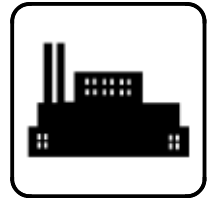


Service Parts

Industrial Generator Sets



Models:

500-1000REZK

KOHLER®
Power Systems _____



TP-7024 1/16

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Introduction

This manual lists service replacement parts for generator set models as listed on the front cover.

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.

Numbering System Significance

This manual uses the following numbering systems:

Specification Number. The product identification number located on the generator set nameplate. Specification numbers break down into groups.

Group Number. A unique number representing a parts group needed to assemble a generator set function. For example, Group 101 is the Air Intake group.

Variation or Module Number. A group might have several variations. Each variation performs the same function with different parts lists. For example, a 50 Hz generator alternator and a 60 Hz generator alternator both perform the same function; however, with different parts. Each difference requires a group variation or module number.

Part Number. The part number identifies an individual assembly, subassembly, component, or accessory kit.

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.

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.

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.

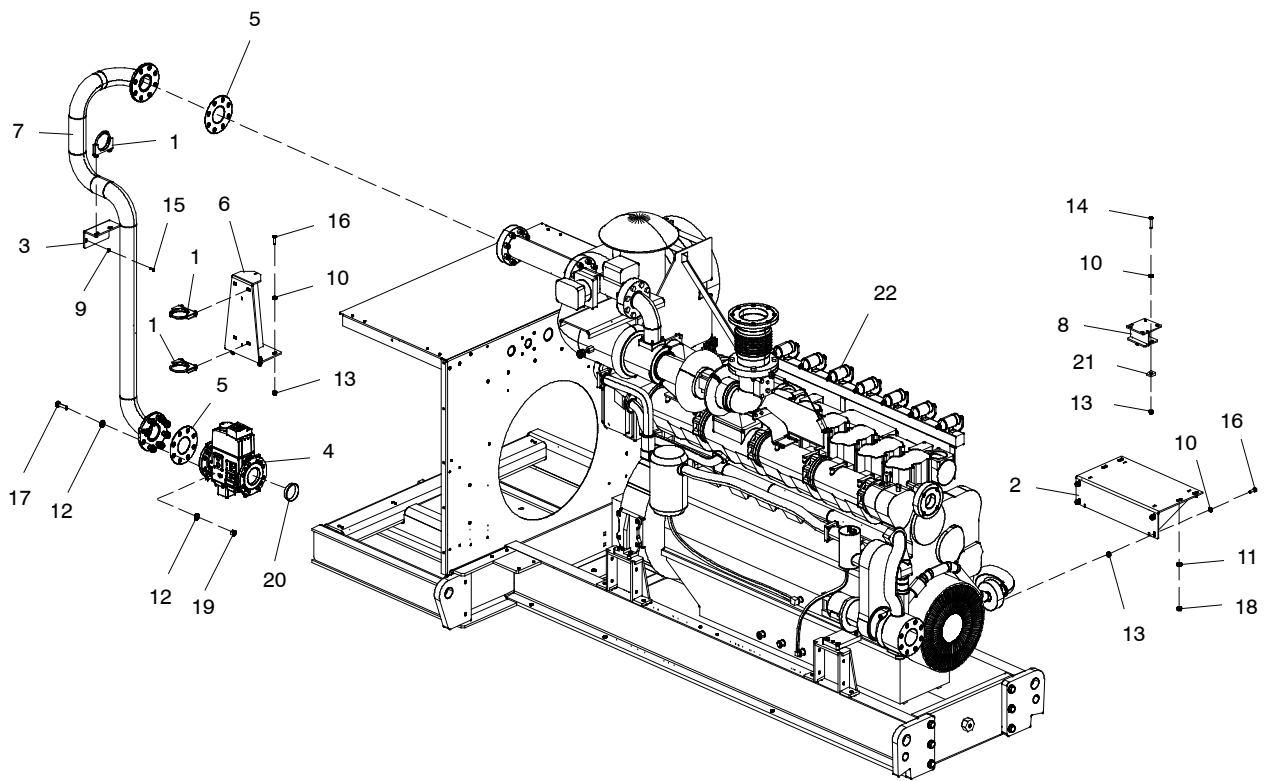
Specification Number Index

Group Title	<i>Air Intake</i>	<i>Fuel System</i>	<i>Cooling System</i>	<i>Engine</i>	<i>Nameplates and Decals</i>	<i>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	109	201	301	701
Spec No.	Variation Number								
500REZK									
GM97513-GA1	-	-	-	1	1	1	*	*	315
GM97513-GA2	-	-	-	2	1	1	*	*	315
750REZK									
GM97128-GA1	-	-	-	3	2	2	*	*	316
GM97128-GA2	-	-	-	4	2	2	*	*	316
1000REZK									
GM94910-GA1	-	1	-	5	3	3	*	*	317
GM94910-GA2	-	1	-	6	3	3	*	*	317

* 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 Group 701: Literature for list of controller parts manuals.

Engine

(500REZK) GM95783-



GM95783-A

Engine

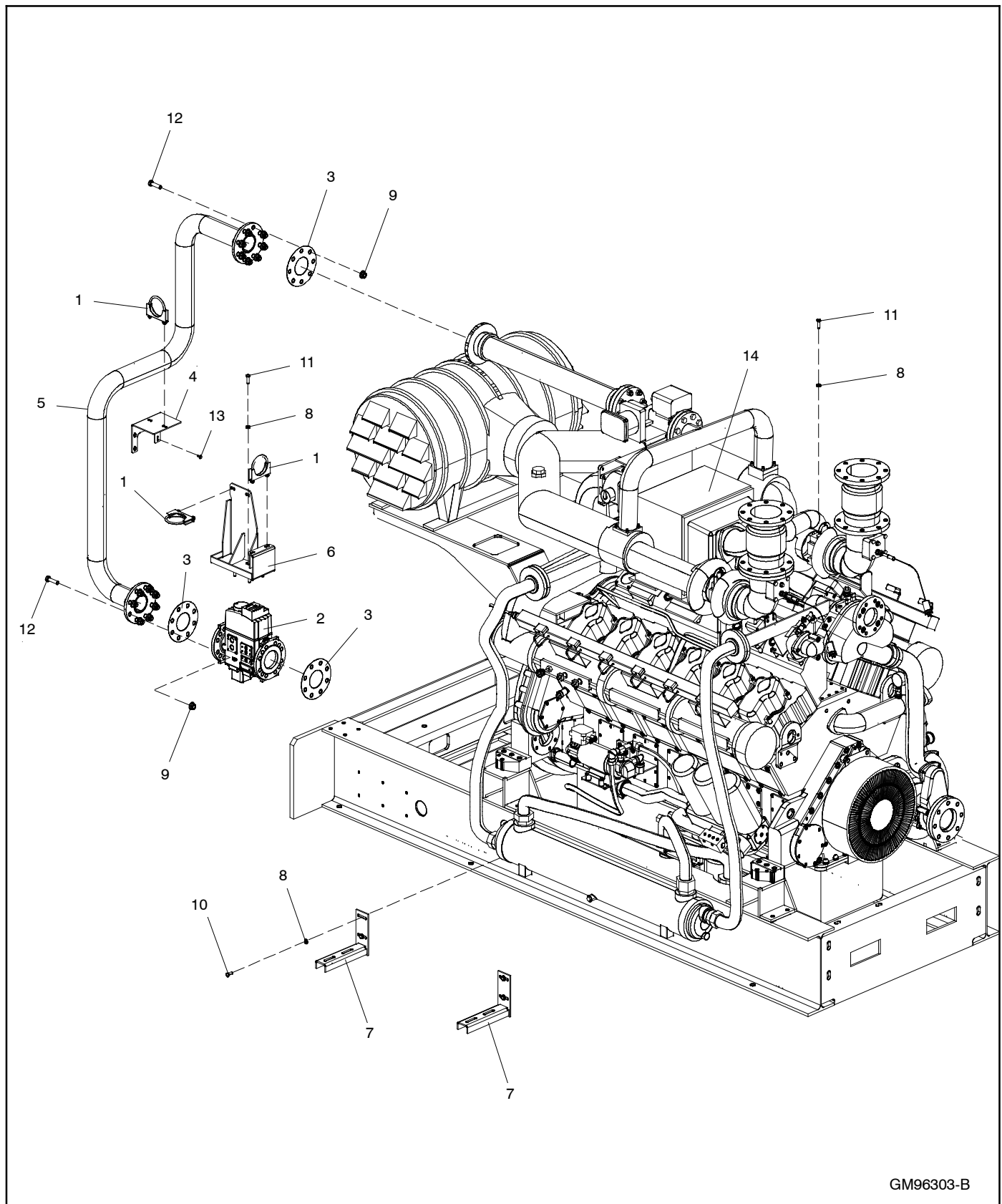
Item	Part Number	Description	Quantity
1	286286	Clamp, muffler, 3.62 in.	3
2	GM95159	Bracket, 24L Oil Cooler	1
3	GM95344	Bracket, Fuel Inlet Support	1
4	GM95375	Valve, Gas ASSV DN80	1
5	GM95416	Gasket, DN80	2
6	GM95784	Bracket, Valve Support	1
7	GM95785	PIPE, FUEL INLET	1
8	GM98778	Bracket, Prelube Pump	1
9	M125A-06-80	Washer, Plain	3
10	M125A-10-80	Washer, Plain 10.5 ID x 20.0 OD	10
11	M125A-12-80	Washer, Plain	4
12	M125A-16-80	Washer, Plain	16
13	M6923-10-80	Nut, Hex 10mm	10
14	M931-10050-60	Screw, hex cap	2
15	M933-06025-60	Screw, Hex Cap	3
16	M933-10035-60	Screw, Hex Cap	8
17	M933-16060-60	Screw, Hex Cap	8
18	M934-12-60	Nut, Hex 12mm	4
19	M934-16-60	Nut, Hex, 16mm, Steel	8
20	X-519-17	Plug, cap	1
21	X-6011-4	Washer, beveled, .44 ID x 1.25 in. OD	2
22	See chart	Engine Assy, DR 24L	1

Use this table to identify part number of item 22.

Variation	Module	Part Number
		Item 22
1	GM95783-GR1	GM94053
2	GM95783-GR2	GM94054

