

Service Parts

Marine Generator Sets



Models:

17EFOZD/20EOZD
17.5EFOZD/20EOZD
20EFOZD/23EOZD
20EFOZD/24EOZD

KOHLER[®]
POWER SYSTEMS

ISO 9001
KOHLER
POWER SYSTEMS
NATIONALLY REGISTERED

TP-6272 8/06b

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Introduction

This manual lists service replacement parts for the generator sets listed on the front cover.

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This manual includes the following main sections:

Table of Contents. Lists the sections of the manual.

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

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 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>Cylinder Block</i>	<i>Gear Housing</i>	<i>Oil Pan</i>	<i>Cylinder Head</i>	<i>Intake Manifold</i>	<i>Turbocharger</i>	<i>Camshaft & Drive Gear</i>	<i>Crankshaft & Flywheel</i>	<i>Piston & Connecting Rod</i>	<i>Lub. Oil System</i>	<i>Lub. Oil Line</i>
Group No.	1	2	3	4	6	7	8	9	10	11	12	
Spec No.	Variation Number											
20EOZD/17EFOZD												
GM32565-GA1	1	1	1	1	1	—	1	1	1	1	—	
GM32565-GA2	1	1	1	1	1	—	1	1	1	1	—	
GM32565-GA3	1	1	1	1	1	—	1	1	1	1	—	
GM32565-GA4	1	1	1	1	1	—	1	1	1	1	—	
GM33036-GA1	3	3	3	3	3	—	3	3	3	3	3	
23EOZD/24EOZD/20EFOZD												
GM32565-GA5	2	2	1	2	2	1	2	2	2	2	1	
GM32565-GA6	2	2	1	2	2	1	2	2	2	2	1	
GM32565-GA7	2	2	1	2	2	1	2	2	2	2	1	
GM32565-GA8	2	2	1	2	2	1	2	2	2	2	1	
GM32565-GA9	2	2	1	2	5	1	2	2	2	2	1	
GM32565-GA10	2	2	1	2	6	1	2	2	2	2	1	
GM32565-GA11	2	2	1	2	5	1	2	2	2	2	1	
GM32565-GA12	2	2	1	2	6	1	2	2	2	2	1	
GM32565-GA13	2	2	1	2	5	2	2	2	2	2	1	
GM32565-GA14	2	2	1	2	5	2	2	2	2	2	1	
GM32565-GA15	2	2	1	2	5	2	2	2	2	2	1	
GM32565-GA16	2	2	1	2	5	2	2	2	2	2	1	
GM33036-GA2	4	3	3	4	4	3	3	3	3	3	4	

— Group is not used.

Specification Number Index

Group Title	<i>Cooling Sea Water System</i>	<i>Cooling Fresh Water System</i>	<i>Cooling Sea Water Pump</i>	<i>Cooling Fresh Water Pump</i>	<i>Cooling Fresh Water Cooler</i>	<i>Cooling Sea Water Line</i>	<i>Cooling Fresh Water Line</i>	<i>Fuel Injection Pump</i>	<i>Fuel Injection Lines</i>	<i>Fuel Line & Filter</i>	<i>Governor</i>	<i>Starting Motor</i>	<i>Gasket Set</i>
Group No.	13	14	15	16	17	18	19	20	21	22	23	24	25
Spec No.	Variation Number												
20EOZD/17EFOZD													
GM32565-GA1	1	1	—	—	1	—	—	1	1	1	—	3	1
GM32565-GA2	3	3	—	—	1	—	—	2	1	1	—	4	1
GM32565-GA3	1	1	—	—	1	—	—	1	1	1	—	3	1
GM32565-GA4	3	3	—	—	1	—	—	2	1	1	—	4	1
GM33036-GA1	—	—	2	3	3	3	3	3	3	3	3	3	3
23EOZD/24EOZD/20EFOZD													
GM32565-GA5	2	2	—	—	2	—	—	5	2	1	—	3	2
GM32565-GA6	4	4	—	—	2	—	—	6	2	1	—	4	2
GM32565-GA7	2	2	—	—	2	—	—	5	2	1	—	3	2
GM32565-GA8	4	4	—	—	2	—	—	6	2	1	—	4	2
GM32565-GA9	2	2	—	—	2	—	—	5	2	1	—	3	2
GM32565-GA10	4	4	—	—	2	—	—	6	2	1	—	4	2
GM32565-GA11	2	2	—	—	2	—	—	5	2	1	—	3	2
GM32565-GA12	4	4	—	—	2	—	—	6	2	1	—	4	2
GM32565-GA13	2	2	—	—	2	—	—	5	2	1	—	3	2
GM32565-GA14	4	4	—	—	2	—	—	6	2	1	—	4	2
GM32565-GA15	2	2	—	—	2	—	—	5	2	1	—	3	2
GM32565-GA16	4	4	—	—	2	—	—	6	2	1	—	4	2
GM33036-GA2	—	—	2	3	4	4	2	4	4	3	4	3	4

