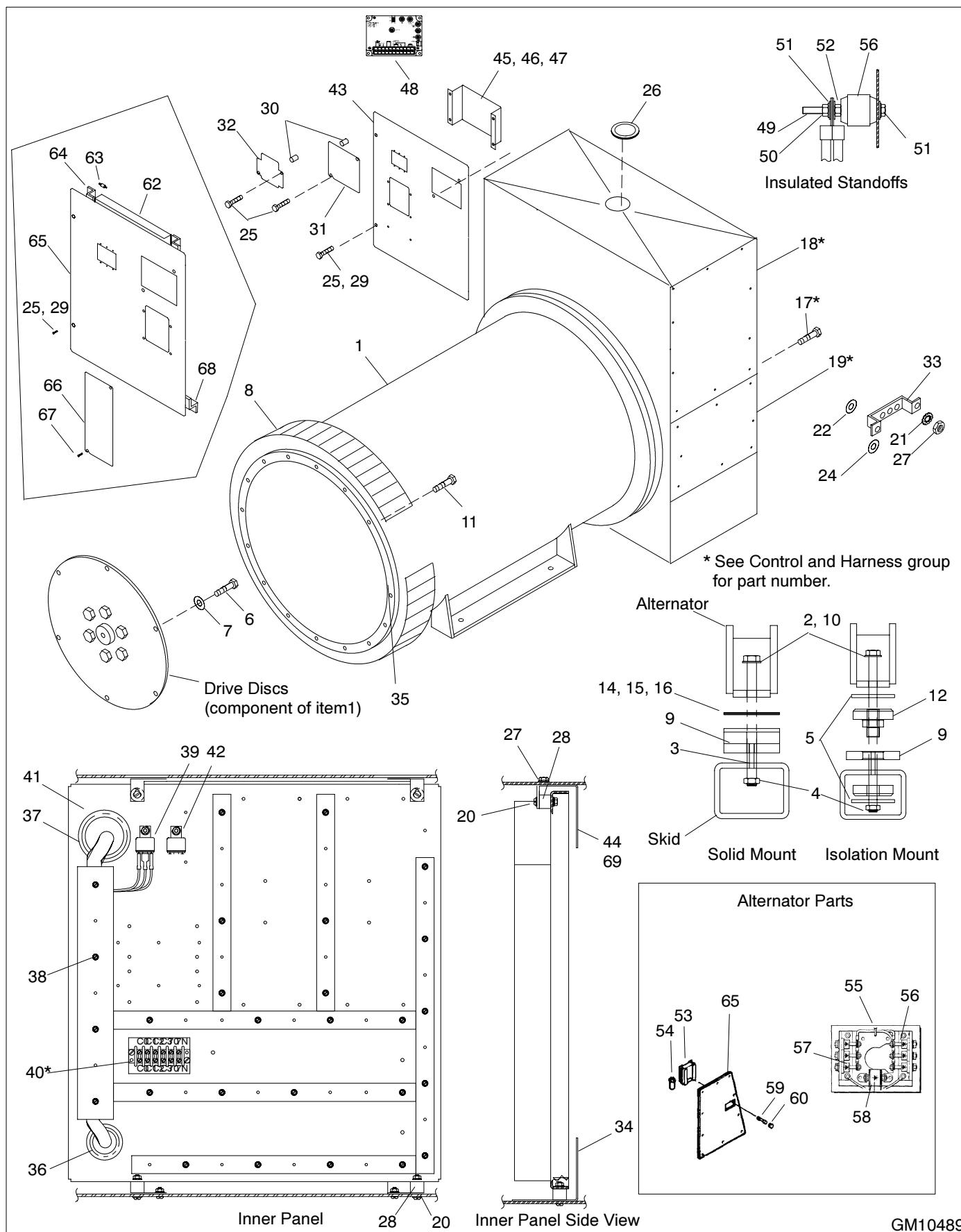
Alternator Part Number and Mount Type

Use this table to identify the module number's alternator part number (item 1) and mount type.

Module Number	Alternator Part Number	Mount Type
GM10443-MA1	A-361758	Isolation
GM10443-MA2	A-361762	Isolation
GM10443-MA3	A-361758	Solid
GM10443-MA4	A-361762	Solid
GM10443-MA5	A-361765	Isolation
GM10443-MA6	A-361765	Solid
GM10443-MA7	GM10490	Isolation
GM10443-MA8	GM10490	Solid
GM10443-MA9	A-361763	Isolation
GM10443-MA10	A-361763	Solid
GM10443-MA11	A-361764	Isolation
GM10443-MA12	A-361764	Solid
GM10443-MA13	GM10549	Isolation
GM10443-MA14	GM10549	Solid
GM10443-MA15	GM10550	Isolation
GM10443-MA16	GM10550	Solid
GM10443-MA17	GM10551	Isolation
GM10443-MA18	GM10551	Solid
GM17024-MA1†	A-361758	Isolation
GM17024-MA2†	A-361758	Solid
GM17024-MA3†	A-361762	Isolation
GM17024-MA4†	A-361762	Solid
GM17024-MA5†	A-361765	Isolation
GM17024-MA6†	A-361765	Solid
GM17024-MA7†	GM10490	Isolation
GM17024-MA8†	GM10490	Solid
GM17024-MA9†	A-361763	Isolation
GM17024-MA10†	A-361763	Solid
GM17024-MA11†	GM10549	Isolation
GM17024-MA12†	GM10549	Solid
GM17024-MA13†	A-361764	Isolation
GM17024-MA14†	A-361764	Solid
GM17024-MA15†	GM10550	Isolation
GM17024-MA16†	GM10550	Solid
GM17024-MA17†	GM10551	Isolation
GM17024-MA18†	GM10551	Solid
GM16900-MA1	F-361007	Solid
GM16900-MA2	F-361008	Solid
GM16900-MA3	F-361011	Solid
GM16900-MA4	F-361014	Solid
GM16900-MA5	F-361018	Solid
GM16900-MA7	B-361006	Solid
GM16900-MA9	B-361010	Solid
GM16900-MA9	B-361013	Solid
GM16900-MA10	B-361016	Solid
GM16900-MA11	B-361017	Solid