Engine, continued

(750REZK) GM96303-



GM96303-B

Engine, continued

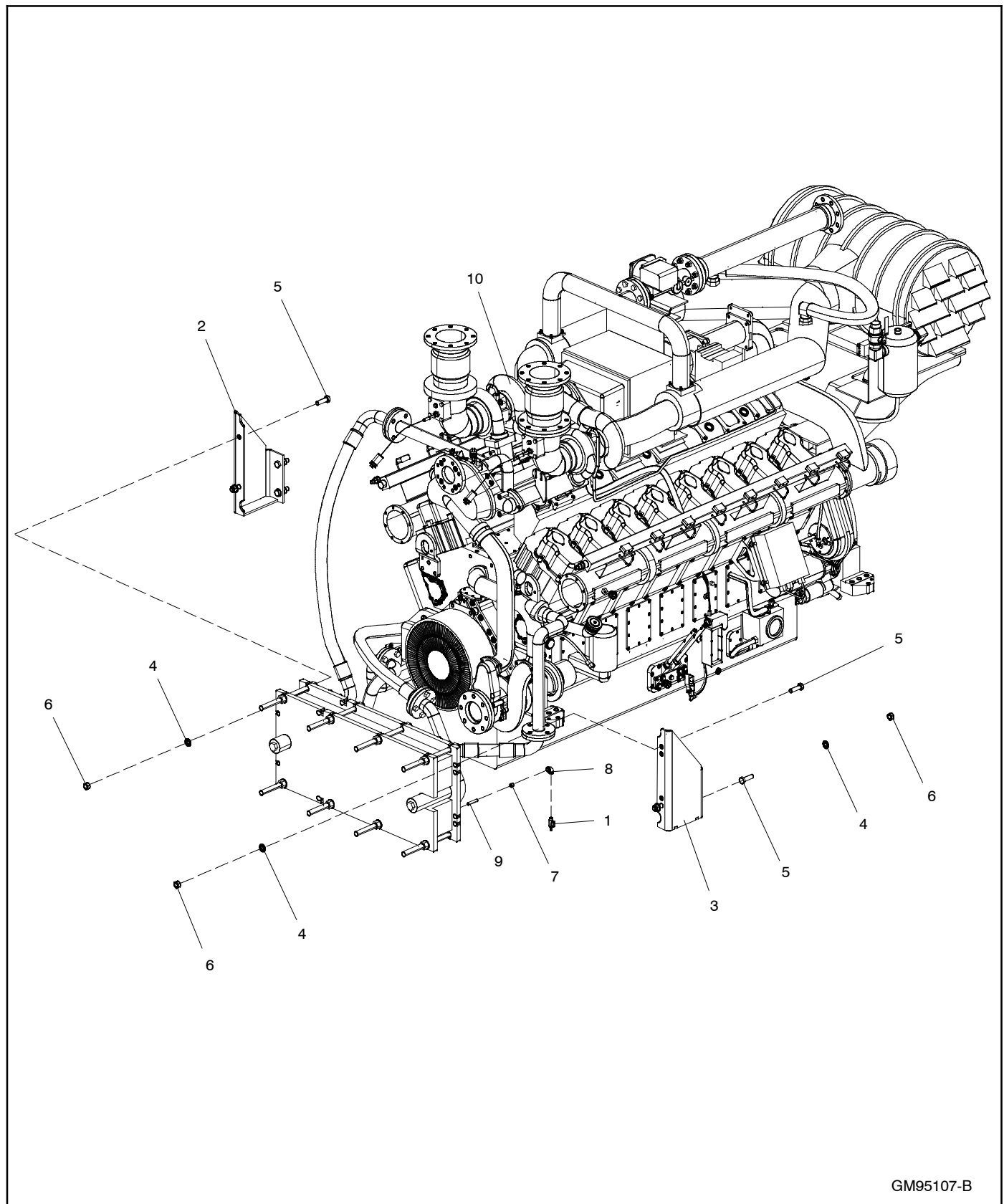
Item	Part Number	Description	Quantity
1	286286	Clamp, muffler, 3.62 in.	3
2	GM95375	Valve, Gas ASSV DN80	1
3	GM95416	Gasket, DN80	3
4	GM95426	Bracket, Fuel Inlet Support	1
5	GM96346	Pipe, Fuel Inlet	1
6	GM96347	Bracket, Valve Support	1
7	GM96424	Seating, Oil Cooler	2
8	M125A-10-80	Washer, Plain 10.5 ID x 20.0 OD	10
9	M6923-16-80	Nut, hex	16
10	M933-10025-60	Screw, hex cap, fully thrd M10 x 25mm	4
11	M933-10035-60	Screw, Hex Cap	6
12	M933-16060-60	Screw, Hex Cap	16
13	X-794-1	Screw, hex wshr hd, drill 1/4-14 x 5/8	4
14	See Chart	Engine Assy, DR 36L, Standby	1

Use this table to identify part number of item 14

Variation	Module	Part Number
		Item 22
3	GM96303-GR1	GM94056
4	GM96303-GR2	GM94057

Engine, continued

(1000REZK) GM95107-



Engine, continued

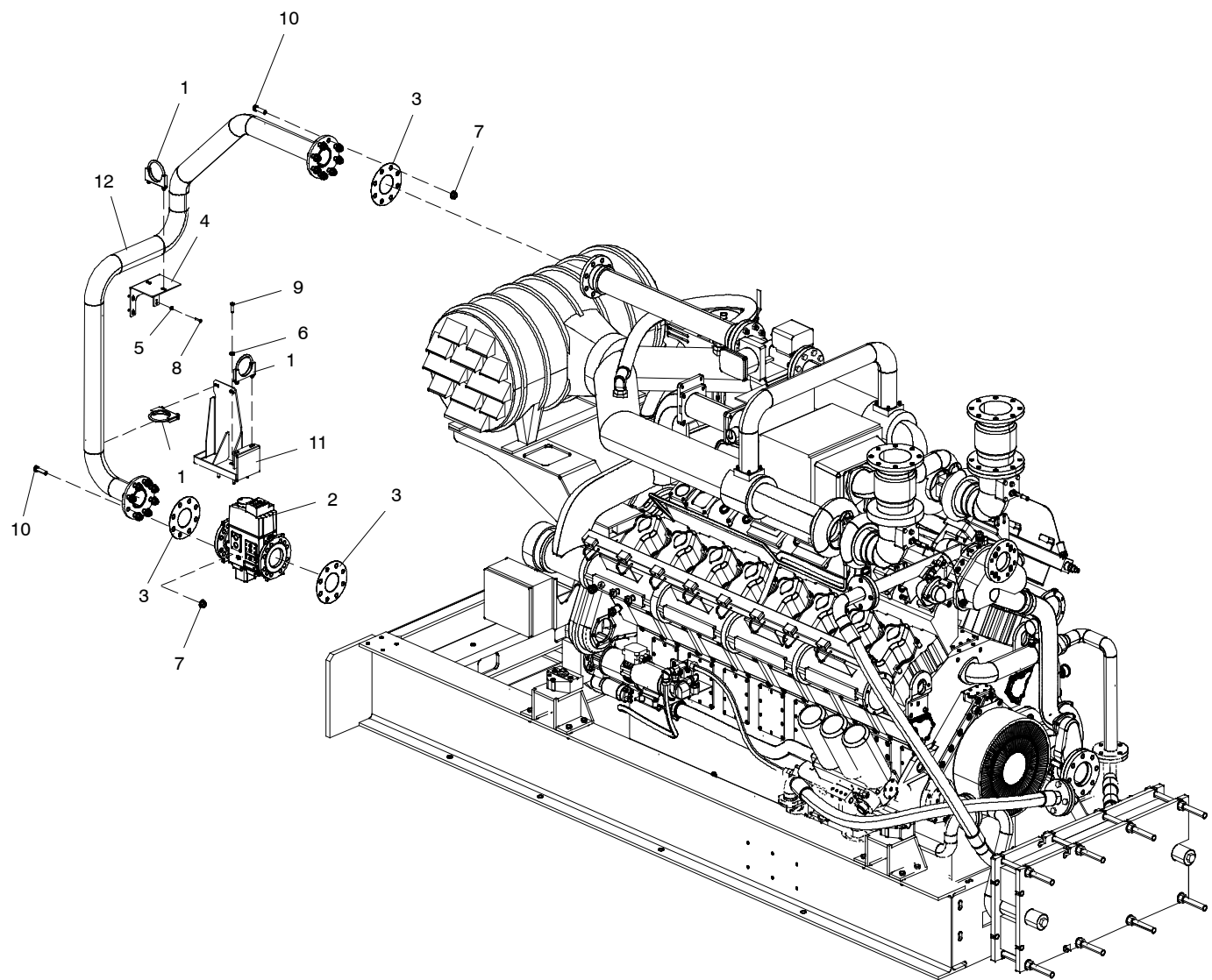
Item	Part Number	Description	Quantity
1	359653	Valve, oil drain (3/8-18 npt)	1
2	GM95411	Support, Oil Cooler (RH)	1
3	GM95459	Support, Oil Cooler (LH)	1
4	M125A-20-80	Washer, Plain	8
5	M931-20065-60	Screw, Hex Cap	8
6	M934-20-80	Nut, hex	8
7	X-202-30	Bushing, reducing (1/4 x 3/8"npt)	1
8	X-215-25	Elbow, pipe (90 deg x 3/8"npt)	1
9	X-220-14	Pipe (1/4"npt x 2.50")	1
10	See Chart	Engine Assy, DR 48L, Standby	1

Use this table to identify part number of item 10

Variation	Module	Part Number
		Item 10
5	GM95107-GR1	GM94059
6	GM95107-GR2	GM94060

Fuel System

(1000REZK) GM99001-MA1



GM99001-

Fuel System

Item	Part Number	Description	Quantity
1	286286	Clamp, muffler, 3.62 in.	3
2	GM95375	Valve, Gas ASSV DN80	1
3	GM95416	Gasket, DN80	3
4	GM95426	Bracket, Fuel Inlet Support	1
5	M125A-06-80	Washer, Plain	4
6	M125A-10-80	Washer, Plain 10.5 ID x 20.0 OD	4
7	M6923-16-80	Nut, hex	16
8	M933-06030-60	Screw, Hex Cap	4
9	M933-10035-60	Screw, Hex Cap	4
10	M933-16060-60	Screw, Hex Cap	16
11	GM96347	Bracket, Valve Support	1
12	GM96425	Pipe, Fuel Inlet	1

Nameplate and Decals

(500REZK) GM99176-GR1

Item	Part Number	Description	Quantity
1	238402	Decal, caution positive term.only	1
2	273780	Decal, warning explosion	2
3	364116	Decal, caution welding disconnect	2
4	GM15300	Decal, Exhaust Piping	3
5	GM79782-1	Decals, Marathon J-Box 350-2000 Kohler	1
6	GM99169	Decal, Fuel Type	1
7	224233	Decal, 1-800 number	1
8	255882	Decal, caution stdby svc connect	2
9	257438	Decal, danger moving rotor	2
10	258815	Decal, warning voltage backfeed	2
11	294520	Decal, danger, high voltage	2
12	345211	Decal, ground	1
13	GM39683	Tag, Hang	1
14	GM49352	Tag, Hang	1
15	GM60531	Decal, Control Height	1
16	GM62217	Nameplate, 5" Tall, Blank	2
17	GM79042	Decal, Phasing	2
18	GM79043	Decal, Phasing C-B-A	2
19	GM79782	Dwg, Assy Marathon J-Box Decals	1
20	X-6246-22	Decal, Kohler Power Systems	2
21	X-6246-23	Decal, Kohler Power Com	1
22	X-6347-CST	Decal, rating	2

Nameplate and Decals

(750REZK) GM98946-GR1

Item	Part Number	Description	Quantity
1	238402	Decal, caution positive term.only	1
2	273780	Decal, warning explosion	2
3	364116	Decal, caution welding disconnect	2
4	GM15300	Decal, Exhaust Piping	3
5	GM79782-1	Decals, Marathon J-Box 350-2000 Kohler	1
6	GM99169	Decal, Fuel Type	1
7	224233	Decal, 1-800 number	1
8	255882	Decal, caution stdby svc connect	2
9	257438	Decal, danger moving rotor	2
10	258815	Decal, warning voltage backfeed	2
11	294520	Decal, danger, high voltage	2
12	345211	Decal, ground	1
13	GM39683	Tag, Hang	1
14	GM49352	Tag, Hang	1
15	GM60531	Decal, Control Height	1
16	GM62217	Nameplate, 5" Tall, Blank	2
17	GM79042	Decal, Phasing	2
18	GM79043	Decal, Phasing C-B-A	2
19	GM79782	Dwg, Assy Marathon J-Box Decals	1
20	X-6246-22	Decal, Kohler Power Systems	2
21	X-6246-23	Decal, Kohler Power Com	1
22	X-6347-CST	Decal, rating	2

