

Service Parts



Generator Sets

Models:

350/400DSE
350/400DSEC
350/400/450DSED
450DSEB

See Group 701: Literature, inside this manual 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 350/400DSE, 350/400DSEC, 350/400/450DSED and 450DSEB generator sets.

Information in this publication represents data available at the time of print. The manufacturer of DDC/MTU Power Generation 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.

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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. 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.

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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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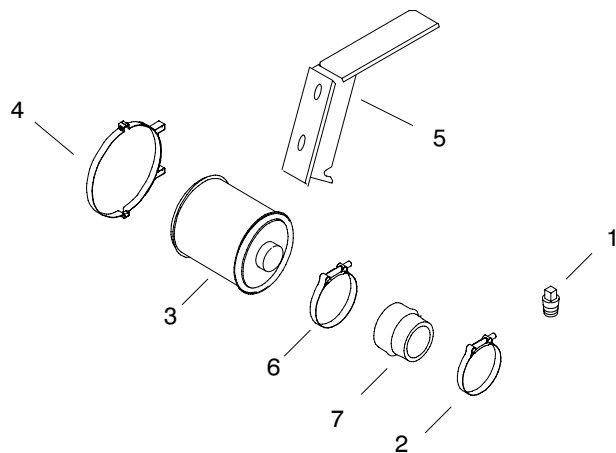
Specification Number Index

Group Title	Air Intake	Cooling System	Engine	Oil Pressure Switch	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							

350DSE								
PA-194382	9	24	32	5	15	279	†	15
PA-194383	9	24	32	5	15	280	†	15
PA-194384	10	23	32	5	16	281	†	15
PA-194385	9	24	32	5	15	282	†	15
PA-194386	10	23	32	5	16	284	†	15
PA-194387	9	24	32	5	15	283	†	15
PA-194388	10	23	32	5	16	285	†	15
PA-194389	*	*	32	5	*	*	†	15
PA-194394	9	24	33	5	15	279	†	15
PA-194395	9	24	33	5	15	280	†	15
PA-194396	10	23	33	5	16	281	†	15
PA-194397	*	*	33	5	*	*	†	15
PA-194402	*	*	34	5	*	*	†	15
GM13280-GA3S	*	*	GR3	GR2	*	*	†	15
GM13280-GA4S	*	*	GR2	GR2	*	*	†	15
GM13280-GA5S	*	*	GR1	GR2	*	*	†	15
GM13280-GA6S	*	*	GR6	GR2	*	*	†	15
350DSEC								
GM35142-GA5S	*	*	42	GR3	*	*	†	98
GM35142-GA6S	*	*	43	GR3	*	*	†	98
GM35142-GA7S	*	*	44	GR3	*	*	†	98
GM35142-GA8S	*	*	45	GR3	*	*	†	98
350DSED								
GM41981-GA3S	*	*	37	GR2	*	*	†	92
400DSE								
PA-194406	*	*	35	5	*	*	†	38
PA-194408	*	*	36	5	*	*	†	38
GM13280-GA1S	*	*	GR5	GR2	*	*	†	38
GM13280-GA2S	*	*	GR4	GR2	*	*	†	38
400DSEC								
GM35142-GA3S	*	*	40	GR3	*	*	†	76
GM35142-GA4S	*	*	41	GR3	*	*	†	76
400DSED								
GM41981-GA1S	*	*	38	GR2	*	*	†	90
450DSEB								
GM35142-GA1S	*	*	3-GR1	GR3	*	*	†	46
GM35142-GA2S	*	*	3-GR2	GR3	*	*	†	46
450DSED								
GM41981-GA2S	*	*	39	GR3	*	*	†	96

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

Group 101: Air Intake



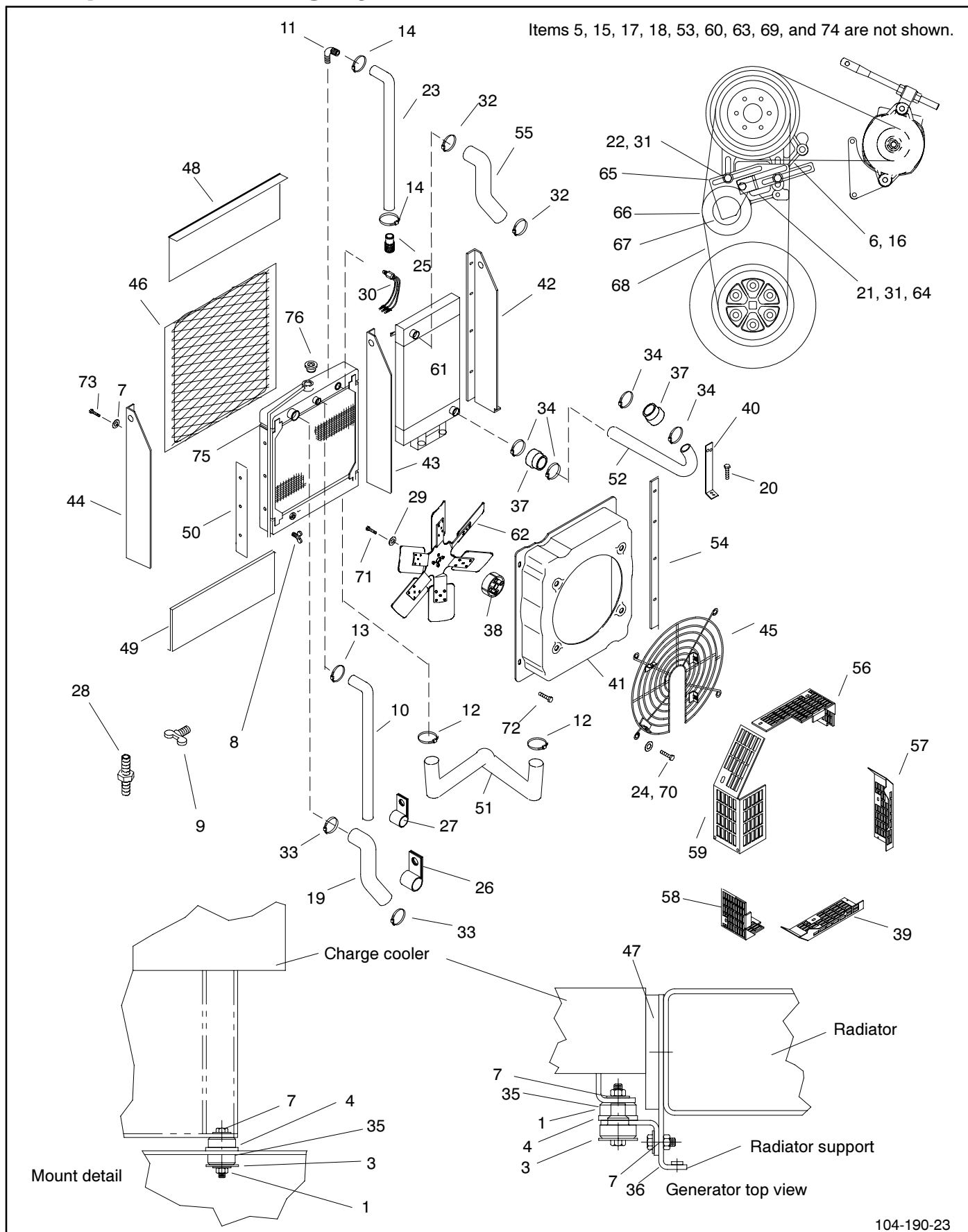
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Item	Part Number	Description	Quantity				
			Variation/Module Number				
			9	10	343579	343727	343728
1	X-75-4	Plug, pipe, 1/8 in.	1	1	1	1	1
2	254344	Clamp, hose	1	1	1		
2	254013	Clamp, hose				1	1
3	272982	Cleaner, air	1	1	1	1	1
4	343530	Clamp, air cleaner	1	1	1	1	1
5	343531	Bracket, air cleaner	1		1	1	
5	343532	Bracket, air cleaner		1			1
6	343587	Clamp, hose	1	1	3	1	1
7	354441	Hose, hump	1	1	1		
7	361847	Hose, hump				1	1
7	354441	Hose, hump, straight, 5 in.				1	1

Item	Part Number	Description	Quantity			
			Variation/Module Number			
			GM13281-MA1	GM13281-MA2	GM13281-MA3	GM13281-MA4
1	X-75-4	Plug, pipe, 1/8 in.				
2	254344	Clamp, hose	1	1		
2	254013	Clamp, hose			1	1
3	272982	Cleaner, air	1	1	1	1
4	343530	Clamp, air cleaner	1	1	1	1
5	343531	Bracket, air cleaner	1		1	
5	343532	Bracket, air cleaner	1	1		1
6	343587	Clamp, hose		1	1	1
7	354441	Hose, hump				
7	361847	Hose, hump			1	1
7	354441	Hose, hump, straight, 5 in.	1	1		

See Kit List section for heavy-duty air cleaner kits.

Group 104: Cooling System

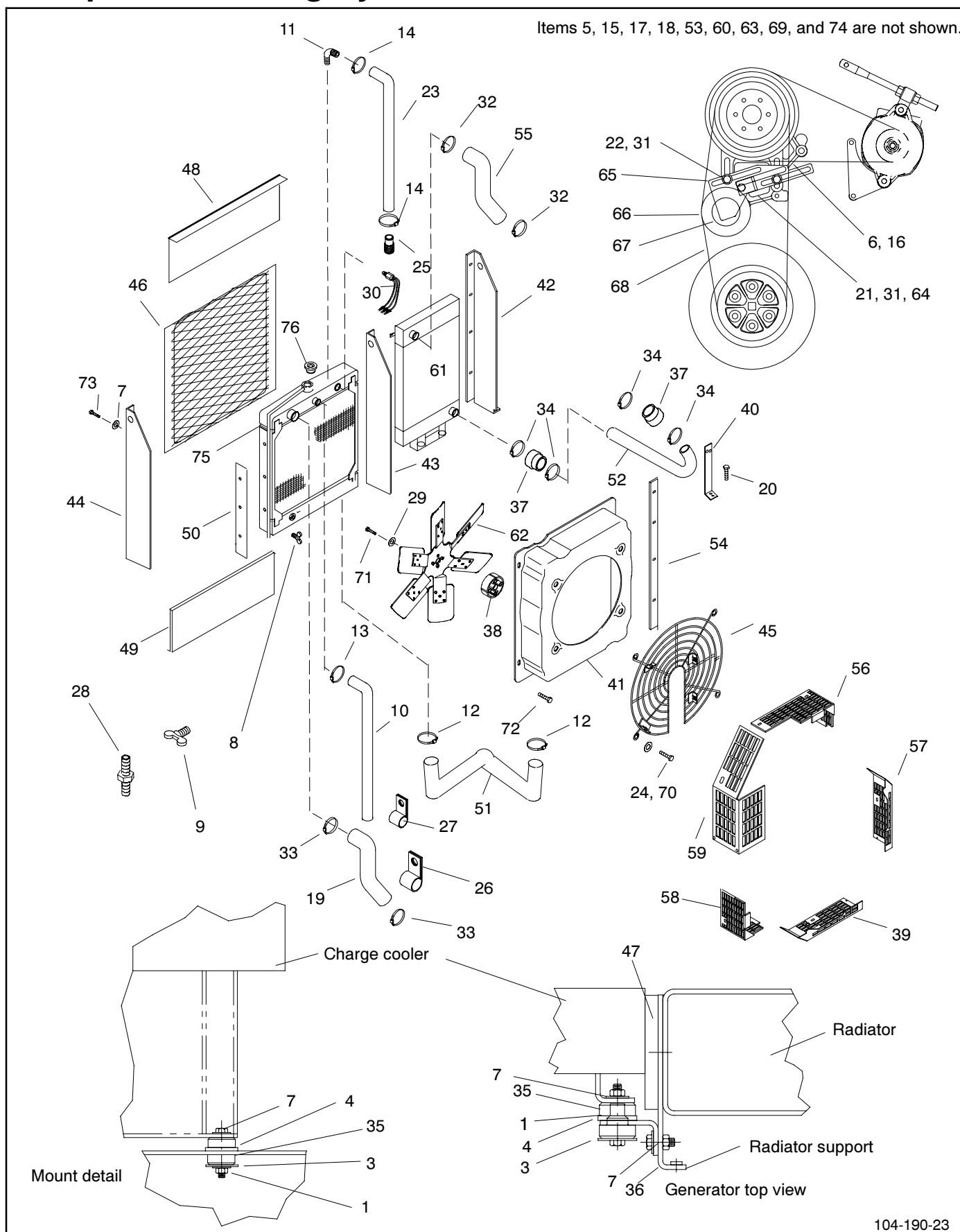


Group 104: Cooling System

Item	Part Number	Description	Quantity				
			Variation/Module Number				
			23	24	343581	343697	GM10642-MA2
1	X-101-16	Nut, elastic stop	4	4	4	4	4
2	X-202-28	Bushing, reducer	1	1	1	1	1
3	X-25-143	Washer, plain	4	4	4	4	4
4	X-25-144	Washer, plain	4	4	4	4	4
5	X-25-30	Washer, plain (not shown)	4	4	4	4	4
6	X-25-44	Washer, plain	1	1	1	1	1
7	X-25-75	Washer, plain	16	16	16	16	16
8	X-256-3	Valve, drain, 1/4 in.	3	3	3	3	3
9	X-256-5	Valve, drain	1	1	1	1	1
10	X-356-38	Hose, radiator	1	1	1	1	1
11	X-391-20	Connector, hose elbow	1	1	1	1	1
12	X-426-2	Clamp, hose	2	2	2	2	2
13	X-426-8	Clamp, hose	2	2	2	2	2
14	X-426-9	Clamp, hose	2	2	2	2	2
15	X-468-7	Tie, cable (not shown)	1	1	1	1	1
16	X-55-46	Screw, HC slotted, 5/16 in.	1	1	1	1	1
17	X-555-1	Elbow, street, 1/4 x 1/4 in. (not shown)	1	1	1	1	1
18	X-6003-8	Conduit, convoluted (not shown)	1	1	1	1	1
19	X-6014-88	Hose, radiator	1	1	1	1	1
20	X-6050-8	Screw, HHC	2	2	2	2	2
21	X-6052-1	Screw, HHC	2	2	2	2	2
22	X-6052-15	Screw, HHC	2	2	2	2	2
23	X-6359-9	Hose, rubber	1	1	1	1	1
24	X-6365-1	Insert, threaded	8	8	8	8	8
25	X-652-3	Fitting, hose	1	1	1	1	1
26	X-672-19	Clamp, insulated	1	1	1	1	1
27	X-672-4	Clamp, insulating	1	1	1	1	1
28	X-751-1	Adapter, hose, 1 x 1 in.	1	1	1	1	1
29	X-801-3	Washer, hardened	6	6	6	6	6
30	254832	Sensor, low fluid	1	1	1	1	1
31	257951	Washer, special	3	3	2	2	2
32	274545	Clamp, hose	2	2	2	2	2
33	275527	Clamp, hose	2	2	2	2	2
34	291590	Clamp, hose	4	4	4	4	4
35	324433	Vibromount	4	4	4	4	4
36	324451	Bracket, charge cooler	2	2	2	2	2
37	GM16637	Hose, hump	2	2	2	2	2
38	343067	Spacer, fan	1	1	1	1	1
39	343097	Guard, bottom belt	1	1	1	1	1
40	343136	Bracket, mounting	1	1	1	1	1

Group 104: Cooling System, continued

Items 5, 15, 17, 18, 53, 60, 63, 69, and 74 are not shown.