† Module uses vibration isolate door-mounted components items 62-69.

Group 201: Generator and Mounting, continued



Group 201: Generator and Mounting, continued

900/1000/2000 kW

Item	Part Number	Description	Qty.
21	X-22-14	Washer, lock, .391 ID x .975 in. OD	4
22	X-25-118	Washer, plain, .406 ID x 1 in. OD	4
23	X-468-9	Cable tie	2
24	X-6086-6	Washer, spring, .39 ID x .81 in. OD	2
25	X-6214-10	Screw, hex flange machine	25
26	X-634-23	Bushing, 1.968 x 2.50 in. NPT	2
27	X-83-7	Nut, hex, 3/8-16, zinc	2
28	229353	Mount, controller	4
29	295009	Retainer	2
30	320828	Insert, threaded, 1/4-20 in.	4
31	361190	Cover, access	1
32	361191	Cover, DVR access	1
33	361271	Bus, ground	1
34	361478	Retainer, inner panel	2
35	GM10640	Guard, alternator	1
36	X-634-16	Bushing, 1.312 x 1.50 in. NPT	1
37	X-634-23	Bushing, 1.968 x 2.50 in. NPT	1
38	X-67-43	Screw, slotted hex washer	27
39	272684	Relay	1
40	*	Terminal block	1
41	361186	Panel, junction box, inner	1
42	272684	Relay	1
43	361518	Door, junction box	1
44	365476	Bracket, inner panel	1
45	GM10429	Bracket, gov. mounting	1
46	282829	Vibromount	4
47	X-22-20	Washer, lock, .172 ID x .373 in. OD	8
48	347841	Controller, governor (900/1000 kW)	1
49	X-6274-7	Rod, threaded	3
50	X-6086-6	Washer, spring, .39 ID x .81 in. OD	6
51	X-25-118	Washer, plain, .406 ID x 1 in. OD	9
52	X-83-7	Nut, hex, 3/8-16, zinc	6
53	X-6128-29	Standoff insulator, 3/8-16 x 2 in.	3
54	GM24876	Voltage regulator, DVR2000E	1
55	347070	Exciter rectifier assembly	1
56	279773	Diode, standard polarity	1
57	279775	Diode, reversing polarity	1
58	279777	Surge suppressor	1
59	347160	Capacitor	1
60	279778	Fuse, 5 amp	1
61	279779	Fuse cap	1
62	GM13563	Panel, inner door	1
63	282829	Vibromount	6
64	GM13562	Bracket, door panel mounting, top	2
65	GM13564	Door, junction box	1
66	GM13565	Cover, access	1
67	X-50-2	Screw, slotted pan head machine	6
68	GM13561	Bracket, door panel mounting, bottom	1
69	GM15336	Bracket, inner panel mounting	1

* See Control and Harness group for part number.