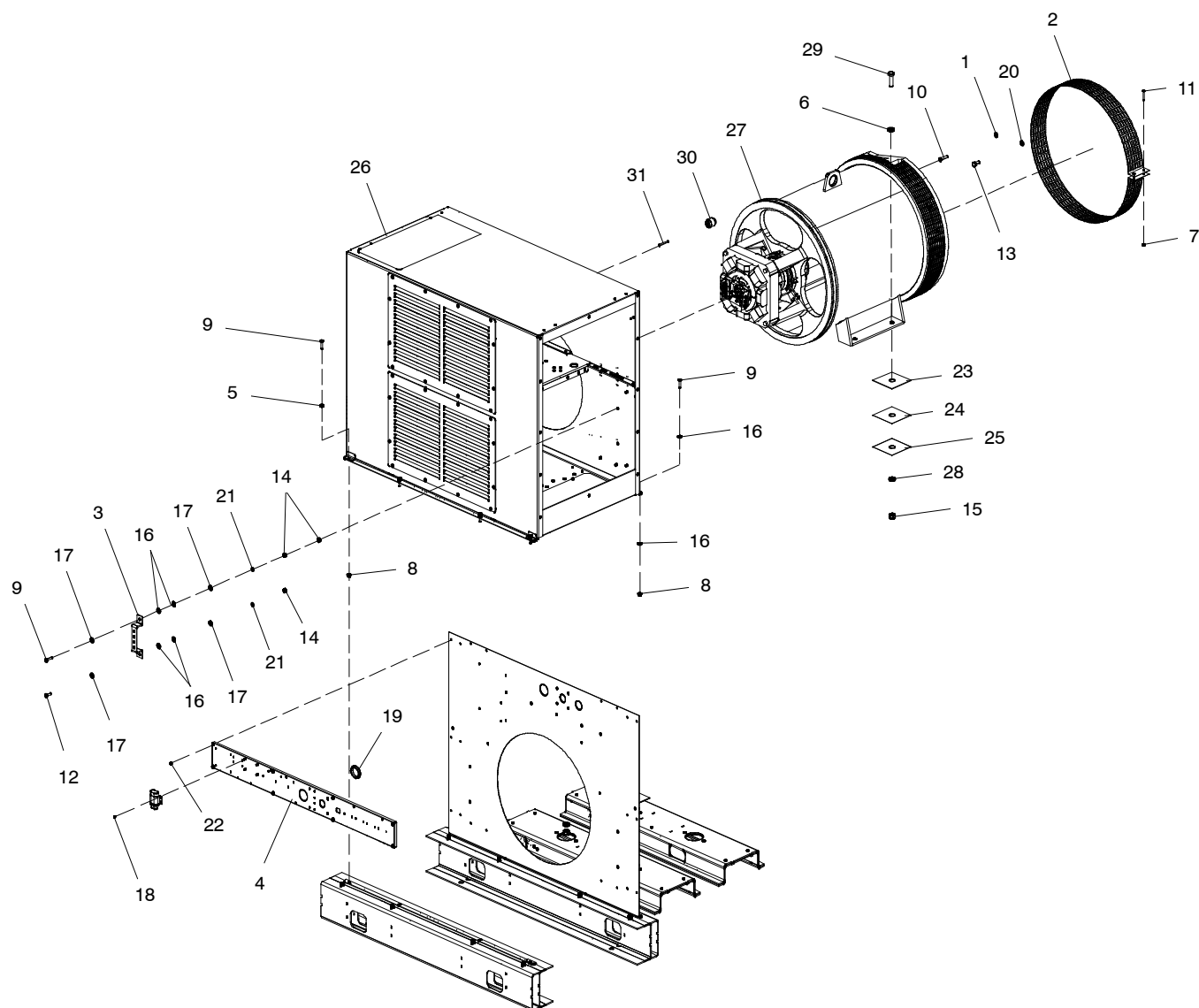
Nameplate and Decals

(1000REZK) GM96798-GR1

Item	Part Number	Description	Quantity
1	238402	Decal, caution positive term.only	2
2	273780	Decal, warning explosion	2
3	364116	Decal, caution welding disconnect	2
4	GM15300	Decal, Exhaust Piping	3
5	GM79782-1	Decals, Marathon J-Box 350-2000 Kohler	1
6	GM99169	Decal, Fuel Type	1
7	224233	Decal, 1-800 number	1
8	255882	Decal, caution stdby svc connect	2
9	257438	Decal, danger moving rotor	2
10	258815	Decal, warning voltage backfeed	2
11	294520	Decal, danger, high voltage	2
12	345211	Decal, ground	1
13	GM39683	Tag, Hang	1
14	GM49352	Tag, Hang	1
15	GM60531	Decal, Control Height	1
16	GM62217	Nameplate, 5" Tall, Blank	2
17	GM79042	Decal, Phasing	2
18	GM79043	Decal, Phasing C-B-A	2
19	GM79782	Dwg, Assy Marathon J-Box Decals	1
20	X-6246-22	Decal, Kohler Power Systems	2
21	X-6246-23	Decal, Kohler Power Com	1
22	X-6347-CST	Decal, rating	2

Alternator and Mounting

(500-1000REZK) GM95782-



GM95872-C

Alternator and Mounting

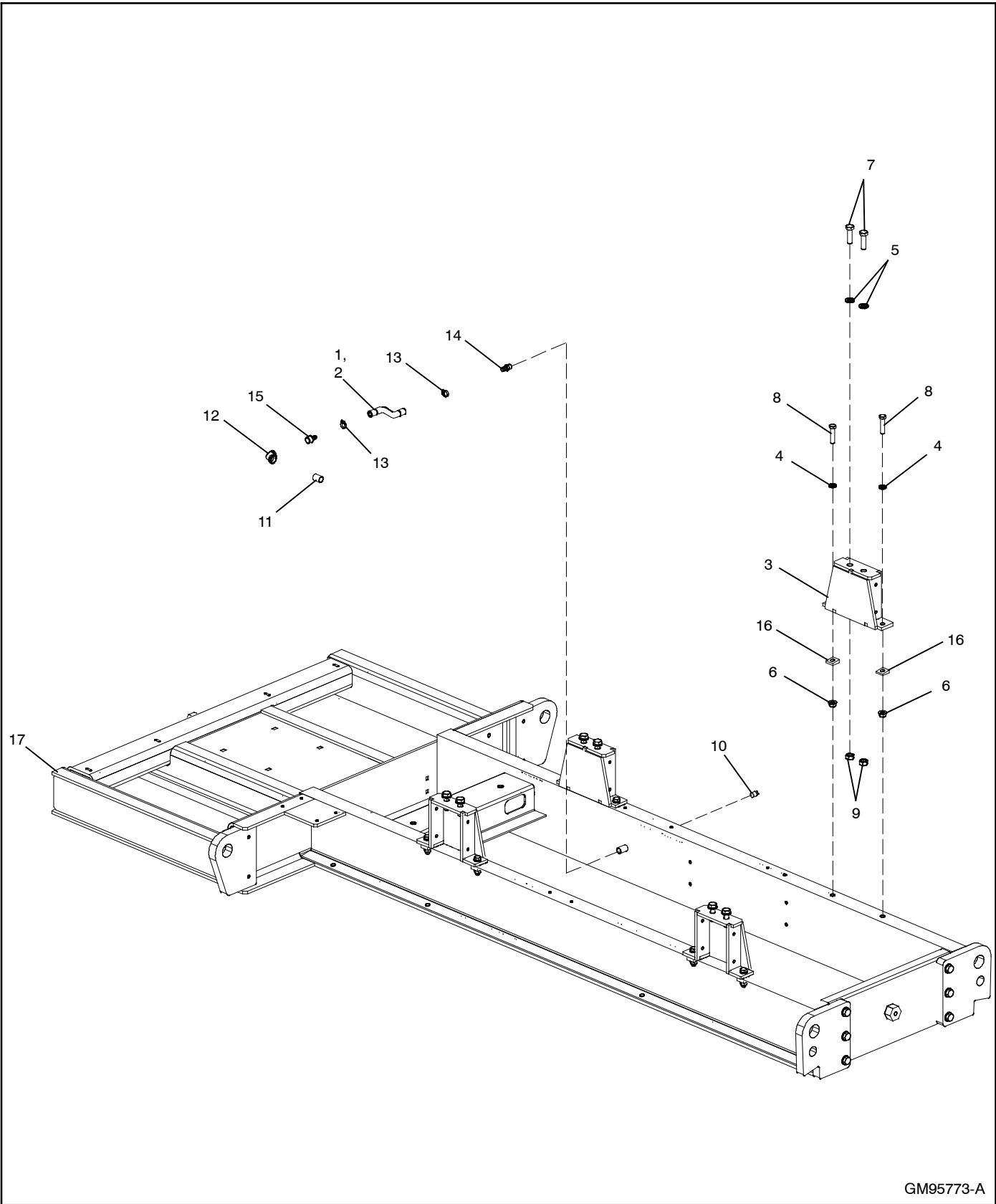
Item	Part Number	Description	Quantity
1	290945	Washer, hardened,.531 IDx1.06 in.OD	16
2	328903	Screen	1
3	361271	Bus, Ground	1
4	GM75910	Panel, Component Mtg.	1
5	M125A-10-80	Washer, Plain 10.5 ID x 20.0 OD	7
6	M125A-20-80	Washer, Plain	4
7	M6923-06-80	Nut, Hex 6mm	2
8	M6923-10-80	Nut, Hex 10mm	8
9	M931-10040-60	Screw, Hex Cap	9
10	M931-12050-82	Screw, Hex Cap	16
11	M933-06050-60	Screw, hex cap, M6x50mm, js500 full thrd	2
12	M933-10030-60	Screw, Hex Cap	1
13	M933-16030-82	Screw, Hex Cap	6
14	M934-10-60	Nut, Hex 10mm	3
15	M982-20-80	Nut, hex elastic stop	4
16	X-22-15	Washer,lock,.456 IDx1.058 in.OD	6
17	X-25-118	Washer, Plain .406 ID x 1 in. OD	4
18	X-67-59	Screw, hex washer, thread-forming	4
19	X-284-25	Grommet, round	1
20	X-801-5	Washer,hardened,.656 ID x 1.06 in.OD	6
21	X-6086-6	Washer, Spring, .39 ID x .81 in OD	2
22	X-6210-2	Nut, flange spiralock, 1/4-20	8
23	290743	Shim	2
24	291190	Shim	2
25	291191	Shim	2
26	GM75930-2	Junction Box Assembly, 5M	1
27	See Chart	Alternator Assy	1
28	M125A-20-80	Washer, Plain	2
29	M931-20065-60	Screw, Hex Cap	2
30	X-6128-29	Standoff insulator, 3/8-16 x 2 in.	3
31	X-6274-7	Stud	3

Use this table to identify part number of item 27

Module	Model Number	Part Number Item 27
GM95872-MA4	500REZK	GM77507-14
GM95872-MA5	500REZK	GM77507-15
GM95872-MA6	750REZK	GM94327-7
GM95872-MA2	750REZK	GM94327-8
GM95872-MA7	750REZK	GM94327-10
GM95872-MA1	1000REZK	GM94327-9

Skid and Mounting

(500REZK) GM95773-MA1

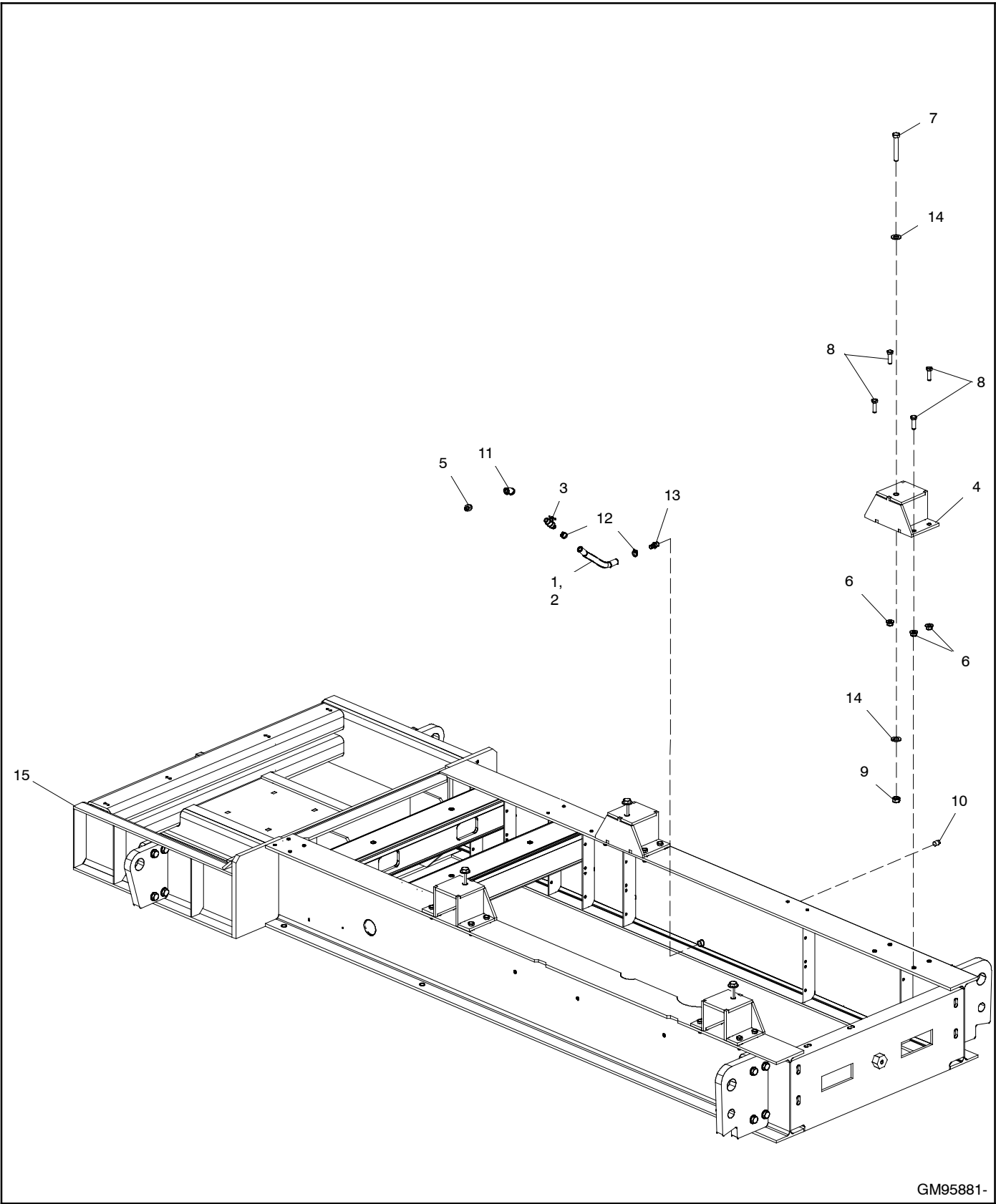


Skid and Mounting

Item	Part Number	Description	Quantity
1	25465 00062	Hose, Fuel & Oil (.625" id)	1
2	X-577-8	Hose, rubber, straight, .62 in. ID	1
3	GM95772	Mount, Engine	4
4	M125A-16-80	Washer, Plain	8
5	M125A-20-80	Washer, Plain	16
6	M6923-16-80	Nut, hex	8
7	M931-20065-60	Screw, Hex Cap	8
8	M933-16070-60	Screw, Hex Cap M16	8
9	M934-20-80	Nut, hex	8
10	X-75-28	Plug, pipe (1/2" nptf)	1
11	X-206-9	Pipe (3/4" npt x 1.38")	1
12	X-215-2	Elbow, pipe (90 deg x 3/4" npt)	1
13	X-426-10	Clamp, hose, .5/1 in.	2
14	X-582-1	Connector, Hose 5/8" x 1/2" MIP Brass	1
15	X-582-10	Connector, hose + Vibra Seal	1
16	X-6011-3	Washer, beveled, .68 ID x 1.5 in. OD	8
17	GM95769	Skid, 5M4028, 24L	1