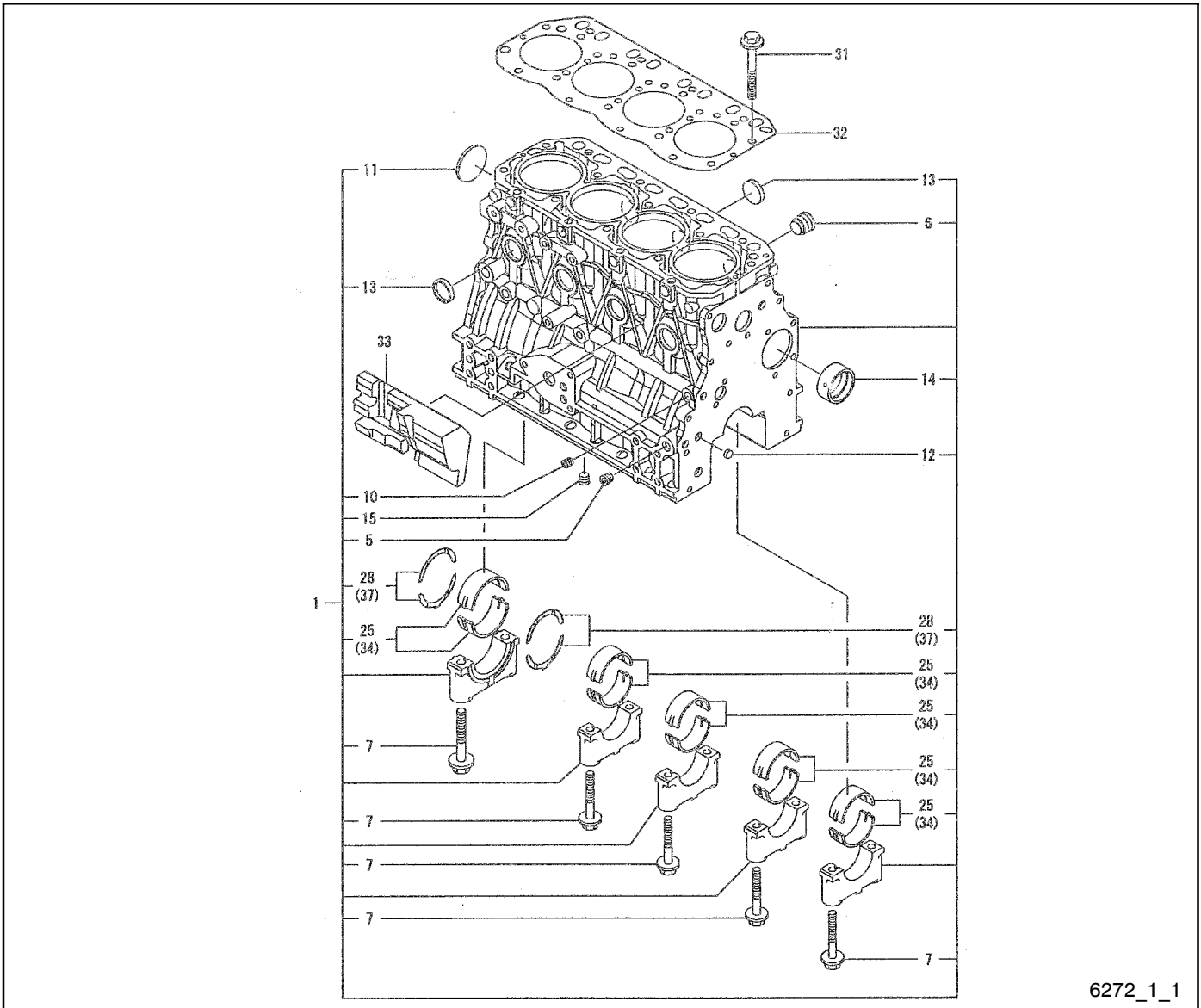
— Group is not used.

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>Preheat</i>	<i>Literature</i>
Group No.	101	103	104	105	107	109	201	301	401	701
Spec No.	Variation Number									
20EOZD/17EFOZD										
GM32565-GA1	65-1	65-2	65-3	4	65-6	65-7	65-8	65-9	—	48
GM32565-GA2	65-1	65-12	65-13	14	65-6	65-7	65-8	65-16	—	48
GM32565-GA3	65-1	65-2	65-3	4	65-10	65-7	65-11	65-9	—	49
GM32565-GA4	65-1	65-12	65-13	14	65-10	65-7	65-11	65-16	—	49
GM33036-GA1	36-1	36-2	36-3	36-4	36-6	36-7	36-8	36-9	—	58
23EOZD/24EOZD/20EFOZD										
GM32565-GA5	—	65-2	65-3	5	65-6	65-7	65-8	65-9	—	50
GM32565-GA6	—	65-12	65-13	15	65-6	65-7	65-8	65-16	—	50
GM32565-GA7	—	65-2	65-3	5	65-10	65-7	65-11	65-9	—	51
GM32565-GA8	—	65-12	65-13	15	65-10	65-7	65-11	65-16	—	51
GM32565-GA9	—	65-2	65-3	5	65-6	65-7	65-8	65-9	11	50
GM32565-GA10	—	65-12	65-13	15	65-6	65-7	65-8	65-16	5	50
GM32565-GA11	—	65-2	65-3	5	65-10	65-7	65-11	65-9	11	51
GM32565-GA12	—	65-12	65-13	15	65-10	65-7	65-11	65-16	5	51
GM32565-GA13	—	65-2	65-3	17	65-6	65-7	65-8	65-9	—	50
GM32565-GA14	—	65-12	65-13	18	65-6	65-7	65-8	65-16	—	50
GM32565-GA15	—	65-2	65-3	17	65-10	65-7	65-11	65-9	—	51
GM32565-GA16	—	65-12	65-13	18	65-10	65-7	65-11	65-16	—	51
GM33036-GA2	—	36-2	36-3	36-5	36-6	36-7	36-8	36-9	—	59

— Group is not used.