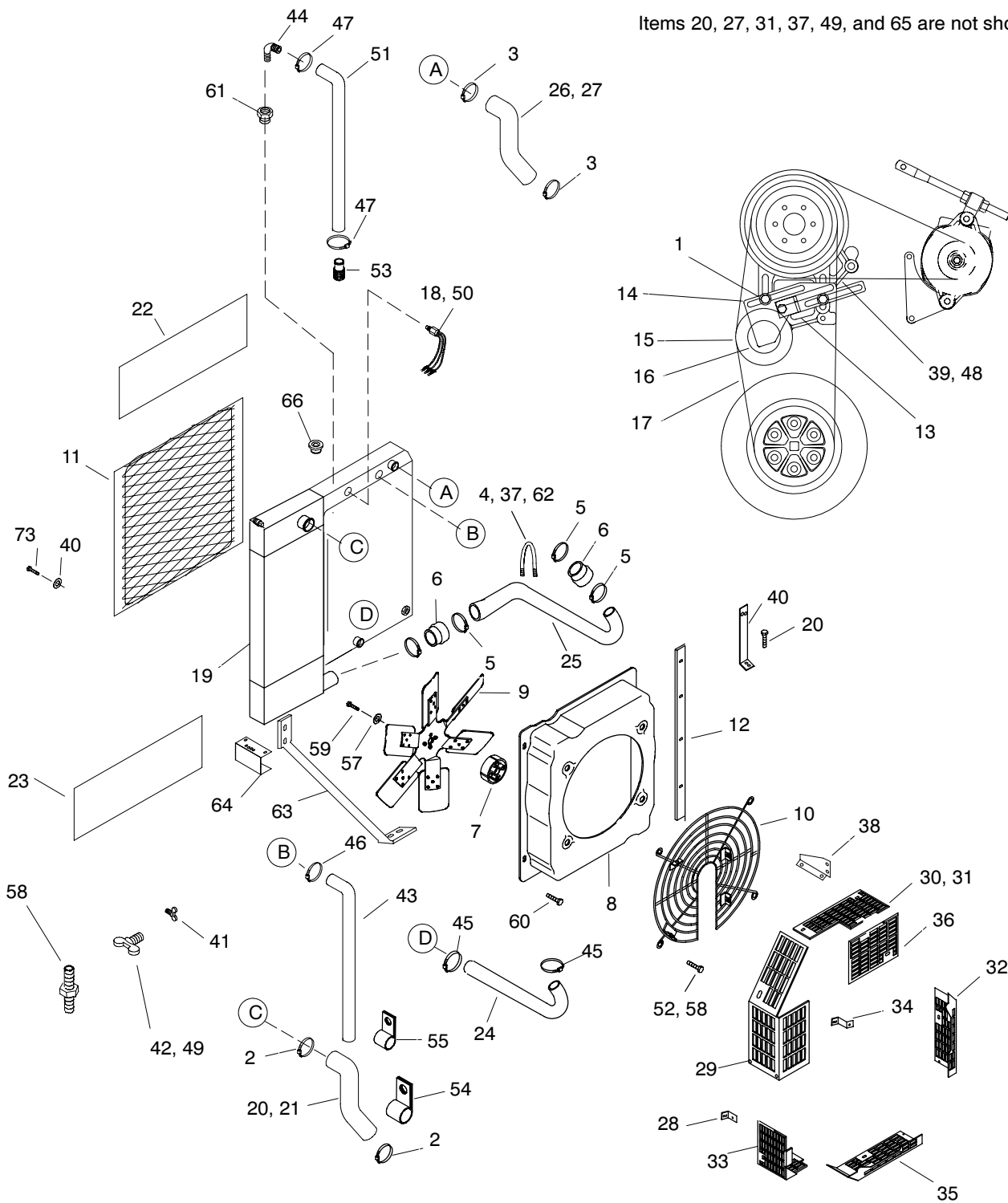
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Group 104: Cooling System, continued

Item	Part Number	Description	Quantity				
			Variation/Module Number				
			23	24	343581	343697	GM10642-MA2
41	343176	Shroud, fan	1	1	1	1	1
42	343182	Support, cooler	1	1	1	1	1
43	343183	Support, radiator	1	1	1	1	1
44	343184	Support, radiator	1	1	1	1	1
45	343185	Guard, fan	1	1	1	1	1
46	343186	Guard, radiator	1	1	1	1	1
47	343193	Insulation, foam	1	1	1	1	1
48	343214	Guard, radiator, top	1	1	1	1	1
49	343215	Guard, radiator, bottom	1	1	1	1	1
50	343288	Spacer, radiator	2	2	2	2	2
51	343289	Hose, radiator, bottom	1	1	1	1	1
52	343337	Tube, charge cooler	1	1	1	1	1
53	343351	Bracket, charge tube (not shown)	1	1	1	1	1
54	343424	Bracket, fan shroud	2	2	2	2	2
55	343430	Hose, charge cooler, top	1	1	1	1	1
56	343434	Guard, belt, top	1	1	1	1	1
57	343435	Guard, belt, right side	1	1	1	1	1
58	343436	Guard, belt, left side	1	1	1	1	1
59	343437	Guard, alternator belt	1	1	1	1	1
60	343439	Bracket, support (not shown)	1	1	1	1	1
61	343180	Cooler, charge air					1
61	343526	Cooler, charge air	1	1	1		
61	343726	Cooler, charge air				1	1
62	343527	Fan, pusher	1	1	1	1	1
63	343586	Support, belt guard (not shown)	1	1	1	1	1
64	343619	Bracket, pulley tensioner	1	1	1	1	1
65	343620	Bracket, pulley tensioner	1	1	1	1	1
66	343621	Pulley, idler	1	1	1	1	1
67	343622	Bushing, idler	1	1	1	1	1
68	343623	V-belt	3	3	3		3
68	343667	V-belt				3	
69	343682	Bracket, belt guard (not shown)	1	1	1	1	1
70	X-125-5	Screw	8	8	8	8	8
71	X-6238-36	Screw	6	6	6	6	6
72	X-125-3	Screw	8	8	8	8	8
73	X-125-24	Screw	10	10	10	10	10
74	X-6238-13	Screw (not shown)	1	1	1	1	1
75	A-343525	Radiator assembly	1	1	1	1	1
76	GM23825	Cap, radiator	1	1	1	1	1

Group 104: Cooling System, continued

Items 20, 27, 31, 37, 49, and 65 are not shown.

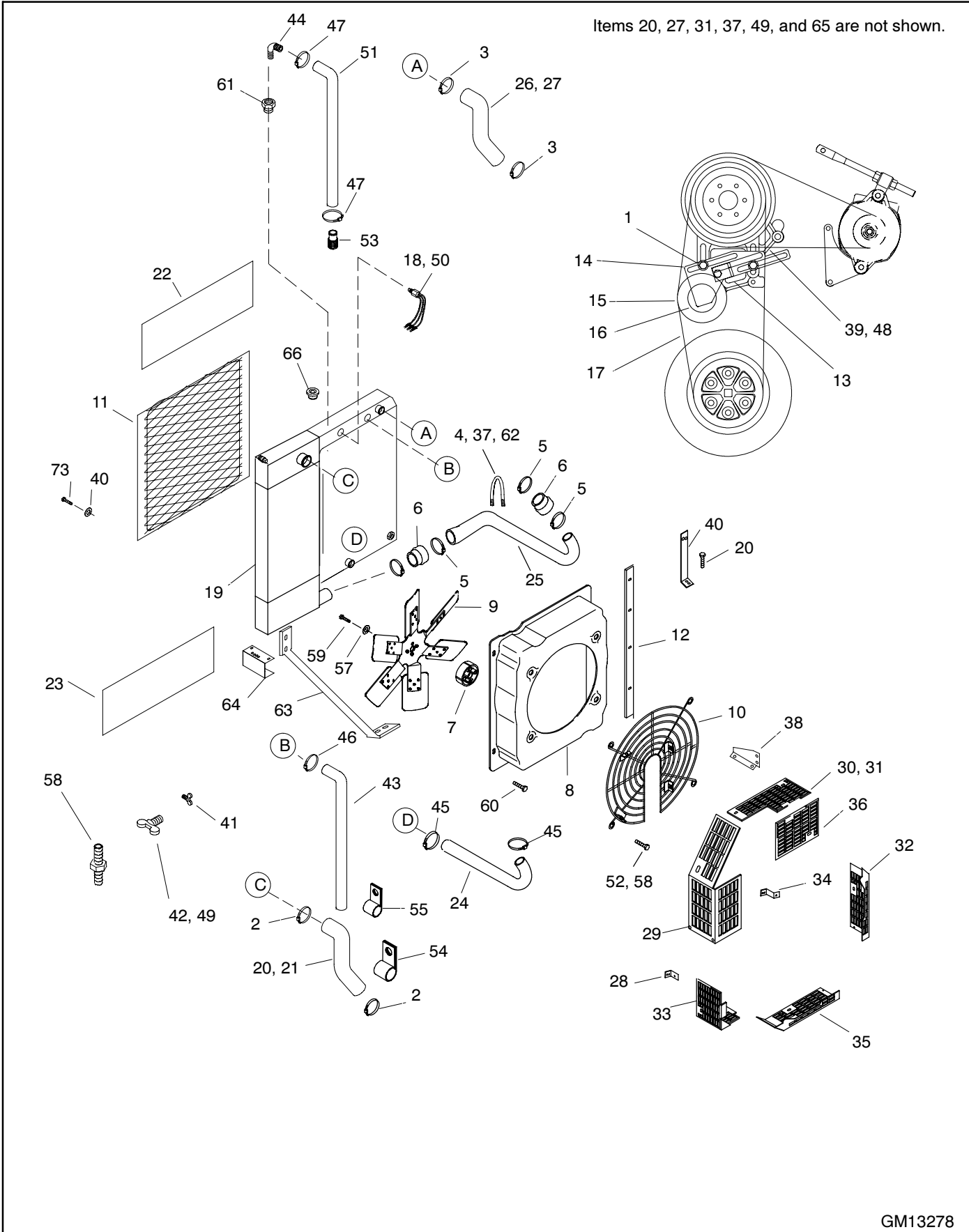


GM13278

Group 104: Cooling System, continued

Item	Part Number	Description	Quantity			
			Module Number			
			GM13278-MA1	GM13278-MA2	GM35145-MA1	GM35145-MA2
1	257951	Washer, special, .562 ID x 1.13 in. OD	2	2	2	2
2	274545	Clamp, hose, 4.31/4.62 in.	2	2	2	2
3	275527	Clamp, hose, 2.81/3.12 in.	2	2	2	2
4	289372	Clamp, muffler, 4.12 in.	2	2	2	2
5	291590	Clamp, hose, 4/4.31 in.	4	4	4	4
6	324473	Hose, hump, straight, 4 in. ID	2	2	2	2
7	343067	Spacer, fan, 5.12 in.	1	1	1	1
8	343176	Shroud, fan	1	1	1	1
9	343180	Fan, pusher	1	1	1	1
10	343185	Guard, fan	1	1	1	1
11	343186	Guard, radiator	1	1	1	1
12	343424	Bracket, fan shroud	2	2	2	2
13	343619	Bracket, pulley tensioner	1	1	1	1
14	343620	Bracket, pulley tensioner	1	1	1	1
15	343621	Pulley, idler	1	1	1	1
16	343622	Bushing, idler, 1.938 in. NPT	1	1	1	1
17	343623	Belt, V, 65.2 in.	3		3	
17	343667	Belt, V, 63.6 in.		3		3
18	365289	Sensor, low fluid	1	1	1	1
19	GM11650	Radiator	1	1	1	1
19	GM28454	Valve, plastic (not shown)	1	1	1	1
20	GM12036	Bracket, charge tube mtg., upper	1	1	1	1
21	GM12037	Hose, charge cooler, upper	1	1	1	1
22	GM12038	Guard, upper radiator	1	1	1	1
23	GM12041	Guard, lower radiator	1	1	1	1
24	GM12042	Hose, lower radiator	1	1	1	1
25	GM12043	Tube, charge cooler	1	1	1	1
26	GM12045	Hose, upper radiator	1	1	1	1
27	GM12046	Bracket, upper radiator hose	1	1	1	1
28	GM12211	Bracket, support	1	1	1	1
29	GM12212	Guard, belt, top left side	1	1	1	1
30	GM12213	Guard, belt top	1	1	1	1
31	GM12214	Support, belt guard, top	1	1	1	1
32	GM12215	Guard, belt, right side	1	1	1	1
33	GM12216	Guard, belt, left side	1	1	1	1
34	GM12217	Bracket, belt guard	1	1	1	1
35	GM12218	Guard, bottom belt	1	1	1	1
36	GM12219	Guard, rear, left side	1	1	1	1
37	GM13725	Bracket, charge cooler tube support (radiator end)	1	1	1	1
38	GM13807	Bracket, belt guard	1	1	1	1
39	X-25-44	Washer, plain .328 ID x .562 OD	1	1	1	1
40	X-25-75	Washer, plain, .344 ID x .875 in. OD	26	26	26	26
41	X-256-3	Valve, drain, 1/4 in. NPT	2	2	2	2
42	X-256-5	Valve, drain	1	1	1	1
43	X-356-38	Hose, radiator, straight, 1 in. ID	1	1	1	1
44	X-391-21	Connector, 90°, 1/4 in. ID hose	1	1	1	1
45	X-426-2	Clamp, hose, 2.31/3.25 in.	2	2	2	2
46	X-426-8	Clamp, hose, .81/1.75 in.	2	2	2	2
47	X-426-9	Clamp, hose, .25/.70 in.	2	2	2	2
48	X-55-46	Screw, hex socket head machine	1	1	1	1
49	X-555-1	Fitting, elbow 1/4 x 1/4 street	1	1	1	1
50	X-6003-120	Conduit, convoluted	1	1	1	1
51	X-6359-9	Hose, rubber, straight, .25 in. ID	1	1	1	1
52	X-6365-2	Insert, threaded	8	8	8	8
53	X-652-3	Fitting, hose	1	1	1	1
54	X-672-19	Clamp, insulated, 3.12 in.	1	1	1	1
55	X-672-4	Clamp, insulated, 1.25 in.	1	1	1	1
56	X-751-1	Adapter, hose, 1 x 1 in.	1	1	1	1
57	X-801-3	Washer, hardened, .406 ID x .812 in. OD	6	6	6	6
58	X-125-5	Screw, HC	8	8	8	8
59	X-6238-36	Screw, HC	6	6	6	6
60	X-125-3	Screw, HC	8	8	8	8
61	X-202-27	Bushing, reducer, 1/8 x 1/4 in. NPT	1	1	1	1
62	GM22996	Bracket, lower charge cooler tube	1			
62	GM35164	Bracket, lower charge cooler tube		1	1	1
63	GM35165	Brace, radiator		2	2	2
64	GM35166	Support, radiator		2	2	2
65	X-400-28	Spacer, .282 ID x .5 OD x .531 in. (not shown)	2	2	2	2
66	352327	Cap, radiator	1	1	1	1