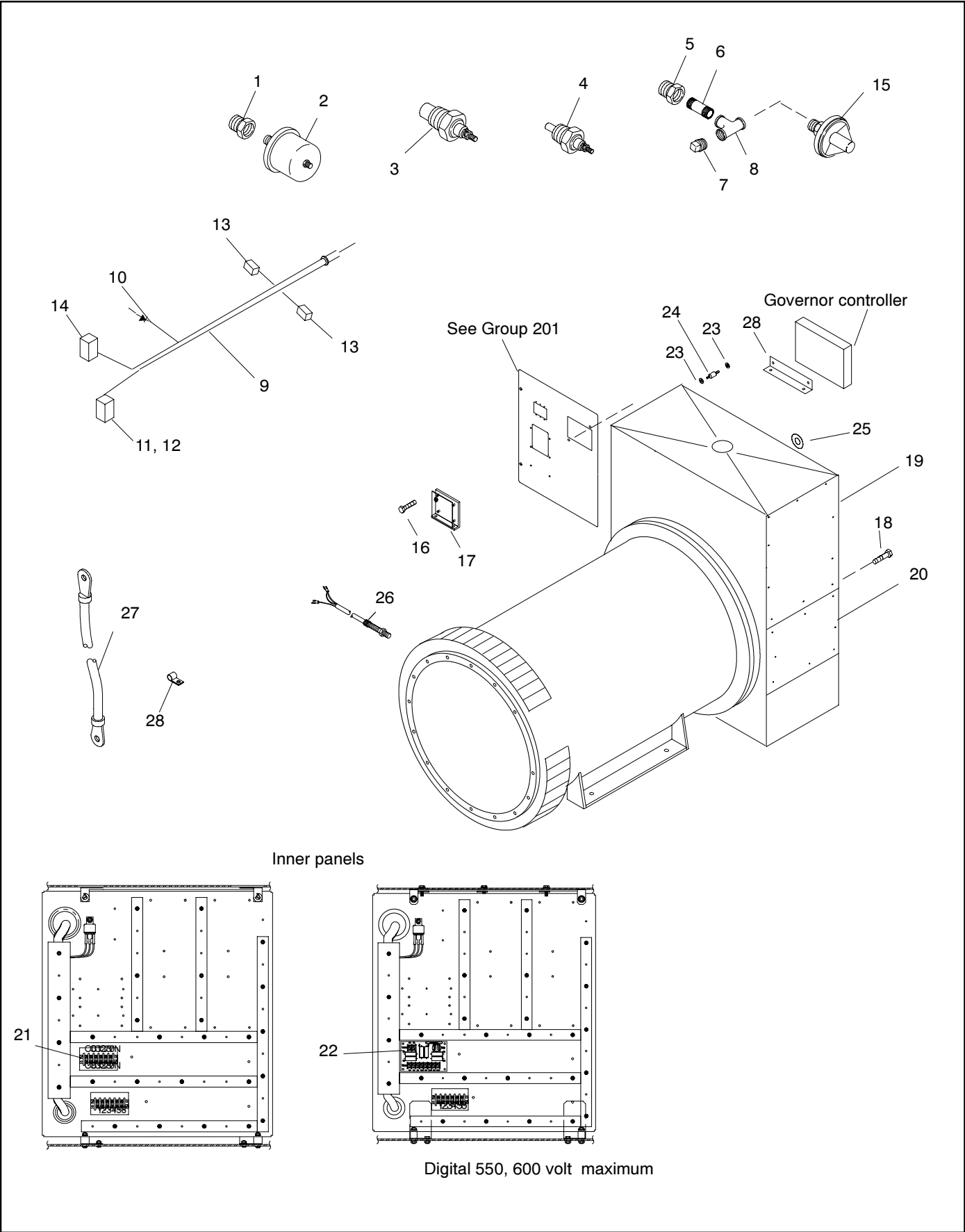
Alternator Part Number and Mount Type

Use this table to identify the kit/module number's alternator part number (item 1) and mount type.

Module Number	Alternator Part Number	Mount Type
GM10443-MA1	A-361758	Isolation
GM10443-MA2	A-361762	Isolation
GM10443-MA3	A-361758	Solid
GM10443-MA4	A-361762	Solid
GM10443-MA5	A-361765	Isolation
GM10443-MA6	A-361765	Solid
GM10443-MA7	GM10490	Isolation
GM10443-MA8	GM10490	Solid
GM10443-MA9	A-361763	Isolation
GM10443-MA10	A-361763	Solid
GM10443-MA11	A-361764	Isolation
GM10443-MA12	A-361764	Solid
GM10443-MA13	GM10549	Isolation
GM10443-MA14	GM10549	Solid
GM10443-MA15	GM10550	Isolation
GM10443-MA16	GM10550	Solid
GM10443-MA17	GM10551	Isolation
GM10443-MA18	GM10551	Solid
GM17024-MA1†	A-361758	Isolation
GM17024-MA2†	A-361758	Solid
GM17024-MA3†	A-361762	Isolation
GM17024-MA4†	A-361762	Solid
GM17024-MA5†	A-361765	Isolation
GM17024-MA6†	A-361765	Solid
GM17024-MA7†	GM10490	Isolation
GM17024-MA8†	GM10490	Solid
GM17024-MA9†	A-361763	Isolation
GM17024-MA10†	A-361763	Solid
GM17024-MA11†	GM10549	Isolation
GM17024-MA12†	GM10549	Solid
GM17024-MA13†	A-361764	Isolation
GM17024-MA14†	A-361764	Solid
GM17024-MA15†	GM10550	Isolation
GM17024-MA16†	GM10550	Solid
GM17024-MA17†	GM10551	Isolation
GM17024-MA18†	GM10551	Solid
GM16900-MA1	F-361007	Solid
GM16900-MA2	F-361008	Solid
GM16900-MA3	F-361011	Solid
GM16900-MA4	F-361014	Solid
GM16900-MA5	F-361018	Solid
GM16900-MA5	F-361018	Solid
GM16900-MA7	B-361006	Solid
GM16900-MA9	B-361010	Solid
GM16900-MA9	B-361013	Solid
GM16900-MA10	B-361016	Solid
GM16900-MA11	B-361017	Solid

† Module uses vibration isolate door-mounted components items 62-69.