Skid and Mounting, continued

(750REZK) GM95881-MA1

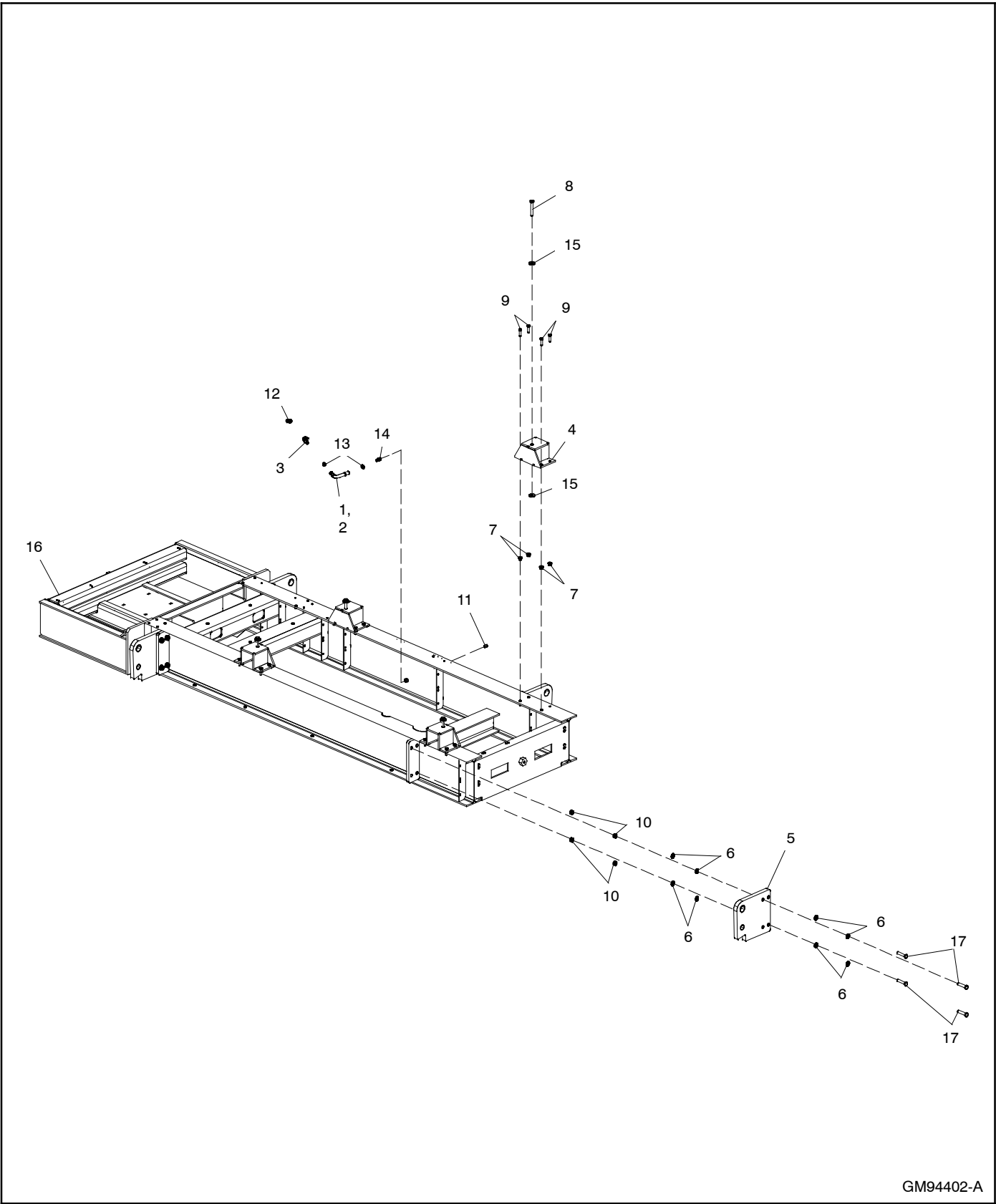


Skid and Mounting, continued

Item	Part Number	Description	Quantity
1	25465 00062	Hose, Fuel & Oil (.625" id)	2
2	X-577-24	Hose, rubber, straight, .62 in. ID	1
3	272701	Valve, oil drain (1/2-14 nptf)	1
4	GM95088	Mount, Engine	4
5	GM96484	Adapter, Bushing	1
6	M6923-16-80	Nut, hex	16
7	M931-20120-60	Screw, hex head	4
8	M933-16050-60	Screw, Hex Cap	16
9	M934-20-80	Nut, hex	4
10	X-75-28	Plug, pipe (1/2" nptf)	1
11	X-225-7	Elbow, pipe (45 deg x 1/2" npt)	1
12	X-426-10	Clamp, hose, .5/1 in.	2
13	X-582-1	Connector, Hose 5/8" x 1/2" MIP Brass	1
14	X-801-13	Washer, Hardened	8
15	GM95882	Skid, 5M4038	1

Skid and Mounting, continued

(1000REZK) GM94402-MA1



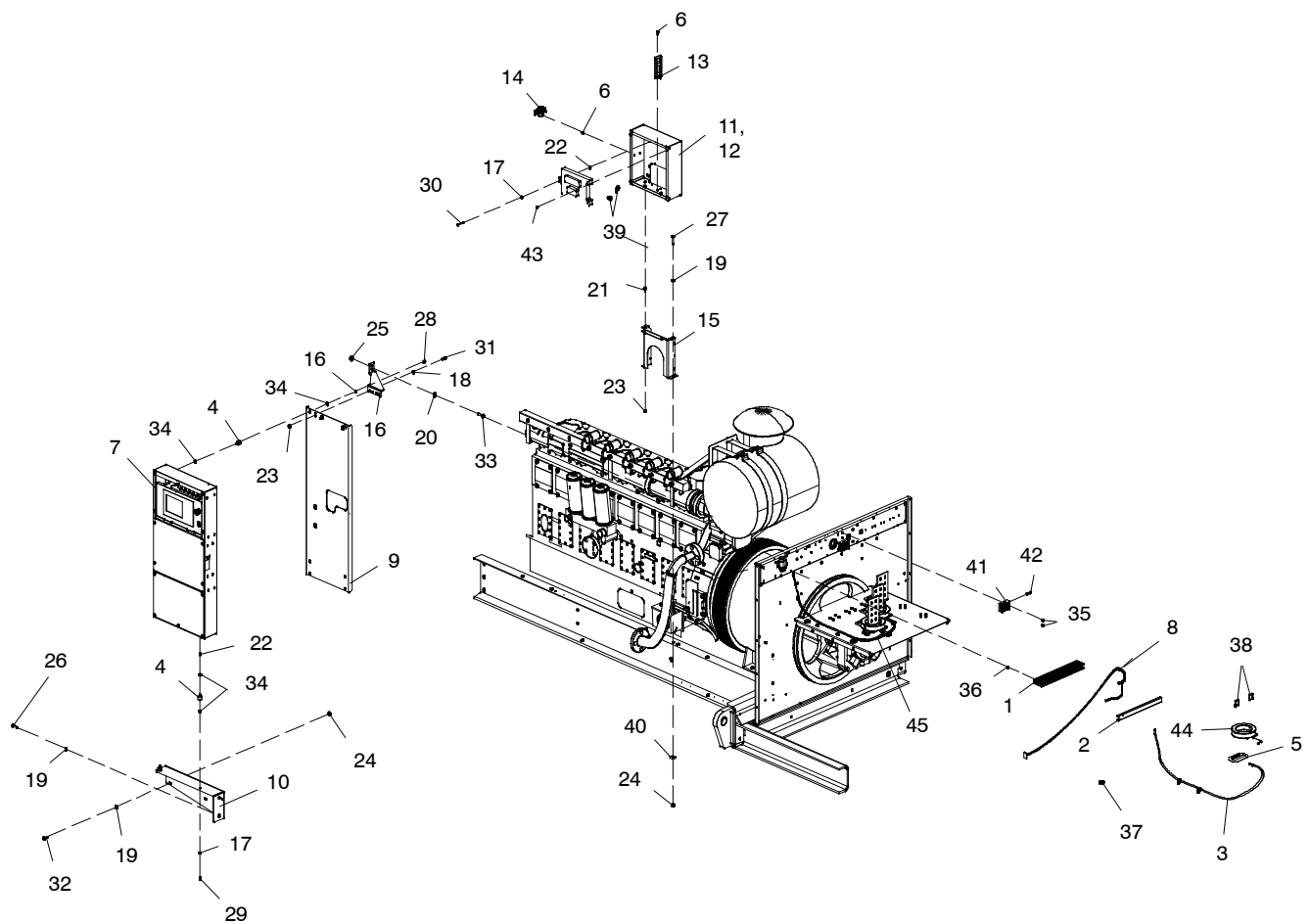
GM94402-A

Skid and Mounting, continued

Item	Part Number	Description	Quantity
1	25465 00062	Hose, Fuel & Oil (.625" id)	1
2	X-577-52	Hose, Rubber Straight, .62 IN. ID	1
3	272701	Valve, oil drain (1/2-14 nptf)	1
4	GM95088	Mount, Engine	4
5	GM97218	Gusset, Lifting	4
6	M125A-20-80	Washer, Plain	32
7	M6923-16-80	Nut, hex	16
8	M931-20120-60	Screw, hex head	4
9	M933-16050-60	Screw, Hex Cap	16
10	M934-20-80	Nut, hex	20
11	X-75-28	Plug, pipe (1/2" nptf)	1
12	X-274-13	Elbow, Street (45 deg x 1/2" npt)	1
13	X-426-10	Clamp, hose, .5/1 in.	2
14	X-582-1	Connector, Hose 5/8" x 1/2" MIP Brass	1
15	X-801-8	Washer, hardened, .812 ID x 2 in. OD	8
16	GM94403	Skid, 5M4044	1
17	M931-20090-60	Screw, Hex Cap	16