Group 104: Cooling System, continued

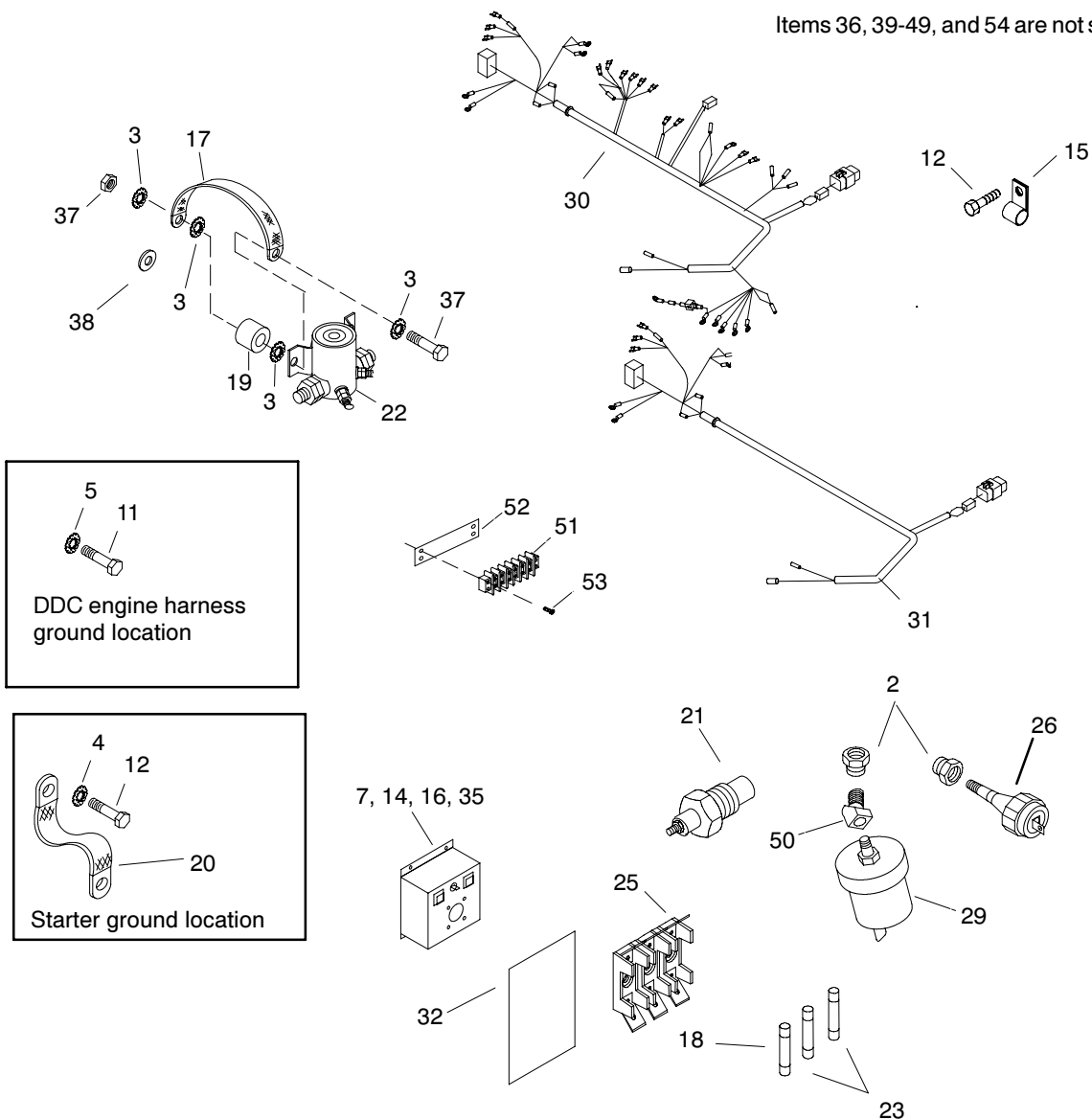


Group 104: Cooling System, continued

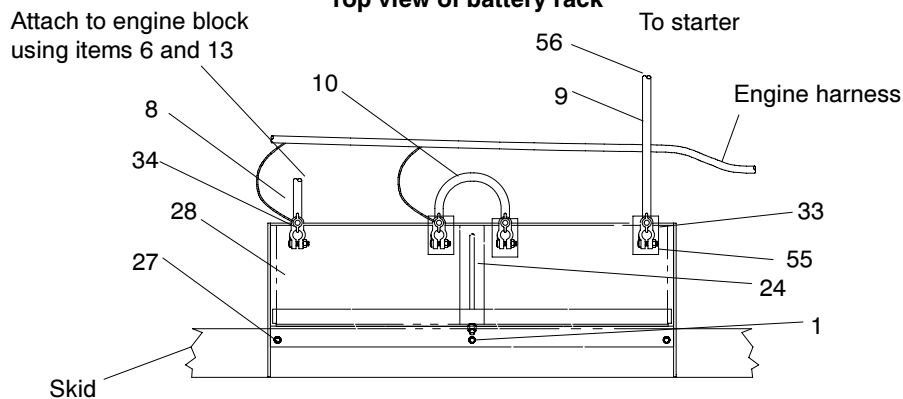
Item	Part Number	Description	Quantity
			Module Number GM41994-MA1
1	257951	Washer, special, .562 ID x 1.13 in. OD	2
2	274545	Clamp, hose, 4.31/4.62 in.	2
3	275527	Clamp, hose, 2.81/3.12 in.	2
4	289372	Clamp, muffler, 4.12 in.	2
5	291590	Clamp, hose, 4/4.31 in.	4
6	324473	Hose, hump, straight, 4 in. ID	2
7	343067	Spacer, fan, 5.12 in.	1
8	343176	Shroud, fan	1
9	343180	Fan, pusher	1
10	343185	Guard, fan	1
11	343186	Guard, radiator	1
12	343424	Bracket, fan shroud	2
13	343619	Bracket, pulley tensioner	1
14	343620	Bracket, pulley tensioner	1
15	343621	Pulley, idler	1
16	343622	Bushing, idler, 1.938 in. NPT	1
17	343623	Belt, V, 65.2 in.	3
18	365289	Sensor, low fluid	1
19	GM11650	Radiator	1
19	GM28454	Valve, plastic (not shown)	1
20	GM12036	Bracket, charge tube mtg., upper	1
21	GM41992	Hose, charge cooler, upper	1
22	GM12038	Guard, upper radiator	1
23	GM12041	Guard, lower radiator	1
24	GM12042	Hose, lower radiator	1
25	GM12043	Tube, charge cooler	1
26	GM12045	Hose, upper radiator	1
27	GM12046	Bracket, upper radiator hose	1
28	GM12211	Bracket, support	1
29	GM12212	Guard, belt, top left side	1
30	GM12213	Guard, belt top	1
31	GM12214	Support, belt guard, top	1
32	GM12215	Guard, belt, right side	1
33	GM12216	Guard, belt, left side	1
34	GM12217	Bracket, belt guard	1
35	GM12218	Guard, bottom belt	1
36	GM12219	Guard, rear, left side	1
37	GM13725	Bracket, charge cooler tube support, radiator end	1
38	GM13807	Bracket, belt guard	1
39	X-25-44	Washer, plain .328 ID x .562 OD	1
40	X-25-75	Washer, plain, .344 ID x .875 in. OD	26
41	X-256-3	Valve, drain, 1/4 in. NPT	2
42	X-256-5	Valve, drain	1
43	X-356-38	Hose, radiator, straight, 1 in. ID	1
44	X-391-21	Connector, 90°, 1/4 in. ID hose	1
45	X-426-2	Clamp, hose, 2.31/3.25 in.	2
46	X-426-8	Clamp, hose, .81/1.75 in.	2
47	X-426-9	Clamp, hose, .25/.70 in.	2
48	X-55-46	Screw, hex socket head machine	1
49	X-555-1	Fitting, elbow 1/4 x 1/4 street	1
50	X-6003-120	Conduit, convoluted	1
51	X-6359-9	Hose, rubber, straight, .25 in. ID	1
52	X-6365-2	Insert, threaded	8
53	X-652-3	Fitting, hose	1
54	X-672-19	Clamp, insulated, 3.12 in.	1
55	X-672-4	Clamp, insulated, 1.25 in.	1
56	X-751-1	Adapter, hose, 1 x 1 in.	1
57	X-801-3	Washer, hardened, .406 ID x .812 in. OD	6
58	X-125-5	Screw, HC	8
59	X-6238-36	Screw, HC	6
60	X-125-3	Screw, HC	8
61	X-202-27	Bushing, reducer, 1/8 x 1/4 in. NPT	1
62	GM35164	Bracket, lower charge cooler tube	1
63	GM35165	Brace, radiator	2
64	GM35166	Support, radiator	2
65	X-400-28	Spacer, .282 ID x .5 OD x .531 in. (not shown)	2
66	352327	Cap, radiator	1

Group 105: Engine

Items 36, 39-49, and 54 are not shown.



Top view of battery rack



105-190-32

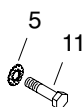
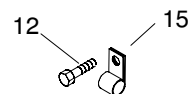
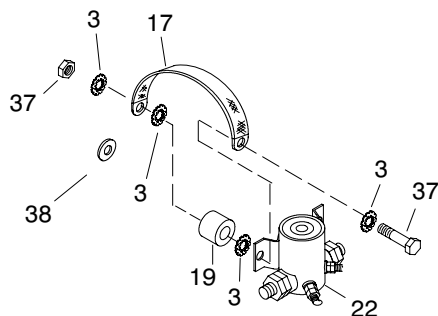
Group 105: Engine

Item	Part Number	Description	Quantity										
			Variation Number										
			32	33	34	35	36	GR1	GR2	GR3	GR4	GR5	GR6
1	X-101-4	Nut, hex elastic stop, 5/16-24	1	1	1	1	1						
1	M982-08-80	Nut, hex elastic stop						1	1	1	1	1	1
2	X-202-27	Bushing, reducer, 1/8 in.	2	2	2	2	2						
2	153659	Bushing, reducer, 1/2 in. x 3/4 in. NPT	1	1	1	1	1	1	1	1	1	1	1
3	X-22-12	Washer, lock, 1/4 in. int./ext. tooth	8	8	8	7	7	7	7	7	7	7	7
4	X-22-14	Washer, lock, 3/8 in. int./ext. tooth	1	1	1	1	1	1	1	1	1	1	1
5	X-22-16	Washer, lock, 5/16 in. int./ext. tooth	2	2	2	1	1	1	1	1	1	1	1
6	X-22-26	Washer, lock, 1/2 in. int./ext. tooth	1	1	1	1	1						
7	X-49-41	Screw, pan head	4	4	4	4	4	4	4	4	4	4	4
8	X-545-165	Cable, battery	1	1	1	1	1	1	1	1	1	1	1
9	X-545-129	Cable, battery	1	1	1	1	1	1	1	1	1	1	1
10	X-545-73	Cable, battery	1	1	1	1	1	1	1	1	1	1	1
11	X-6050-8	Screw, HHC	1	1	1	1	1						
12	X-6051-2	Screw, HHC	2	2	2	2	2						
13	X-6052-1	Screw, HHC	1	1	1	1	1						
14	X-6214-6	Cap, plastic	1	1	1	1	1	1	1	1	1	1	1
15	X-672-32	Clamp, insulated	1	1	1	1	1	1	1	1	1	1	1
16	X-74-6	Nut, hex zinc-plated	4	4	4	4	4	4	4	4	4	4	4
17	223033	Strap, ground, 3/8 x 5 in.	1	1	1	1	1	1	1	1	1	1	1
18	239298	Fuse 5 A, 250 V, .25 x 1.25 in.	1	1	1	1	1	1	1	1	1	1	1
19	259632	Bumper	2	2	2	2	2	2	2	2	2	2	2
20	266581	Strap, ground	1	1	1	1	1	1	1	1	1	1	1
21	268298	Sender, water temperature	1	1	1	1	1						
22	268371	Relay	1	1	1	1	1	1	1	1	1	1	1
23	283645	Fuse 15 A, 250 V, .25 x 1.25 in.	2	2	2	2	2	2	2	2	2	2	2
24	GM13268	Bolt, angle						1	1	1	1	1	1
24	360491	Bolt, angle	1	1	1	1	1						
25	292821	Holder, fuse	1	1	1	1	1	1	1	1	1	1	1
26	328309	Switch, assembly pressure	1	1	1	1	1						
27	343220	Rack, battery	1	1	1	1	1	1	1	1	1	1	1
28	343221	Clamp, battery	1	1	1	1	1	1	1	1	1	1	1
29	343473	Sender, oil pressure	1	1	1	1	1						
30	343574	Harness, engine (includes items 43-49)	1	1	1	1	1	1	1	1	1	1	1
31	343575	Harness, DDEC (includes items 39-42)		1	1	1	1	1	1	1	1	1	1
32	343601	Strip, marker, 3-fuse	1	1	1	1	1	1	1	1	1	1	1
33	345039	Terminal, battery	2	2	2	2	2						
34	345056	Terminal, battery	2	2	2	2	2						
35	A-343591	Box assembly	1	1	1	1	1	1	1	1	1	1	1
36	A-343457	Engine assembly (not shown)	1							1			
36	A-343458	Engine assembly (not shown)		1				1					
36	A-343679	Engine assembly (not shown)			1				1				
36	B-343692	Engine assembly (not shown)				1						1	
36	B-343693	Engine assembly (not shown)					1				1		
36	B-343696	Engine assembly (not shown)											1
37	#	1/4-20 hardware	2	2	2	2	2	2	2	2	2	2	2
38	X-25-26	Washer (not shown)	2	2	2	2	2	2	2	2	2	2	2
39	343129	Connector, 30-pin (P5) (not shown)	1	1	1	1	1	1	1	1	1	1	1
40	343130	Connector, 30-pin (P3) (not shown)	1	1	1	1	1	1	1	1	1	1	1
41	343131	Connector, 6-pin (P6) (not shown)	1	1	1	1	1	1	1	1	1	1	1
42	239408	Connector, 4-pin (P29) (not shown)	1	1	1	1	1	1	1	1	1	1	1
43	290262	Boot (not shown)	1	1	1	1	1	1	1	1	1	1	1
44	233959	Diode, 6 A (not shown)	4	4	4	4	4	4	4	4	4	4	4
45	239411	Connector, 4-pin (P2) (not shown)	1	1	1	1	1	1	1	1	1	1	1
46	295145	Connector, 4-pin (P1) (not shown)	1	1	1	1	1	1	1	1	1	1	1
47	292800	Connector, cable (not shown)	1	1	1	1	1	1	1	1	1	1	1
48	259689	Connector, 9-pin (P4) (not shown)	1	1	1	1	1	1	1	1	1	1	1
49	269190	Connector, 6-pin (not shown)	1	1	1	1	1	1	1	1	1	1	1
50	267428	Elbow, 45 degree street	1	1	1	1	1	1	1	1	1	1	1
51	295314	Block, terminal	1	1	1	1	1	1	1	1	1	1	1
52	299090	Marker, strip	1	1	1	1	1	1	1	1	1	1	1
53	X-49-6	Screw, cross recess pan head machine	2	2	2	2	2	2	2	2	2	2	2
54	343351	Bracket, charge tube mounting (not shown)	1	1	1	1	1						
55	GM20745	Boot, battery lug						3	3	3	3	3	3
56	GM22350	Boot, starter terminal						1	1	1	1	1	1

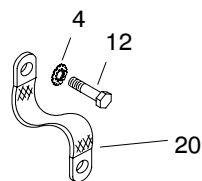
Common hardware. Procure locally.

