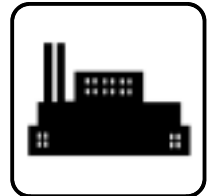


Service Parts

Industrial Generator Sets



Models:

450REOZD-4

500–1000ROZD-4

See Group 701, Literature inside this manual for part numbers of
Engine and Accessory Parts Catalogs

See TP-6009 for Decision-Maker 3™ and
Decision-Maker 340™ Controller Parts



KOHLER[®]
POWER SYSTEMS

TP-6021 7/01b

Table of Contents

Subject	Page	Subject	Page
Introduction	1	Group 201: Generator and Mounting	16
Number Significance	1	Alternator Part Number and Mount Type	19
How to Find Part Numbers	1	Control and Harness	20
Hardware References	1	Group 701: Literature	22
Specification Number Index	2	Kit List	23
Recommended Spare Parts	3	Cooling System Kits	24
Group 101: Air Intake	4	Air Intake Kits	27
Group 104: Cooling System	6	Appendix A. Glossary of Abbreviations	A-1
Group 105: Engine	10	Appendix B. Common Hardware Application Guidelines	A-3
Group 107: Nameplate and Decals	13	Appendix C. General Torque Specifications ...	A-4
Group 109: Skid and Plant Mounting	14	Appendix D. Common Hardware Identification	A-5
		Appendix E. Common Hardware List	A-6

Introduction

This manual lists service replacement parts for 450–1000 kW generator sets.

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

Information in this publication represents data available at the time of print. Kohler Co. reserves the right to change this publication and the products represented without notice and without any obligation or liability whatsoever.

This manual includes the following main sections:

Table of Contents. Lists the sections of the manual.

Introduction (and other information sections). Contains introductory material about part numbers, illustrations, and hardware.

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 instructions.

xin:004:004

How to Find Part Numbers

Use the following steps to locate a service replacement part.

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

xin:004:005

Hardware References

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

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

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

xin:004:006

Specification Number Index

Group Title	<i>Air Intake</i>	<i>Fuel System</i>	<i>Cooling System</i>	<i>Engine</i>	<i>Nameplates and Decals</i>	<i>Oil Pressure Switch</i>	<i>Skid and Plant Mounting</i>	<i>Generator and Mounting</i>	<i>Controller and Mounting</i>	<i>Literature</i>
Group No.	101	103	104	105	107	108	109	201	301	701
Spec No.	Variation Number									
Model										
450ROZD-4										
PA-197001	*	—	*	102	92	—	*	*	†	97
PA-197002	*	—	*	103	92	—	*	*	†	97
GM16974-GA1	*	—	*	1	GR1	—	*	*	†	97
GM16974-GA2	*	—	*	2	GR1	—	*	*	†	97
500ROZD-4										
PA-197003	*	—	*	104	92	—	*	*	†	118
PA-197014	*	—	*	116	92	—	*	*	†	118
GM16975-GA1	*	—	*	3	GR1	—	*	*	†	118
GM16975-GA2	*	—	*	4	GR1	—	*	*	†	118
600ROZD-4										
PA-197015	*	—	*	113	92	—	*	*	†	123
PA-197016	*	—	*	114	92	—	*	*	†	123
GM16976-GA1	*	—	*	5	GR1	—	*	*	†	123
GM16976-GA2	*	—	*	6	GR1	—	*	*	†	123
750ROZD-4										
PA-197017	*	—	*	115	92	—	*	*	†	137
PA-197018	*	—	*	110	92	—	*	*	†	103
PA-197038	*	—	*	119	GR1	—	*	*	†	137
GM16977-GA1	*	—	*	7	GR1	—	*	*	†	137
GM16977-GA2	*	—	*	8	GR1	—	*	*	†	137
GM16977-GA3	*	—	*	9	GR1	—	*	*	†	103
800ROZD-4										
PA-197019	*	—	*	105	92	—	*	*	†	104
PA-197020	*	—	*	106	92	—	*	*	†	104
GM16978-GA1	*	—	*	10	GR1	—	*	*	†	104
GM16978-GA2	*	—	*	11	GR1	—	*	*	†	104
900ROZD-4										
PA-197021	*	—	*	107	92	—	*	*	†	131
PA-197022	*	—	*	108	92	—	*	*	†	131
GM16979-GA1	*	—	*	12	GR1	—	*	*	†	131
GM16979-GA2	*	—	*	13	GR1	—	*	*	†	131
GM17864-GA1	*	—	*	14	GR1	—	*	*	†	131
1000ROZD-4										
PA-197023	*	—	*	109	92	—	*	*	†	138
GM16980-GA1	*	—	*	15	GR1	—	*	*	†	138
GM17865-GA1	*	—	*	16	GR1	—	*	*	†	138

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

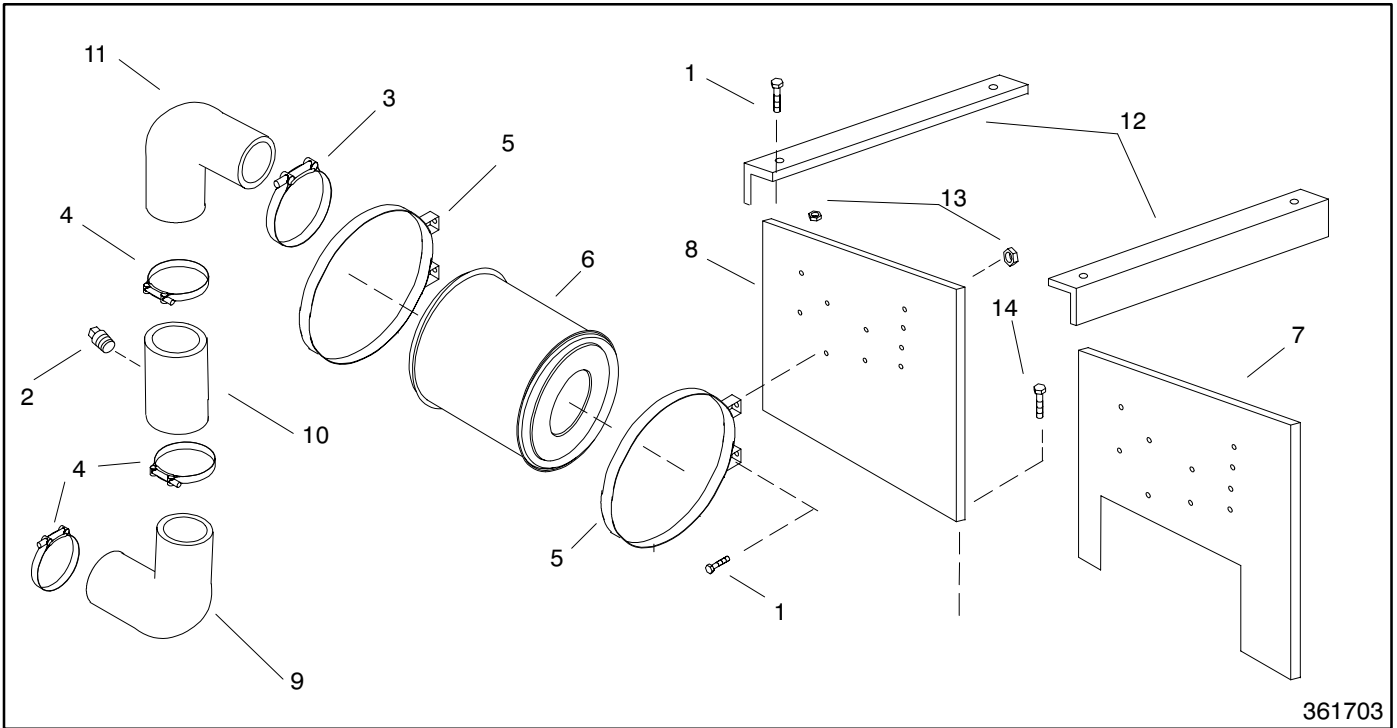
† Configured group. Refer to the generator set nameplate for the module number. See controller parts catalog TP-6009 for controller parts lists.

Recommended Spare Parts

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

Part Number	Description	450 kW	500 kW	600 kW	750 kW	800 kW	900 kW	1000 kW
291207	Fuse, 1.5 A	5	5	5	5	5	5	5
243273	Fuse, 3 A	5	5	5	5	5	5	5
283645	Fuse, 15 A	5	5	5	5	5	5	5
239298	Fuse, 5 A			5				
A-336415	Main circuit board	1	1	1	1	1	1	1
328725	Voltage regulator, DVR2000	1	1	1	1	1	1	1
A-336432	Indicator board	1	1	1	1	1	1	1
B-354647	PCB assembly, pulse counter DDEC			1	1	1	1	1
291740	Lamp, 125 V, .33 W	5	5	5	5	5	5	5
361687	Hose, upper radiator, 76.2 mm ID	1						
361387	Hose, radiator		1					
X-356-38	Hose, radiator			1				
X-356-39	Hose, radiator					1		
X-507-6	Hose, radiator			1	1	1	1	1
X-281-31	Hose, radiator						1	
X-311-12	Hose						1	1
361689	Hose, upper radiator, 44.5 mm ID	1	1					
361688	Hose, lower radiator, 101.6 mm ID	1	1					
361556	Hose, radiator			1				
365612	Hose, radiator				1			
361736	Hose, radiator, 101.6 mm ID				1	1	1	1
361690	Hose, lower radiator, 44.5 mm ID	1	1					
365624	Sender, oil pressure	1		1	1	1	1	1
361159	Sender, temperature		1	1	1	1		1
361693	Air cleaner	14						
343219	Air cleaner		14					
272982	Air cleaner			14	28	28		
272981	Air cleaner						28	28
365013	Filter, primary fuel	7	7					
365014	Filter, secondary fuel	7	7	14	14	14	14	14
GM13224	Filter, oil	28	28	28	40	40	40	40
365289	Sensor, low fluid	1	1	1	1	1	1	1
283420	Lamp, 28 V, 4.8 W	5	5	5	5	5		5
GM10166	Sender, temperature	1	1	1	1	1	1	
GM16809	Set, fan belt	1	1					
GM16810	Thermostat	1	1					
328585	Thermostat			1	1	1	1	1
GM16811	Gasket, thermostat	1	1					
GM16812	Filter, oil	14	14					
GM16813	Injector	4	4					