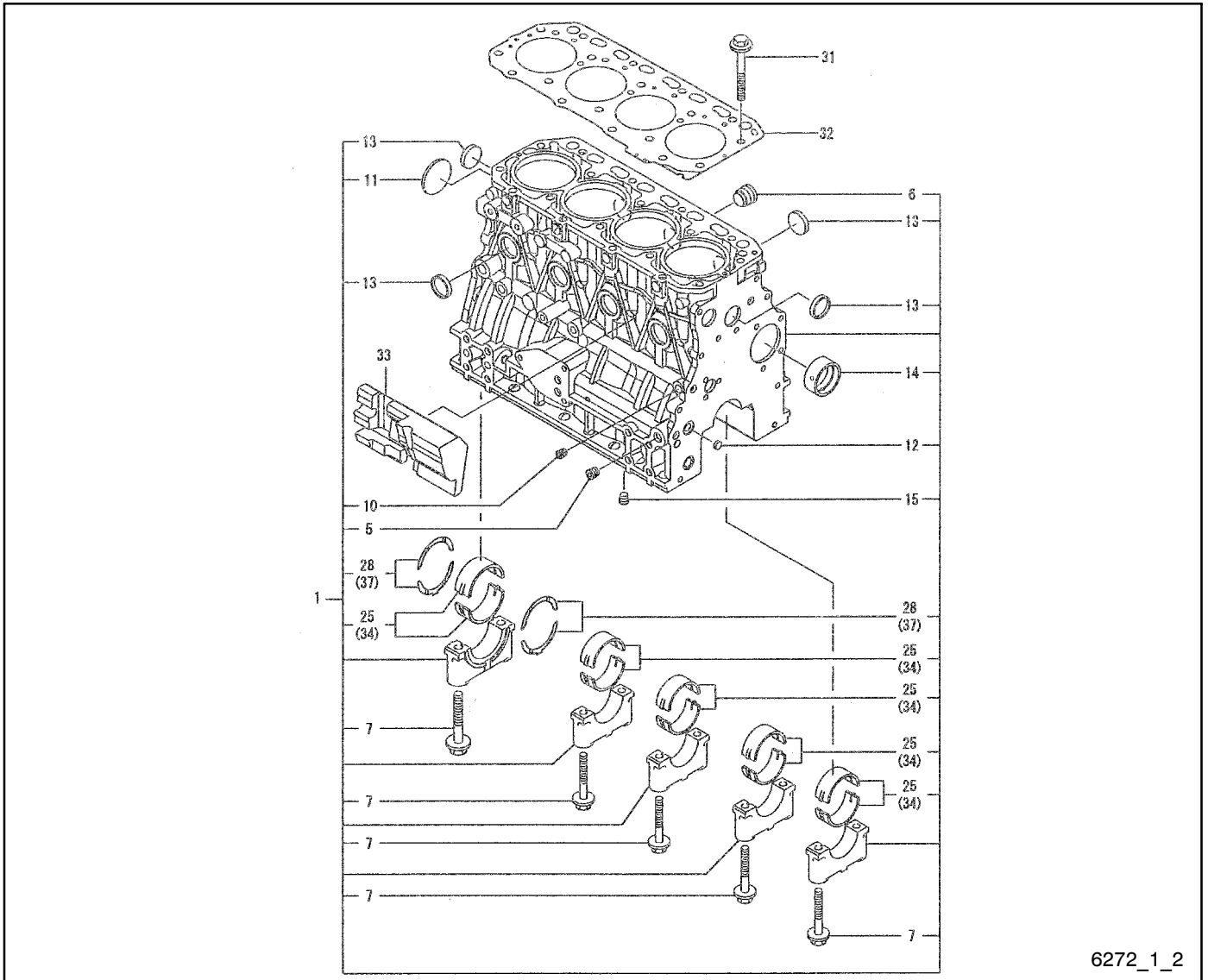
Group 1: Cylinder Block



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Item	Part Number	Description	Quantity
			Variation Number
1	GM35757	Block assembly, cylinder	1
5	252771	Plug PT 1/4	2
6	252566	Plug	1
7	252803	Bolt	10
10	252078	Plug	1
11	GM35519	Plug	1
12	252728	Plug	2
13	225924	Plug	8
14	252933	Bush	1
15	252771	Plug PT 1/4	1
25	GM13297	Main bearing set, upper and lower	5
28	252977	Thrust bearing	2
31	252797	Stud, cylinder head	18
32	GM13317	Gasket, cylinder head	1
33	GM35523	Spacer	1
34	256585	Bearing, main, undersized 0.25	5
37	256765	Bearing, thrust, oversized 0.25	1