Control and Harness



Control and Harness

Item	Part Number	Description	Quantity														Generator Set Spec Number			
			Module																	
			GM16967-MA1	GM16968-MA1	GM16968-MA2	GM16972-MA1	GM16973-MA1	GM16973-MA2	GM17232-MA1	GM17232-MA2	GM30662-MA1	GM30663-MA1	GM30952-MA1	GM30952-MA2	GM13277-GA1	PA-111201	PA-111202	PA-111203	PA-111204	
1	GM10576	Adapter bushing		1	1		1	1												
1	267428	Fitting, 45 deg. street elbow	1			1					1	1			2	1	1	1	1	
1	X-555-2	Fitting, elbow, 1/8 x 1/8 in., street					1	1												
1	GM12035	Adapter bushing	1			1			1	1	2				1					
2	343474	Sender, oil pressure	1	2	2						1				1	1	1	1	1	
2	GM16788	Sensor, oil pressure (sender/switch)				1	1	1	1	1		1	1	1						
3	241481	Switch, high temperature shutoff	1	1	1						1				1	1	1	1	1	
4	268298	Sender, water temperature	1	1	1						1				1	1	1	1	1	
4	GM16787	Sensor, water temp. (sender/switch)				1	1	1	1	1		1	1	1						
5	GM12035	Adapter bushing	1									1	1	1	1					
5	GM12576	Adapter bushing		1	1											1	1	1	1	
6	X-217-6	Nipple, pipe, 1/8 x 3/4 in.	1	1	1						1				1	1	1	1	1	
7	X-75-1	Plug, pipe 1/8	1	1	1						1				1	1	1	1	1	
8	X-203-16	Fitting, tee, 1/8 x 1/8 x 1/8 in., pipe	1	1	1						1				1	1	1	1	1	
9	GM10613	Harness, engine		1	1											1	1	1	1	
9	GM12551	Harness, engine	1																	
9	GM15495	Harness, engine				1														
9	GM15496	Harness, engine					1	1												
9	GM17434	Harness, engine							1	1			1	1						
9	GM30614	Harness, engine									1									
9	GM30679	Harness, engine										1								
10	233959	Diode, 6 A	4	5	5	5	7	7							4	5	5	5	5	
11	292800	Connector, cable	1	1	1	1	1	1							1	1	1	1	1	
12	295145	Connector, 24-position	1	1	1	1	1	1							1	1	1	1	1	
13	GM11422	Connector	2	3	3	2	3	3							2	3	3	3	3	
14	GM11423	Connector	1	1	1	1	1	1							1	1	1	1	1	
15	GM10574	Switch, pressure, LOP	1	1	1						1				1	1	1	1	1	
16	M965A-06012-20	Screw, pan head machine				4	4	4	4	4		4	4	4						
17	GM11718	PCB assy., Marathon excitation inter.				1	1	1	1	1		1	1	1						
18	X-6217-10	Screw, hex flange machine	22	22	24	22	22	24	24	24	28	28	24	24	22	24	24	24	24	
19	361184	Panel, junction box, front	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
20	361826	Panel, junct. box (5M and 7M4046 alt.)	1	1		1	1				1	1			1	1	1	1	1	
20	328901	Panel, junct. box (7M alt. except 7M4046)			1			1	1	1			1	1		1	1	1	1	
21	X-49-6	Screw, cross recess	2	2	2					2	2			2						
21	255080	Marker, strip	1	1	1						1									
21	254127	Marker, strip								1				1						
21	295314	Terminal block	1	1	1						1									
21	X-405-2	Terminal block								1				1						
22	GM13980	PCB assembly, CT burden resistor				1	1	1	1			1	1							
22	X-70-12	Nut, hex machine screw, 8-32				4	4	4	4			4	4							
22	X-712-9	Spacer, .25 OD, .5 in.				4	4	4	4				4	4						
23	X-22-18	Washer, lock							8	8	8	8	8	8						
24	282829	Vibromount							4	4	4	4	4	4						
25	243488	Grommet, round							2	2	2	2	2	2						
26	-	Pickup, mag. (supplied with engine)							1	1	1									
26	255749	Pickup, magnetic							1	1			1	1						
27	X-545-149	Cable, battery (not shown)							1	1			1	1						
28	GM30658	Bracket, governor mounting									4	4	4	4						

Group 701: Literature

Item	Part Number	Description	Quantity			
			Variation Number			
			148	150	157	162
1	MP-5583	S/M 350-1600DS, Industrial	1	1	1	1
2	MP-5700	I/M Industrial	1	1	1	1
3	MP-6117	P/C Accessories, 230-2000 kW, Diesel	1	1	1	1
4	MP-5750	O/M, 20-2000 kW	1	1	1	
4	MP-5750-CS	O/M, 20-2000 kW, Chinese Simplified	1	1	1	
4	MP-5750-CT	O/M, 20-2000 kW, Chinese Traditional	1	1	1	
4	MP-5750-F	O/M, 20-2000 kW, French	1	1	1	
4	MP-5750-S	O/M, 20-2000 kW, Spanish	1	1	1	
5	MP-5829	O/M, Digital Controller	1	1	1	
5	MP-6083	O/M, Digital 550 Controller	1	1	1	1
6	MP-6009	P/C Controllers	1	1	1	1
7	MP-6057	P/C 600/900/1000/2000DSM	1	1	1	1
8	MP-6058	W/D 600-2000DSM	1	1	1	1
9	MP-6063	O/M, Mitsubishi S12H	1	1		
9	MP-6094	O/M, Mitsubishi S6R/S6R2, 600 kW			1	
9	MP-6132	O/M, Mitsubishi S16R, 2000 kW				1
10	MP-6064	P/C Mitsubishi S12H, 1000 kW	1	1		
10	MP-6089	P/C Mitsubishi S6R, 600 kW			1	
10	MP-6131	P/C Mitsubishi S16R, 2000 kW			1	
11	MP-6065	S/M Mitsubishi S12H	1	1	1	
11	MP-6095	S/M Mitsubishi S6R/S6R2, 600 kW			1	
11	MP-6133	S/M Mitsubishi S16R, 2000 kW				1
12	MP-5578	O/I/S/M Marathon alternator MagnaMAX DVR	1	1	1	1
12	MP-5578-F	O/I/S/M Marathon alternator MagnaMAX DVR, French	1	1	1	1
12	MP-5578-S	O/I/S/M Marathon alternator MagnaMAX DVR, Spanish	1	1	1	1
13	MP-5579	O/I/S/M Marathon alternator voltage regulator DVR	1	1	1	1
13	MP-5579-F	O/I/S/M Marathon alternator voltage regulator DVR	1	1	1	1
13	MP-5579-S	O/I/S/M Marathon alternator voltage regulator DVR	1	1	1	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.