Group 105: Engine, continued

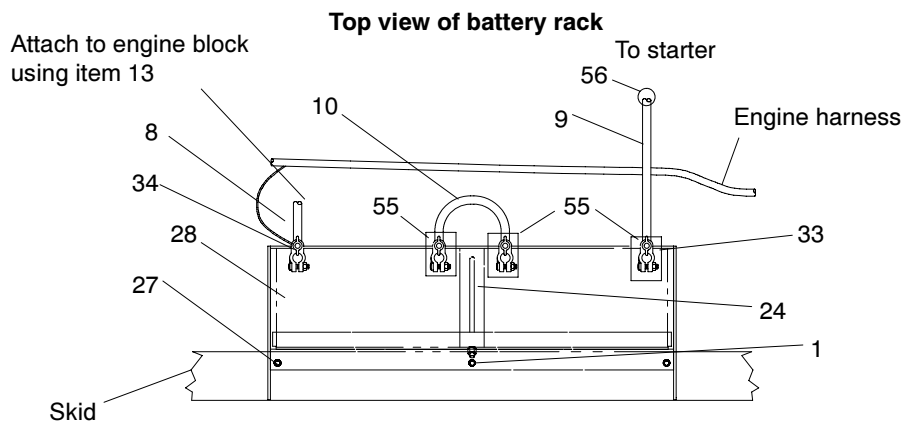
Items 36 and 54 are not shown.



DDC engine harness
ground location



Starter ground location



105-190-32

Group 105: Engine, continued

Item	Part Number	Description	Quantity											
			Variation Number											
			3-GR1	3-GR2	37	38	39	40	41	42	43	44	45	
1	M982-08-80	Nut, hex elastic stop	1	1	1	1	1	1	1	1	1	1	1	
3	X-22-12	Washer, lock, 1/4 in. int./ext. tooth	7	7	7	7	7	7	7	7	7	7	7	
4	X-22-14	Washer, lock, 3/8 in. int./ext. tooth	1	1	1	1	1	1	1	1	1	1	1	
5	X-22-16	Washer, lock, 5/16 in. int./ext. tooth	1	1	1	1	1	1	1	1	1	1	1	
8	X-545-165	Cable, battery	1	1	1	1	1	1	1	1	1	1	1	
9	X-545-129	Cable, battery	1	1	1	1	1	1	1	1	1	1	1	
10	X-545-73	Cable, battery	1	1	1	1	1	1	1	1	1	1	1	
11	M933-08016-60	Screw, hex cap	1	1	1	1	1	1	1	1	1	1	1	
12	M933-10020-60	Screw, hex cap	1	1	1	1	1	1	1	1	1	1	1	
13	M933-12020-60	Screw, hex cap	1	1	1	1	1	1	1	1	1	1	1	
15	X-672-32	Clamp, insulated	1	1	1	1	1	1	1	1	1	1	1	
17	223033	Strap, ground, 3/8 x 5 in.	1	1										
19	259632	Bumper	2	2	2	2	2	2	2	2	2	2	2	
20	266581	Strap, ground	1	1	1	1	1	1	1	1	1	1	1	
22	268371	Relay	1	1	1	1	1	1	1	1	1	1	1	
24	GM13268	Bolt, angle	1	1	1	1	1	1	1	1	1	1	1	
27	GM30631	Rack, battery	1	1	1	1	1	1	1	1	1	1	1	
28	343221	Clamp, battery	1	1	1	1	1	1	1	1	1	1	1	
36	GM34557	Engine assembly (not shown)	1											
36	GM34558	Engine assembly (not shown)		1										
36	GM41904	Engine, 350 kW, Series 60 Tier 3 (not shown)			1									
36	GM41905	Engine, 400 kW, Series 60 Tier 3 (not shown)				1								
36	GM41906	Engine, 450 kW, Series 60 Tier 3 (not shown)					1							
36	B-343692	Engine assembly, 400 kW (not shown)					1							
36	B-343693	Engine assembly, 400 kW (not shown)						1						
36	A-343457	Engine assembly, 350 kW (not shown)							1					
36	A-343679	Engine assembly (not shown)								1				
36	B-343696	Engine assembly, 350 kW (not shown)										1		
36	A-343458	Engine assembly, 350 kW (not shown)											1	
37	#	1/4-20 hardware	2	2	2	2	2	2	2	2	2	2	2	
55	GM20745	Boot, battery lug	3	3	3	3	3	3	3	3	3	3	3	
56	GM22350	Boot, starter terminal	1	1	1	1	1	1	1	1	1	1	1	

Common hardware. Procure locally.

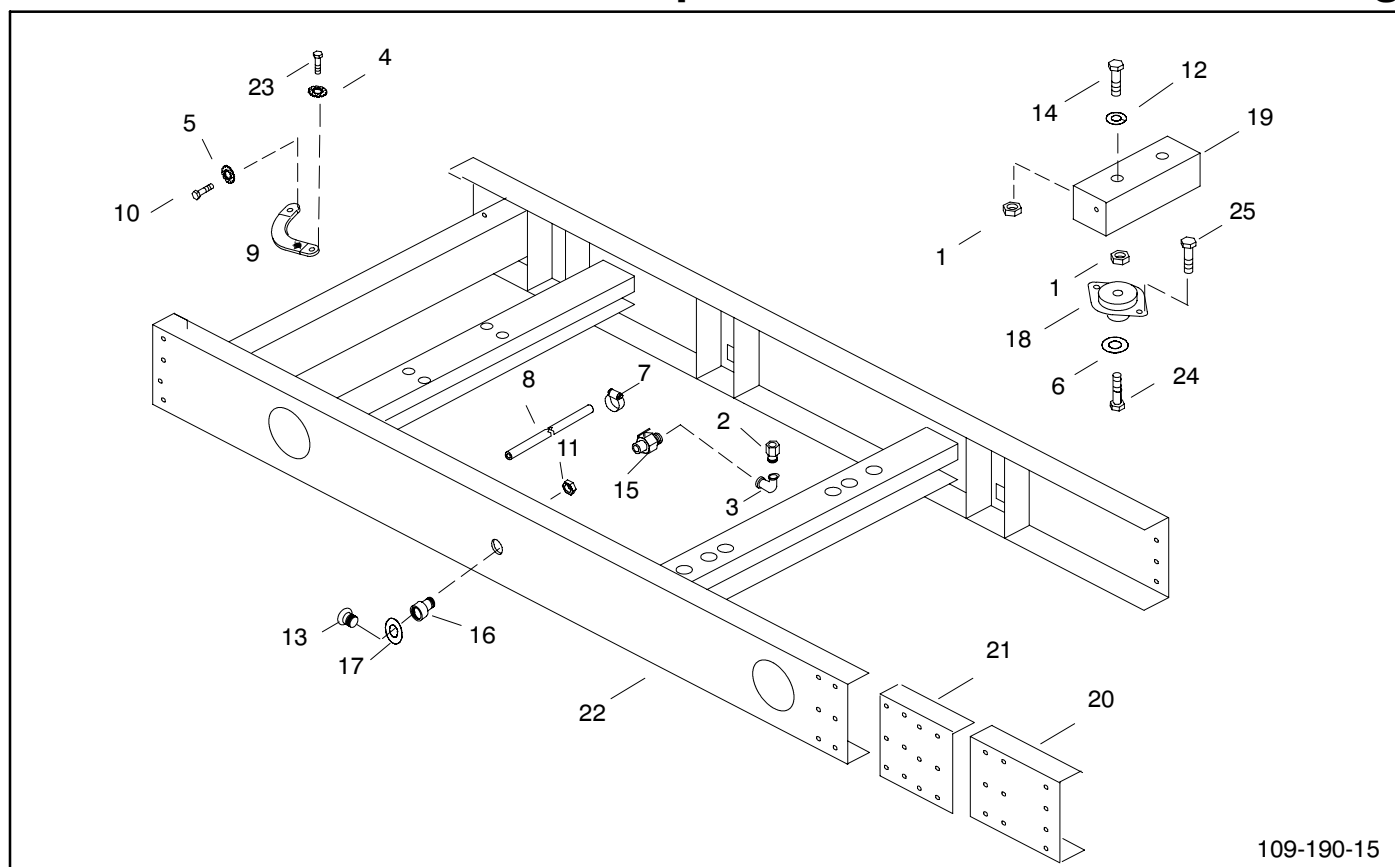
Routine Engine Service Parts

Item	Part Number	Description	Quantity (per engine)		
			Variation Number		
			350	400	450
1	279262	Filter, primary fuel	1	1	1
2	279261	Filter, secondary fuel	1	1	1
3	343445	Filter, oil	2	2	2
4	—	Belt, fan (see Group 104)	1	1	1

Group 107: Nameplates and Decals

Item	Part Number	Description	Quantity		
			Variation Number		
			5	GR2S	GR3S
1	238402	Decal, caution positive terminal only	1	1	1
2	249808	Decal, warning rotating parts	1	1	1
3	249809	Decal, caution hot engine	1	2	1
4	249810	Decal, warning hot coolant	1	1	1
5	255882	Decal, caution standby service connection	1	1	1
6	257438	Decal, danger moving rotor	2	1	1
7	273780	Decal, warning explosion	1	1	1
8	324069	Nameplate, model/ratings	1	1	1
9	343165	Decal, caution—not a step	1	1	1
10	347166	Decal, electrical equipment	1	1	1
11	364116	Decal, caution standby service connection	2	2	3
12	GM13227	Decal, warning fan force	1	1	1
13	GM13228	Decal, warning fan force	1	1	1
14	X-6301-3	Decal, DDC/MTU logo	1	2	0
15	X-6302-1	Decal, DDC/MTU symbol, 3.14 in. dia.	1	2	
16	GM23477-6	Decal, DDC/MTU			1
16	GM15300	Decal, exhaust piping		1	1
17	GM19296	Decal, fuel type		1	1
18	GM20171	Decal, warning fan		1	1
19	294520	Decal, danger high voltage		1	1
20	GM39683	Tag, hang (lug selection)		1	1

Group 109: Skid and Plant Mounting

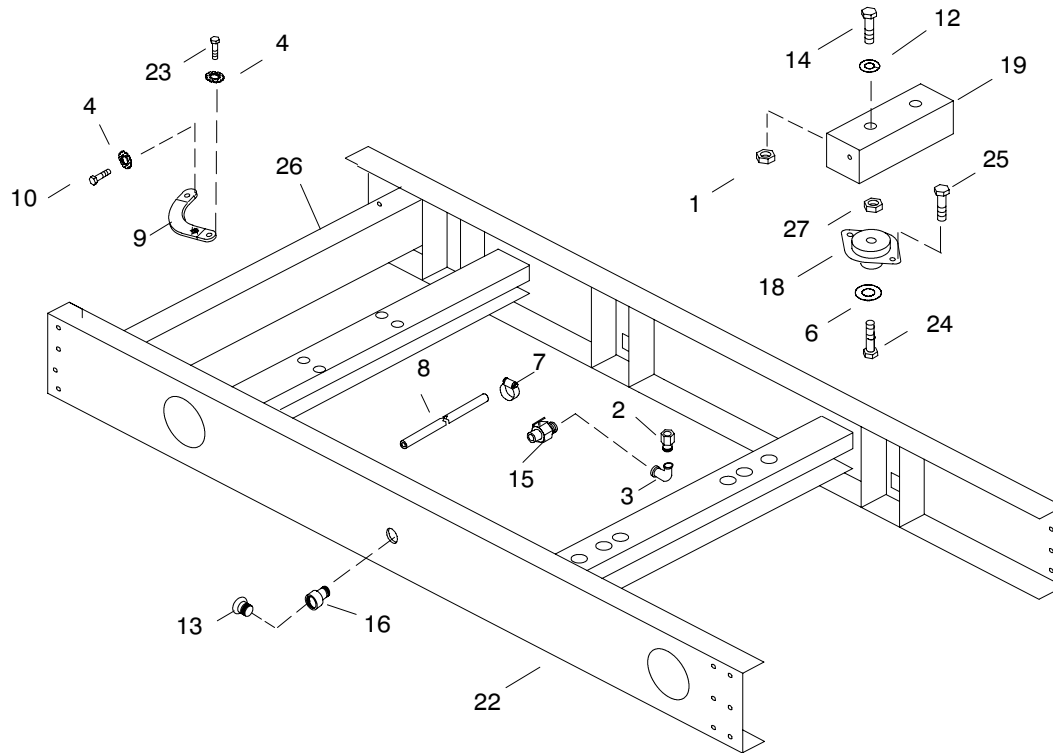


109-190-15

Item	Part Number	Description	Quantity					
			Variation/Module Number					
			15	16	343582	343583	GM13279-MA1	GM13279-MA2
1	X-101-15	Nut, elastic stop, 5/8-11	4	4	4	4		
1	M982-20-80	Nut, hex elastic stop					4	4
2	X-202-41	Bushing, reducer	1	1	1	1	1	1
3	X-211-1	Elbow, street, 1/2 in.	1	1	1	1	1	1
4	X-22-16	Washer, lock, 5/16 in. int./ext. tooth	1	1	1	1	3	3
5	X-22-26	Washer, lock, 1/2 in. int./ext. tooth	1	1	1	1		1
6	X-25-112	Washer, plain	2	2	2	2	2	2
7	X-426-10	Clamp, hose	2	2	2	2	2	2
8	X-577-27	Hose	1	1	1	1	1	1
9	X-6046-5	Strap, ground	1	1	1	1		
9	GM21085	Strap, ground					1	1
10	X-6052-1	Screw, HHC	1	1	1	1		
11	X-80-1	Nut, hex	1	1	1	1		
12	X-801-9	Washer, hardened	2	2	2	2		
12	X-801-8	Washer, hardened					2	2
13	241062	Plug, drain	1	1	1	1		
13	X-75-3	Plug, pipe					1	1
14	273049	Screw	2	2	2	2		
15	272701	Valve, oil drain	1	1	1	1	1	1
16	273729	Adapter, hose	1	1	1	1		
16	X-582-1	Coupling, hose					1	1
17	276552	Washer, nylon	1	1	1	1		
18	336024	Vibromount	2	2	2	2	2	2
19	GM28345	Support, engine, front	1	1	1	1	1	1
20	343105	Extension, skid	2	2	2	2		
20	GM23238	Extension, skid					2	2
21	343107	Bracket, connection	2	2	2	2	2	2
21	GM23237	Bracket, skid connection					2	2
22	343572	Skid	1		1			
22	343573	Skid		1		1		
22	GM23241	Skid						1
22	GM23240	Skid					1	
23	#	Hardware, 5/16-18	1	1	1	1		
24	X-6021-12	Screw	2	2	2	2		
25	#	Hardware, 3/8-16	4	4	4	4		

Common hardware. Procure locally.