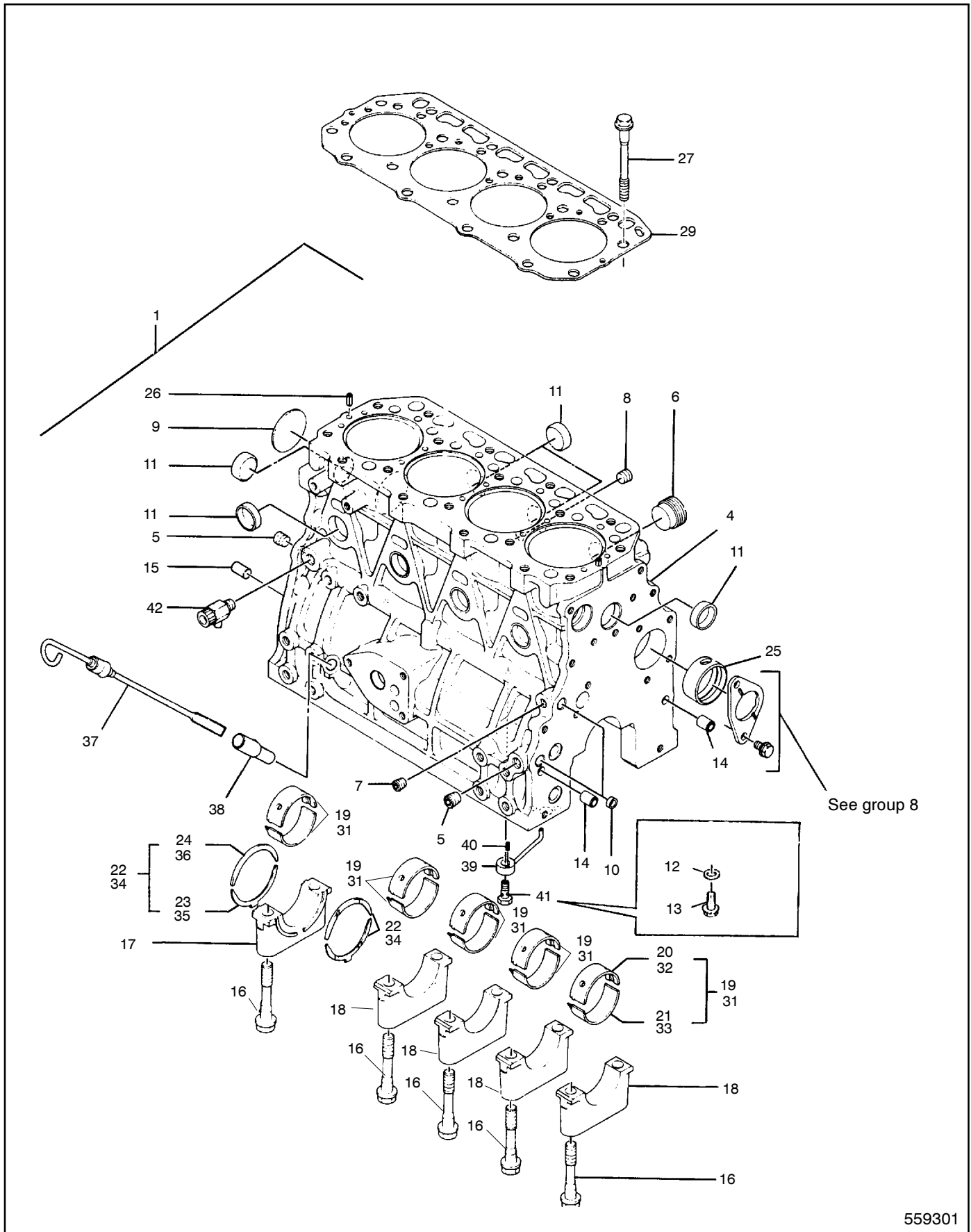
Group 1: Cylinder Block



6272_1_2

Item	Part Number	Description	Quantity
			Variation Number
1	GM35753	Block assembly, cylinder	1
5	252771	Plug PT 1/4	2
6	252566	Plug	1
7	252803	Bolt	10
10	252078	Plug	1
11	GM35519	Plug	1
12	252728	Plug	2
13	225924	Plug	8
14	252933	Bush	1
15	252771	Plug PT 1/4	1
25	GM13297	Main bearing set, upper and lower	5
26	252977	Thrust bearing	2
31	252797	Stud, cylinder head	18
32	GM35582	Gasket, head	1
33	GM35523	Spacer	1
34	256585	Bearing, main, oversized 0.25	5
37	256765	Bearing, thrust, oversized 0.25	1