Group 101: Air Intake

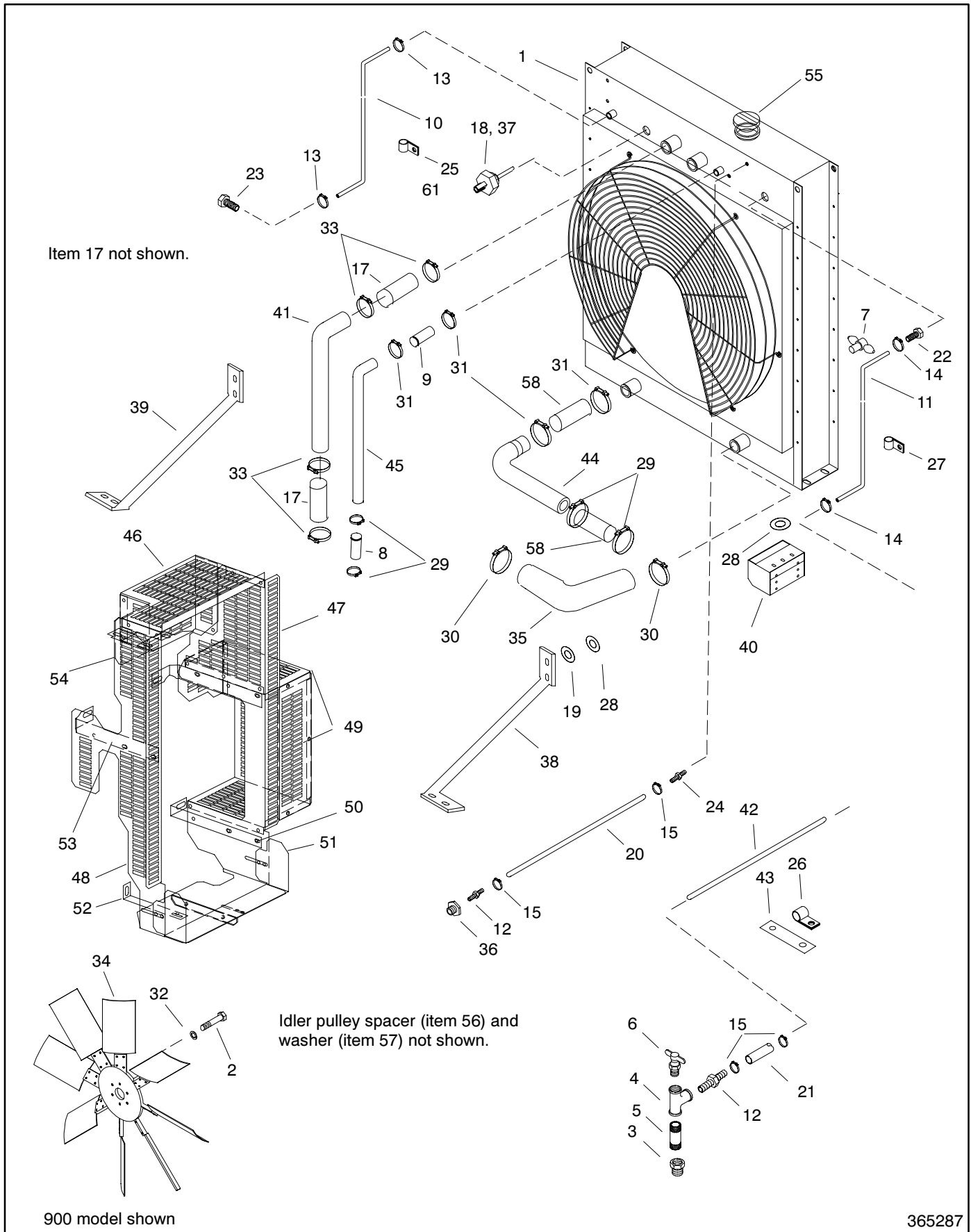


Group 101: Air Intake

Item	Part Number	Description	Quantity				
			Module Number				
			361703	361704	365223	361911	365274
1	M933-08025-60	Screw, hex cap			4		
1	M933-10020-60	Screw, hex cap	4	4	4	4	
1	M933-08020-60	Screw, hex cap	13	13		3	
2	X-75-1	Plug, pipe, 1/8 in.	2	2			
2	X-75-4	Plug, pipe, 1/8 in.			2	2	
3	254013	Clamp, hose, 6.25/6.56 in.	2	2		2	2
3	280998	Clamp, hose, 7.5/7.81 in.					4
3	343287	Clamp, hose, 4.14/4.44 in.		2			
3	343175	Clamp, hose, 3.06/3.38 in.			4		
3	343587	Clamp, hose, 7.38/7.69 in.			4		
4	254344	Clamp, hose, 5.43/5.74 in.			2		
4	254087	Clamp, hose, 4.44/4.75 in.	6	4			
4	291559	Clamp, hose, 7.25/7.56 in.				2	
5	274242	Mount, air cleaner					2
5	343218	Mount, air cleaner	4	4			
5	343530	Clamp, air cleaner			2	2	
6	272981	Air cleaner					2
6	343219	Air cleaner	2	2			
6	272982	Air cleaner			2	2	
7	365383	Bracket, air cleaner					1
8	361692	Bracket, air cleaner, LS	1	1			
8	361777	Bracket, AC				1	
8	365194	Bracket, air cleaner mounting, LS			1		
8	365382	Bracket, air cleaner					1
8	X-400-104	Spacer, .344 x .750 x .500 (not shown)				2	2
9	361694	Hose, air intake	2				
9	GM17742	Hose, air intake		2			
10	328609	Reducer, hose insert			2		
10	361696	Tube assembly	2	2			
11	361737	Hose, air intake	2	2			
11	361695	Hose, air intake	2				
11	361847	Hose, hump				2	
11	365200	Hose, offset			2		2
12	365463	Bracket, AC support	2	2			
13	M6923-8-80	Nut, hex (expense)	12	12			
13	M982-10-80	Nut, hex, elastic stop	4	4	4	4	
14	M933-8020-60	Screw, hex cap	4				3
14	M933-8030-60	Screw, hex cap				1	1

See page 27 of the Kit List section for heavy-duty air cleaner kits.

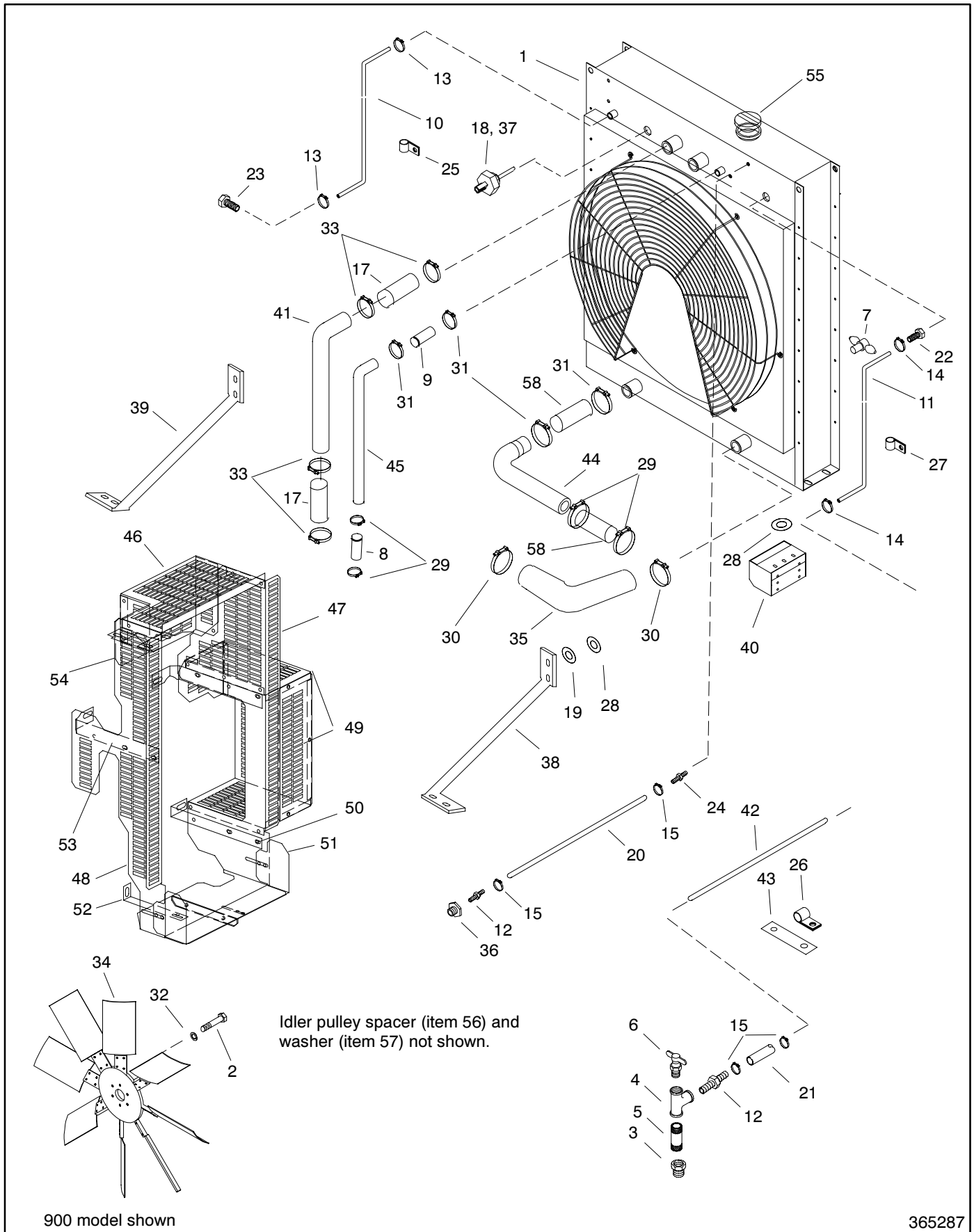
Group 104: Cooling System



Group 104: Cooling System

Item	Part Number	Description	Quantity											
			Module Number											
			365287	GM11660-MA1	361705	361706	361772	361747	365016	365233	361912	365047		
1	A-361529	Radiator assembly						1						
1	A-361593	Radiator assembly			1									
1	A-361595	Radiator assembly				1								
1	A-361697	Radiator assembly										1		
1	A-361684	Radiator assembly					1							
1	A-361857	Radiator assembly							1					
1	A-365020	Radiator assembly								1				
1	A-365020	Radiator assembly											1	
1	A-365286	Radiator assembly	1	1										
2	X-129-57	Bolt, hex cap	6	6	6	6	6	6	6	6	6	6	6	6
3	X-202-29	Bushing, reducer, 1/8 in.	1	1				1	1	1	1	1	1	1
4	X-203-10	Tee, pipe	1	1				1	1	1	1	1	1	1
4	X-296-18	Connector, half union			1	1	1							
5	X-217-6	Nipple, pipe, 1/8 x 3/4 in.	1	1				1	1	1	1	1	1	1
6	X-256-2	Valve, drain, 1/8	1	1				1	1	1	1	1	1	1
7	X-256-5	Valve, drain	1	2	2	2	2	1	3	1	1	1	1	1
8	X-281-31	Hose, radiator	1	1										1
8	X-311-11	Hose, radiator (D)							1	1				1
9	X-281-31	Hose, radiator							1	1				
9	X-311-12	Hose, radiator	1	1										
10	X-312-49	Hose				1	1							
10	X-312-58	Hose, .62 ID							1					
10	X-312-59	Hose, .62 ID	1	1						1				1
11	X-356-33	Hose							1					
11	X-356-35	Hose, radiator												1
11	X-356-37	Hose, radiator	1	1						1				
11	X-356-38	Hose, radiator			1	1	1	1						
11	X-356-39	Hose, coolant											1	
12	25 326 03	Connector, hose	1	2				2	2	2	2	2	2	2
12	X-426-9	Clamp, hose						6						
12	X-6370-3	Connector, hose			1	1	1							
13	X-426-18	Clamp, hose	2	2										2
13	X-426-20	Clamp, hose			2	2	2							
13	X-426-3	Clamp, hose							2	2				
14	X-426-8	Clamp, hose	2	2	2	2	2	2	2	2	2	2	2	2
15	X-426-9	Clamp, hose	6	6	4	4	4		6	6	6	6	6	6
16	X-468-7	Tie, cable	4	4				4	7	4	4	4	4	4
17	X-507-6	Hose, radiator	4	4				4	4	4	4	4	4	4
18	X-6003-120	Conduit, convoluted	1	1	1	1	1	1	1	1	1	1	1	1
19	X-6011-3	Washer, beveled	4	4								4	4	
20	X-386-103	Hose			2	1	1							
20	X-386-112	Line, flex fuel				1	1							
20	X-6359-10	Hose, rubber	2	2				1	1	1	1	1	2	
20	X-6359-5	Hose, rubber										1		
20	X-6359-6	Hose, rubber						1	1					
20	X-6359-9	Hose, rubber								1				
21	X-6359-12	Hose, rubber	1	1				1	1	1	1	1	1	1
22	X-6370-2	Connector, hose	1	1	1	1	1	1	1	1	1	1	1	1
22	X-6370-5	Connector, swivel							1					
23	X-6370-5	Connector, swivel	1	1	1	1	1			1				1
24	X-652-1	Fitting, hose				1	1							
24	X-652-3	Fitting, hose	2	2	2	1	1	2	2	2	2	2	2	2
25	X-672-13	Clamp, insulated	2	2					1	2	2	2	2	2
26	X-672-15	Clamp, insulator	2	2	1	1	1	1	1	1	2	2	2	2
27	X-672-4	Clamp, insulating	1	1				1	1	2	2	2	2	2
28	X-801-9	Washer, hardened	16	16								14	16	16
29	249887	Clamp, hose, 2.25/2.56 in.	3	3						1			3	
29	249417	Clamp, hose							1					
29	276319	Clamp, hose, 2.13/2.44 in.							2	2				
29	GM11993	Clamp, hose	1	1	4	4	4			1				1
30	274545	Clamp, hose, 4.31/4.62 in.	2	2	2	2	2	2	2	2	2	2	2	2
31	276319	Clamp, hose, 2.13/2.44 in.	2	2		2	2							2
31	276320	Clamp, hose, 2.38/2.69 in.							1					

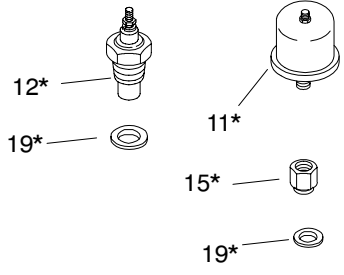
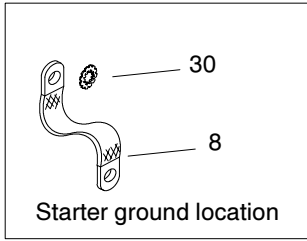
Group 104: Cooling System, continued