Group 109: Skid and Plant Mounting, continued

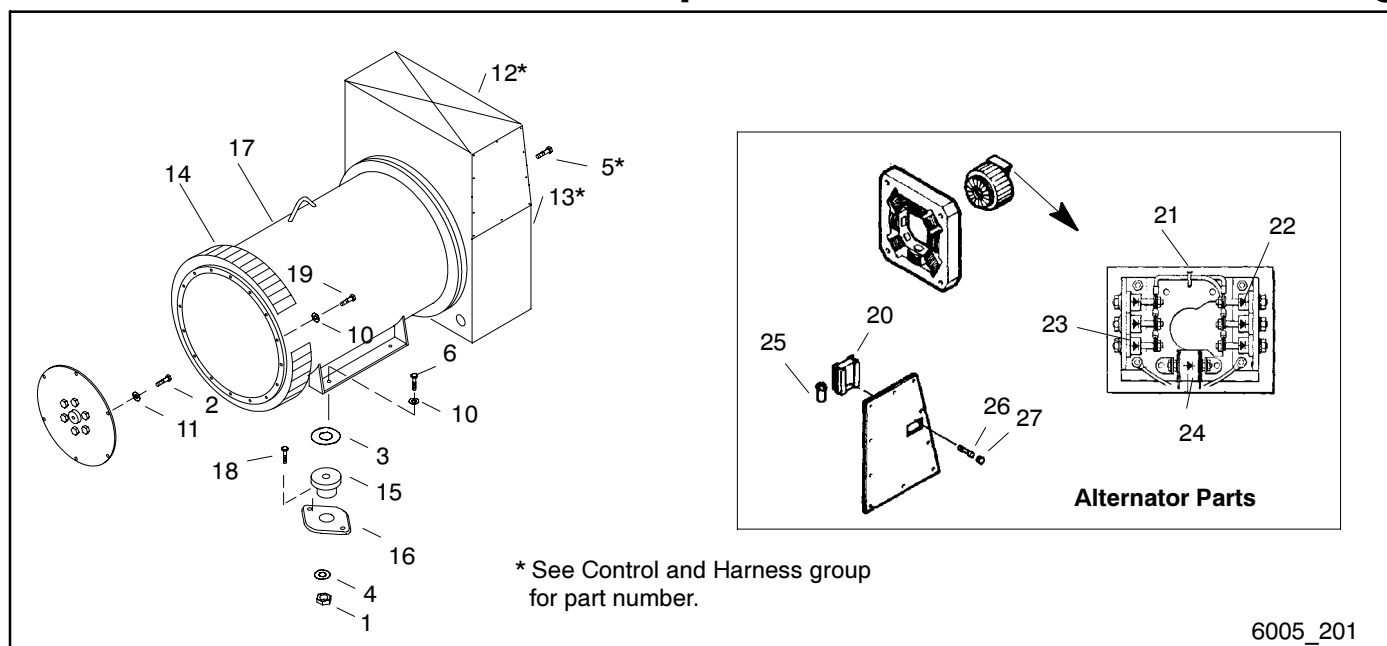


109-190-15

Item	Part Number	Description	Quantity	
			Module Number	
			GM35146-MA1	GM35146-MA2
1	M982-20-80	Nut, hex elastic stop	2	2
2	X-202-41	Bushing, reducer	1	1
3	X-211-1	Elbow, street, 1/2 in.	1	1
4	X-22-16	Washer, lock, 5/16 in. int./ext. tooth	3	3
6	X-25-112	Washer, plain	2	2
7	X-426-10	Clamp, hose, .5/1 in.	2	2
8	X-577-27	Hose, rubber, straight, .62 in ID	1	1
9	GM21085	Strap, ground, 16 in.	1	1
10	M933-08050-60	Screw, hex cap	1	1
12	X-801-8	Washer, hardened, .812 ID x 2 in.	2	2
13	X-75-3	Plug, pipe	1	1
14	M933-20055-60	Screw, hex cap	2	2
15	272701	Valve, oil drain	1	1
16	X-582-1	Coupling, hose	1	1
18	336024	Vibromount	2	2
19	GM35159	Support, engine, front	1	1
22	GM35169	Skid	1	
22	GM42803	Skid		1
23	M933-12030-60	Screw, hex cap	1	1
24	M931-16090-60	Screw, hex cap	2	2
25	M-933-10040-60	Screw, hex cap	4	4
26	GM28629	Crossmember, skid	1	1
27	M982-16-80	Nut, hex elastic stop	2	2

Common hardware. Procure locally.

Group 201: Generator and Mounting



Item	Part Number	Description	Qty.
1	M982-20-80	Nut, hex elastic stop	2
2	X-129-54	Screw, HC, 1/2-13 x 1 1/4 in.	8
3	X-25-150	Washer, plain	2
4	X-25-151	Washer, plain	2
5	X-6217-10	Screw, hex flange	13
6	M931-20120-60	Screw, hex head	2
7	X-750-14	Marker, wire tab no. L1 (not shown)	1
8	X-750-15	Marker, wire tab no. L2 (not shown)	1
9	X-750-16	Marker, wire tab no. L3 (not shown)	1
10	X-801-6	Washer, hardened	12
11	290945	Washer, hardened	8
12	*	Cover, top back	1
13	*	Cover, louvered	1
14	See chart	Screen	1
15	354634	Vibromount	2
16	354717	Plate, generator mounting	2
17	See chart	Alternator assembly	1
18	#	Hardware, 1/2-13	4
19	X-6024-16	Bolt, hex cap	12
20	328725	Voltage regulator, DVR2000	1
21	347071	Exciter rectifier assembly (includes items 22-24)	1
22	279772	Diode, standard polarity	1
23	279774	Diode, reversing polarity	1
24	279776	Surge suppressor	1
25	347160	Capacitor	1
26	279778	Fuse, 5 amp	1
27	279779	Fuse cap	1

Common hardware. Procure locally.

* See Control and Harness group for part number.

Generator and Mounting Part Numbers

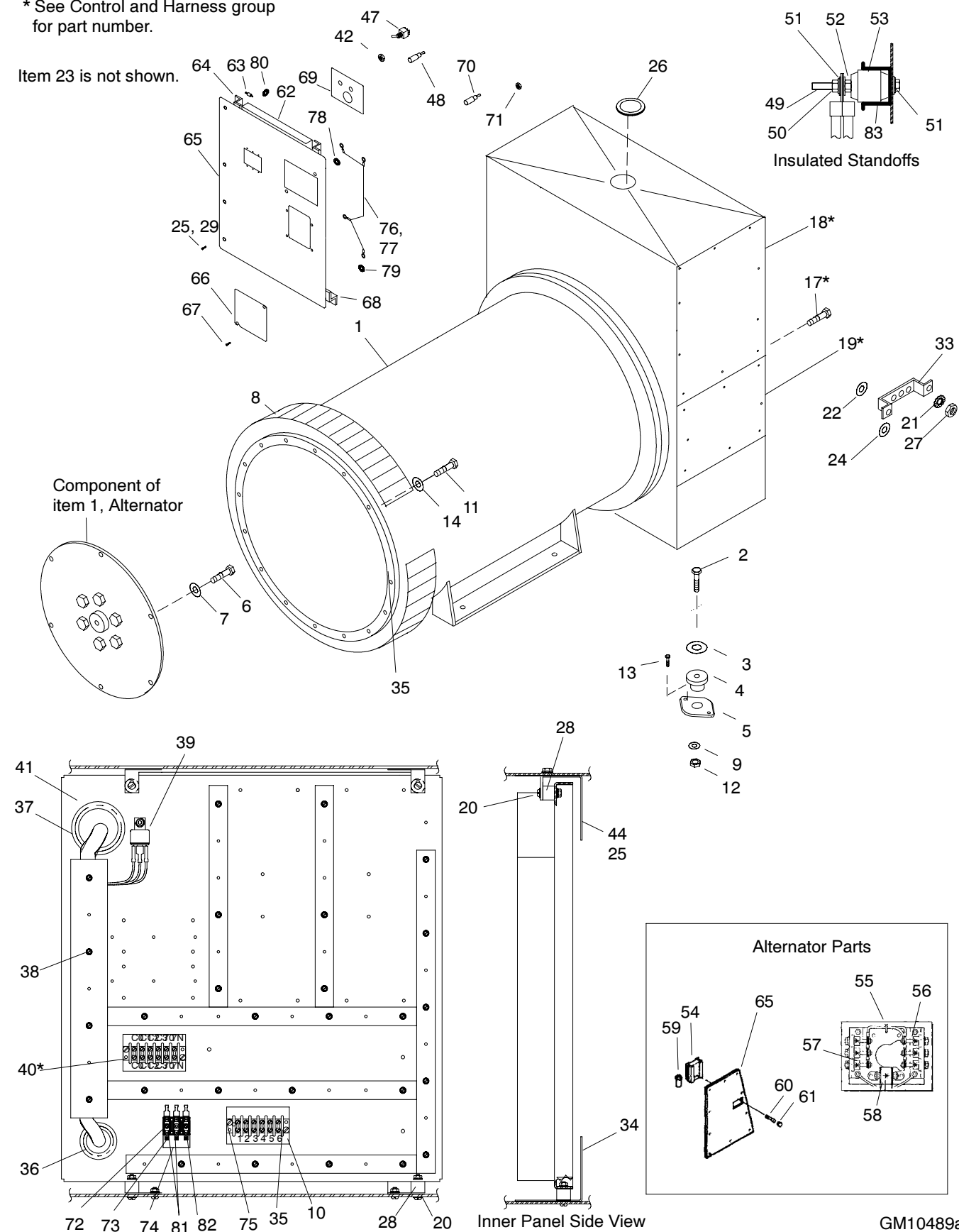
Use this table to identify the part number of item 14 and item 17.

Variation/ Module No.	Alternator Description	Item 14, Screen	Item 17, Alternator Assembly
279	4M4019	328902	A-328098
280	4M4021	328902	A-328099
281	5M4027	328903	A-328101
282	4M4158, 380 V	328902	A-328116
283	4M4266, 600 V	328902	A-328127
284	5M4161, 380 V	328903	A-328662
285	5M4272, 600 V	328902	A-328099
325983	5M4160, 380 V	328903	A-328117
325984	5M4024	328903	A-354635
325935	4M4019	328902	A-328098
325936	4M4021	328902	A-328099
325937	5M4027	328903	A-328101
325938	4M4158, 380 V	328902	A-328116
325939	4M4266, 600 V	328902	A-328127
325940	5M4161, 380 V	328903	A-328662
325941	5M4272, 600 V	328902	A-328099
GM13276-MA1S	4M4019	328902	A-328098
GM13276-MA2S	4M4021	328902	A-328099
GM13276-MA3S	5M4024	328903	A-354635
GM13276-MA4S	5M4027	328903	A-328101
GM13276-MA5S	4M4158, 380 V	328902	A-328116
GM13276-MA6S	5M4160, 380 V	328902	A-328117
GM13276-MA7S	5M4162, 380 V	328903	A-328662
GM13276-MA8S	4M4266, 600 V	328902	A-328127
GM13276-MA9S	5M4272, 600 V	328903	A-328663
GM16943-MA1S	4M4019	328902	A-328098
GM16943-MA2S	4M4021	328902	A-328099
GM16943-MA3S	5M4024	328903	A-354635
GM16943-MA4S	5M4027	328903	A-328101
GM16943-MA5S	4M4158, 380 V	328902	A-328116
GM16943-MA6S	5M4160, 380 V	328902	A-328117
GM16943-MA7S	5M4162, 380 V	328903	A-328662
GM16943-MA8S	4M4266, 600 V	328902	A-328127
GM16943-MA9S	5M4272, 600 V	328903	A-328663

Group 201: Generator and Mounting, continued

* See Control and Harness group for part number.

Item 23 is not shown.