Controller

(500REZK) GM95356-



GM95356-A

Controller

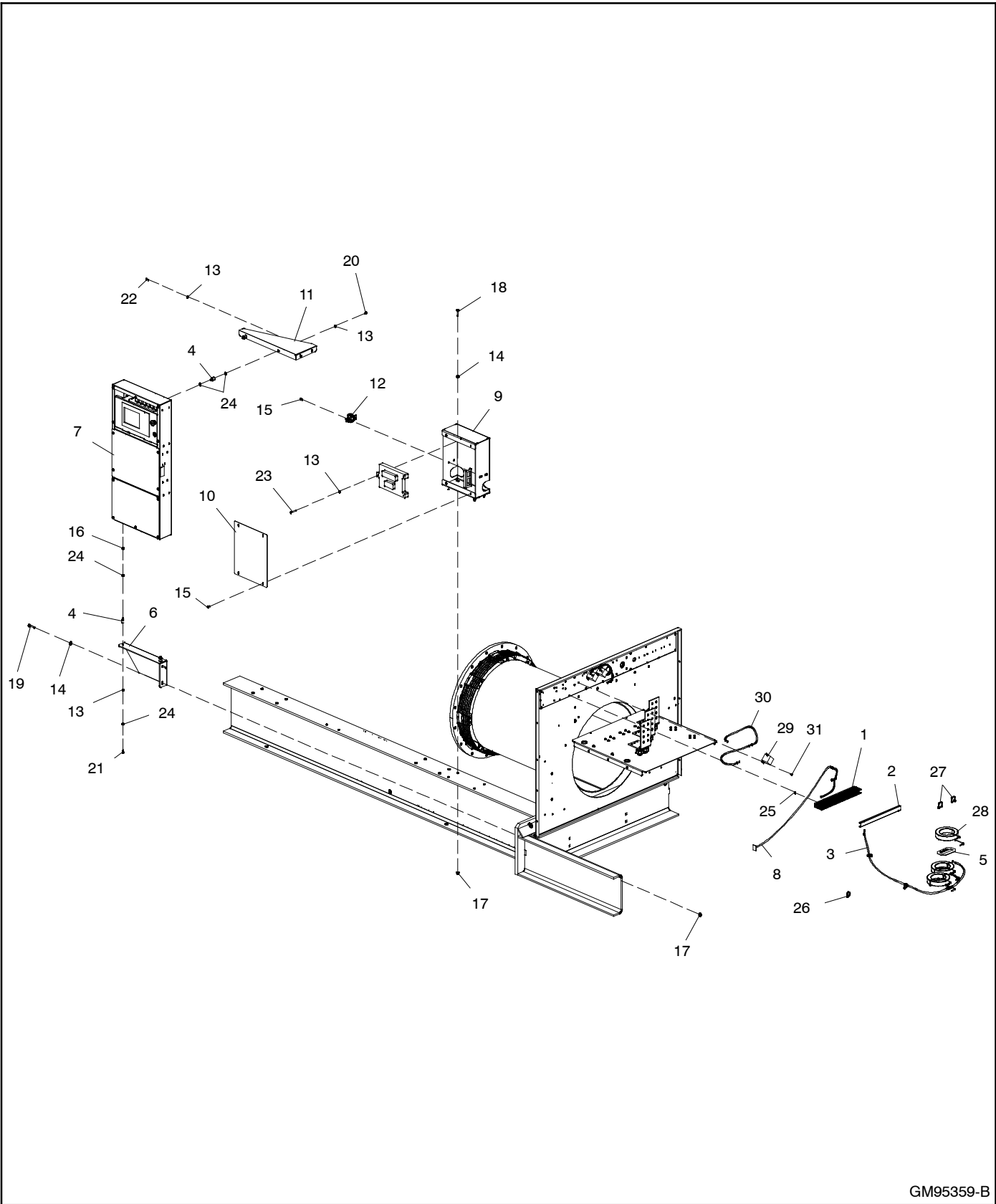
Item	Part Number	Description	Quantity
1	29758 01030	Wiring Duct, Narrow Slot 1" x 3" White	1
2	29759 00010	Wiring Duct Cover, 1" Wide White	1
3	GM11501	Harness, Wiring CT, 350-400 S60 Diesel	1
4	GM38784-2	Vibromount, Controller	4
5	GM75902	Support, CT	3
6	GM78761-1	Screw, Sheetmetal	4
7	GM95346-3	CONTROLLER ASSY, DEC8000	1
8	GM97006	Harness, A/C	1
9	GM98774	Bracket, Controller	1
10	GM98776	Bracket, Controller Support	1
11	GM99200	Cover, Wire Housing Box	1
12	GM99263	Box, Wire Housing	1
13	GM99267	Bracket, Elec. Connection	1
14	GM99273	Relay, Contactor	1
15	GM99354	Pedestal, Wire Box	1
16	GM99429	Bracket, Controller Support	1
17	M125A-06-80	Washer, Plain	7
18	M125A-08-80	Washer, Plain 8.4 ID x 16.0 OD	2
19	M125A-10-80	Washer, Plain 10.5 ID x 20.0 OD	8
20	M125A-12-80	Washer, Plain	1
21	M6921-08020-60	Screw, Hex Flange M8 x 20	4
22	M6923-06-80	Nut, Hex 6mm	5
23	M6923-08-80	Nut, Hex 8mm	6
24	M6923-10-80	Nut, Hex 10mm	6
25	M6923-12-80	Nut, Hex	1
26	M931-10040-60	Screw, Hex Cap	2
27	M931-10050-60	Screw, hex cap	2
28	M933-06012-60	Screw	2
29	M933-06016-60	Screw, hex cap, M6x16mm, js500 full thrd	2
30	M933-06050-60	Screw, hex cap, M6x50mm, js500 full thrd	3
31	M933-08025-60	Screw, hex cap	2
32	M933-10025-60	Screw, hex cap, fully thrd M10 x 25mm EXP	4
33	M933-12040-60	Screw, Hex Cap	1
34	X-22-12	Washer, lock.262 IDx.743 in.OD	8
35	X-67-156	Screw, Tapping	4
36	X-67-59	Screw, hex washer, thread-forming	2
37	X-468-1	Cable Tie	3
38	X-468-4	Cable tie	6
39	X-468-9	Cable tie	4
40	X-6011-4	Washer, beveled, .44 ID x 1.25 in. OD	2
41	X-6129-3	Fuse block	2
42	X-6135-1	Fuse, 1 A, 600 V	6
43	X-6216-1	Screw, Phillips hex crimpite	4
44	See chart	Current Transformer	4
45	See chart	Harness, AC Guascor	4

Use this table to identify part number of items 44 and 45

Module	Part Number	
	Item 44	Item 45
GM95356-MA1	297675	GM98654
GM95356-MA2	291548	GM98654
GM95356-MA3	297756	GM98654
GM95356-MA4	291546	GM98654
GM95356-MA5	297149	GM98655

Controller, continued

(750REZK) GM95359-



GM95359-B

Controller, continued

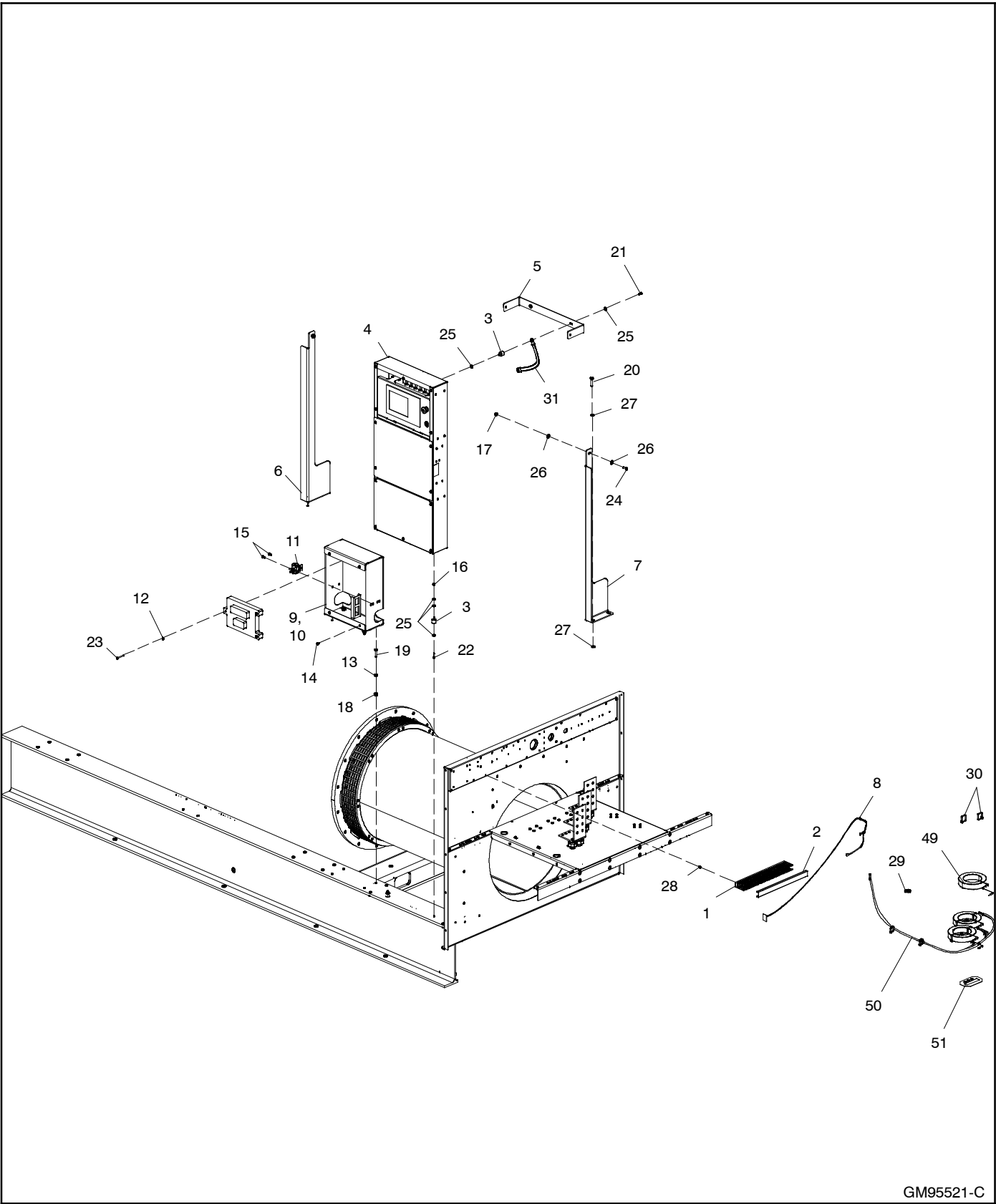
Item	Part Number	Description	Quantity
1	29758 01030	Wiring Duct, Narrow Slot 1" x 3" White	1
2	29759 00010	Wiring Duct Cover, 1" Wide White	1
3	GM11501	Harness, Wiring CT, 350-400 S60 Diesel	1
4	GM38784-2	Vibromount, Controller	4
5	GM75902	Support, CT	3
6	GM95345	Bracket, Controller Support	1
7	GM95346-1	Controller Assy	1
8	GM97006	Harness, A/C	1
9	GM98779	Box, Wire Housing	1
10	GM98780	Cover, Wire Housing Box	1
11	GM99206	Bracket, Controller Support	1
12	GM99273	Relay, Contactor	1
13	M125A-06-80	Washer, Plain	9
14	M125A-10-80	Washer, Plain 10.5 ID x 20.0 OD	6
15	M6921-06016-60	Screw, Hex Flange M6x16mm fly thrd js500	6
16	M6923-06-80	Nut, Hex 6mm	2
17	M6923-10-62	Nut, Hex 10mm	6
18	M931-10040-60	Screw, Hex Cap	4
19	M931-10050-60	Screw, hex cap	2
20	M933-06014-60	Screw, Hex Cap	2
21	M933-06016-60	Screw, hex cap, M6x16mm, js500 full thrd	2
22	M933-06020-60	Screw, hex cap	2
23	M933-06050-60	Screw, hex cap, M6x50mm, js500 full thrd	3
24	X-22-12	Washer, lock.262 IDx.743 in.	8
25	X-67-59	Screw, hex washer, thread-forming	2
26	X-468-1	Cable Tie	3
27	X-468-4	Cable tie	6
28	See Chart	Current transformer, 1000:5, round	3
29	See Chart	Transformer, 347 V, 115.6 V	3
30	See Chart	Harness, Wiring Potential Transformers	1
31	See Chart	Screw, hex washer, thread-forming	6

Use this table to identify part number of items 28, 29, 30 and 31

Module	Part Number			
	Item 28	Item 28	Item 30	Item 31
GM95359-MA1	297675	-	-	-
GM95359-MA2	297677	-	-	-
GM95359-MA3	291547	-	-	-
GM95359-MA4	297756	258990	GM77974	X-67-59
GM95359-MA5	291546	258990	GM77974	X-67-59