Group 1: Cylinder Block, continued

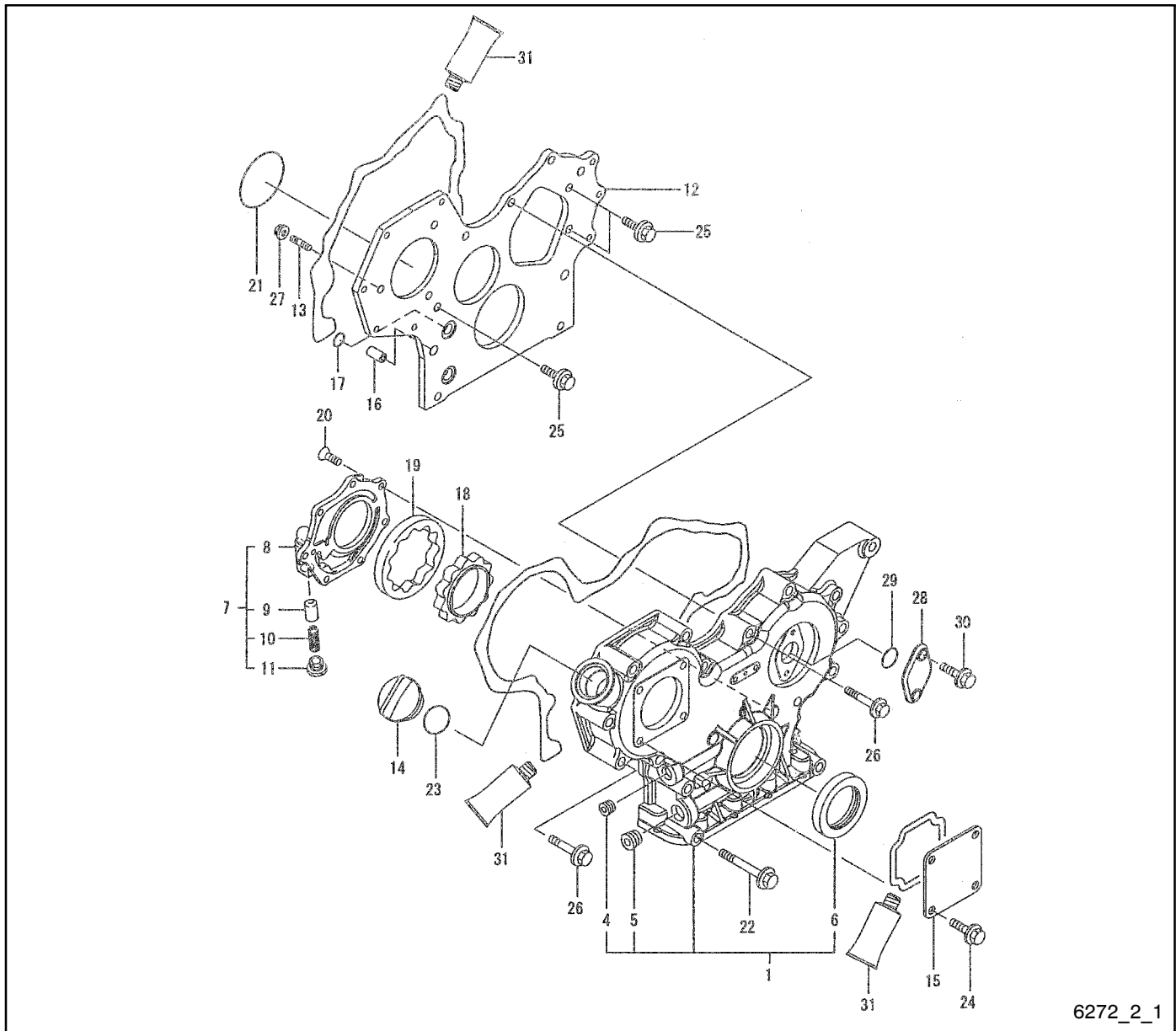


Group 1: Cylinder Block, continued

Item	Part Number	Description	Quantity	
			Variation Number 3	Variation Number 4
1	GM13345	Block assembly, cylinder	1	
1	GM13347	Block assembly, cylinder		1
4	X	Block, cylinder	1	1
5	252771	Plug, PT 1/4	2	2
6	252566	Plug	1	1
7	256515	Plug, PT 1/8, screw	1	1
8	250975	Plug, PT 1/4	1	
9	225827	Plug	1	1
10	252728	Plug	2	2
11	225924	Plug	8	8
12	—	Not used		
13	—	Not used		
14	—	Not used		
15	—	Not used		
16	252803	Bolt, bearing cap	10	10
17	X	Bearing cap	1	1
18	X	Bearing cap	4	4
19	GM13297	Bearing, main (includes items 20, 21)	5	5
20	X	Bearing, main	5	5
21	X	Bearing, main	5	5
22	252977	Bearing, thrust (includes items 23, 24)	2	2
23	X	Bearing, thrust	2	2
24	X	Bearing, thrust	2	2
25	252933	Bush, camshaft	1	1
26	—	Not used		
27	252797	Stud, cylinder head	18	18
29	GM13317	Gasket, cylinder head, standard	1	
29	363429	Gasket, cylinder head, standard		1
31	256585	Bearing, main, undersized 0.25 (includes items 32, 33)	5	5
32	X	Bearing	5	5
33	X	Bearing	5	5
34	256765	Bearing, thrust, 0.25 oversized (includes items 35, 36)	2	2
35	X	Bearing	2	2
36	X	Bearing	2	2
37	252951	Dipstick	1	1
38	252759	Guide, dipstick	1	1
39	—	Not used		
40	—	Not used		
41	252771	Plug, PT 1/4	1	1
42	252394	Cock	1	1

X Item not sold separately.