	600 kW	900/1000 kW	2000 kW
Controllers			
See Parts Catalog MP-6009 for parts lists.			
Cooling Systems			
Remote radiator	GM13541-MA1	GM10977-MA1	—
Remote radiator flex kit	—	GM10976-KP1	—
Heater, block			
240 V	—	GM10699-KA4	—
380 V	—	GM10699-KA3	—
480 V	—	GM10699-KA2	—
Heater, block including isolation valves			
208 V, 1-Phase	GM21100-KA1	—	—
240 V, 1-Phase	GM21100-KA2	GM19409-KA1	GM17215-KA1
240 V, 3-Phase	—	GM19409-KA3	GM17215-KA2
380 V, 3-Phase	—	GM19409-KA4	GM17215-KA3
480 V, 1-Phase	GM21100-KA3	GM19409-KA2	GM17215-KA5
480 V, 3-Phase	—	GM19409-KA5	GM17215-KA4
Block heater isolation valves	GM12529-KA1	PA-365308	—
Duct flange, radiator	365204	GM10991-KA1	GM17216-KA1
Optional Kits			
See Parts Catalog MP-6117 for parts lists.			
Paint and Miscellaneous Parts			
Paint	All models use 221331 Spray Can, 221332 Gallon		

Cooling System Kits

Qty.	Description	Part No.
Remote Radiator Setup		GM10977-MA1
1	Bracket, belt guard	GM10546
1	Bracket, belt guard	GM10544
1	Bracket, belt guard	GM10545
1	Bracket, belt guard	GM10547
1	Guard, pulley right side	GM10952
1	Guard, pulley bottom	GM10951
1	Guard, pulley front	GM10955
1	Guard, pulley left side	GM10950
1	Guard, pulley top	GM10949
1	Bracket, guard	GM10948
1	Tube, water inlet	GM10953
1	Tube, outlet	GM10954
4	Clamp, hose, 3.43/3.75 in.	324342
2	Hose, radiator, straight, 3 in. ID	X-507-4
12	Screw, hex washer head, drill	X-794-1
1	Plug, pipe, 1/2	X-75-3
1	Ball, bearing	GM10996

Remote Radiator Setup		GM13541-MA1
1	Clamp, hose, 2.81/3.12 in.	275527
1	Clamp, hose, 3.88/4.19 in.	336229
1	Flange, water connection, outlet	GM11962
1	Flange, water connection, inlet	GM11963
1	Guard, belt guard mounting	GM12351
1	Guard, belt guard mounting	GM12352
1	Guard, belt guard mounting	GM12353
2	Guard, belt guard mounting	GM12354
1	Guard, belt guard mounting	GM12355
1	Guard, pulley, top	GM13510
1	Guard, pulley, LS	GM13511
1	Guard, pulley, bottom	GM13512
1	Guard, pulley, RS	GM13513
1	Cover, pulley	GM13514
4	Screw, hex cap	M961-10030-60
1	Hose, radiator, straight, 2.5 in. ID	X-424-10
1	Hose, radiator, straight, 3.5 in. ID	X-6014-70

Qty.	Description	Part No.
Remote Radiator Flex Kit		GM10976-KP1
32	Screw, hex head machine	X-6021-1
32	Nut, hex, 5/8-11, zinc	X-85-3
2	Adapter, flexible, radiator	354044
Block Heater, Single		GM12080-KA1
1	Bushing, reducing, 1/2 x 3/4 in. NPT	153659
1	Strap, ground	223033
4	Bumper	259632
1	Tag, hang	279047
1	Thermostat, block heater	279813
1	Heater, block	279816
4	Gasket, washer	297001
1	Box, block heater control	354316
1	Cover, block heater control	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Label, wiring diagram	354328
1	Bracket, block heater	354687
1	Bushing, adapter	GM10577
1	Fitting, tee, pipe, 1/2 in.	X-203-13
1	Nipple, pipe, 1/2 x 1 3/16 in.	X-209-2
1	Pipe, 1/2 in. NPT	X-209-21
1	Fitting, elbow, pipe, 1/2 in.	X-215-1
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .391 ID x .975 in. OD	X-22-14
1	Valve, drain	X-256-5
3	Fitting, 45° street elbow	X-274-13
1	Fitting, 45° street elbow	X-274-15
4	Clamp, hose, .69/1.25 in.	X-426-12
2	Coupling, hose	X-582-7
2	Hose, coolant, 40 in.	X-6367-7
4	Screw, slotted hex washer head machine	X-97-13