Controller, continued

(1000REZK) GM95521-



GM95521-C

Controller, continued

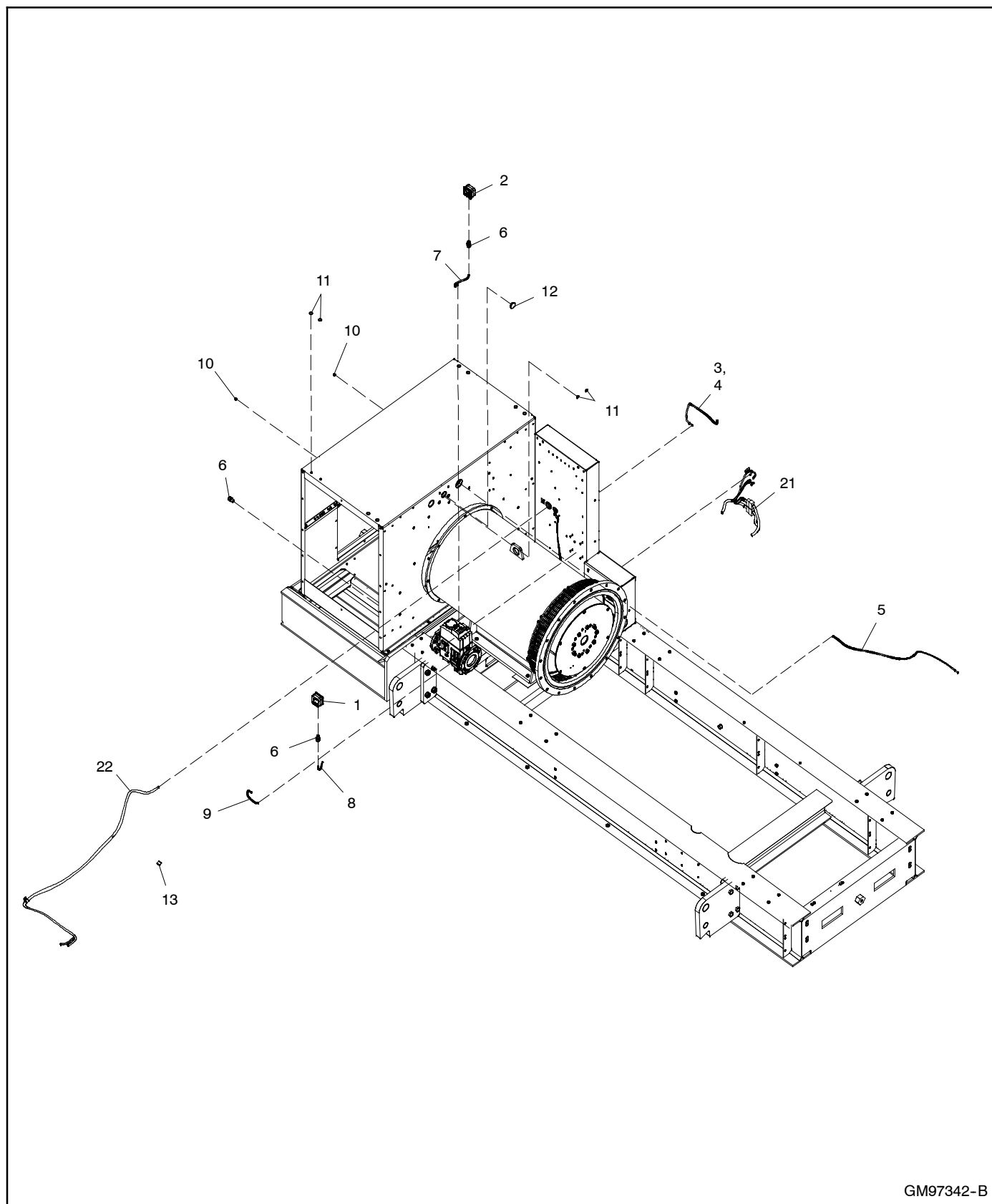
Item	Part Number	Description	Quantity
1	29758 01030	Wiring Duct, Narrow Slot 1" x 3" White	1
2	29759 00010	Wiring Duct Cover, 1" Wide White	1
3	GM38784-2	Vibromount, Controller	4
4	GM95346-1	Controller Assy	1
5	GM95404	Bracket, Controller Top	1
6	GM95405	Bracket, Controller Side LH	1
7	GM95406	Bracket, Controller Side RH	1
8	GM97006	Harness, A/C	1
9	GM98779	Box, Wire Housing	1
10	GM98780	Cover, Wire Housing Box	1
11	GM99273	Relay, Contactor	1
12	M125A-06-80	Washer, Plain	3
13	M125-10-80	WASHER, PLAIN	4
14	M6921-06014-60	Screw, Hex Cap Flange	4
15	M6921-06016-60	Screw, Hex Flange M6x16mm fly thrd js500	2
16	M6923-06-80	Nut, Hex 6mm	2
17	M6923-08-80	Nut, Hex 8mm	2
18	M6923-10-80	Nut, Hex 10mm	4
19	M931-10040-60	Screw, Hex Cap	4
20	M931-12045-60	Screw, Hex Cap	4
21	M933-06016-60	Screw, hex cap, M6x16mm, js500 full thrd	2
22	M933-06025-60	Screw, Hex Cap	2
23	M933-06050-60	Screw, hex cap, M6x50mm, js500 full thrd	3
24	M933-08025-60	Screw, hex cap	2
25	X-22-12	Washer, lock.262 IDx.743 in.OD	10
26	X-22-16	Washer, lock.326 IDx.883 in.OD	4
27	X-22-4	Washer, lock, .521 ID x .884 in.OD	8
28	X-67-59	Screw, hex washer, thread-forming	2
29	X-468-1	Cable Tie	3
30	X-468-4	Cable tie	6
31	X-6046-12	Strap, Ground	1
49	See Chart	Current transformer, 2000:5, round	3
50	See Chart	Harness, Wiring CT, 350-400 S60 Diesel	1
51	See Chart	Support, CT	3

Use this table to identify part number of items 49, 50 and 51

Module	Part Number		
	Item 49	Item 50	Item 51
GM95521-MA1	297675	GM11501	GM75902
GM95521-MA2	291548	GM11501	GM75902

Control & Harness

(500-1000REZK) GM97342-



GM97342-B

Control & Harness

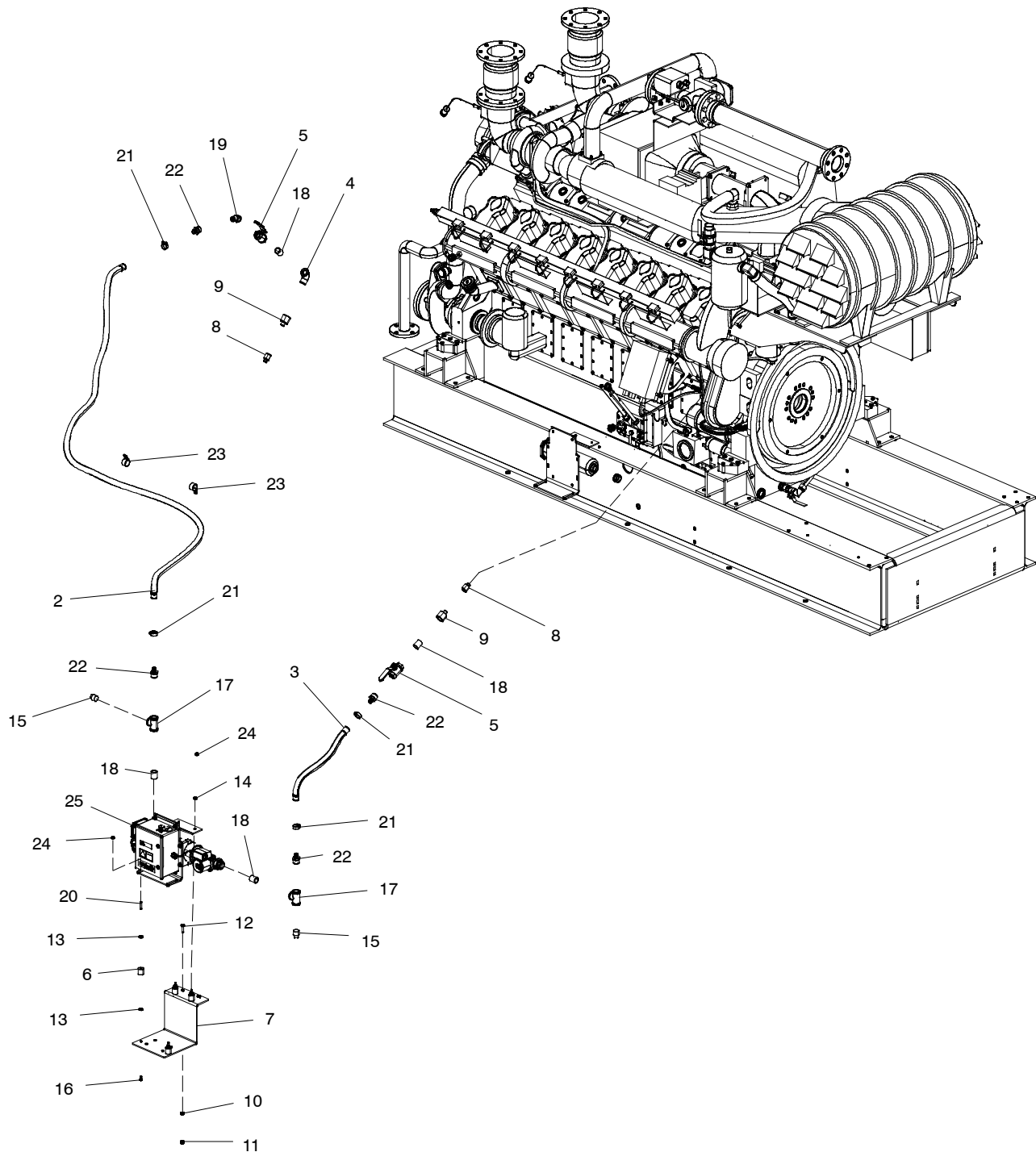
Item	Part Number	Description	Quantity
1	GM96410	Pressure Switch	1
2	GM96411	PRESSURE SWITCH	1
3	GM97003	Harness, Control Box	1
4	GM97004	Harness, Input/Output Module	1
5	GM97005	Harness, Control Box	1
6	GM99040	Grommet, 1/2 NPT, 3 of 4mm Holes	3
7	GM99083	Harness, Low Fuel Pressure, Guascor	1
8	GM99084	Harness, High Fuel Pressure, Guascor	1
9	GM99085	Harness, F.V. Proof of Closure, Guascor	1
10	X-301-34	Plug,button	7
11	X-301-47	Plug, Button	12
12	X-301-48	Plug, Button	1
13	X-672-31	Clamp, insulated, .75 in.	2
21	See Chart	Harness, Engine	1
22	See Chart	Harness, Guascor Fuel Pressure Switches	1

Use this table to identify part number of items 21 and 22

Module	Part Number	
	Item 21	Item 22
GM97342-MA1	GM95879	GM99051
GM97342-MA2	GM98614	GM99051
GM97342-MA3	GM98652	GM99051