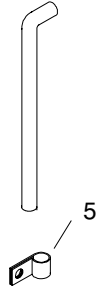
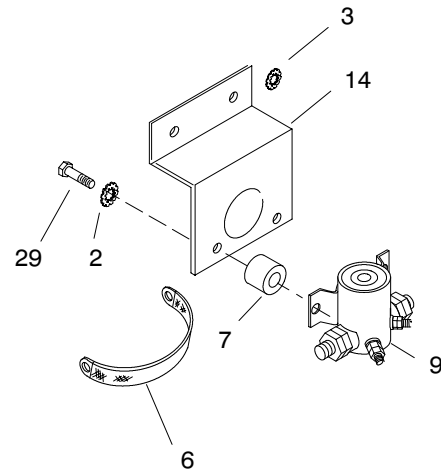
Group 104: Cooling System, continued

Item	Part Number	Description	Quantity										
			Module Number										
			365287	GM11660-MA1	361705	361706	361772	361747	365016	365233	361912	365047	
32	290945	Washer, hardened	1	1	1	6	6	6	6	6	6	6	6
33	291542	Clamp, hose, 3.25/3.56 in.	8	8	2	2	2						8
33	324342	Clamp, hose, 3.43/3.75 in.						8	8	8			
34	274757	Fan								1			1
34	279863	Fan, pusher						1	1			1	
34	299892	Fan, pusher	1	1									
34	361934	Fan			1	1							
34	361935	Fan, pusher				1							
35	361556	Hose, lower radiator						1	1				
35	361688	Hose, lower radiator			1	1							
35	365650	Hose, lower radiator					1						
35	361736	Hose, lower radiator	1	1							1	1	1
36	365220	Bushing, adapter	1	1	1	1	1	1	1	1	1	1	1
36	365498	O-ring			1	1	1	1	1	1	1	1	1
37	365289	Sensor assembly, low fluid	1	1	1	1	1	1	1	1	1	1	1
38	354531	Support, radiator, LS									1		1
38	354532	Support, radiator, RS										1	
38	361559	Support, radiator, RS						1	1				
38	365312	Support, radiator, RS	1	1									
39	354530	Support, radiator, RS									1		1
39	354533	Support, radiator, RS										1	
39	361558	Support, radiator, LS						1	1				
39	365313	Support, radiator, LS	1	1									
40	361561	Support, radiator						2					
40	361723	Support, radiator										2	
40	365043	Support, radiator							4	4			4
40	365396	Support, radiator	4	4									
41	361522	Tube, radiator										2	
41	361560	Tube, upper radiator						2	2				
41	361687	Hose, upper radiator			1	1							
41	365651	Hose, upper radiator					1						
41	365031	Tube, upper radiator									2		2
41	365399	Tube, upper radiator	2	2									
42	361933	Line, vent			1	1	1						
42	365481	Tube, radiator vent	1									1	1
42	365482	Tube, radiator vent		1					1	1	1		
43	365483	Bracket, support	2									2	2
43	X-400-214	Spacer			1	1	1						
44	GM20168	Hose replacement kit (includes hose, clamps, and item 58)			1	1	1						
44	GM19484	Tube, lower radiator, SCC			1	1	1						
44	365611	Hose, lower radiator							1				
44	365612	Hose, lower radiator									1		1
44	365613	Hose, lower radiator	1	1									
45	361689	Hose, upper radiator			1	1							
45	365649	Hose, upper radiator					1						
45	361745	Guard, belt, top								1			
45	365549	Tube, upper							1				
45	365614	Tube, upper (SCCC)	1	1							1		1
46	GM14326	Guard, top			1	1	1						
46	GM14335	Guard, top	1	1				1	1	1	1	1	1
47	GM14328	Guard, belt, LS	1	1	1	1	1	1	1	1	1	1	1
48	GM14327	Guard, belt, RS	1	1	1	1	1	1	1	1	1	1	1
49	GM14331	Guard, belt charging alternator	1	1	1	1	1	1	1	1	1	1	1
49	GM19427	Guard, battery charging alternator	1	1	1	1	1	1	1	1	1	1	1
50	GM14333	Bracket, support	1	1	1	1	1	1	1	1	1	1	1
51	GM17574	Guard, belt, bottom			1	1	1						
51	GM17575	Guard, belt, bottom	1	1				1	1	1	1	1	1
52	GM14334	Bracket, support	1	1	1	1	1	1	1	1	1	1	1
53	GM14332	Bracket, support	2	2	2	2	2	2	2	2	2	2	2
54	GM14329	Guard, belt, top, LS and RS	2	2	1	1	1	2	2	2	2	2	2
55	GM16641	Cap, radiator										1	
56	X-400-210	Spacer, .406 ID x .625 OD x 2.344			3	3	3						
57	X-801-11	Washer, hardened, .406 ID x 1.375			3	3	3						
58	X-6014-24	Hose, radiator, straight, 1.75			1	1	1						

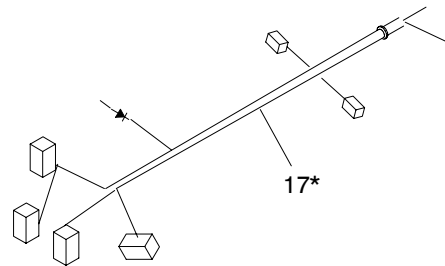
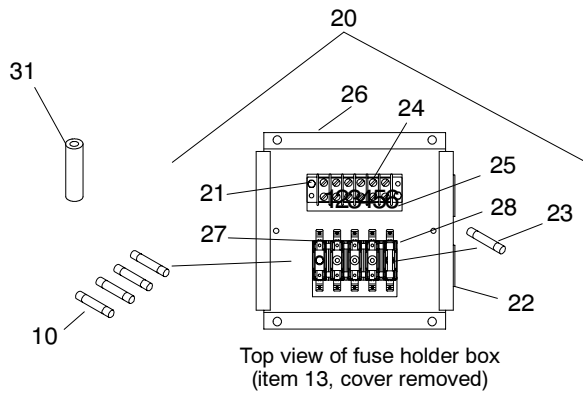
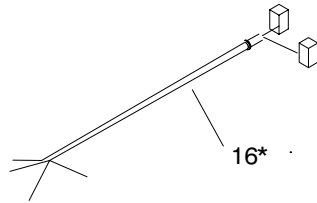
Group 105: Engine



* See Control and Harness group for part number.



Crankcase hose (supplied by DDC)



Items not shown: 1, 4, 18

Group 105: Engine

Item	Part Number	Description	Qty.
1	See chart	Engine assembly (not shown)	1
2	X-22-12	Washer, lock, 1/4 int.-ext. tooth	8
3	X-22-30	Washer, lock, 5/8 ext. tooth	4
4	X-468-4	Tie, cable (not shown)	2
5	X-672-6	Clamp, insulating	1
6	223033	Strap, ground, 3/8 x 5 in.	1
7	259632	Bumper	2
8	GM10772	Strap, ground, 8V engine	1
8	X-6046-10	Strap, ground, 12V engine	1
8	266581	Strap, ground, 16V engine	1
9	272713	Solenoid, cranking	1
10	292937	Fuse, 20 A, 250 volt	4
10	283645	Fuse, 15 A, 250 volt	4
11	*	Sender, oil pressure	1
12	*	Sender, temperature	1
13	361242	Cover, fuse box (not shown)	1
13	X-67-142	Screw, cross recess (not shown)	6
14	361773	Bracket, C-relay	1
15	*	Adapter, bushing	1
16	*	Harness, engine power	1
17	*	Harness, engine	1
18	365404	Plate, fuse box mount (not shown)	1
19	*	O-ring	2
20	A-361308†	Box assembly, fuse holder	1
21	X-49-26†	Screw, PHM, 6-32 x .50	4
22	X-634-15†	Bushing, nylon, 1.0 ID	2
23	239298†	Fuse, 5 A, 250 V, .25 x 1.25	1
24	295314†	Block, terminal	1
25	299090†	Marker, strip	1
26	361241†	Box, fuse holder	1
27	361265†	Holder, fuse, 5 pole	1
28	361326†	Strip, marker, 5 fuse	1
29	X-465-8	Screw, hex cap	2
30	X-22-26	Washer, lock, .521 x 1.24 in.	1
30	X-22-30	Washer, lock, 5/8 ext. tooth, 8V engine	1
31	X-400-161	Spacer, .531 ID x 1 OD x .75 in.	2
31	X-400-214	Spacer, .282 ID x .5 OD x 1.9 in.	2
31	X-400-224	Spacer, .282 ID x .5 OD x 1.438 in.	2

* See Control and Harness group for part number.

† Item is not used on 8V series engines.

Engine Part Number

Use this table to identify the generator set engine part number (item 1).

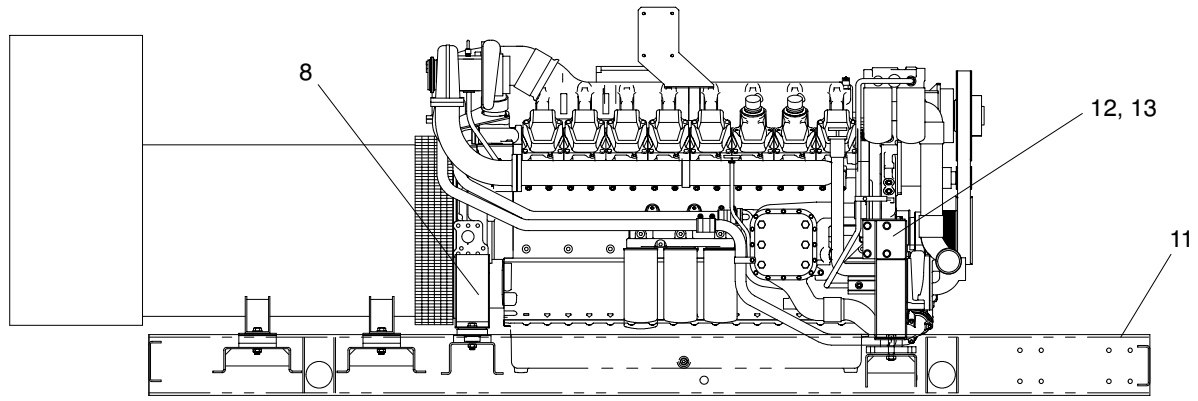
Variation Number	Engine Assembly Part Number	Engine Model Description
1, 102	A-361677	Series 8V, 450 kW, 60 Hz
2, 103	A-361676	Series 8V, 450 kW, 50 Hz
3, 104	A-361564	Series 8V, 500 kW, 60 Hz
10, 105	A-361566	Series 16V, 800 kW, 60 Hz
11, 106	A-361679	Series 16V, 800 kW, 50 Hz
13, 107	A-361830	Series 16V, 900 kW, 50 Hz
12, 108	A-361831	Series 16V, 900 kW, 60 Hz
15, 109	A-361681	Series 16V, 1000 kW, 60 Hz
9, 110	A-361828	Series 16V, 750 kW, 50 Hz
5, 113	A-361565	Series 12V, 600 kW, 60 Hz
6, 114	A-361678	Series 12V, 600 kW, 50 Hz
7, 115	A-361680	Series 12V, 750 kW, 60 Hz
4, 116	A-361827	Series 12V, 500 kW, 50 Hz
8, 119	GM11865	Series 12V, 750 kW, 60 Hz
14	GM17862	Series 16V, 900/1000 kW, 60 Hz

Notes

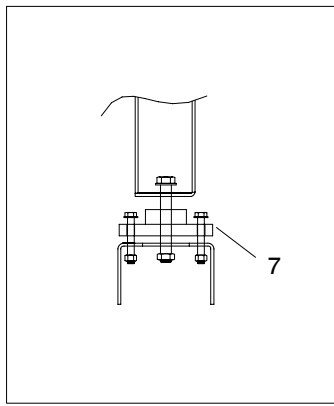
Group 107: Nameplate and Decals

Item	Part Number	Description	Quantity
			Variation Number GR1
1	224233	Decal, 1-800 number	1
2	238402	Decal, caution positive term. only	1
3	249808	Decal, warning rotating parts	2
4	249809	Decal, caution, hot engine	2
5	249810	Decal, warning hot coolant	1
6	255882	Decal, caution stdby svc connect	1
7	294520	Decal, danger	1
8	257438	Decal, danger moving rotor	2
9	GM13227	Decal, warning fan force	1
10	GM13228	Decal, warning lifting support	1
11	364116	Decal, caution welding disconnect	2
12	327004	Nameplate, model/ratings, Kohler	1
13	347166	Decal, electrical equipment	1
14	347272	Decal, Power	2
15	347273	Decal, System	2
16	X-6232-3	Decal, stripes	1
17	X-6246-1	Decal, Kohler Power System	1
18	X-6275-7	Logo, Kohler	2