Block Heater Kits: GM10699-KA1-GM10699-KA4

Qty.	Description	Common Parts	Unique Parts			
			GM10699-KA1	GM10699-KA2	GM10699-KA3	GM10699-KA4
1	Heater, block (includes items marked *)		347686	GM10700	GM10701	GM10702
1	*Pump		328148	328148	328148	328148
1	*Contactor		328217	328217	GM19498	328217
1	*Transformer		328218	328218	GM19499	328218
1	*Element, replacement		GM19305	GM19496	GM19497	GM19500
1	*Thermostat, high limit		GM19494	GM19494	GM19494	GM19494
1	Washer, nylon, .878 ID x .132 in OD	276552				
1	Tag, hang	279047				
1	Harness, wiring	279956				
1	Relay	291309				
1	Tag, instruction	299896				
1	Track, mounting, 1 in.	347278				
1	Thermostat	347742				
1	Bushing, adapter	GM10577				
1	Bushing, reducing, 1/2 x 3/4 in. NPT	X-202-41				
1	Fitting, tee, pipe, 1 x 1 x 1 in.	X-203-2				
1	Fitting, elbow, street 1/2 in.	X-211-1				
1	Nipple, pipe, 1 x 1 1/2 in.	X-218-24				
4	Clamp, hose, .69/1.25 in.	X-426-12				
2	Coupling, hose	X-582-15				
1	Coupling, hose	X-582-7				
1	Coupling, hose	X-582-8				
2	Washer, beveled, .44 ID x 1.25 in. OD	X-6011-4				
1	Socket	X-6124-4				
1	Hose, coolant 70 in.	X-6367-3				
1	Hose, coolant 56 in.	X-6367-5				
2	Clamp, insulated, 1.06 in.	X-672-32				
1	Plug, pipe (1 in. NPT)	X-75-13				
2	Screw, hex washer head, drill	X-794-2				

Cooling System Kits

Block Heater Kits: GM17215-KA1-GM17215-KA3

Qty.	Description	Common Parts	Unique Parts		
			GM17215-KA1	GM17215-KA2	GM17215-KA3
1	Heater, block		361246	361248	361249
1	Block heater service element		GM29666	GM29668	GM29669
1	Tag, hang	279047			
2	Vibromount	292834			
1	Tag, instruction	299896			
2	Vibromount	328645			
2	Valve, shutoff	GM19670			
1	Bracket, block heater	GM20012			
1	Bracket, block heater	GM20013			
1	Tee, pipe, 1 x 1 x 1 in. NPT	X-203-3			
3	Pipe, 1/2 in. NPT x 1.5 in.	X-209-5			
2	Elbow, pipe, 90 deg. x 1/2 in. NPT	X-215-1			
1	Pipe, 1 in. NPT x 1.5 in.	X-218-24			
1	Elbow, street (45 deg. x 1 in. NPT)	X-274-10			
2	Stud, 5/16-18 x 1.5 in.	X-352-65			
4	Clamp, hose, .69/1.25 in.	X-426-12			
2	Connector, hose	X-582-15			
2	Connector, hose	X-582-7			
1	Hose, coolant 35 in.	X-6367-11			
1	Hose, coolant 70 in.	X-6367-3			
1	Plug, pipe, 1 in. NPT	X-75-13			

Block Heater Kits: GM17215-KA4-GM17215-KA5

Qty.	Description	Common Parts	Unique Parts	
			GM17215-KA4	GM17215-KA5
1	Heater, block		361240	361247
1	Block heater service element		GM29665	GM29667
1	Tag, hang	279047		
2	Vibromount	292834		
1	Tag, instruction	299896		
2	Vibromount	328645		
2	Valve, shutoff	GM19670		
1	Bracket, block heater	GM20012		
1	Bracket, block heater	GM20013		
1	Tee, pipe, 1 x 1 x 1 in. NPT	X-203-3		
3	Pipe, 1/2 in. NPT x 1.5 in.	X-209-5		
2	Elbow, pipe, 90 deg. x 1/2 in. NPT	X-215-1		
1	Pipe, 1 in. NPT x 1.5 in.	X-218-24		
1	Elbow, street (45 deg. x 1 in. NPT)	X-274-10		
2	Stud, 5/16-18 x 1.5 in.	X-352-65		
4	Clamp, hose, .69/1.25 in.	X-426-12		
2	Connector, hose	X-582-15		
2	Connector, hose	X-582-7		
1	Hose, coolant 35 in.	X-6367-11		
1	Hose, coolant 70 in.	X-6367-3		
1	Plug, pipe, 1 in. NPT	X-75-13		

Cooling System Kits, continued

Block Heater Kits: GM21100-KA1-GM21100-KA3

Qty.	Description	Common Parts	Unique Parts		
			GM21100-KA1	GM21100-KA2	GM21100-KA3
1	Heater, block		GM19667	GM19668	GM19669
1	Block heater service element		GM29480	GM29481	GM29482
1	Thermostat		GM29529	GM29529	
1	Bushing, reducing (1/2 x 3/4 in NPT)	153659			
1	Strap, ground (5 in.)	223033			
4	Bumper	259632			
1	Tag, hang	279047			
1	Thermostat, block heater	279813			
4	Gasket, washer	297001			
1	Box, block heater control	354316			
1	Cover, block heater control	354317			
1	Gasket, control box	354318			
1	Decal, warning	354325			
1	Label, wiring diagram	354328			
1	Bracket, block heater	354687			
1	Bushing, adapter	GM10577			
2	Valve, shutoff	GM19670			
1	Fitting, tee, pipe, 1/2 x 1/2 x 1/2 in.	X-203-13			
2	Pipe, 1/2 NPT x 1.19 in.	X-209-2			
1	Pipe, 1/2 NPT x 2 in.	X-209-6			
1	Fitting, elbow, street 1/2 in.	X-211-1			
1	Valve, drain (1/2 in. NPT)	X-256-5			
3	Elbow, street (45 deg. x 1/2 in. NPT)	X-274-13			
1	Elbow, street (45 deg. x 3/4 in. NPT)	X-274-15			
4	Clamp, hose, .69/1.25 in.	X-426-12			
2	Connector, hose	X-582-7			
2	Hose, coolant 40 in.	X-6367-7			
4	Screw, slotted hex washer head	X-97-13			