Block Heater

(500-1000REZK) GM98862-



Items Not Shown: 1

GM98862-

Block Heater

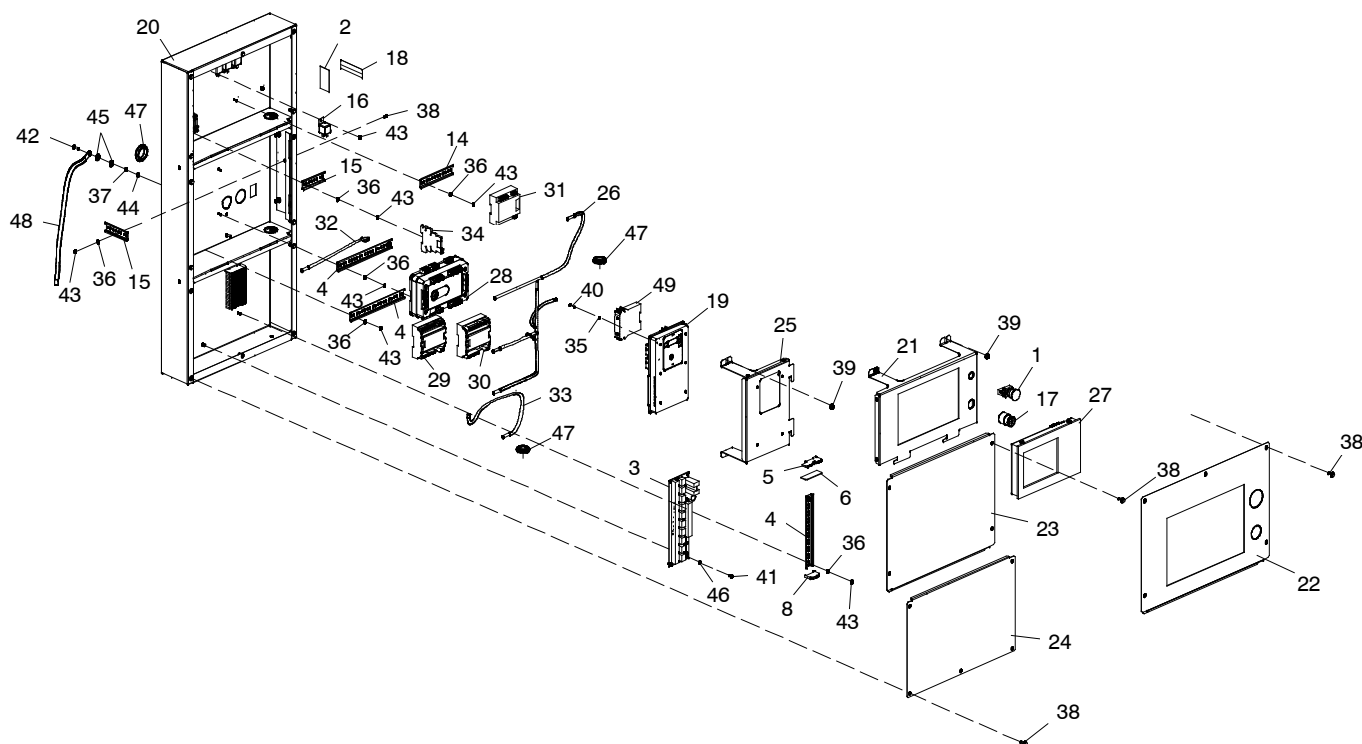
Item	Part Number	Description	Quantity
1	25452 00075	Hose, Coolant SAE 20R3 D2 (.75"ID)	17
2	X-6367-18	Hose, Coolant	1
3	X-6367-7	Hose, Coolant 40"	1
4	151385	Elbow, street (90 deg x 1"nptf)	1
5	255633	Valve, shutoff (1"npt)	2
6	328645	Vibromount, controller	4
7	GM60615	Bracket, Block Heater	1
8	GM98767	ADAPTER, BUSHING	2
9	GM98768	ADAPTER, BUSHING	2
10	M125A-10-80	Washer, Plain 10.5 ID x 20.0 OD	2
11	M6923-10-80	Nut, Hex 10mm	2
12	M933-10035-60	Screw, Hex Cap	2
13	X-22-16	Washer, lock.326 IDx.883 in.OD	8
14	X-25-37	Washer, Plain, .406 ID X.812 IN. OD	2
15	X-75-13	Plug, pipe (1" nptf)	2
16	X-125-23	Bolt, Hex Cap	4
17	X-203-2	Tee, pipe (1 x 1 x 1 npt)	2
18	X-218-24	Pipe (1"npt x 1.50")	4
19	X-274-10	Elbow, street (45 deg x 1"npt)	1
20	X-352-65	Stud, 5/16-18 x 1.5 in.	4
21	X-426-12	Clamp, hose, .69/1.25 in.	4
22	X-582-15	Connector, hose + Vibra Seal	4
23	X-672-6	Clamp, insulated, 1.38 in.	2
24	X-6210-7	Nut, flange spiralock, 5/16-18	4
25	See Chart	HEATER, BLOCK 208V 1PH 9000W	1

Use this table to identify part number of item 25

Module	Model	Part Number
		Item 25
GM98863-MA1	500REZK	GM97609
GM98863-MA2	500REZK	GM97610
GM98863-MA3	500REZK	GM97611
GM98863-MA4	500REZK	GM97612
GM98863-MA5	500REZK	GM97613
GM98863-MA6	500REZK	GM97614
GM98862-MA1	750/1000REZK	GM97615
GM98862-MA2	750/1000REZK	GM97616
GM98862-MA3	750/1000REZK	GM97617
GM98862-MA4	750/1000REZK	GM97618
GM98862-MA5	750/1000REZK	GM97619
GM98862-MA6	750/1000REZK	GM97620

Controller Assembly

(500-1000REZK) GM95346-



Items Not Shown: 7, 9, 10, 11, 12, 13

GM95346-C

Controller Assembly

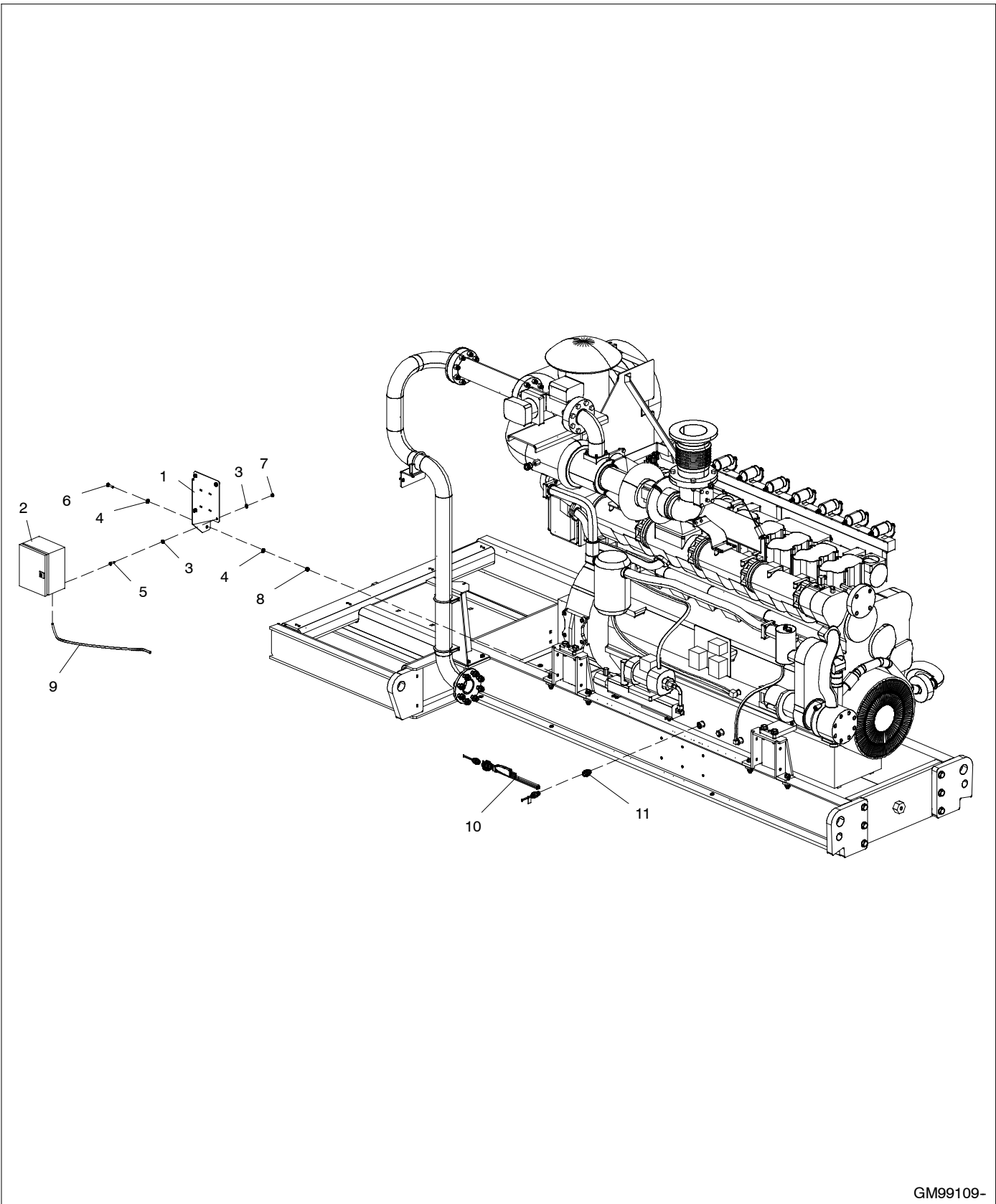
Item	Part Number	Description	Quantity
1	292364	Switch, emergency stop pushbutton	1
2	294520	Decal, danger, high voltage	1
3	D-294303	PCB assembly, 10-relay dry contact	1
4	GM23502	Rail, Din	3
5	GM36084	Terminal Block, Cage Clamp 4-Pole Gray	35
6	GM36085	End Plate, 4-Pole Gray	2
7	GM36086	Jumper, 2-Pole	1
8	GM36087	End Stop, Screwless Gray	2
9	GM36117	Wire Marker 1-10	1
10	GM36118	Wire Marker 11-20	1
11	GM36119	Wire Marker 21-30	1
12	GM36120	Wire Marker 31-40	1
13	GM46800	Jumper, Staggered from 1 to 3	7
14	GM47488	Rail, Din	1
15	GM48806	Rail, Din	2
16	GM49747	Relay, 24V DC	6
17	GM63146	Alarm, Piezo Sound	1
18	GM84656-14	Decal, UL	1
19	GM90151	Regulator, Voltage DVR2000EC+	1
20	GM95347	Enclosure, Controller Assy	1
21	GM95350	Panel, Controller	1
22	GM95351	Cover, Controller Top	1
23	GM95352	Cover, Controller Center	1
24	GM95353	Cover, Controller Bottom	1
25	GM95355	Panel, Controller	1
27	GM96317	Controller Display Unit	1
28	GM96318	Controller Basebox	1
29	GM96319	Analog Input Module	1
30	GM96422	Input/Output Module	1
31	GM96901	Can Converter	1
32	GM97003	Harness Control Box	1
33	GM97004	Harness, Input/Output Module	1
34	GM99468	RELAY, 24VDC, 50MA	5
35	M125A-03-60	Washer, Plain (EXP)	4
36	M125-04-80	Washer, Plain	12
37	M125A-05-80	Washer, Plain	1
38	M6921-06016-60	Screw, Hex Flnge M6x16mm fly thrd js500	14
39	M6923-06-80	Nut, Hex 6mm (EXP)	4
40	M7985A-03020-20	Screw, Pan Head Machine	4
41	M7985A-04010-20	Screw, Pan Head Machined	4
42	M7985A-05020-20	Screw, Pan Head Machine (NRP)	1
43	M934-04-50	Nut, Hex 4mm (NRP)	18
44	M934-05-50	Nut, Hex 5mm (NRP)	1
45	X-22-12	Washer, lock.262 IDx.743 in.OD(GM-NRP)KM	2
46	X-22-7	Washer,Lock.172 ID x.333 in.OD(GM-NRP)KM	4
47	X-284-4	Grommet, round	3
48	X-6046-2	Strap, ground (32 in.)	1
49	See Chart	Transmitter, Universal	

Use this table to identify part number of item 49

Module	Part Number	
	Item 49	Qty
GM95346-1	GM96902	2
GM95346-3	GM96902	1

Oil Pan heater

GM99109-



GM99109-

Oil Pan heater

Item	Part No.	Description	Qty.
1	GM99108	Bracket, Junction Box	1
2	GM99163	Assy, Junction Box	1
3	M125A-08-80	Washer, Plain 8.4 ID x 16.0 OD	8
4	M125A-10-80	Washer, Plain 10.5 ID x 20.0 OD	4
5	M933-08025-60	Screw, hex cap	4
6	M933-10035-60	Screw, Hex Cap	2
7	M934-08-60	Nut, Hex	4
8	M934-10-60	Nut, Hex 10mm	2
9	See Chart	Harness, Oil Heater, Guascor 480V	1
10	See Chart	Oil Heater	1
11	See Chart	Thermostat	1

Use this table to identify part number of items 9,10 and 11

Module	Model	Part Number		
		Item 9	Item 10	Item 11
GM99109-MA1	500REZK	GM99259	-	-
GM99109-MA2	500REZK	-	GM99017	GM99021
GM99109-MA3	500REZK	-	GM99018	GM99021
GM99109-MA4	500REZK	-	GM99019	GM99021
GM99110-MA1	750/1000REZK	GM99260	-	-
GM99110-MA2	750/1000REZK	-	GM99017	GM99020
GM99110-MA3	750/1000REZK	-	GM99018	GM99020
GM99110-MA4	750/1000REZK	-	GM99019	GM99020

Miscellaneous Kits

Qty.	Description	Part No.
	Remote Radiator, 50C, 500REZK	GM99319-KP1
1	Cooling System, Remote Mount, 480V E-Fan	GM99272
	Kit, Combination Starter, Solid State	GM99164-KP1
1	Enclosed Soft Starter	GM98992
	Remote Radiator, 50C, 750REZK	GM99318-KP1
1	Cooling System, Remote Mount, 480V E-Fan	GM98991
	Kit, Enclosed Soft Starter	GM99295-KP1
1	Enclosed Soft Starter	GM99294
	Cooling, Remote Radiator	GM94906-KP1
1	Cooling System, Remote Mount, 480V E-Fan	GM95418
	Combination Starter, Solid State	GM98861-KP1
1	Combination Starter, Solid State	GM98769
	Gaseous Fuel Filter	GM98891-KP1
1	Filter, Fuel	GM98890

Qty.	Description	Part No.
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Touch-Up Paint

Gloss and textured paint is available from Aftermarket Parts.