Group 2: Gear Housing

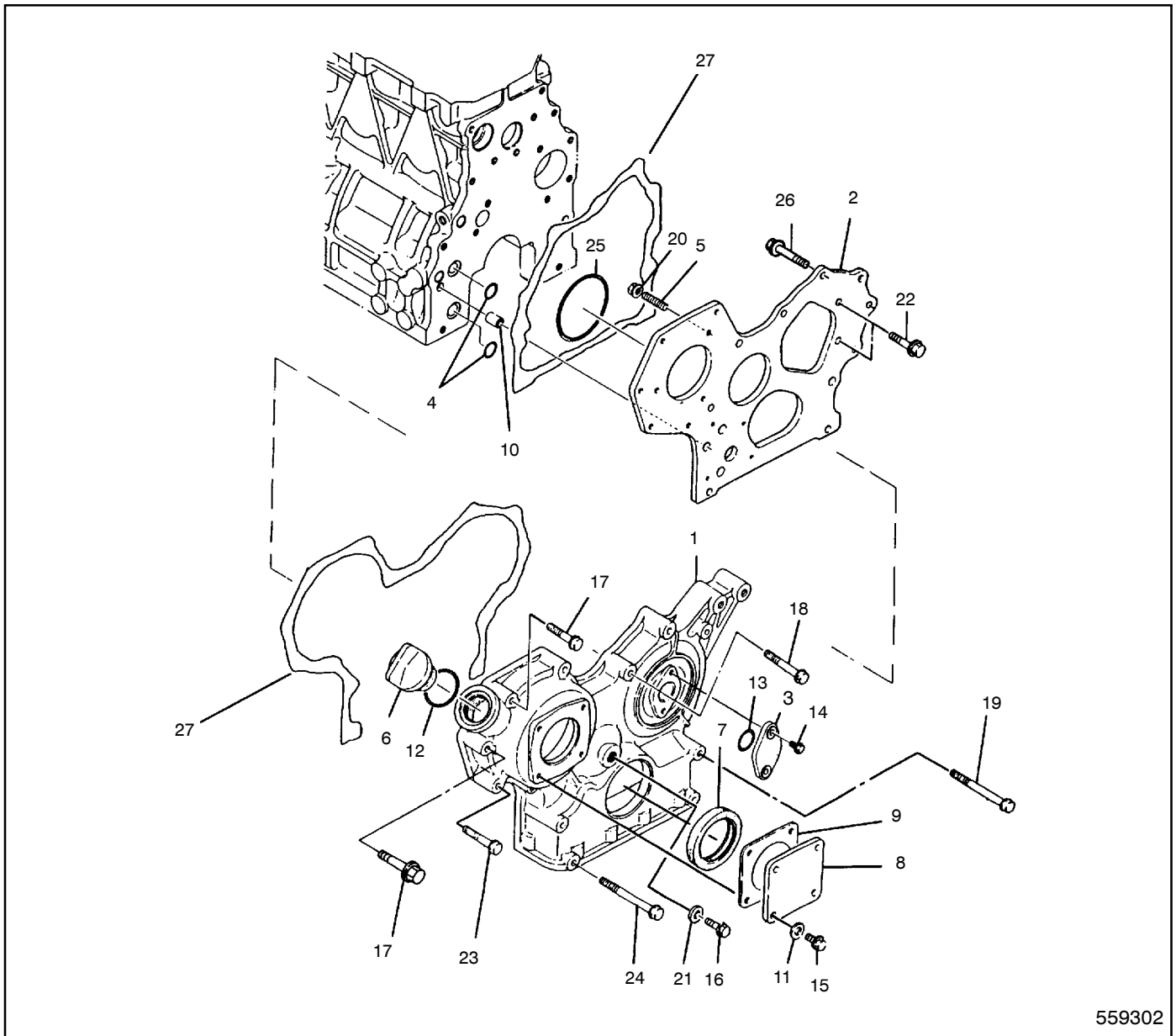


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Item	Part Number	Description	Quantity	
			Variation Number 1	Variation Number 2
1	GM35736	Housing assembly, gear	1	
1	GM35752	Housing assembly, gear		1
4	GM35720	Plug, screw	1	1
5	GM35721	Plug	1	1
6	252931	Oil seal	1	1
7	GM35464	Cover assembly, pump	1	1
8	GM35463	Cover, lube oil pump	1	1
9	GM35653	Valve, relief	1	1
10	GM35578	Spring	1	1
11	GM35520	Plug	1	1
12	GM35429	Flange, gear case	1	1
13	GM35430	Stud, M8 x 25	3	3
14	250837	Cap	1	1
15	256531	Cover	1	1
16	252932	Knock, pipe	2	2
17	GM35421	O-ring	4	4

Item	Part Number	Description	Quantity	
			Variation Number 1	Variation Number 2
18	GM35465	Rotor, inner	1	
18	GM35609	Rotor, inner		1
19	GM35466	Rotor, outer	1	
19	GM35610	Rotor, outer		1
20	GM35467	Screw, M6 x 16	7	7
21	252764	O-ring, pump	1	1
22	GM35522	Bolt, M8 x 85	3	3
23	252684	O-ring	1	1
24	252696	Bolt, M8 x 12	4	4
25	252696	Bolt, M8 x 12	3	3
26	256798	Bolt, M8 x 55, plated	12	12
27	GM35732	Nut	3	3
28	252750	Cover, blind	1	1
29	256796	O-ring	1	1
30	252693	Bolt	2	2
31	252998	Gasket	1	1

Group 2: Gear Housing



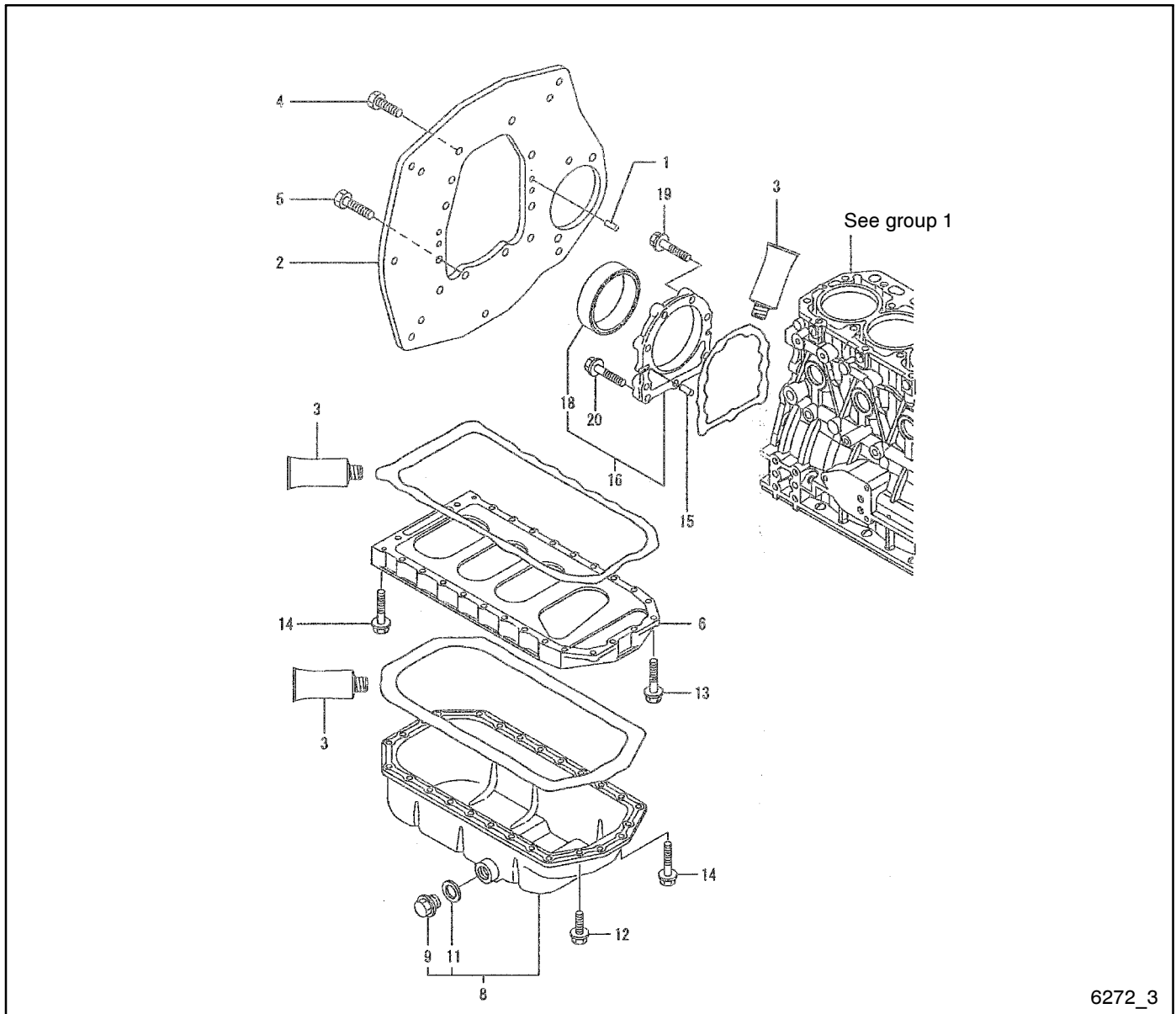
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Item	Part Number	Description	Quantity
			Variation Number
1	229799	Housing, gear	1
2	252861	Flange, gear housing	1
3	252750	Cover, blind	1
4	250981	O-ring	2
5	252409	Stud, M8 x 22	3
6	250837	Cap, lub. oil supply	1
7	252931	Seal, oil, front	1
8	256531	Cover	1
9	252085	Gasket	1
10	252932	Pipe, knock	2
11	252734	Seal, washer 8	4
12	252684	O-ring	1
13	256796	O-ring	1
14	252693	Bolt, M6 x 16, plated	2