Cooling System Kits, continued

Block Heater Kits: GM19409-KA1-GM19409-KA5

Qty.	Description	Common Parts	Unique Parts		
			GM19409-KA1	GM19409-KA2	GM19409-KA3
1	Heater, block		361246	361247	361248
1	Element, replacement		GM29666	GM29667	GM29668
1	Washer, nylon, .878 ID x .132 in OD	276552			
1	Tag, hang	279047			
1	Harness, wiring	279956			
2	Vibromount	292834			
1	Tag, instruction	299896			
2	Vibromount	328645			
1	Bushing, adapter	GM10577			
1	Valve, shutoff (3/4-14 NPT)	GM19666			
1	Valve, shutoff (1/2-14 NPT)	GM19670			
1	Bracket, block heater	GM20012			
1	Bracket, block heater	GM20013			
1	Fitting, tee, pipe, 1 x 1 x 1 in.	X-203-2			
1	Pipe (3/4 in. NPT x 1.38 in.)	X-206-9			
1	Pipe (1/2 in. NPT x 1.19 in.)	X-209-2			
1	Fitting, elbow, street1/2 in.	X-211-1			
1	Nipple, pipe, 1 x 1 1/2 in.	X-218-24			
2	Stud, 5/15-18 x 1.5 in.	X-352-65			
4	Clamp, hose, .69/1.25 in.	X-426-12			
2	Connector, hose	X-582-15			
1	Connector, hose	X-582-7			
1	Connector, hose	X-582-8			
2	Washer, beveled, .44 ID x 1.25 in. OD	X-6011-4			
1	Hose, coolant 70 in.	X-6367-3			
1	Hose, coolant 56 in.	X-6367-5			
2	Clamp, insulated, 1.06 in.	X-672-32			
1	Plug, pipe (1 in. NPT)	X-75-13			

Block Heater Kits: GM19409-KA1-GM19409-KA5

Qty.	Description	Common Parts	Unique Parts	
			GM19409-KA4	GM19409-KA5
1	Heater, block		361249	361240
1	Element, replacement		GM29669	GM29665
1	Washer, nylon, .878 ID x .132 in OD	276552		
1	Tag, hang	279047		
1	Harness, wiring	279956		
2	Vibromount	292834		
1	Tag, instruction	299896		
2	Vibromount	328645		
1	Bushing, adapter	GM10577		
1	Valve, shutoff (3/4-14 NPT)	GM19666		
1	Valve, shutoff (1/2-14 NPT)	GM19670		
1	Bracket, block heater	GM20012		
1	Bracket, block heater	GM20013		
1	Fitting, tee, pipe, 1 x 1 x 1 in.	X-203-2		
1	Pipe (3/4 in. NPT x 1.38 in.)	X-206-9		
1	Pipe (1/2 in. NPT x 1.19 in.)	X-209-2		
1	Fitting, elbow, street1/2 in.	X-211-1		
1	Nipple, pipe, 1 x 1 1/2 in.	X-218-24		
2	Stud, 5/15-18 x 1.5 in.	X-352-65		
4	Clamp, hose, .69/1.25 in.	X-426-12		
2	Connector, hose	X-582-15		
1	Connector, hose	X-582-7		
1	Connector, hose	X-582-8		
2	Washer, beveled, .44 ID x 1.25 in. OD	X-6011-4		
1	Hose, coolant 70 in.	X-6367-3		
1	Hose, coolant 56 in.	X-6367-5		
2	Clamp, insulated, 1.06 in.	X-672-32		
1	Plug, pipe (1 in. NPT)	X-75-13		

Cooling System Kits, continued

Qty.	Description	Part No.
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Block Heater Isolation		PA-365308
1	Nipple, pipe	X-206-9
1	Nipple, pipe, 1/2 x 1 3/16 in.	X-209-2
1	Valve, shutoff	255612
1	Valve	255632

Block Heater Isolation		GM12529-KA1
1	Nipple, pipe, 1/2 x 2 in.	X-209-6
1	Nipple, pipe, 1/2 x 1 3/16 in.	X-209-2
1	Fitting, elbow, street, 1/2 in.	X-211-1
2	Valve, shutoff	255612

Qty.	Description	Part No.
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Radiator Duct Flange		365204
8	Rivet, pop, .187 in.	X-781-10
2	Frame, air duct	365210
2	Frame, air duct	365211

Radiator Duct Flange		GM10991-KA1
8	Rivet, pop, .187 in.	X-781-10
2	Frame, air duct	GM10992
2	Frame, air duct	GM10993

Radiator Duct Flange		GM17216-KA1
12	Rivet, pop, .187 in.	X-781-10
2	Frame, air duct, LS and RS	GM17661
2	Frame, air duct, top and bottom	GM17662

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. lbs.	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. lbs.	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.