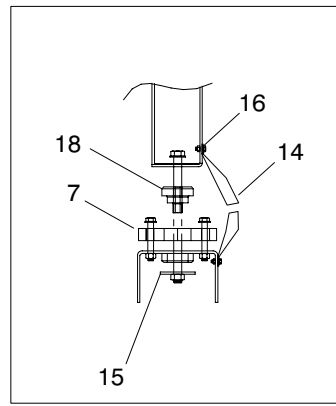
Group 109: Skid and Plant Mounting



Radiator end

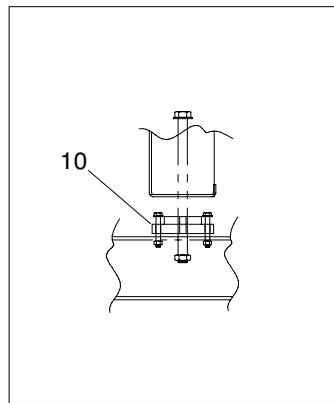


Solid mounting

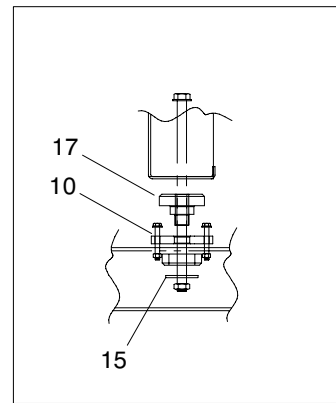


Isolation mounting

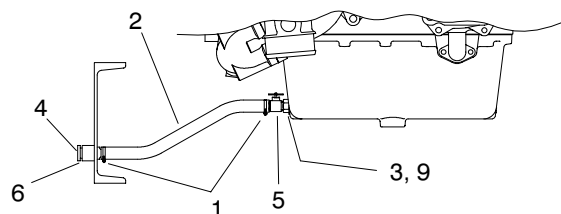
Generator end



Solid mounting



Isolation mounting



365046

Group 109: Skid and Plant Mounting

Cross-reference the module number of your skid and plant mounting to the letter key in the Model Number to Key Cross-Reference table below. Refer to the key column in the following table.

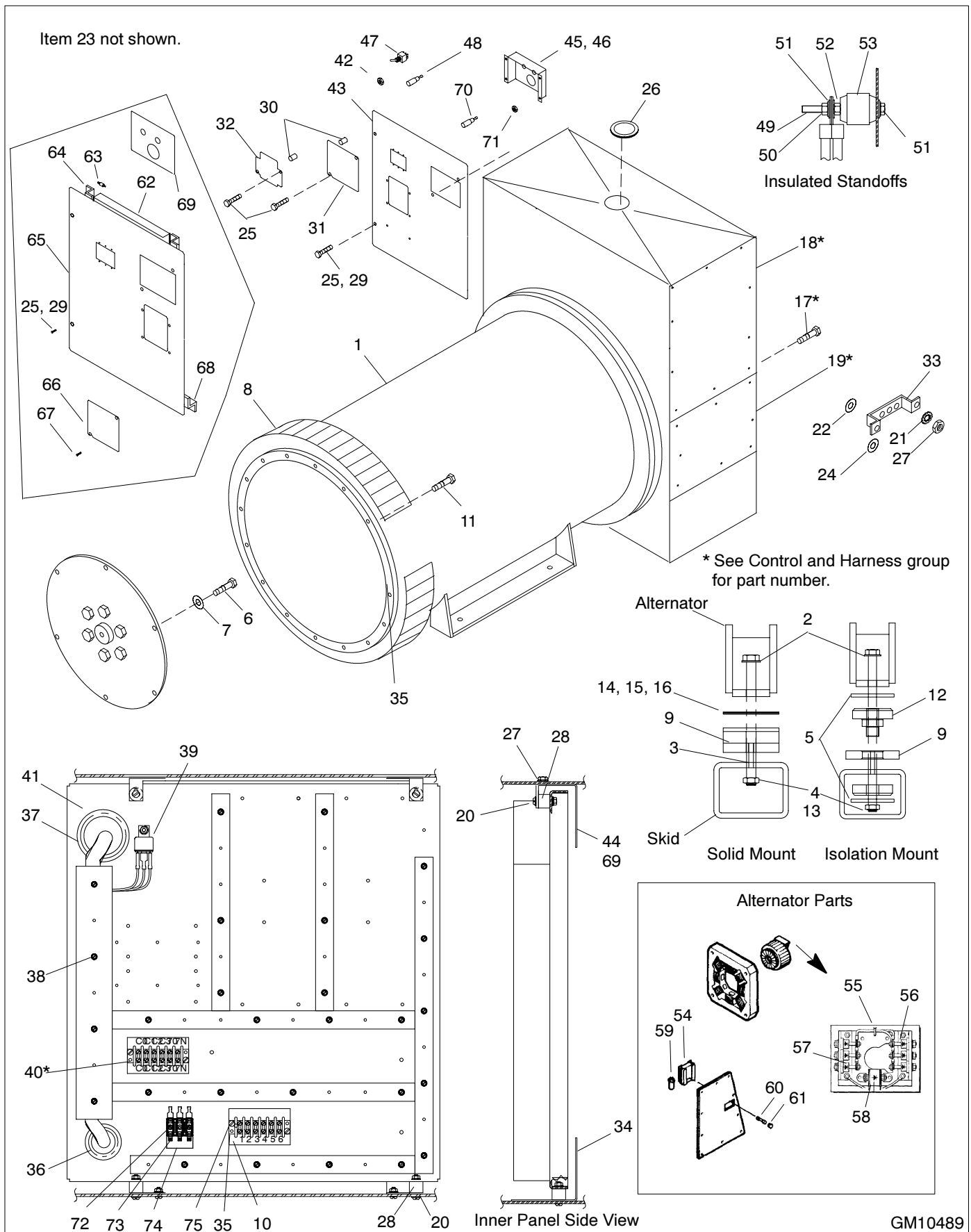
Item	Part Number	Description	Quantity												
			Key												
			A	B	C	D	E	F	G	H	I	J	K	L	M
1	X-426-3	Clamp, hose			2	2	2	2	2	2	2	2	2	2	
1	X-426-10	Clamp, hose	1	1											
2	X-577-28	Hose .625 in. x 17 in.			1	1	1	1	1	1	1	1	1	1	
2	X-577-44	Hose, rubber, straight, .62 in. ID	1	1											
3	X-6427-2	Washer, copper			1	1	1	1	1	1	1	1	1	1	
3	365500	O-ring	1	1											
4	241062	Plug, drain	1	1	1	1	1	1	1	1	1	1	1	1	
5	272701	Valve, oil drain	1	1	1	1	1	1	1	1	1	1	1	1	
6	276552	Washer, nylon (not shown)	1	1	1	1	1	1	1	1	1	1	1	1	
6	273729	Adapter, hose	1	1											
7	X-80-1	Nut, hex jam, 1 1/4 (not shown)	1	1											
7	361668	Plate, engine spacer				2		2					2	2	
7	361039	Plate, generator mounting					2				2	2			
7	361733	Plate, engine mounting			2				2	2					
8	361731	Foot, mounting				2	2	2	2	2		2		2	
8	365395	Foot, mounting									2		2		
9	361735	Adapter, bushing			1	1	1	1	1	1	1	1	1	1	
9	361917	Adapter, bushing	1	1											
9	X-202-41	Bushing, reducing, 1/2 x 3/4 in. NPT	1	1											
9	X-211-1	Fitting, street elbow, 1/2 in.	1	1											
10	361924	Plate, engine mounting				2		2					2	2	
10	361039	Plate, generator mounting					2		2		2	2			
10	361733	Plate, engine mounting							2						
11	365030	Skid						1	1						
11	365253	Skid										1		1	
11	365251	Skid									1		1		
11	365191	Skid							1						
11	361660	Skid								1					
11	361850	Skid				1	1								
11	365449	Skid			1										
11	361685	Skid	1												
11	361686	Skid		1											
12	365466	Mounting, foot, RS	1	1	1	1	1	1	1	1	1	1	1	1	
13	365475	Mounting, foot, LS	1	1	1	1	1	1	1	1	1	1	1	1	
14	X-22-16	Washer, lock, .326 ID x .883 in. OD	2	2	3		4		4	4	3	4	4		
15	X-25-152	Washer, plain, 1.06 ID x 5.25 in. OD					4				4	4			
15	X-25-155	Washer, plain			4					4	4				
15	X-25-151	Washer, plain, .8 ID x 3 in. OD	2	2											
16	290418	Strap, ground			1		1		1	1	1	1			
16	245294	Strap, ground	1	1											
17	361054	Vibromount					2		2						
17	365190	Vibromount								2					
18	361919	Vibromount					2		2		4	4			
18	361734	Vibromount			2					2	2				
18	324393	Vibromount	2	2											

Module Number to Key Cross-Reference

Use the module number of your skid and plant mounting from the generator set nameplate to determine the key.

Module Number	Key	Module Number	Key	Module Number	Key
361707	A	365046	F	365256	K
361708	B	365192	G	365257	L
361846	C	365225	H	365259	M
361913	D	365228	I		
361914	E	365254	J		

Group 201: Generator and Mounting



Group 201: Generator and Mounting

Item	Part Number	Description	Qty.
1	See chart page 19	Alternator assembly	1
2	M931-20160-60	Screw, hex cap, 2-point mounting	2
2	M931-20160-60	Screw, hex cap, 3-pt. mtg., isolation, 16V engine	2
2	M931-20140-60	Screw, hex cap, 3-pt. mtg., isolation, 12V engine	2
2	M931-20120-60	Screw, hex cap, 3-pt. mtg., solid, 16V engine	2
2	M931-20120-60	Screw, hex cap, 4-pt. mtg., solid, 5M alternator	4
2	M931-20160-60	Screw, hex cap, 4-pt. mtg., isolation, 5M alternator	4
2	M931-24160-60	Screw, hex cap, 4-pt. mtg., isolation, 7M alternator	4
3	M934-20-80	Nut, hex, isolation	8
4	M982-20-80	Nut, hex elastic stop	2
4	M934-20-80	Nut, hex elastic stop, 4-pt. mtg., solid, 5M alternator	2
4	M934-20-80	Nut, hex elastic stop, 3-pt. mtg., solid, 5M alternator	4
4	M934-24-80	Nut, hex elastic stop, 4-pt. mtg., solid, 7M alternator	4
4	M982-24-60	Nut, hex elastic stop, 4-pt. mtg., isolation, 7M alternator	4
5	X-25-152	Washer, plain, 1.06 ID x 5.25 in.	8
6	X-129-54	Screw, hex cap, 450-600 kW	8
6	X-6021-14	Screw, hex cap, 750-1000 kW	6
6	X-6021-13	Screw, HC, 1000 kW, 380/600 volt	6
7	290945	Washer, hardened, 450-600 kW	8
7	X-801-5	Washer, hardened, .656 ID x 1.06	6
8	328903	Screen, 5M alternator	1
8	GM10557	Screen, 7M alternator	1
9	361039	Plate, generator mounting	2
10	299090	Marker, strip	1
11	M931-10080-82	Screw, hex cap, 450-600 kW	12
11	M931-12050-82	Screw, hex cap, 750-1000 kW	16
11	M931-12040-82	Screw, HC, 1000 kW, 380/600 volt	16
12	361179	Vibromount, 2-pt. mtg., 12V series	2
12	361054	Vibromount, 2-pt. mtg., 8V series	2
12	361919	Vibromount, 3-pt. mtg., 16V series	2
12	365190	Vibromount, 3-pt. mtg., 12V series	2
12	361919	Vibromount, 4-pt. mtg., 12V series	4
13	X-400-239	Spacer, 5M alternator, isolation	2
13	X-400-241	Spacer, 5M alternator, solid	2
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 (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
27	X-83-7	Nut, hex, zinc, 3/8-16	2

Item	Part Number	Description	Qty.
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	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
43	361518	Door, junction box	1
44	365476	Bracket, inner panel	1
45	361188	Bracket, diagnostics mounting	1
46	361517	Plate, diagnostic silkscreen	1
47	354151	Switch, toggle, 8V series engine	1
47	297680	Switch, toggle, 12/16V series	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
55	347070	Exciter rectifier assembly, 7M alt.	1
56	279772	Diode, standard polarity	1
56	279773	Diode, standard polarity, 7M alt.	1
57	279774	Diode, reversing polarity	1
57	279775	Diode, reversing polarity, 7M alt.	1
58	279776	Surge suppressor	1
58	279777	Surge suppressor, 7M alt.	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	GM17570	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	343601	Strip, marker	1
75	X-49-36	Screw, RHM	4

* See Control and Harness group for part number.