Item	Part Number	Description	Quantity
			Variation Number
15	252695	Bolt, M8 x 12, plated	4
16	252696	Bolt, M8 x 16, plated	1
17	252703	Bolt, M8 x 45, plated	4
18	256798	Bolt, M8 x 55, plated	3
19	256799	Bolt, M8 x 85, plated	2
20	252723	Nut, M8	3
21	252734	Washer, seal 8	1
22	252696	Bolt, M8 x 16, plated	3
23	252704	Bolt, M8 x 50, plated	2
24	229500	Bolt, M8 x 90, plated	2
25	252764	O-ring, F.I. pump	1
26	252697	Bolt, M8 x 20, plated	2
27	252998	Gasket, liquid	AR

AR As Required

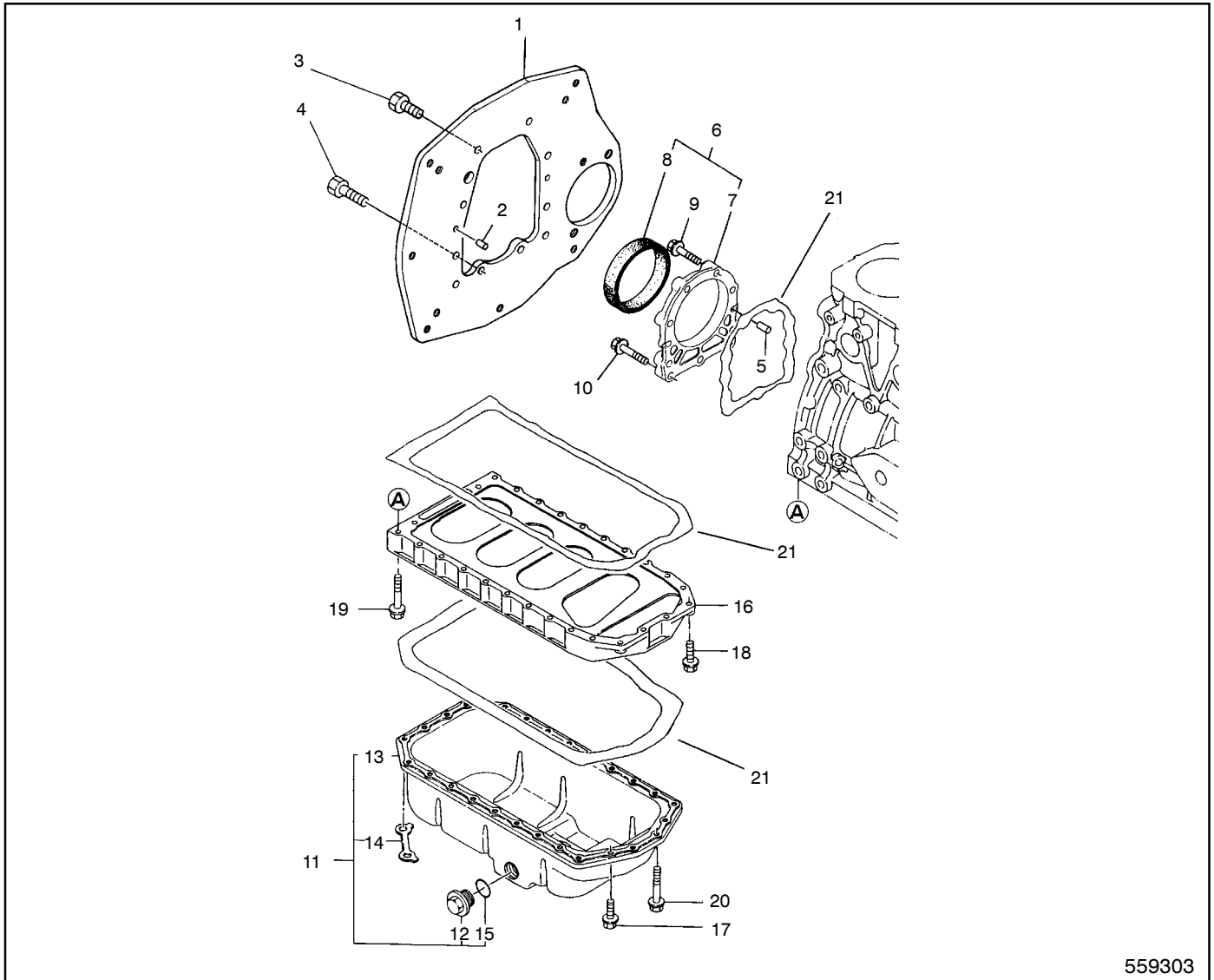
Group 3: Oil Pan



6272_3

Item	Part Number	Description	Quantity
			Variation Number
1	256750	Parallel pin, 8 x 16	2
2	229114	Mounting flange	1
3	252998	Gasket	1
4	229505	Bolt, M10 x 20	6
5	252714	Bolt	4
6	252862	Spacer, pump	1
8	229519	Sump assembly, lub. oil	1
9	225386	Drain plug	1
11	225425	Seal washer	1
12	252696	Bolt, M8 x 12	4
13	252699	Bolt, M8 x 25, plated	2
14	252703	Bolt	24
15	256750	Parallel pin, 8 x 16	2
16	225866	Case assembly	1
18	252930	Rear oil seal	1
19	363430	Bolt, M8 x 30	6
20	252701	Bolt, M8 x 35	3