Description	Part Number
Paint, Gloss KCB, 12oz spray can	GM71383
Paint, Gloss KCB, 1 gallon can	GM71387
Paint, Textured KCB, 12oz spray can	GM82834
Paint, Textured KCB, 1 gallon can	GM82835
Paint, Textured Black, 12 oz spray can	GM82836

Appendix A Abbreviations

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

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

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

Appendix B Common Hardware Application Guidelines

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

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

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

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

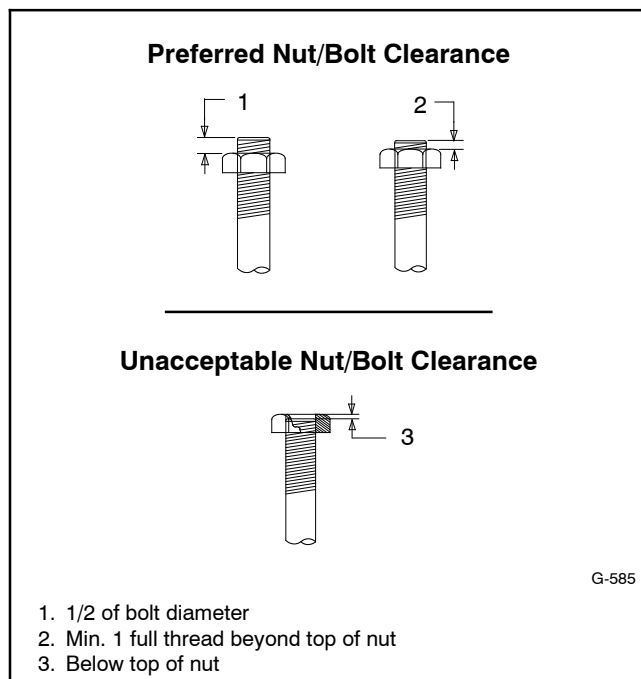


Figure 1 Acceptable Bolt Lengths

Steps for common hardware application:

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

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

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

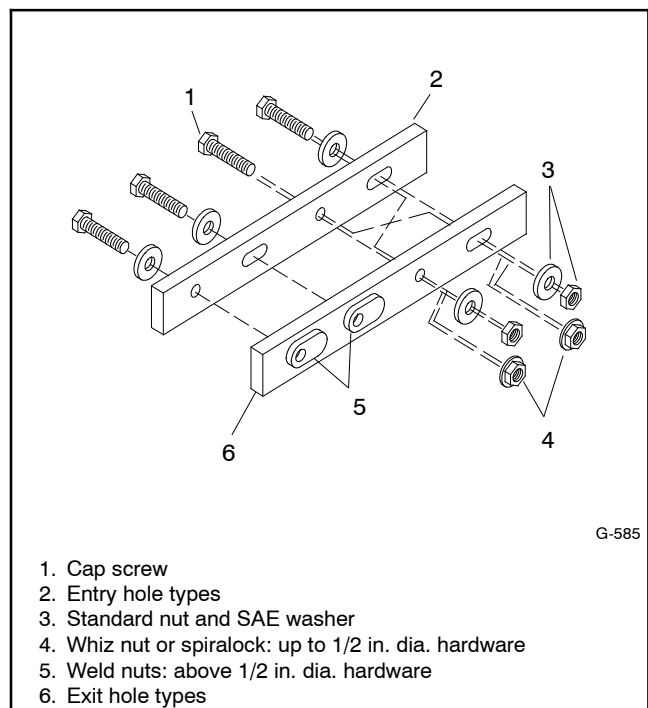


Figure 2 Acceptable Hardware Combinations

Appendix C General Torque Specifications

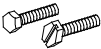
American Standard Fasteners Torque Specifications					
Size	Torque Measurement	Assembled into Cast Iron or Steel			Assembled into Aluminum Grade 2 or 5
		Grade 2	Grade 5	Grade 8	
8-32	Nm (in. lb.)	1.8 (16)	2.3 (20)	—	See Note 3
10-24	Nm (in. lb.)	2.9 (26)	3.6 (32)	—	
10-32	Nm (in. lb.)	2.9 (26)	3.6 (32)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

Metric Fasteners Torque Specifications, Measured in Nm (ft. lb.)				
Size (mm)	Assembled into Cast Iron or Steel			Assembled into Aluminum Grade 5.8 or 8.8
	Grade 5.8	Grade 8.8	Grade 10.9	
M6 x 1.00	6.2 (4.6)	9.5 (7)	13.6 (10)	See Note 3
M8 x 1.25	15.0 (11)	23.0 (17)	33.0 (24)	
M8 x 1.00	16.0 (11)	24.0 (18)	34.0 (25)	
M10 x 1.50	30.0 (22)	45.0 (34)	65.0 (48)	
M10 x 1.25	31.0 (23)	47.0 (35)	68.0 (50)	
M12 x 1.75	53.0 (39)	80.0 (59)	115.0 (85)	
M12 x 1.50	56.0 (41)	85.0 (63)	122.0 (90)	
M14 x 2.00	83.0 (61)	126.0 (93)	180.0 (133)	
M14 x 1.50	87.0 (64)	133.0 (98)	190.0 (140)	
M16 x 2.00	127.0 (94)	194.0 (143)	278.0 (205)	
M16 x 1.50	132.0 (97)	201.0 (148)	287.0 (212)	
M18 x 2.50	179.0 (132)	273.0 (201)	390.0 (288)	
M18 x 1.50	189.0 (140)	289.0 (213)	413.0 (305)	

Notes:

1. 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	

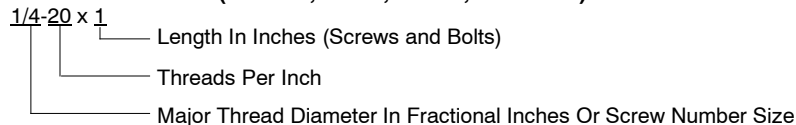
Hardness Grades	
American Standard	
Grade 2	
Grade 5	
Grade 8	
Grade 8/9 (Hex Socket Head)	
Metric	
Number stamped on hardware; 5.8 shown	

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

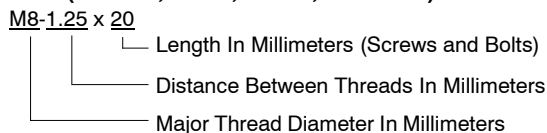
Phillips screw is a registered trademark of Phillips Screw Company.

Sample Dimensions

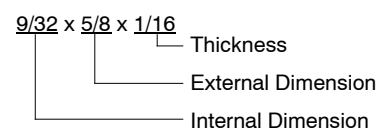
American Standard (Screws, Bolts, Studs, and Nuts)



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	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-6238-14	3/8-24 x .75	X-6009-1	1-8	Standard		
X-465-6	1/4-20 x .50	X-6238-16	3/8-24 x 1.25					
X-465-2	1/4-20 x .62	X-6238-21	3/8-24 x 4.00					
X-465-16	1/4-20 x .75	X-6238-22	3/8-24 x 4.50					
X-465-18	1/4-20 x .88							
X-465-7	1/4-20 x 1.00	X-6024-5	7/16-14 x .75		X-6210-3	6-32	Whiz	
X-465-8	1/4-20 x 1.25	X-6024-2	7/16-14 x 1.00		X-6210-4	8-32	Whiz	
X-465-9	1/4-20 x 1.50	X-6024-8	7/16-14 x 1.25		X-6210-5	10-24	Whiz	
X-465-10	1/4-20 x 1.75	X-6024-3	7/16-14 x 1.50		X-6210-1	10-32	Whiz	
X-465-11	1/4-20 x 2.00	X-6024-4	7/16-14 x 2.00		X-6210-2	1/4-20	Spiralock	
X-465-12	1/4-20 x 2.25	X-6024-11	7/16-14 x 2.75	X-6210-6	1/4-28	Spiralock		
X-465-14	1/4-20 x 2.75	X-6024-12	7/16-14 x 6.50	X-6210-7	5/16-18	Spiralock		
X-465-21	1/4-20 x 5.00			X-6210-8	5/16-24	Spiralock		
X-465-25	1/4-28 x .38	X-129-15	1/2-13 x .75	X-6210-9	3/8-16	Spiralock		
X-465-20	1/4-28 x 1.00	X-129-17	1/2-13 x 1.00	X-6210-10	3/8-24	Spiralock		
		X-129-18	1/2-13 x 1.25	X-6210-11	7/16-14	Spiralock		
X-125-33	5/16-18 x .50	X-129-19	1/2-13 x 1.50	X-6210-12	1/2-13	Spiralock		
X-125-23	5/16-18 x .62	X-129-20	1/2-13 x 1.75	X-6210-15	7/16-20	Spiralock		
X-125-3	5/16-18 x .75	X-129-21	1/2-13 x 2.00	X-6210-14	1/2-20	Spiralock		
X-125-31	5/16-18 x .88	X-129-22	1/2-13 x 2.25					
X-125-5	5/16-18 x 1.00	X-129-23	1/2-13 x 2.50	X-85-3	5/8-11	Standard		
X-125-24	5/16-18 x 1.25	X-129-24	1/2-13 x 2.75	X-88-12	3/4-10	Standard		
X-125-34	5/16-18 x 1.50	X-129-25	1/2-13 x 3.00	X-89-2	1/2-20	Standard		
X-125-25	5/16-18 x 1.75	X-129-27	1/2-13 x 3.50					
X-125-26	5/16-18 x 2.00	X-129-29	1/2-13 x 4.00					
230578	5/16-18 x 2.25	X-129-30	1/2-13 x 4.50					
X-125-29	5/16-18 x 2.50	X-463-9	1/2-13 x 5.50					
X-125-27	5/16-18 x 2.75	X-129-44	1/2-13 x 6.00					
X-125-28	5/16-18 x 3.00							
X-125-22	5/16-18 x 4.50	X-129-51	1/2-20 x .75	X-25-46	.125	.250	.022	#4
X-125-32	5/16-18 x 5.00	X-129-45	1/2-20 x 1.25	X-25-9	.156	.375	.049	#6
X-125-35	5/16-18 x 5.50	X-129-52	1/2-20 x 1.50	X-25-48	.188	.438	.049	#8
X-125-36	5/16-18 x 6.00			X-25-36	.219	.500	.049	#10
X-125-40	5/16-18 x 6.50	X-6021-3	5/8-11 x 1.00	X-25-40	.281	.625	.065	1/4
		X-6021-4	5/8-11 x 1.25	X-25-85	.344	.687	.065	5/16
X-125-43	5/16-24 x 1.75	X-6021-2	5/8-11 x 1.50	X-25-37	.406	.812	.065	3/8
X-125-44	5/16-24 x 2.50	X-6021-1	5/8-11 x 1.75	X-25-34	.469	.922	.065	7/16
X-125-30	5/16-24 x .75	273049	5/8-11 x 2.00	X-25-26	.531	1.062	.095	1/2
X-125-39	5/16-24 x 2.00	X-6021-5	5/8-11 x 2.25	X-25-15	.656	1.312	.095	5/8
X-125-38	5/16-24 x 2.75	X-6021-6	5/8-11 x 2.50	X-25-29	.812	1.469	.134	3/4
		X-6021-7	5/8-11 x 2.75	X-25-127	1.062	2.000	.134	1
X-6238-2	3/8-16 x .62	X-6021-12	5/8-11 x 3.75					
X-6238-10	3/8-16 x .75	X-6021-11	5/8-11 x 4.50					
X-6238-3	3/8-16 x .88	X-6021-10	5/8-11 x 6.00					
X-6238-11	3/8-16 x 1.00							
X-6238-4	3/8-16 x 1.25	X-6021-9	5/8-18 x 2.50					
X-6238-5	3/8-16 x 1.50							
X-6238-1	3/8-16 x 1.75	X-6239-1	3/4-10 x 1.00					
X-6238-6	3/8-16 x 2.00	X-6239-8	3/4-10 x 1.25					
X-6238-17	3/8-16 x 2.25	X-6239-2	3/4-10 x 1.50					
X-6238-7	3/8-16 x 2.50	X-6239-3	3/4-10 x 2.00					
X-6238-8	3/8-16 x 2.75	X-6239-4	3/4-10 x 2.50					
X-6238-9	3/8-16 x 3.00	X-6239-5	3/4-10 x 3.00					
X-6238-19	3/8-16 x 3.25	X-6239-6	3/4-10 x 3.50					
X-6238-12	3/8-16 x 3.50							
X-6238-20	3/8-16 x 3.75	X-792-1	1-8 x 2.25					
X-6238-13	3/8-16 x 4.50	X-792-5	1-8 x 3.00					
X-6238-18	3/8-16 x 5.50	X-792-8	1-8 x 5.00					
X-6238-25	3/8-16 x 6.50							

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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