Notes

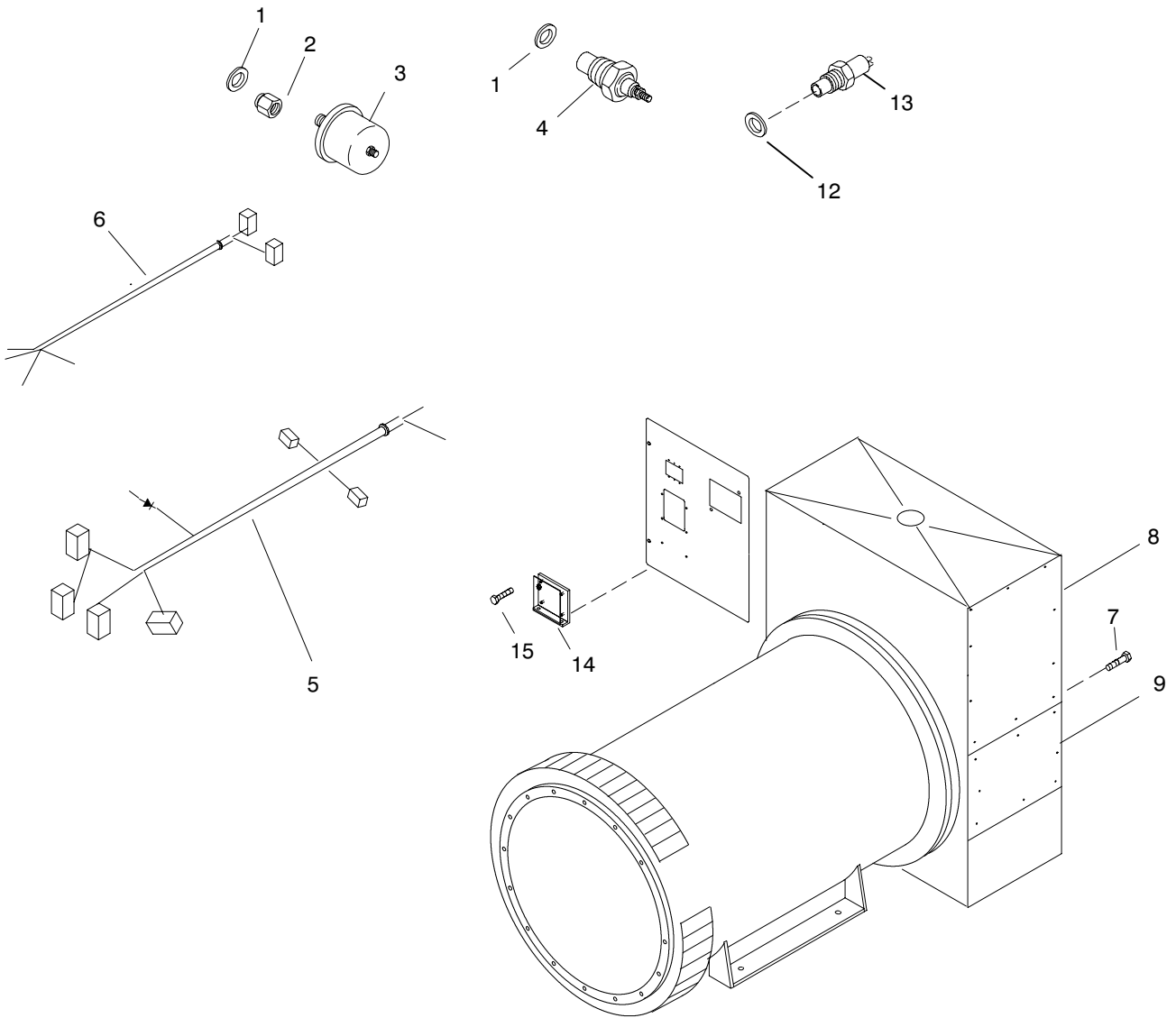
Alternator Part Number and Mount Type

Use this table to identify the module number's alternator part number (item 1, page 17) and mount type.

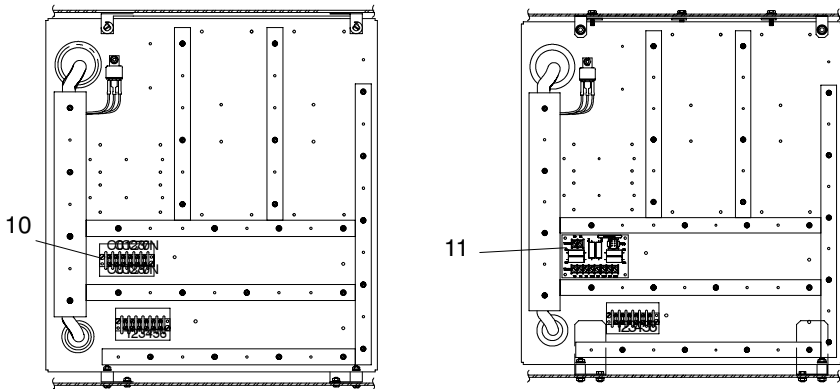
Module Number	Alternator Part Number	Mount Type
GM17020-MA1*, GM17020-MA10*, 361709, 365932	A-361851	Isolation
GM17020-MA2*, GM17020-MA11*, 361710, 365936	A-361852	Isolation
GM17020-MA3*, GM17020-MA12*, 361711, 361786	A-361749	Isolation
GM17020-MA4*, GM17020-MA13*, 361712, 361787	A-361750	Isolation
GM17020-MA5*, 361713	A-361855	Isolation
GM17020-MA6*, 361714	A-361856	Isolation
GM17020-MA7*, GM17020-MA15*, 361715, 361789	A-361752	Isolation
GM17020-MA8*, 361716	A-361854	Isolation
GM17020-MA9*, GM17020-MA16*, 361717, 361790	A-361753	Isolation
GM17020-MA14*, 361788	A-361751	Isolation
GM17020-MA2*, 361791	A-361754	Isolation
GM17021-MA10*, 361794	A-361757	Solid
GM17021-MA12*, 361795	A-361758	Solid
GM17021-MA16*, 361796	A-361759	Solid
GM17021-MA20*, 361798	A-361761	Solid
GM17021-MA14*, 361799	A-361762	Solid
GM17021-MA18*, 361800	A-361763	Solid
GM17021-MA22*, 361801	A-361764	Solid
GM17021-MA1*, GM17021-MA7*, 361802, 365532	A-361756	Isolation
GM17021-MA4*, GM17021-MA15*, 361805	A-361759	Isolation
GM17021-MA13*, 361808	A-361762	Isolation
GM17021-MA17*, 361809	A-361763	Isolation
GM17021-MA21*, 361810	A-361764	Isolation
GM17022-MA2*, 361811	A-361765	Solid
GM17022-MA4*, 361812	A-361766	Solid
GM17022-MA6*, 361813	A-361767	Solid
GM17022-MA8*, 361814	A-361768	Solid
GM17022-MA10*, 361815	A-361769	Solid
GM17022-MA1*, 361816	A-361765	Isolation
GM17022-MA3*, 361817	A-361766	Isolation
GM17022-MA5*, 361818	A-361767	Isolation
GM17022-MA7*, 361819	A-361768	Isolation
GM17022-MA9*, 361820	A-361769	Isolation
GM17021-MA2*, GM17021-MA9*, 365387, 361803	A-361757	Isolation
GM17021-MA3*, GM17021-MA11*, 365388, 361804	A-361758	Isolation
GM17021-MA5*, 365389, 361806	A-361760	Isolation
GM17021-MA6*, GM17021-MA19*, 365390, 361807	A-361761	Isolation
GM17021-MA8*, 365531	A-361756	Solid

* Module uses vibration isolated door-mounted component items 62-69.

Control and Harness



Inner panels



Decision-Maker 550, 600 volt maximum

Control and Harness

Cross-reference the module number of your control and harness and engine group variation to the letter key in the Model Number to Key Cross-Reference table below. Refer to the key column in the following table.

Item	Part Number	Description	Quantity												
			Module Number												
			A	B	C	D	E	F	G	H	I	J	K	L	
1	365499	O-ring	2	2	2	2	2	2							
2	361916	Adapter, bushing	1	1	1	1	1	1							
3	365624	Sender, oil pressure	1	1	1	1	1	1							
4	GM10166	Sender, temperature	1	1	1	1	1	1							
5	365907	Harness, engine	1												
5	361775	Harness, engine		1											
5	365310	Harness, engine			1										
5	365426	Harness, engine				1									
5	361942	Harness, engine					1	1							
5	GM16932	Harness, engine							1						
5	GM16948	Harness, engine								1					
5	GM16951	Harness, engine									1				
5	GM16949	Harness, engine										1			
5	GM16950	Harness, engine											1	1	
6	365908	Harness, power	1							1					
6	361774	Harness, power		1							1				
6	365309	Harness, power			1							1			
6	365425	Harness, power				1							1		
6	361941	Harness, power					1	1						1	
7	X-6217-10	Screw, hex flange machine	22	22	22	22	24	24	22	22	22	22	22	1	24
8	361184	Panel, junction box top	1	1	1	1	1	1	1	1	1	1	1	1	1
9	361826	Panel, junction box bottom	1	1	1	1	1	1	1	1	1	1	1	1	1
9	328901	Panel, junction box bottom						1							1
10	295314	Block, terminal	1	1	1	1	1	1							
10	255080	Marker, strip	1	1	1	1	1	1							
10	X-49-6	Screw, cross recess pan head	2	2	2	2	2	2							
11	GM13980	PCB assembly, CT burden resistor							1	1	1	1	1	1	1
11	X-70-12	Nut, hex machine screw, 8-32							4	4	4	4	4	4	4
11	X-712-9	Spacer, .25 OD, .5 in.							4	4	4	4	4	4	4
12	365615	O-ring, ISO 6149							1	1	1	1	1	1	1
13	GM10061	Switch, temperature							1	1	1	1	1	1	1
14	GM11718	PCB assembly, Marathon excitation interface							1	1	1	1	1	1	1
15	M965A-06012-20	Screw, pan head machine							4	4	4	4	4	4	4

Module Number to Key Cross-Reference

Use the module number of your control and harness from the generator set nameplate or engine group variation from the Specification Number Index at the front of this book to determine the key.