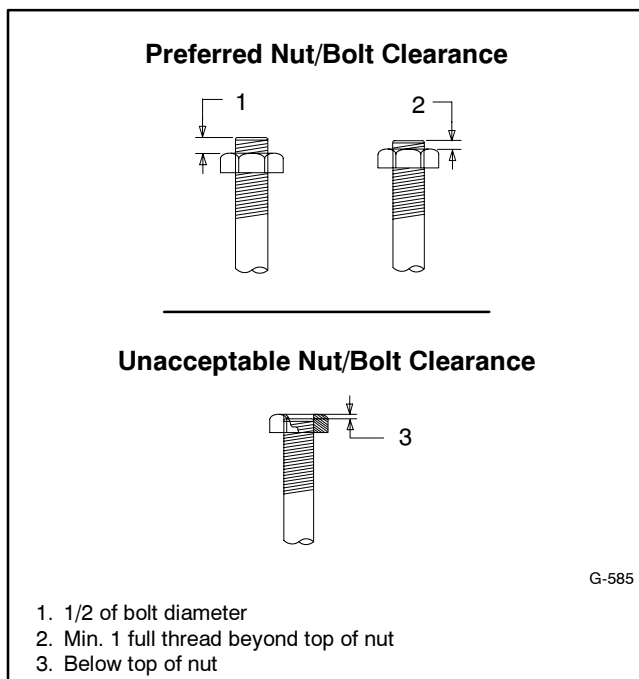


Figure 1 Acceptable Bolt Lengths

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.

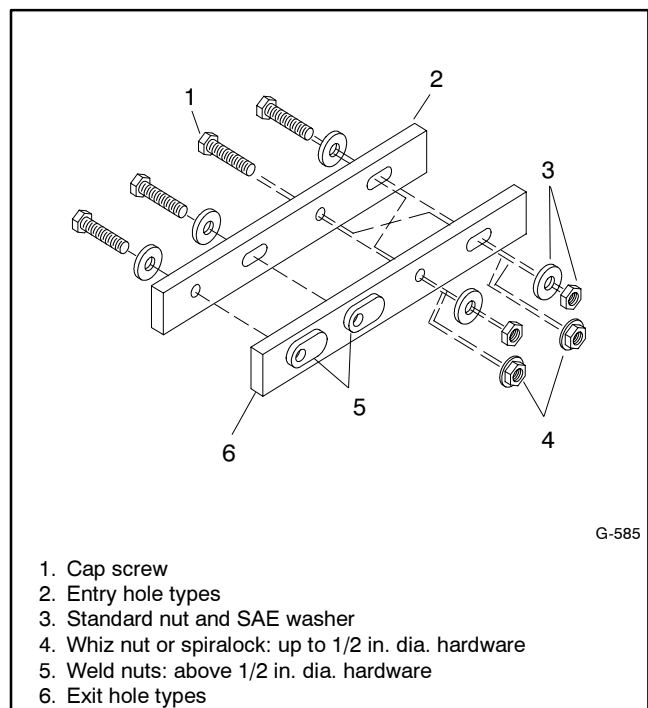


Figure 2 Acceptable Hardware Combinations

Appendix C General Torque Specifications

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	Nm (in. lb.)	1.8 (16)	2.3 (20)	—	1.8 (16)
10-24	Nm (in. lb.)	2.9 (26)	3.6 (32)	—	2.9 (26)
10-32	Nm (in. lb.)	2.9 (26)	3.6 (32)	—	2.9 (26)
1/4-20	Nm (in. lb.)	6.8 (60)	10.8 (96)	14.9 (132)	6.8 (60)
1/4-28	Nm (in. lb.)	8.1 (72)	12.2 (108)	16.3 (144)	8.1 (72)
5/16-18	Nm (in. lb.)	13.6 (120)	21.7 (192)	29.8 (264)	13.6 (120)
5/16-24	Nm (in. lb.)	14.9 (132)	23.1 (204)	32.5 (288)	14.9 (132)
3/8-16	Nm (ft. lb.)	24.0 (18)	38.0 (28)	53.0 (39)	24.0 (18)
3/8-24	Nm (ft. lb.)	27.0 (20)	42.0 (31)	60.0 (44)	27.0 (20)
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	5.6 (4)	9.9 (7)	14.0 (10)	5.6 (4)
M8 x 1.25	13.6 (10)	25.0 (18)	35.0 (26)	13.6 (10)
M8 x 1.00	21.0 (16)	25.0 (18)	35.0 (26)	21.0 (16)
M10 x 1.50	27.0 (20)	49.0 (35)	68.0 (50)	27.0 (20)
M10 x 1.25	39.0 (29)	49.0 (35)	68.0 (50)	39.0 (29)
M12 x 1.75	47.0 (35)	83.0 (61)	117.0 (86)	—
M12 x 1.50	65.0 (48)	88.0 (65)	125.0 (92)	—
M14 x 2.00	74.0 (55)	132.0 (97)	185.0 (136)	—
M14 x 1.50	100.0 (74)	140.0 (103)	192.0 (142)	—
M16 x 2.00	115.0 (85)	200.0 (148)	285.0 (210)	—
M16 x 1.50	141.0 (104)	210.0 (155)	295.0 (218)	—
M18 x 2.50	155.0 (114)	275.0 (203)	390.0 (288)	—
M18 x 1.50	196.0 (145)	305.0 (225)	425.0 (315)	—

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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