Group 201: Generator and Mounting, continued

Item	Part Number	Description	Qty.
1	See chart	Alternator assembly	1
2	M931-20120-60	Screw, hex head	2
3	X-25-150	Washer, plain, .8 ID x 4.25 in. OD	2
4	354634	Vibromount	2
5	354717	Plate, generator mounting	2
6	X-129-59	Bolt, hex cap	8
7	290945	Washer, hardened, .531 ID x 1.06 in. OD	8
8	328903	Screen	1
9	X-25-151	Washer, plain, .8 ID x 3 in. OD	2
10	299090	Marker, strip	1
11	X-6024-16	Bolt, hex cap	12
12	M982-20-80	Nut, hex elastic stop	2
13	M931-12045-60	Screw, hex head	4
14	X-801-6	Washer, hardened, .469 ID x .922 in. OD	12
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 (not shown)	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
28	229353	Mount, controller	4
29	295009	Retainer	10
33	361271	Bus, ground	1
34	361478	Retainer, inner panel	2
35	295314	Block, terminal	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	151511	Ring, lock	1

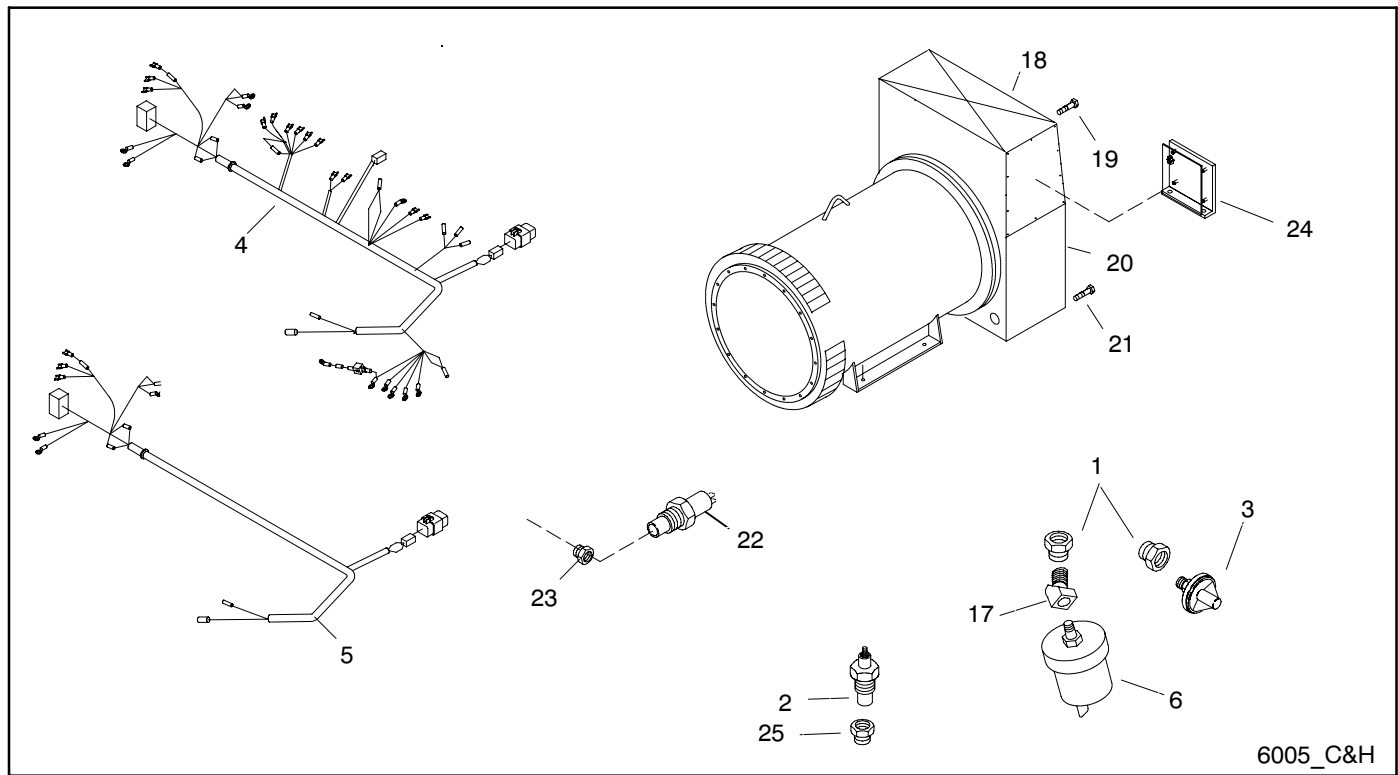
* See Control and Harness group for part number.

Item	Part Number	Description	Qty.
44	GM41599	Bracket, inner panel	1
47	354151	Switch, toggle, 8V series engine	1
48	343684	Lamp, yellow	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	Insulator, standoff, 3/8-16 x 2 in.	3
54	328725	Voltage regulator, DVR2000	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 A	1
61	279779	Cap, fuse	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	GM17571	Cover, access	1
67	X-50-2	Screw, slotted pan head machine	4
68	GM13561	Bracket, dr panel mounting, bottom	1
69	See chart	Plate, diagnostic silkscreen	1
70	343685	Lamp, red	1
71	X-74-6	Nut, hex	4
72	X-49-2	Screw, cross recess PHM	2
73	292821	Fuse holder	1
74	GM28784	Strip, marker	1
75	X-49-36	Screw, RHM	4
76	GM21264	Harness, inner panel ground	1
77	361567	Base, tie wrap (not shown)	2
78	X-22-12	Washer, lock, .262 ID x .743 in. OD	2
79	X-22-13	Washer, lock, .20 ID x .595 in. OD	1
80	X-22-18	Washer, lock, .172 ID x .595 in. OD	12
81	292937	Fuse, 20 A	2
82	239298	Fuse, 5 A	1
83	GM41600	Bracket, insulator support	1

Use this table to identify the part number of item 1 and item 69.

Module No.	Alternator Description	Item 1, Alternator Assembly	Item 69, Diagnostic Plate
GM35144-MA1	5M4024	A-361851	GM17570
GM35144-MA2	5M4027	A-361852	GM17570
GM35144-MA3	5M4028	A-361749	GM17570
GM35144-MA4	5M4160	A-361855	GM17570
GM35144-MA5	5M4162	A-361856	GM17570
GM35144-MA6	5M4270	A-361854	GM17570
GM35144-MA7	5M4272	A-361753	GM17570
GM35144-MA8	4M4019	GM42815	GM46193
GM35144-MA9	4M4021	GM42816	GM46193
GM35144-MA10	4M4158	GM42841	GM46193
GM35144-MA11	4M4266	GM42842	GM46193
GM35144-MA12	5M4024	A-361851	GM46193
GM35144-MA13	5M4027	A-361852	GM46193
GM35144-MA14	5M4028	A-361749	GM46193
GM35144-MA15	5M4160	A-361855	GM46193
GM35144-MA16	5M4162	A-361856	GM46193
GM35144-MA17	5M4270	A-361854	GM46193
GM35144-MA18	5M4272	A-361753	GM46193

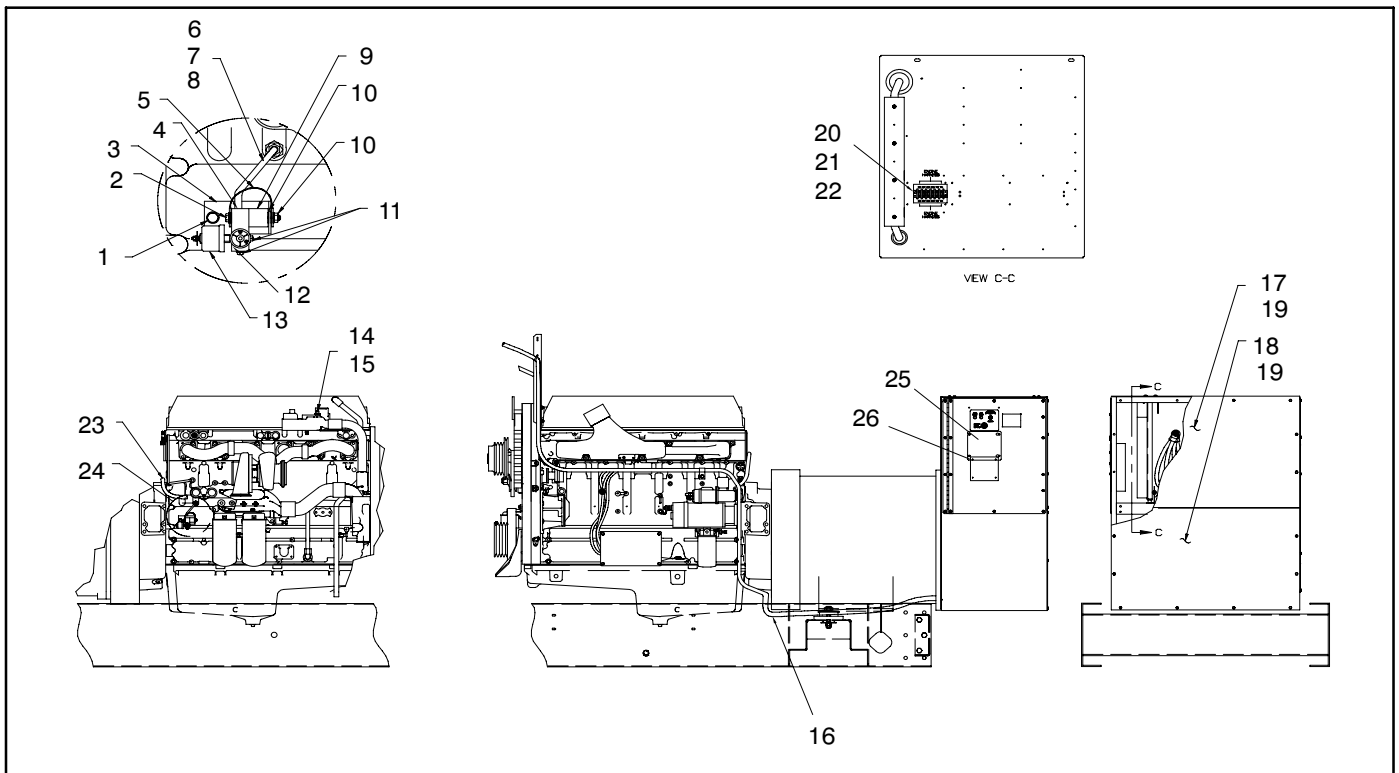
Control and Harness



6005_C&H

Item	Part Number	Description	Quantity			
			Module Number			
			GM16952-MA1	GM16952-MA2	550 Controller only	
					GM16946-MA1	GM16946-MA2
1	X-202-27	Bushing, reducer, 1/8 x 1/4 in.	2	2		
2	268298	Sender, water temperature	1	1		
3	328309	Switch, assembly pressure	1	1		
4	343574	Harness, wiring (includes items 7-13)	1	1		
4	GM11499	Harness, wiring (includes items 7, 11-16)			1	1
5	343575	Harness, wiring (diagnostics) (includes items 42-44)				
6	343473	Sender, oil pressure	1	1		
7	233959	Diode, 6 A, 100 V (not shown)	3	3	4	4
8	239411	Connector, jack, 4-position (P2) (not shown)	1	1		
9	259689	Connector, plug, 9-position (P4) (not shown)	1	1		
10	269190	Connector, plug, 6-position (not shown)	1	1		
11	290262	Boot (not shown)	1	1	1	1
12	292800	Connector, cable (not shown)	1	1	1	1
13	295145	Connector, 24-position (not shown)	1	1	1	1
14	343129	Connector, 30-pin (P5) (not shown)	1	1	1	1
15	343130	Connector, 5-pin (P3) (not shown)	1	1	1	1
16	343131	Connector, 6-pin (P6) (not shown)	1	1	1	1
17	267428	Elbow, 45° street	1	1		
18	328896	Cover, top back (4M alternator)	1		1	
18	328897	Cover, top back (5M alternator)		1		1
19	X-6217-10	Screw, hex flange machine	10	10	10	10
20	328899	Cover, louvered (4M alternator)	1		1	
20	328900	Cover, louvered (5M alternator)		1		1
21	X-6210-10	Nut, flange spiralock, 3/8-24	5	5	5	5
22	290090	Switch, temperature			1	1
23	168848	Bushing, reducing, 1/2 x 1 in. NPT			1	1
24	GM11718	PCB assembly, excitation interface			1	1
25	153659	Bushing, reducing, 1/2 x 3/4 in. NPT	1	1		

Control and Harness, continued



Item	Part Number	Description	Quantity			
			Module Number			
			GM35147-MA1S	GM35148-MA1S	GM42001-MA1S	GM42002-MA1S
1	X-22-16	Washer, lock, .326 ID x .883 in. OD	1		1	
2	X-22-12	Washer, lock, .262 ID x .743 in. OD	1		1	
3	GM35184	Bracket, sender	1		1	
4	267548	Block, oil gauge	1		1	
5	223033	Strap, ground, 5 in.	1		1	
6	270727	Fuel line, flexible	1		1	
7	X-202-27	Bushing, reducing, 1/8 x 1/4 in.	1		1	
8	X-447-10	Elbow, oil line, 90°	1		1	
9	259632	Bumper	1		1	
10	X-22-12	Washer, lock, .262 ID x .743 in. OD	2		2	
11	X-75-4	Plug, pipe, 1/8 in. NPT	2		2	
12	328309	Switch assembly, oil pressure	1			
13	343473	Sender, oil pressure	1		1	
14	268298	Sender, water temperature	1		1	
15	153659	Bushing, reducing, 1/2 x 3/4 in.	1		1	
16	GM38455	Harness, engine, 450 kW	1			
16	GM38456	Harness, engine, 450 kW		1		
16	GM39852	Harness, engine			1	
16	GM39853	Harness, engine				1
17	361184	Panel, J-box front	1	1	1	1
18	361826	Panel, junction	1	1	1	1
19	X-6217-10	Screw, hex flange machine	22	22	22	22
20	295314	Terminal block	1		1	
20	GM13980	PCB assy., CT burden resistor		1		1
21	255080	Marker, strip	1		1	
21	X-712-9	Spacer, .25 OD, .5 in.		4		4
22	X-49-6	Screw, pan head 6-32 x 3/4	2		2	
22	X-70-12	Nut, hex machine screw		4		4
23	290090	Switch, low water temp.		1		1
24	168848	Bushing, reducing, 1/2 x 1 in.		1		1
25	GM11718	PCB assembly, Marathon excitation interface		1		1
26	M965A-06012-20	Screw, pan head machine		4		4

Group 701: Literature

Item	Part Number	Description	Quantity							
			Variation Number							
			15	38	46	76	90	92	96	98
1	MP-5374	Warranty 1-Year Limited Industrial	1			1	1	1	1	1
2	MP-6356	S/M Controllers, 20-2800 kW	1	1	1	1	1	1	1	1
2	MP-6373	S/M Pilot-Excited PM Alternator, 350-2800 kW	1	1	1	1	1	1	1	1
3	MP-5700	I/M Stationary Duty	1	1	1	1	1	1	1	1
4	MP-6117	P/C Accessories, 230-2000 kW	1	1	1	1	1	1	1	1
5	MP-5750	O/M 20-2000 kW	1	1	1					
5	MP-5750-CS	O/M 20-2000 kW Chinese	1	1	1					
5	MP-5750-CT	O/M 20-2000 kW Chinese	1	1	1					
5	MP-5750-F	O/M 20-2000 kW French	1	1	1					
5	MP-5750-S	O/M 20-2000 kW Spanish	1	1	1					
6	MP-5829	O/M Digital Controller	1	1	1					
6	MP-6083	O/M Digital 550 Controller, before V. 2.10	1	1						
6	MP-6200	O/M Digital 550 Controller, V. 2.10	1	1	1	1	1	1	1	1
7	MP-5988	W/D 230-400DSE	1	1	1					
7	MP-6354	W/D 200DSEB, 230-300DSED					1	1	1	
7	MP-6338	W/D 200-450DSEB, 350/400DSE				1				1
8	MP-6005	P/C 350/400DSE, 350-450DSED	1	1	1	1	1	1	1	1
9	TP-5578	O/I/S/M Marathon Alternator Magna DVR	1	1	1	1	1	1	1	1
9	TP-5578-F	O/I/S/M Marathon Alternator Magna DVR	1	1	1	1	1	1	1	1
9	TP-5578-S	O/I/S/M Marathon Alternator Magna DVR	1	1	1	1	1	1	1	1
10	TP-6199	O/I/S/M Marathon DVR2000E	1	1	1	1	1	1	1	1
11	TP-5611	O/M DDC 71/92/149 Series	1	1	1	1				1
11	TP-6419	O/M DDC Series 60 Tier 3					1	1	1	
12	TP-5843	S/M DDC 60 Series	1	1	1	1				1
13	TP-6421	S/M DDC Series 60 Tier 3					1	1	1	
13	TP-5980	P/C DDC 60 Series, 300-350 kW	1							1
13	TP-6047	P/C DDC 60 Series, 400 kW		1	1	1				
13	TP-6411	P/C DDC 60 Series Tier 3 350-450 kW					1	1	1	
14	MP-6009	P/C Controllers	1	1	1	1	1	1	1	1
15	MP-6140	O/I/M Controller Setup and Application 550	1	1	1	1	1	1	1	1
16	MP-6161	O/M Microprocessor-Plus w/Comm, Basic	1	1	1	1	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.