Key	Kit Number	Engine Group Variation No.	kW	Controllers
A	GM16964-MA1	102, 103, 104	450 50/60 Hz, 500 60 Hz	Engine Gauge Box and 16-Light
B	GM16965-MA1	113, 114, 116	500 50 Hz, 600 50/60 Hz	Engine Gauge Box and 16-Light
C	GM16965-MA2	115	750 60 Hz	Engine Gauge Box and 16-Light
D	GM16966-MA1	105, 106, 108, 110	750 50 Hz, 800, 900 60 Hz	Engine Gauge Box and 16-Light
E	GM16966-MA2	107, 109	900 50 Hz, 1000 60 Hz	Engine Gauge Box and 16-Light
F	GM16966-MA3		1000 50 Hz	Engine Gauge Box and 16-Light
G	GM16969-MA1		450 50/60 Hz, 500 60 Hz	Decision-Maker 550
H	GM16970-MA1		500 50 Hz, 600 50/60 Hz	Decision-Maker 550
I	GM16970-MA2		750 60 Hz	Decision-Maker 550
J	GM16971-MA1		750 50 Hz, 800, 900 60 Hz	Decision-Maker 550
K	GM16971-MA2		900 50 Hz, 1000 60 Hz	Decision-Maker 550
L	GM16971-MA3		1000 50 Hz	Decision-Maker 550

Group 701: Literature

Item	Part Number	Description	Quantity							
			Variation Number							
			97	103	104	118	123	131	137	138
1	TP-5374	Warranty, 1 Year Limited	1	1	1	1	1	1	1	1
2	TP-5578	O/I/S/M Marathon Alternator Magna DVR	1	1	1	1	1	1	1	1
3	TP-5579	O/I/S/M Marathon Voltage Regulator DVR	1	1	1	1	1	1	1	1
4	TP-5583	S/M 350-1600ROZD	1	1	1	1	1	1	1	1
5	TP-5700	I/M Industrial	1	1	1	1	1	1	1	1
6	TP-6117	P/C Accessories, 230-2000 kW diesel	1	1	1	1	1	1	1	1
7	TP-5750	O/M 20-2000 kW	1	1	1	1	1	1	1	1
8	TP-5829	O/M DEC340 Controller	1	1	1	1	1	1	1	1
9	TP-6004	W/D 450REOZD-4, 500-2000ROZD-4	1	1	1	1	1	1	1	1
10	TP-6009	P/C Controller, Industrial	1	1	1	1	1	1	1	1
11	TP-6021	P/C 450-1000ROZD-4	1	1	1	1	1	1	1	1
12	TP-6022	O/M DDC 2000 Series 450-500 kW	1	1	1	1	1	1	1	1
13	TP-6025	S/M DDC 2000 Series 500(50Hz)-1000 kW	1	1	1	1	1	1	1	1
14	TP-6026	P/C 450 kW 50-60Hz, 500kW, DDC 16V2000	1			1	1		1	
14	TP-6027	P/C 500-600 50Hz, 600-750 60Hz DDC	1			1	1		1	
14	TP-6028	P/C 750-900 50Hz, 800-1000 60Hz DDC		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.

	450 kW	500 kW	600 kW	750 kW	800 kW	900 kW	1000 kW
Controller Kits							
See Parts Catalog TP-6009 for parts lists.							
Cooling System Kits							
Block Heater							
Single Heater, 60 Hz	361943	361943	GM10026-KA1	GM10026-KA2	GM10028-KA1	GM10028-KA2	GM10028-KA2
Single Heater, 50 Hz	361943	GM10026-KA1	GM10026-KA1	GM10028-KA1	GM10028-KA2	GM10028-KA2	GM10028-KA2
Dual Heater, 60 Hz	N/A	N/A	GM10027-KA1	GM10027-KA2	GM10030-KA1	GM10030-KA2	GM10030-KA2
Dual Heater, 50 Hz	N/A	GM10027-KA1	GM10027-KA1	GM10030-KA1	GM10030-KA2	GM10030-KA2	GM10030-KA2
Isolation Valve, Block Heater							
Single Heater, 60 Hz	365308	365308	GM10322-KA1	GM10322-KA1	GM10324-KA1	GM10326-KA1	GM10326-KA1
Single Heater, 50 Hz	N/A	GM10322-KA1	GM10322-KA1	GM10324-KA1	GM10326-KA1	GM10326-KA1	GM10326-KA1
Dual Heater, 60 Hz	N/A	N/A	GM10323-KA1	GM10323-KA1	GM10325-KA1	GM10327-KA1	GM10327-KA1
Dual Heater, 50 Hz	N/A	GM10323-KA1	GM10323-KA1	GM10325-KA1	GM10327-KA1	GM10327-KA1	GM10327-KA1
Radiator Duct Flange							
60 Hz	GM10790-KA1	365202	365203	365205	365204	N/A	365296
50 Hz	365202	365203	365203	365204	365205	365296	365296
Remote Radiator							
60 Hz	GM14348-MA1	GM14348-MA1	GM14348-MA3	GM14348-MA2	GM14348-MA3	GM14348-MA2	GM14348-MA2
50 Hz	GM14348-MA1	GM14348-MA3	GM14348-MA2	GM14348-MA3	GM14348-MA2	GM14348-MA2	GM14348-MA2
Air Intake Kits							
Heavy-Duty, 60 Hz	361770	361770	365265	365265	365268	365272	365272
Heavy-Duty, 50 Hz	361771	365266	365266	365268	365268	365268	N/A

Optional Kits

Paint and Miscellaneous Parts

Paint, Kohler Cream Beige

All models use 221338 spray can, 221337 gallon, GM19489 touch up

N/A Not Applicable

Cooling System Kits

Qty.	Description	Part No.
Block Heater, 480 Volt		
1	Strap, ground	223033
1	Fitting, elbow, 45 degree, street	227642
4	Bumper	259632
1	Tag, hang	279047
1	Heater, block (includes item marked *)	279816
1	*Element, replacement	GM19503
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	Adapter, bushing	361917
1	Thermostat, block heater	361944
1	Adapter, bushing	361955
1	O-ring	365499
1	O-ring, ISO 6149	365501
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .391 ID x .974 in. OD	X-22-14
4	Clamp, hose, .69/1.25 in.	X-426-12
1	Screw, cross recess pan head machine	X-51-15
1	Coupling, hose	X-582-7
1	Coupling, hose	X-582-8
1	Fuse block	X-6129-8
1	Fuse, 10 A, 600 V	X-6135-6
1	Hose	X-6367-1
1	Hose, coolant	X-6367-3
4	Screw, slotted hex washer head, machine	X-97-13
1	Plug, freeze	GM10025
1	Fitting, 45 degree, street elbow	227521

Block Heater, Single Heater		
		GM10026-KA1
1	Strap, ground	223033
4	Bumper	259632
1	Tag, hang	279047
1	Heater, block (includes item marked *)	279816
1	*Element, replacement	GM19503
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	Adapter, bushing	361918
1	Thermostat, block heater	361944
1	O-ring	365499
1	O-ring, ISO 6149	365501
1	Fitting, elbow, 90 degree, street	X-211-5
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .391 ID x .974 in. OD	X-22-14
1	Fitting, 45 degree, street elbow	X-274-15
4	Clamp, hose, .69/1.25 in.	X-426-12
2	Tie, cable	X-468-9
2	Coupling, hose	X-582-8
1	Hose, coolant, 15 in.	X-6367-4
1	Hose, coolant, 40 in.	X-6367-7
4	Screw, slotted hex washer head, machine	X-97-13
1	Flange	GM10023
1	Plug, freeze	GM10024
1	Gasket	GM10065

Qty.	Description	Part No.
Block Heater, Single Heater		
1	Strap, ground	223033
4	Bumper	259632
1	Tag, hang	279047
1	Heater, block (includes item marked *)	279816
1	*Element, replacement	GM19503
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	Adapter, bushing	361918
1	Thermostat, block heater	361944
1	O-ring	365499
1	O-ring, ISO 6149	365501
1	Fitting, elbow, 90 degree, street	X-211-5
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .391 ID x .974 in. OD	X-22-14
1	Fitting, 45 degree, street elbow	X-274-15
4	Clamp, hose, .69/1.25 in.	X-426-12
2	Tie, cable	X-468-9
2	Coupling, hose	X-582-8
1	Hose, coolant, 15 in.	X-6367-4
1	Hose, coolant, 40 in.	X-6367-7
4	Screw, slotted hex washer head, machine	X-97-13
1	Flange	GM10023
1	Plug, freeze	GM10024
1	Gasket	GM10065
2	Elbow, street, 90 degree x 3/4 in. NPT	SA-472

Block Heater, Dual Heater		
		GM10027-KA1
1	Strap, ground	223033
1	Fitting, 45 degree, street elbow	227521
4	Bumper	259632
2	Tag, hang	279047
2	Heater, block (includes item marked *)	279816
1	*Element, replacement	GM19503
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	Adapter, bushing	361917
1	Adapter, bushing	361918
1	Thermostat, block heater	361944
1	O-ring	365499
1	O-ring	365501
1	O-ring, ISO 6149	365501
1	Pipe, 3/4 in. NPT x 6.00 in.	X-206-15
1	Pipe, 3/4 in. NPT x 1.38 in.	X-206-9
1	Fitting, elbow, 90 degree, street	X-211-5
1	Coupling, pipe, 3/4 in.	X-216-13
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
4	Washer, lock, .391 ID x .974 in. OD	X-22-14
1	Elbow, pipe, 45 degree x 3/4 in. NPT	X-225-8
1	Fitting, 45 degree, street elbow	X-274-2
12	Clamp, hose, .69/1.25 in.	X-426-12
2	Tie, cable	X-468-9
4	Coupling, hose	X-582-8
1	Hose	X-6367-2
1	Hose, coolant, 15 in.	X-6367-4
3	Hose, coolant, 40 in.	X-6367-7
4	Screw, slotted hex washer head, machine	X-97-13
1	Flange	GM10023
1	Bracket, block heater	GM10024
1	Plug, freeze	GM10025
1	Gasket	GM10065
1	Shield, heat	GM10669

Cooling System Kits

Qty.	Description	Part No.
Block Heater, Dual Heater		
		GM10027-KA1
1	Strap, ground	223033
1	Fitting, 45 degree, street elbow	227521
4	Bumper	259632
2	Tag, hang	279047
2	Heater, block (includes item marked *)	279816
1	*Element, replacement	GM19503
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	Adapter, bushing	361917
1	Adapter, bushing	361918
1	Thermostat, block heater	361944
1	O-ring	365499
1	O-ring	365500
1	O-ring, ISO 6149	365501
1	Pipe, 3/4 in. NPT x 6.00 in.	X-206-15
1	Pipe, 3/4 in. NPT x 1.38 in.	X-206-9
1	Fitting, elbow, 90 C street	X-211-5
1	Coupling, pipe, 3/4 in.	X-216-13
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
4	Washer, lock, .391 ID x .974 in. OD	X-22-14
1	Elbow, pipe, 45 degree x 3/4 in. NPT	X-225-8
1	Fitting, 45 degree, street elbow	X-274-2
12	Clamp, hose, .69/1.25 in.	X-426-12
2	Tie, cable	X-468-9
4	Coupling, hose	X-582-8
1	Hose	X-6367-2
1	Hose, coolant, 15 in.	X-6367-4
3	Hose, coolant, 40 in.	X-6367-7
4	Screw, slotted hex washer head, machine	X-97-13
1	Flange	GM10023
1	Bracket, block heater	GM10024
1	Plug, freeze	GM10025
1	Gasket	GM10065
1	Shield, heat	GM10669
2	Elbow, street, 90 degree x 3/4 in. NPT	SA-472
1	Hose	X-691-23
Block Heater, Single Heater		
		GM10028-KA1
1	Strap, ground	223033
4	Bumper	259632
1	Tag, hang	279047
2	Heater, block (includes item marked *)	279816
1	*Element, replacement	GM19503
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	Adapter, bushing	361918
1	Thermostat, block heater	361944
1	O-ring	365499
1	O-ring ISO 6149	365501
1	Flange	GM10023
1	Gasket	GM10065
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .391 ID x .975 in. OD	X-22-14
4	Nut, weld, 1/4-20	X-244-4
1	Fitting, 45 degree, street elbow	X-274-15
2	Fitting, 45 degree, street elbow	X-274-15
4	Clamp, hose, .69/1.25 in.	X-426-12
2	Tie, cable	X-468-9
2	Coupling, hose	X-582-8
2	Terminal	X-6077-1
1	Hose, coolant, 26 in.	X-6367-6
1	Hose, coolant, 40 in.	X-6367-7
4	Screw, slotted hex washer head	X-97-13

Qty.	Description	Part No.
Block Heater, Single Heater		
		GM10028-KA2
1	Strap, ground	223033
4	Bumper	259632
1	Tag, hang	279047
2	Heater, block (includes item marked *)	279816
1	*Element, replacement	GM19503
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	Adapter, bushing	361918
1	Thermostat, block heater	361944
1	O-ring	365499
1	O-ring ISO 6149	365501
1	Flange	GM10023
1	Gasket	GM10065
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .391 ID x .975 in. OD	X-22-14
4	Nut, weld, 1/4-20	X-244-4
1	Fitting, 45 degree, street elbow	X-274-15
2	Fitting, 90 degree, street elbow	X-211-5
4	Clamp, hose, .69/1.25 in.	X-426-12
2	Tie, cable	X-468-9
2	Coupling, hose	X-582-8
2	Terminal	X-6077-1
1	Hose, coolant, 26 in.	X-6367-6
1	Hose, coolant, 40 in.	X-6367-7
4	Screw, slotted hex washer head	X-97-13
Block Heater, Dual Heater		
		GM10030-KA1
1	Strap, ground	223033
4	Bumper	259632
2	Tag, hang	279047
2	Heater, block (includes item marked *)	279816
1	*Element, replacement	GM19503
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
2	Bracket, block heater	354687
1	Adapter, bushing	361917
1	Adapter, bushing	361918
1	Thermostat, block heater	361944
1	O-ring	365499
1	O-ring ISO 6149	365500
1	O-ring, ISO 6149	365501
1	Flange	GM10023
1	Plug, freeze	GM10025
1	Gasket	GM10065
1	Fitting, elbow, 90 degree, street	X-211-5
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .391 ID x .975 in. OD	X-22-14
8	Nut, weld, 1/4-20	X-244-4
1	Fitting, 45 degree, street elbow	X-274-15
2	Fitting, 45 degree, street elbow	X-274-15
8	Clamp, hose, .69/1.25 in.	X-426-12
2	Tie, cable	X-468-9
4	Coupling, hose	X-582-8
2	Washer, beveled, .44 ID x 1.25 in. OD	X-6011-4
2	Terminal	X-6077-1
2	Hose	X-6367-2
1	Hose, coolant, 26 in.	X-6367-6
1	Hose, coolant, 40 in.	X-6367-7
4	Screw, slotted hex washer head, machine	X-97-13
1	Fitting, 45 degree, street elbow	227521

Cooling System Kits

Qty.	Description	Part No.
Block Heater, Dual Heater		
		GM10030-KA2
1	Strap, ground	223033
4	Bumper	259632
2	Tag, hang	279047
2	Heater, block (includes item marked *)	279816
1	*Element, replacement	GM19503
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
2	Bracket, block heater	354687
1	Adapter, bushing	361917
1	Adapter, bushing	361918
1	Thermostat, block heater	361944
1	O-ring	365499
1	O-ring, ISO 6149	365500
1	O-ring, ISO 6149	365501
1	Flange	GM10023
1	Plug, freeze	GM10025
1	Gasket	GM10065
1	Fitting, elbow, 90 degree, street	X-211-5
10	Washer, lock, .262 ID x .743 in. OD	X-22-12
2	Washer, lock, .391 ID x .975 in. OD	X-22-14
8	Nut, weld, 1/4-20	X-244-4
1	Fitting, 45 degree, street elbow	X-274-15
2	Fitting, 90 degree, street elbow	X-211-5
8	Clamp, hose, .69/1.25 in.	X-426-12
2	Tie, cable	X-468-9
4	Coupling, hose	X-582-8
2	Washer, beveled, .44 ID x 1.25 in. OD	X-6011-4
2	Terminal	X-6077-1
2	Hose	X-6367-2
1	Hose, coolant, 26 in.	X-6367-6
1	Hose, coolant, 40 in.	X-6367-7
4	Screw, slotted hex washer head, machine	X-97-13
1	Fitting, 45 degree, street elbow	227521
Block Heater Isolation Valve		
		365308
1	Valve, shutoff	255612
1	Valve	255632
1	Nipple, pipe	X-206-9
1	Nipple, pipe, 1/2 x 2 1/2 in.	X-209-3
Block Heater Isolation, Single Heater		
		GM10322-KA1
2	Valve	GM10328
1	Fitting, 45 degree, street elbow	X-274-15
2	Nipple, pipe, 1/2 x 2 1/2 in.	X-206-2
Block Heater Isolation, Dual Heater		
		GM10323-KA1
4	Valve	GM10328
1	Fitting, 45 degree, street elbow	X-274-15
1	Nipple, pipe, 1/2 x 2 1/2 in.	X-206-2
Block Heater Isolation, Single Heater		
		GM10324-KA1
4	Valve	GM10324
2	Nipple, pipe, 1/2 x 2 1/2 in.	X-206-2
1	Fitting, 45 degree, street elbow	X-206-46
1	Fitting, 45 degree, street elbow	X-274-15

Qty.	Description	Part No.
Block Heater Isolation, Dual Heater		
		GM10325-KA1
4	Valve	GM10325
1	Nipple, pipe	X-206-4
1	Nipple, pipe, 3/4 in. NPT x 3.50 in.	X-206-6
1	Fitting, 45 degree, street elbow	X-274-2
1	Fitting, 45 degree, street elbow	X-274-15
Block Heater Isolation, Single Heater		
		GM10326-KA1
4	Valve	GM10326
1	Nipple, pipe, 3/4 x 2 in.	X-206-2
1	Fitting, elbow	SA-472
Block Heater Isolation, Dual Heater		
		GM10327-KA1
4	Valve	GM10328
1	Pipe, 3/4 in. NPT x 1.38 in.	X-206-9
1	Pipe, 3/4 in. NPT x 2.50 in.	X-206-4
1	Pipe, 3/4 in. NPT x 2 in.	X-206-2
2	Elbow, street, 45 degree x 3/4 in. NPT	X-274-2
Radiator Duct Flange		
		365202
2	Frame, air duct	365206
2	Frame, air duct	365207
8	Rivet, pop, .187 in.	X-781-10
Radiator Duct Flange		
		365203
2	Frame, air duct	365208
2	Frame, air duct	365209
8	Rivet, pop, .187 in.	X-781-10
Radiator Duct Flange		
		365204
2	Frame, air duct	365210
2	Frame, air duct	365211
8	Rivet, pop, .187 in.	X-781-10
Radiator Duct Flange		
		365205
2	Frame, air duct	365212
2	Frame, air duct	365213
8	Rivet, pop, .187 in.	X-781-10
Radiator Duct Flange		
		365296
2	Frame, air duct	365212
2	Frame, air duct	365214
8	Rivet, pop, .187 in.	X-781-10
Radiator Duct Flange		
		GM10790-KA1
2	Frame, air duct	GM10789
2	Frame, air duct	365207
8	Rivet, pop, .187 in.	X-781-10

Air Intake Kits

Qty.	Description	Part No.
Heavy-Duty Air Cleaner 365265		
1	Air cleaner, DDC	A-279713
2	Element, air cleaner	279736
1	Air cleaner, DDC	A-354106
2	Element, air cleaner	279736
6	Clamp, hose, 6.25/6.56 in.	254013
2	Clamp, hose, 5.43/5.74 in.	254344
2	Hose, elbow, 90 degree, 6 x 6 in. ID	272627
2	Cap, rain	272674
2	Tube assembly	274623
4	Bracket, air cleaner	291666
2	Hose, elbow, 90 degree, molded, 6 in. ID	343217
2	Support	365446
2	Plate, head air cleaner	365473
2	Cap, pipe, 1/8 in. NPT	X-268-7
Heavy-Duty Air Cleaner 365266		
1	Air cleaner	A-343258
2	Element, air cleaner	343259
1	Air cleaner	A-365525
2	Element, air cleaner	343259
2	Cap, rain	254010
4	Band, mounting	254012
4	Clamp, hose, 6.25/6.56 in.	254013
2	Hose, elbow, 90 degree, molded, 6 in. ID	273105
2	Tube assembly	274623
2	Clamp, hose, 5.94/6.25 in.	274976
4	Hose, elbow, 90 degree, molded, 6 in. ID	279741
2	Clamp, hose, 5.81/6.12 in.	291504
2	Support	365446
2	Plate, head air cleaner	365473
2	Cap, pipe, 1/8 in. NPT	X-268-7
Heavy-Duty Air Cleaner 365268		
1	Air cleaner, DDC	A-279713
1	Element, air cleaner	279736
1	Air cleaner	A-354106
1	Element, air cleaner	279736
8	Clamp, hose, 6.25/6.56 in.	254013
4	Hose, elbow, 90 degree	272627
2	Cap, rain	272674
2	Tube assembly	274623
4	Bracket, air cleaner	291666
2	Plate, head air cleaner	365445
1	Support	365446
1	Support, head air cleaner	365447
2	Cap, pipe, 1/8 in. NPT	X-268-7
1	Spacer, .375 ID x .75 OD x .5 in.	X-400-104

Qty.	Description	Part No.
Heavy-Duty Air Cleaner 365270		
1	Air cleaner assembly	A-365216
1	Element, air cleaner	365529
1	Air cleaner assembly	A-365524
1	Element, air cleaner	365529
2	Cap, rain	254010
4	Band, mounting	254012
6	Clamp, hose, 6.25/6.56 in.	254013
2	Fitting, elbow, 90 degree	272627
2	Tube assembly	274623
2	Hose, elbow, 90 degree, molded, 6 in. ID	279741
2	Clamp, hose, 5.81/6.12 in.	291504
1	Support	365446
1	Support, head air cleaner	365447
2	Plate, head air cleaner	365472
2	Pipe, 1/8 NPT	X-217-14
1	Spacer, .375 ID x .75 OD x .5 in.	X-400-104
2	Plug, pipe, 1/8	X-75-4
Heavy-Duty Air Cleaner 365272		
1	Air cleaner	A-279714
1	Element, air cleaner	279738
1	Air cleaner	A-361366
1	Element, air cleaner	279738
2	Hose, elbow, 90 degree, molded, 7 in. ID	272663
2	Clamp, hose, 6.56/6.87 in.	272960
2	Tube assembly	274664
4	Bracket, air cleaner	279715
2	Hose, elbow, 90 degree, molded, 7 in. ID	279716
2	Clamp, hose, 8.63/8.94 in.	279717
2	Cap, rain	279722
4	Clamp, hose, 7.38/7.69 in.	280998
1	Support	365446
1	Support, head air cleaner	365447
2	Plate	365448
2	Cap, pipe, 1/8 in. NPT	X-268-7
1	Spacer, .375 ID x .75 OD x .5 in.	X-400-104

Air Intake Kits

Qty.	Description	Part No.
Heavy-Duty Air Cleaner 361770		
1	Air cleaner assembly	A-361741
1	Element, air cleaner	361693
1	Air cleaner assembly	A-361742
1	Element, air cleaner	361693
2	Cap, rain	254010
4	Band, mounting	254012
6	Clamp, hose, 4.31/4.62 in.	274545
2	Clamp, hose, 5.81/6.12 in.	291504
1	Bracket, air cleaner, RS	361691
1	Bracket, air cleaner, LS	361692
2	Hose, air intake	361694
2	Tube assembly	361696
2	Hose, air intake, HDAC	361738
2	Bracket, AC support	365463
1	Bracket, HDAC, RS	365464
1	Bracket, HDAC, LS	365465
2	Coupling, half	X-511-12
2	Tube, steel	X-522-87
2	Plug, pipe, 1/8 in.	X-75-1

Qty.	Description	Part No.
Heavy-Duty Air Cleaner 361771		
1	Air cleaner assembly	A-361741
1	Element, air cleaner	361693
1	Air cleaner assembly	A-361742
1	Element, air cleaner	361693
2	Cap, rain	254010
4	Band, mounting	254012
4	Clamp, hose, 4.31/4.62 in.	274545
2	Clamp, hose, 5.81/6.12 in.	291504
2	Clamp, hose, 3.06/3.38 in.	343175
1	Bracket, air cleaner, RS	361691
1	Bracket, air cleaner, LS	361692
2	Hose, air intake	361695
2	Tube assembly	361696
2	Hose, air intake HDAC	361738
2	Bracket, AC support	365463
1	Bracket, HDAC, RH	365464
1	Bracket, HDAC, LH	365465
2	Plug, pipe, 1/8 in.	X-75-1

Appendix A Abbreviations

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

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

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

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.

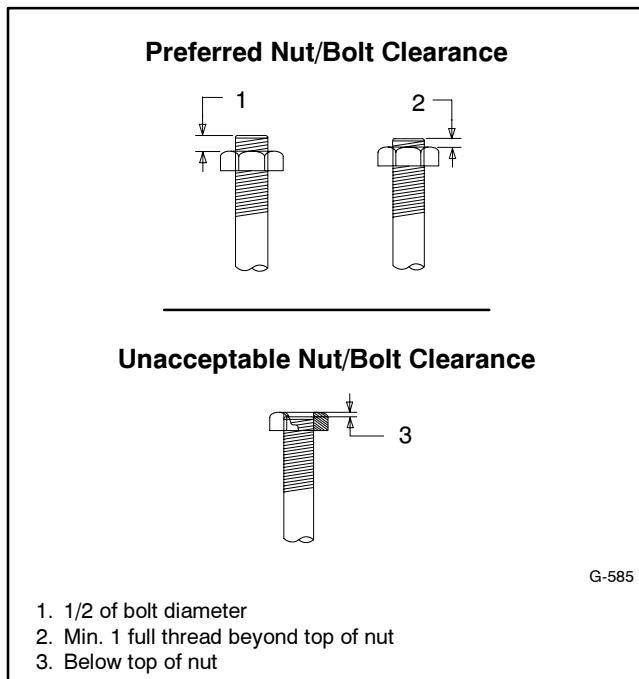


Figure 1 Acceptable Bolt Lengths

1. 1/2 of bolt diameter
2. Min. 1 full thread beyond top of nut
3. Below top of nut

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.