	350DSE	400DSE	450DSEB
Air Intake Systems			
Air Cleaner, Heavy-Duty	343540	343729	
Air Cleaner, Heavy-Duty	343541	343730	343730

Controllers

See Parts Catalog MP-6009 for parts lists.

Cooling Systems

Heater, Block			
90/120 Volt	GM19402-KA1	GM19402-KA1	GM19402-KA1
190/208 Volt	GM19402-KA2	GM19402-KA2	GM19402-KA2
210/240 Volt	GM19402-KA3	GM19402-KA3	GM19402-KA3
380/480 Volt	GM19402-KA4	GM19402-KA4	GM19402-KA4
Heater, Block (Reconnectable)			
90-240 Volt	343584	343584	
380-480 Volt	343585	343585	
Duct Flange, Radiator	343246	343246	343246

Optional Kits

See Parts Catalog MP-6117 for parts lists.

Paint and Miscellaneous Parts

Paint All models use 221331 Spray Can, 221332 Gallon, GM19491 Touch Up

	350DSEC	400DSEC
Air Intake Systems		
Air Cleaner, Heavy-Duty (4M Alt., 12.7L)	343540	-
Air Cleaner, Heavy-Duty (5M Alt., 12.7L)	343541	-
Air Cleaner, Heavy-Duty (4M Alt., 14.0L)	343729	343729
Air Cleaner, Heavy-Duty (5M Alt., 14.0L)	343730	GM38532-MA3

Controllers

See Parts Catalog MP-6009 for parts lists.

Cooling Systems

Heater, Block		
90/120 Volt	GM19402-KA1	GM19402-KA1
190/208 Volt	GM19402-KA2	GM19402-KA2
210/240 Volt	GM19402-KA3	GM19402-KA3
380/480 Volt	GM19402-KA4	GM19402-KA4
Duct Flange, Radiator	343246	343246

Optional Kits

See Parts Catalog MP-6117 for parts lists.

Paint and Miscellaneous Parts

Paint All models use 221331 Spray Can, 221332 Gallon, GM19491 Touch Up

Kit List, continued

	350DSED	400DSED	450DSED
Air Intake Systems			
Air Cleaner, Heavy-Duty (4M Alt.)	343729	343729	
Air Cleaner, Heavy-Duty (5M Alt.)	GM38532-MA3	GM38532-MA3	GM38532-MA3
Controllers			
See Parts Catalog MP-6009 for parts lists.			
Cooling Systems			
Heater, Block			
90/120 Volt	GM38859-KA1	GM38859-KA1	GM38859-KA1
190/208 Volt	GM38859-KA2	GM38859-KA2	GM38859-KA2
210/240 Volt	GM38859-KA3	GM38859-KA3	GM38859-KA3
380/480 Volt	GM38859-KA4	GM38859-KA4	GM38859-KA4
Duct Flange, Radiator	GM13896-KA3	GM13896-KA3	GM13896-KA3
Optional Kits			
See Parts Catalog MP-6117 for parts lists.			
Paint and Miscellaneous Parts			
Paint	All models use 221331 Spray Can, 221332 Gallon, GM19491 Touch Up		

Air Intake Kits

Qty.	Description	Part No.
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Air Cleaner, Heavy-Duty

343540

1	Cleaner assembly, air	A-279713
1	Element, air cleaner	279736
1	Element, air cleaner (secondary)	279737
4	Nut, lock	X-101-13
1	Tube, steel	X-522-60
1	Tube, steel	X-522-85
2	Screw, HHC	X-6052-7
1	Plug, pipe, 1/8 in.	X-75-4
5	Clamp	254013
1	Clamp, hose	254344
2	Elbow, 90°	272627
1	Cap, rain	272674
2	Bracket, air cleaner	291666
1	Bracket, mounting	343243
1	Hose, hump	343429
1	Bracket, air cleaner support	343538

Air Cleaner, Heavy-Duty

343541

1	Cleaner assembly, air	A-279713
1	Element, air cleaner	279736
1	Element, air cleaner (secondary)	279737
4	Nut, lock	X-101-13
1	Tube, steel	X-522-60
1	Tube, steel	X-522-85
2	Screw, HHC	X-6052-7
1	Plug, pipe, 1/8 in.	X-75-4
5	Clamp	254013
1	Clamp, hose	254344
2	Elbow, 90°	272627
1	Cap, rain	272674
2	Bracket, air cleaner	291666
1	Bracket, mounting	343243
1	Hose, hump	343429
1	Bracket, air cleaner support	343539

Air Cleaner, Heavy-Duty

343729

1	Cleaner assembly, air	A-279713
1	Element, air cleaner	279736
1	Element, air cleaner (secondary)	279737
4	Nut, lock	X-101-13
1	Tube, steel	X-522-85
2	Screw, HHC	X-6052-7
1	Plug, pipe, 1/8 in.	X-75-4
6	Clamp	254013
2	Elbow, 90°	272627
1	Cap, rain	272674
1	Tube assembly	274623
2	Bracket, air cleaner	291666
1	Bracket, mounting	343243
1	Bracket, air cleaner support	343538
1	Hose, straight air	343731

Air Cleaner, Heavy-Duty

343730

1	Cleaner assembly, air	A-279713
1	Element, air cleaner	279736
1	Element, air cleaner (secondary)	279737
4	Nut, lock	X-101-13
1	Tube, steel	X-522-85
2	Screw, HHC	X-6052-7
1	Plug, pipe, 1/8 in.	X-75-4
6	Clamp	254013
2	Elbow, 90°	272627
1	Cap, rain	272674
1	Tube assembly	274623
2	Bracket, air cleaner	291666
1	Bracket, mounting	343243
1	Bracket, air cleaner support	343539
1	Hose, straight air	343731

Qty.	Description	Part No.
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Air Cleaner, Heavy-Duty

GM38532-MA3

1	Cleaner assembly, air	A-279713
1	Element, air cleaner	279736
1	Element, air cleaner (secondary)	279737
6	Clamp	254013
2	Elbow, 90 deg.	272627
1	Cap, rain	272674
1	Tube assembly	274623
2	Bracket, air cleaner	291666
1	Bracket, mounting	343243
1	Hose, straight air	343731
1	Tube, steel, 86 in. OD x 14 in.	X-522-80
2	Screw, HHC	X-6052-7
1	Plug, pipe, 1/8 in.	X-75-4
1	Bracket, air cleaner mounting	GM38632
4	Nut, hex elastic stop	M982-08-80

Block Heater

343584

1	Pipe, 3/4 x 4 in.	A-107
4	Nut, elastic stop, 1/4-20	X-101-8
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe	X-209-21
1	Nipple, pipe, 1/2 x 1 1/2 in.	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
1	Coupling, pipe, 1/2 in.	X-216-20
9	Washer, lock, 1/4 in. int./ext. tooth	X-22-12
2	Washer, lock, .391 ID x .975 in. OD	X-22-14
4	Clamp, hose, 1.25 in. max.	X-426-12
2	Connector, hose	X-582-7
1	Plug, pipe, 1/2 in.	X-75-28
4	Screw, slotted hex washer head	X-97-13
1	Strap, ground, 3/8 x 5 in.	223033
4	Bumper	259632
1	Tag, hang	279047
1	Tag, instruction	279280
1	Block heater (includes items marked *)	279814
1	*Element, replacement	GM19501
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Box, block heater	354315
1	Cover, block heater	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Label, wiring diagram	354327
1	Bracket, block heater	354687
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10

Cooling System Kits

Qty.	Description	Part No.
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Block Heater

343585

1	Pipe, 3/4 x 4 in.	A-107
4	Nut, elastic stop, 1/4-20	X-101-8
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe	X-209-21
1	Nipple, pipe, 1/2 x 1 1/2 in.1	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
1	Coupling, pipe, 1/2 in.	X-216-20
9	Washer, lock, 1/4 in. int./ext. tooth	X-22-12
2	Washer, lock, .391 ID x .975 in. OD	X-22-14
4	Clamp, hose, 1.25 in. max.	X-426-12
2	Connector, hose	X-582-7
1	Plug, pipe, 1/2 in.	X-75-28
4	Screw, slotted hex washer head	X-97-13
1	Strap, ground, 3/8 x 5 in.	223033
4	Bumper	259632
1	Tag, hang	279047
1	Tag, instruction	279280
1	Block heater (includes items marked *)	279815
1	*Element, replacement	GM19502
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Box, block heater	354316
1	Cover, block heater	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Label, wiring diagram	354328
1	Bracket, block heater	354687
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10

Block Heater

GM19402-KA1

1	Box, block heater control	354315
1	Label, wiring diagram	354327
1	Block heater (includes items marked *)	GM20133
1	*Block heater service element	GM29477
1	*Thermostat	GM29529
4	Bumper	259632
1	Strap, ground	223033
1	Tag, hang	279047
1	Tag, instruction	279280
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Cover, block heater control box	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Bracket, block heater	354687
1	Pipe, 3/4 x 4 in.	A-107
2	Valve, shutoff	GM19670
4	Nut, elastic stop, 1/4 in.	M982-06-80
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe	X-209-21
2	Pipe, 1/2 x 1 1/2 in.	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
1	Coupling, pipe, 1/2 in.	X-216-20
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .326 ID x .883 in. ID	X-22-16
4	Clamp, hose, 1.25 in. maximum	X-426-12
2	Connector, hose	X-582-7
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10
4	Screw, slotted hex washer head, machine	X-97-13

Qty.	Description	Part No.
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Block Heater

GM19402-KA2

1	Box, block heater control	354315
1	Label, wiring diagram	354327
1	Block heater (includes items marked *)	GM20134
1	*Block heater service element	GM29478
1	*Thermostat	GM29529
4	Bumper	259632
1	Strap, ground	223033
1	Tag, hang	279047
1	Tag, instruction	279280
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Cover, block heater control box	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Bracket, block heater	354687
1	Pipe, 3/4 x 4 in.	A-107
2	Valve, shutoff	GM19670
4	Nut, elastic stop, 1/4 in.	M982-06-80
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe	X-209-21
2	Pipe, 1/2 x 1 1/2 in.	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
1	Coupling, pipe, 1/2 in.	X-216-20
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .326 ID x .883 in. ID	X-22-16
4	Clamp, hose, 1.25 in. maximum	X-426-12
2	Connector, hose	X-582-7
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10
4	Screw, slotted hex washer head, machine	X-97-13

Block Heater

GM19402-KA3

1	Box, block heater control	354315
1	Label, wiring diagram	354327
1	Block heater (includes items marked *)	GM20135
1	*Block heater service element	GM29474
1	*Thermostat	GM29529
4	Bumper	259632
1	Strap, ground	223033
1	Tag, hang	279047
1	Tag, instruction	279280
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Cover, block heater control box	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Bracket, block heater	354687
1	Pipe, 3/4 x 4 in.	A-107
2	Valve, shutoff	GM19670
4	Nut, elastic stop, 1/4 in.	M982-06-80
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe	X-209-21
2	Pipe, 1/2 x 1 1/2 in.	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
1	Coupling, pipe, 1/2 in.	X-216-20
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .326 ID x .883 in. ID	X-22-16
4	Clamp, hose, 1.25 in. maximum	X-426-12
2	Connector, hose	X-582-7
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10
4	Screw, slotted hex washer head, machine	X-97-13

Cooling System Kits

Qty.	Description	Part No.
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Block Heater		GM19402-KA4
1	Box, block heater control	354316
1	Label, wiring diagram	354328
1	Block heater (includes items marked *)	GM20136
1	*Block heater service element	GM29479
1	*Thermostat	GM29529
4	Bumper	259632
1	Strap, ground	223033
1	Tag, hang	279047
1	Tag, instruction	279280
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Cover, block heater control box	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Bracket, block heater	354687
1	Pipe, 3/4 x 4 in.	A-107
2	Valve, shutoff	GM19670
4	Nut, elastic stop, 1/4 in.	M982-06-80
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe	X-209-21
2	Pipe, 1/2 x 1 1/2 in.	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
1	Coupling, pipe, 1/2 in.	X-216-20
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .326 ID x .883 in. ID	X-22-16
4	Clamp, hose, 1.25 in. maximum	X-426-12
2	Connector, hose	X-582-7
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10
4	Screw, slotted hex washer head, machine	X-97-13

Block Heater		GM38859-KA1
1	Box, block heater control	354315
1	Label, wiring diagram	354327
1	Block heater (includes items marked *)	GM20133
1	*Block heater service element	GM29477
1	*Thermostat	GM29529
1	Strap, ground	223033
1	Tag, hang	279047
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Cover, block heater control box	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Pipe, 3/4 x 4 in.	A-107
2	Valve, shutoff	GM19670
4	Vibromount	GM38784-2
1	Bracket, block heater	GM38859
1	Tag, hang	GM39752
4	Nut, elastic stop, 1/4 in.	M982-06-80
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe, 1/2 x 4 1/2 in.	X-209-21
2	Pipe, 1/2 x 1 1/2 in.	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .326 ID x .883 in. ID	X-22-16
4	Clamp, hose, 1.25 in. maximum	X-426-12
2	Connector, hose	X-582-7
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10
4	Screw, slotted hex washer head, machine	X-97-13