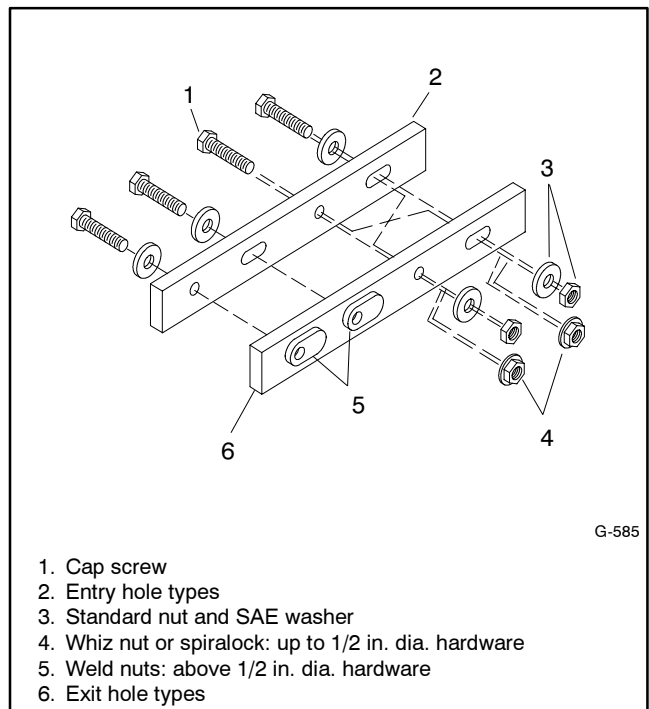


Figure 2 Acceptable Hardware Combinations

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

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	

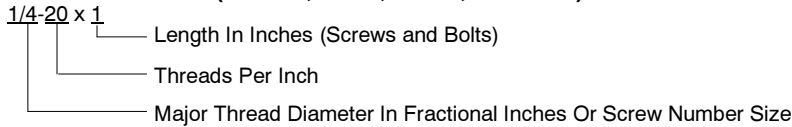
Hardness Grades	
American Standard	
Grade 2	
Grade 5	
Grade 8	
Grade 8/9 (Hex Socket Head)	
Metric	
Number stamped on hardware; 5.8 shown	

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

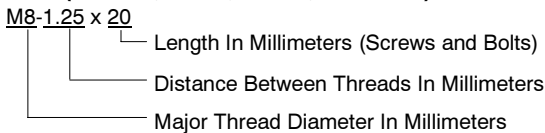
Phillips® screw is a registered trademark of Phillips Screw Company.

Sample Dimensions

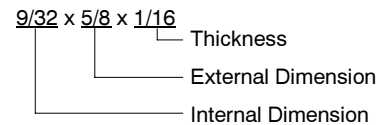
American Standard (Screws, Bolts, Studs, and Nuts)



Metric (Screws, Bolts, Studs, and Nuts)



Plain Washers



Lock Washers



Appendix E Common Hardware List

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

American Standard

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

Washers

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

Metric

Hex head bolts are hardness grade 8.8 unless noted.

Part No.	Dimensions	Part No.	Dimensions	Part No.	Dimensions	Type	
Hex Head Bolts (partial thread)			Hex Head Bolts (full thread)			Hex Nuts	
M931-05055-60	M5-0.80 x 55	M933-04006-60	M4-0.70 x 6	M934-03-50	M3-0.50	Standard	
M931-06040-60	M6-1.00 x 40	M933-05035-60	M5-0.80 x 35	M934-035-50	M3.5-0.50	Standard	
M931-06055-60	M6-1.00 x 55	M933-05050-60	M5-0.80 x 50	M934-04-50	M4-0.70	Standard	
M931-06060-60	M6-1.00 x 60	M933-06010-60	M6-1.00 x 10	M934-05-50	M5-0.80	Standard	
M931-06070-60	M6-1.00 x 70	M933-06014-60	M6-1.00 x 14	M982-05-80	M5-0.80	Elastic Stop	
M931-06070-SS	M6-1.00 x 70	M933-06016-60	M6-1.00 x 16	M934-06-60	M6-1.00	Standard	
M931-06075-60	M6-1.00 x 75	M933-06020-60	M6-1.00 x 20	M934-06-64	M6-1.00	Std. (green)	
M931-06090-60	M6-1.00 x 90	M933-06025-60	M6-1.00 x 25	M6923-06-80	M6-1.00	Spirallock	
M931-06150-60	M6-1.00 x 150	M933-06040-60	M6-1.00 x 40	M982-06-80	M6-1.00	Elastic Stop	
M931-08035-60	M8-1.25 x 35	M933-06050-60	M6-1.00 x 50	M934-08-60	M8-1.25	Standard	
M931-08040-60	M8-1.25 x 40	M933-08012-60	M8-1.25 x 12	M6923-08-80	M8-1.25	Spirallock	
M931-08040-82	M8-1.25 x 40*	M933-08016-60	M8-1.25 x 16	M982-08-80	M8-1.25	Elastic Stop	
M931-08045-60	M8-1.25 x 45	M933-08020-60	M8-1.25 x 20	M934-10-60	M10-1.50	Standard	
M931-08050-60	M8-1.25 x 50	M933-08025-60	M8-1.25 x 25	M934-10-60F	M10-1.25	Standard	
M931-08055-60	M8-1.25 x 55	M933-08030-60	M8-1.25 x 30	M6923-10-80	M10-1.50	Spirallock	
M931-08055-82	M8-1.25 x 55*	M933-08030-82	M8-1.25 x 30*	M6923-10-62	M10-1.50	Spirallock†	
M931-08060-60	M8-1.25 x 60	M933-10012-60	M10-1.50 x 12	M982-10-80	M10-1.50	Elastic Stop	
M931-08070-60	M8-1.25 x 70	M961-10020-60	M10-1.25 x 20	M934-12-60	M12-1.75	Standard	
M931-08070-82	M8-1.25 x 70*	M933-10020-60	M10-1.50 x 20	M934-12-60F	M12-1.25	Standard	
M931-08075-60	M8-1.25 x 75	M933-10025-60	M10-1.50 x 25	M6923-12-80	M12-1.75	Spirallock	
M931-08080-60	M8-1.25 x 80	M961-10030-60	M10-1.25 x 30	M982-12-80	M12-1.75	Elastic Stop	
M931-08090-60	M8-1.25 x 90	M933-10030-60	M10-1.50 x 30	M982-14-80	M14-2.00	Elastic Stop	
M931-08095-60	M8-1.25 x 95	M933-10030-82	M10-1.50 x 30*	M6923-16-80	M16-2.00	Spirallock	
M931-08100-60	M8-1.25 x 100	M961-10035-60	M10-1.25 x 35	M982-16-80	M16-2.00	Elastic Stop	
M931-08120-60	M8-1.25 x 120	M933-10035-60	M10-1.50 x 35	M934-18-80	M18-2.5	Standard	
M931-08130-60	M8-1.25 x 130	M933-12016-60	M12-1.75 x 16	M982-18-80	M18-2.50	Elastic Stop	
M931-08140-60	M8-1.25 x 140	M933-12020-60	M12-1.75 x 20	M934-20-80	M20-2.50	Standard	
M931-10040-82	M10-1.25 x 40*	M933-12025-60	M12-1.75 x 25	M982-20-80	M20-2.50	Elastic Stop	
M931-10040-60	M10-1.50 x 40	M933-12025-82	M12-1.75 x 25*	M934-22-60	M22-2.50	Standard	
M931-10045-60	M10-1.50 x 45	M961-12030-60	M12-1.25 x 30	M934-24-80	M24-3.00	Standard	
M931-10050-60	M10-1.50 x 50	M933-12030-60	M12-1.75 x 30	M982-24-80	M24-3.00	Elastic Stop	
M931-10055-60	M10-1.50 x 55	M933-12035-60	M12-1.75 x 35	M934-30-80	M30-3.50	Standard	
M931-10060-60	M10-1.50 x 60	M961-12040-82	M12-1.25 x 40*	Washers			
M931-10065-60	M10-1.50 x 65	M933-12040-60	M12-1.75 x 40	Part No.	ID	OD	Bolt/ Thick. Screw
M931-10070-60	M10-1.50 x 70	M933-12040-82	M12-1.75 x 40*	M125A-03-80	3.2	7.0	0.5 M3
M931-10080-60	M10-1.50 x 80	M961-14025-60	M14-1.50 x 25	M125A-04-80	4.3	9.0	0.8 M4
M931-10090-60	M10-1.50 x 90	M933-14025-60	M14-2.00 x 25	M125A-05-80	5.3	10.0	1.0 M5
M931-10090-82	M10-1.50 x 90*	M961-16025-60	M16-1.50 x 25	M125A-06-80	6.4	12.0	1.6 M6
M931-10100-60	M10-1.50 x 100	M933-16025-60	M16-2.00 x 25	M125A-08-80	8.4	16.0	1.6 M8
M931-10110-60	M10-1.50 x 110	M961-16030-82	M16-1.50 x 30*	M125A-10-80	10.5	20.0	2.0 M10
M931-10120-60	M10-1.50 x 120	M933-16030-82	M16-2.00 x 30*	M125A-12-80	13.0	24.0	2.5 M12
M931-10130-60	M10-1.50 x 130	M933-16035-60	M16-2.00 x 35	M125A-14-80	15.0	28.0	2.5 M14
M931-10140-60	M10-1.50 x 140	M961-16040-60	M16-1.50 x 40	M125A-16-80	17.0	30.0	3.0 M16
M931-10180-60	M10-1.50 x 180	M933-16040-60	M16-2.00 x 40	M125A-18-80	19.0	34.0	3.0 M18
M931-12045-60	M12-1.75 x 45	M933-16050-60	M16-2.00 x 50	M125A-20-80	21.0	37.0	3.0 M20
M960-12050-60	M12-1.25 x 50	M933-16050-82	M16-2.00 x 50*	M125A-24-80	25.0	44.0	4.0 M24
M960-12050-82	M12-1.25 x 50*	M933-16060-60	M16-2.00 x 60				
M931-12050-60	M12-1.75 x 50	M933-18035-60	M18-2.50 x 35				
M931-12055-60	M12-1.75 x 55	M933-18050-60	M18-2.50 x 50				
M931-12060-60	M12-1.75 x 60	M933-18060-60	M18-2.50 x 60				
M931-12065-60	M12-1.75 x 65	M933-20050-60	M20-2.50 x 50				
M931-12075-60	M12-1.75 x 75	M933-20055-60	M20-2.50 x 55				
M931-12080-60	M12-1.75 x 80	Pan Head Machine Screws					
M931-12090-60	M12-1.75 x 90	M7985A-03010-20	M3-0.50 x 10	* This metric hex bolt's hardness is grade 10.9.			
M931-12100-60	M12-1.75 x 100	M7985A-03012-20	M3-0.50 x 12	† This metric hex nut's hardness is grade 8.			
M931-12110-60	M12-1.75 x 110	M7985A-04010-20	M4-0.70 x 10				
M960-16090-60	M16-1.50 x 90	M7985A-04020-20	M4-0.70 x 20				
M931-16090-60	M16-2.00 x 90	M7985A-04100-20	M4-0.70 x 100				
M931-16100-60	M16-2.00 x 100	M7985A-05010-20	M5-0.80 x 10				
M931-20065-60	M20-2.50 x 65	M7985A-05012-20	M5-0.80 x 12				
M931-20120-60	M20-2.50 x 120	M7985A-05016-20	M5-0.80 x 16				
M931-20160-60	M20-2.50 x 160	M7985A-05100-20	M5-0.80 x 100				
M931-22090-60	M22-2.50 x 90	M7985A-06100-20	M6-1.00 x 100				
M931-22120-60	M22-2.50 x 120	Flat Head Machine Screws					
M931-22160-60	M22-2.50 x 160	M965A-04012-SS	M4-0.70 x 12				
M931-24090-60	M24-3.00 x 90	M965A-05012-SS	M5-0.80 x 12				
M931-24120-60	M24-3.00 x 120	M965A-05016-20	M5-0.80 x 16				
M931-24160-60	M24-3.00 x 160						

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