Qty.	Description	Part No.
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Block Heater		GM38859-KA2
1	Box, block heater control	354315
1	Label, wiring diagram	354327
1	Block heater (includes items marked *)	GM20134
1	*Block heater service element	GM29478
1	*Thermostat	GM29529
1	Strap, ground	223033
1	Tag, hang	279047
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Cover, block heater control box	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Pipe, 3/4 x 4 in.	A-107
2	Valve, shutoff	GM19670
4	Vibromount	GM38784-2
1	Bracket, block heater	GM38859
1	Tag, hang	GM39752
4	Nut, elastic stop, 1/4 in.	M982-06-80
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe, 1/2 x 4 1/2 in.	X-209-21
2	Pipe, 1/2 x 1 1/2 in.	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .326 ID x .883 in. ID	X-22-16
4	Clamp, hose, 1.25 in. maximum	X-426-12
2	Connector, hose	X-582-7
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10
4	Screw, slotted hex washer head, machine	X-97-13

Block Heater		GM38859-KA3
1	Box, block heater control	354315
1	Label, wiring diagram	354327
1	Block heater (includes items marked *)	GM20135
1	*Block heater service element	GM29474
1	*Thermostat	GM29529
1	Strap, ground	223033
1	Tag, hang	279047
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Cover, block heater control box	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Pipe, 3/4 x 4 in.	A-107
2	Valve, shutoff	GM19670
4	Vibromount	GM38784-2
1	Bracket, block heater	GM38859
1	Tag, hang	GM39752
4	Nut, elastic stop, 1/4 in.	M982-06-80
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe, 1/2 x 4 1/2 in.	X-209-21
2	Pipe, 1/2 x 1 1/2 in.	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .326 ID x .883 in. ID	X-22-16
4	Clamp, hose, 1.25 in. maximum	X-426-12
2	Connector, hose	X-582-7
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10
4	Screw, slotted hex washer head, machine	X-97-13

Air Intake Kits

Qty.	Description	Part No.
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Block Heater

GM38859-KA4

1	Box, block heater control	354316
1	Label, wiring diagram	354328
1	Block heater (includes items marked *)	GM20136
1	*Block heater service element	GM29479
1	*Thermostat	GM29529
1	Strap, ground	223033
1	Tag, hang	279047
4	Gasket, washer	297001
1	Plug, freeze	324094
1	Thermostat, block heater	343222
1	Cover, block heater control box	354317
1	Gasket, control box	354318
1	Decal, warning	354325
1	Pipe, 3/4 x 4 in.	A-107
2	Valve, shutoff	GM19670
4	Vibromount	GM38784-2
1	Bracket, block heater	GM38859
1	Tag, hang	GM39752
4	Nut, elastic stop, 1/4 in.	M982-06-80
1	Bushing, reducer	X-202-41
1	Tee, pipe, 1/2 in.	X-203-13
1	Pipe, 1/2 x 4 1/2 in.	X-209-21
2	Pipe, 1/2 x 1 1/2 in.	X-209-5
1	Elbow, pipe, 3/4 in.	X-215-2
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .326 ID x .883 in. ID	X-22-16
4	Clamp, hose, 1.25 in. maximum	X-426-12
2	Connector, hose	X-582-7
1	Hose, coolant, 44 in.	X-6367-1
1	Hose, coolant, 55 in.	X-6367-10
4	Screw, slotted hex washer head, machine	X-97-13

Qty.	Description	Part No.
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Duct Flange, Radiator

343246

8	Rivet, pop, .187 in.	X-781-11
4	Screw, drill hex	X-794-1
2	Frame, air duct (top/bottom)	343271
2	Frame, air duct (sides)	343272

Duct Flange, Radiator

GM13896-KA3

8	Rivet, pop, .187 in.	X-781-19
2	Frame, air duct (horizontal)	GM38785
2	Frame, air duct (vertical)	GM38786

Appendix A Abbreviations

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

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

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

Appendix B Common Hardware Application Guidelines

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

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

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

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

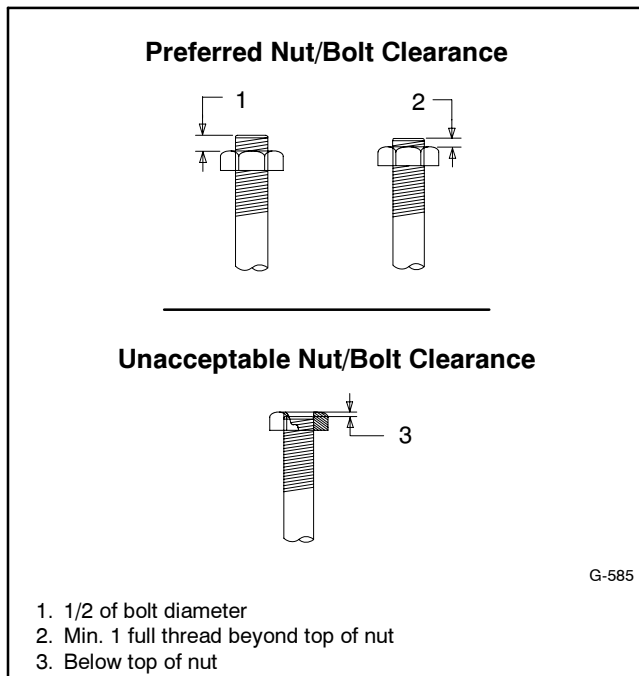


Figure 1 Acceptable Bolt Lengths

Steps for common hardware application:

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

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

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

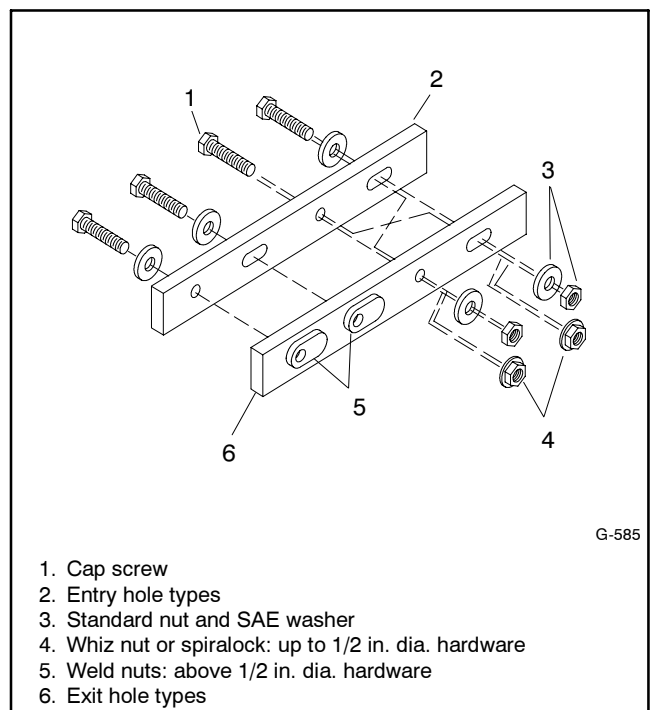


Figure 2 Acceptable Hardware Combinations

Appendix C General Torque Specifications

American Standard Fasteners Torque Specifications					
Size	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. The torque values above are general guidelines. Always use the torque values specified in the service manuals and/or assembly drawings when they differ from the above torque values.
2. The torque values above are based on new plated threads. Increase torque values by 15% if non-plated threads are used.
3. Hardware threaded into aluminum must have either two diameters of thread engagement or a 30% or more reduction in the torque to prevent stripped threads.
4. Torque values are calculated as equivalent stress loading on American hardware with an approximate preload of 90% of the yield strength and a 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	

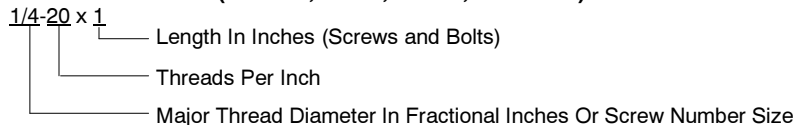
Hardness Grades	
American Standard	
Grade 2	
Grade 5	
Grade 8	
Grade 8/9 (Hex Socket Head)	
Metric	
Number stamped on hardware; 5.8 shown	

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

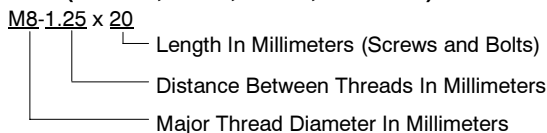
Phillips® screw is a registered trademark of Phillips Screw Company.

Sample Dimensions

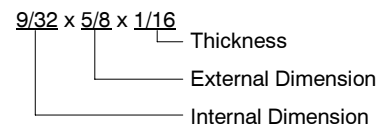
American Standard (Screws, Bolts, Studs, and Nuts)



Metric (Screws, Bolts, Studs, and Nuts)



Plain Washers



Lock Washers



Appendix E Common Hardware List

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

American Standard

Part No. Dimensions Hex Head Bolts (Grade 5)

X-465-17	1/4-20 x .38
X-465-6	1/4-20 x .50
X-465-2	1/4-20 x .62
X-465-16	1/4-20 x .75
X-465-18	1/4-20 x .88
X-465-7	1/4-20 x 1.00
X-465-8	1/4-20 x 1.25
X-465-9	1/4-20 x 1.50
X-465-10	1/4-20 x 1.75
X-465-11	1/4-20 x 2.00
X-465-12	1/4-20 x 2.25
X-465-14	1/4-20 x 2.75
X-465-21	1/4-20 x 5.00
X-465-25	1/4-28 x .38
X-465-20	1/4-28 x 1.00
X-125-33	5/16-18 x .50
X-125-23	5/16-18 x .62
X-125-3	5/16-18 x .75
X-125-31	5/16-18 x .88
X-125-5	5/16-18 x 1.00
X-125-24	5/16-18 x 1.25
X-125-34	5/16-18 x 1.50
X-125-25	5/16-18 x 1.75
X-125-26	5/16-18 x 2.00
230578	5/16-18 x 2.25
X-125-29	5/16-18 x 2.50
X-125-27	5/16-18 x 2.75
X-125-28	5/16-18 x 3.00
X-125-22	5/16-18 x 4.50
X-125-32	5/16-18 x 5.00
X-125-35	5/16-18 x 5.50
X-125-36	5/16-18 x 6.00
X-125-40	5/16-18 x 6.50
X-125-43	5/16-24 x 1.75
X-125-44	5/16-24 x 2.50
X-125-30	5/16-24 x .75
X-125-39	5/16-24 x 2.00
X-125-38	5/16-24 x 2.75
X-6238-2	3/8-16 x .62
X-6238-10	3/8-16 x .75
X-6238-3	3/8-16 x .88
X-6238-11	3/8-16 x 1.00
X-6238-4	3/8-16 x 1.25
X-6238-5	3/8-16 x 1.50
X-6238-1	3/8-16 x 1.75
X-6238-6	3/8-16 x 2.00
X-6238-17	3/8-16 x 2.25
X-6238-7	3/8-16 x 2.50
X-6238-8	3/8-16 x 2.75
X-6238-9	3/8-16 x 3.00
X-6238-19	3/8-16 x 3.25
X-6238-12	3/8-16 x 3.50
X-6238-20	3/8-16 x 3.75
X-6238-13	3/8-16 x 4.50
X-6238-18	3/8-16 x 5.50
X-6238-25	3/8-16 x 6.50

Part No. Dimensions Hex Head Bolts, cont.

X-6238-14	3/8-24 x .75
X-6238-16	3/8-24 x 1.25
X-6238-21	3/8-24 x 4.00
X-6238-22	3/8-24 x 4.50
X-6024-5	7/16-14 x .75
X-6024-2	7/16-14 x 1.00
X-6024-8	7/16-14 x 1.25
X-6024-3	7/16-14 x 1.50
X-6024-4	7/16-14 x 2.00
X-6024-11	7/16-14 x 2.75
X-6024-12	7/16-14 x 6.50
X-129-15	1/2-13 x .75
X-129-17	1/2-13 x 1.00
X-129-18	1/2-13 x 1.25
X-129-19	1/2-13 x 1.50
X-129-20	1/2-13 x 1.75
X-129-21	1/2-13 x 2.00
X-129-22	1/2-13 x 2.25
X-129-23	1/2-13 x 2.50
X-129-24	1/2-13 x 2.75
X-129-25	1/2-13 x 3.00
X-129-27	1/2-13 x 3.50
X-129-29	1/2-13 x 4.00
X-129-30	1/2-13 x 4.50
X-463-9	1/2-13 x 5.50
X-129-44	1/2-13 x 6.00
X-129-51	1/2-20 x .75
X-129-45	1/2-20 x 1.25
X-129-52	1/2-20 x 1.50
X-6021-3	5/8-11 x 1.00
X-6021-4	5/8-11 x 1.25
X-6021-2	5/8-11 x 1.50
X-6021-1	5/8-11 x 1.75
273049	5/8-11 x 2.00
X-6021-5	5/8-11 x 2.25
X-6021-6	5/8-11 x 2.50
X-6021-7	5/8-11 x 2.75
X-6021-12	5/8-11 x 3.75
X-6021-11	5/8-11 x 4.50
X-6021-10	5/8-11 x 6.00
X-6021-9	5/8-18 x 2.50
X-6239-1	3/4-10 x 1.00
X-6239-8	3/4-10 x 1.25
X-6239-2	3/4-10 x 1.50
X-6239-3	3/4-10 x 2.00
X-6239-4	3/4-10 x 2.50
X-6239-5	3/4-10 x 3.00
X-6239-6	3/4-10 x 3.50
X-792-1	1-8 x 2.25
X-792-5	1-8 x 3.00
X-792-8	1-8 x 5.00

Part No. Dimensions Type

Hex Nuts

X-6009-1	1-8	Standard
X-6210-3	6-32	Whiz
X-6210-4	8-32	Whiz
X-6210-5	10-24	Whiz
X-6210-1	10-32	Whiz
X-6210-2	1/4-20	Spiralock
X-6210-6	1/4-28	Spiralock
X-6210-7	5/16-18	Spiralock
X-6210-8	5/16-24	Spiralock
X-6210-9	3/8-16	Spiralock
X-6210-10	3/8-24	Spiralock
X-6210-11	7/16-14	Spiralock
X-6210-12	1/2-13	Spiralock
X-6210-15	7/16-20	Spiralock
X-6210-14	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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