Group 3: Oil Pan



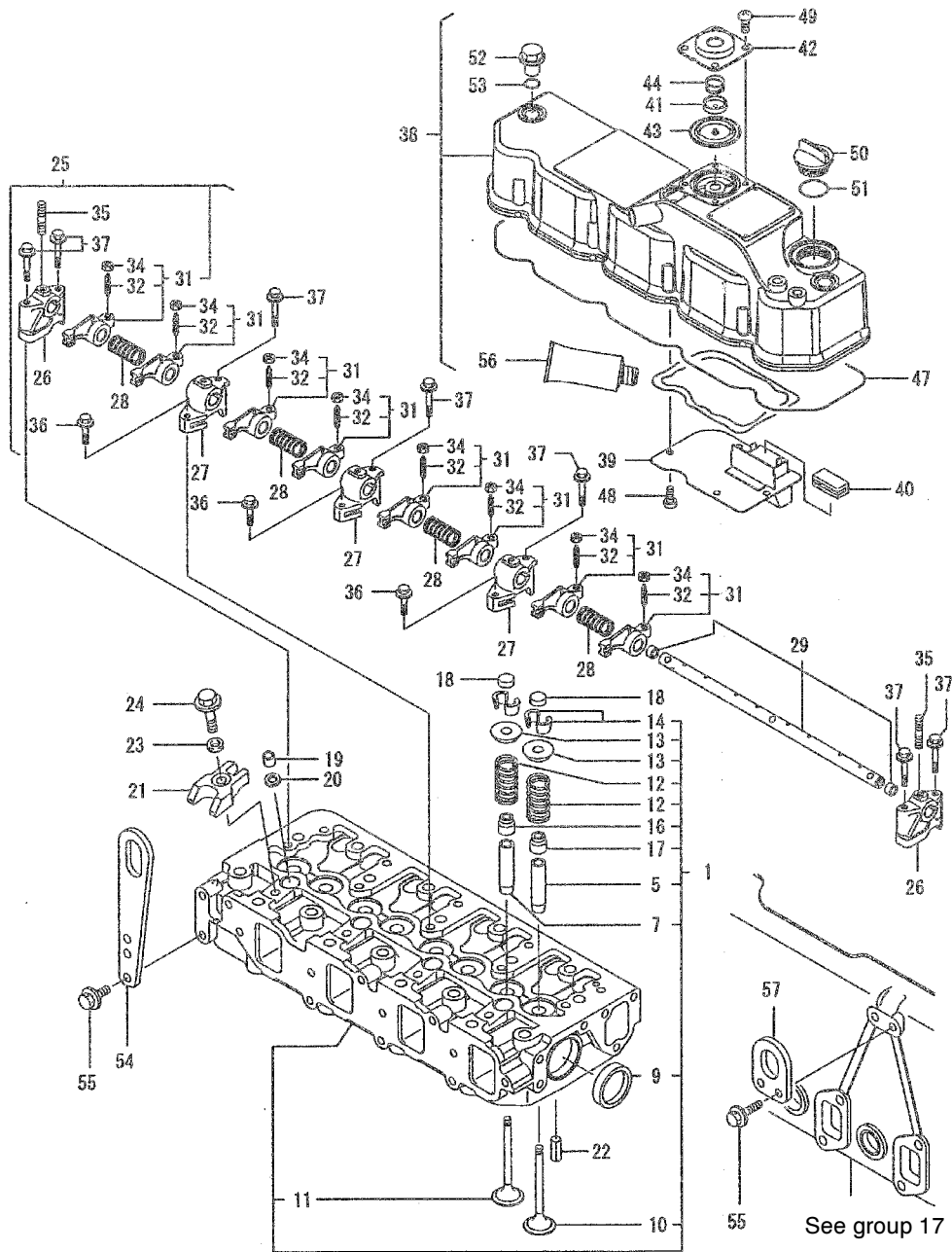
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Item	Part Number	Description	Quantity		Item	Part Number	Description	Quantity	
				Variation Number					Variation Number
1	229114	Back plate	1	3	12	225386	Plug	1	3
2	256750	Pin, parallel, 8 x 16	2		13	X	Sump, oil	1	
3	225923	Bolt, M10 x 20	6		14	—	Not used	1	
4	363210	Bolt, M10 x 25	4		15	225425	Washer, seal	1	
5	256750	Pin, parallel, 8 x 16	2		16	252862	Spacer, oil sump	1	
6	225866	Case assembly, oil seal (includes item 7 and 8)	1		17	252696	Bolt, M8 x 16, plated	4	
7	X	Case, oil seal	1		18	252699	Bolt, M8 x 25, plated	2	
8	252930	Seal, oil, rear	1		19	252703	Bolt, M8 x 45, plated	24	
9	363430	Bolt, M8 x 30, collar	6		20	252703	Bolt, M8 x 45, plated	24	
10	252701	Bolt, M8 x 35, plated	3		21	252998	Gasket, liquid	AR	
11	229519	Sump assembly, lub. oil (includes items 12-15)	1						

X Item not sold separately.

AR As Required

Group 4: Cylinder Head

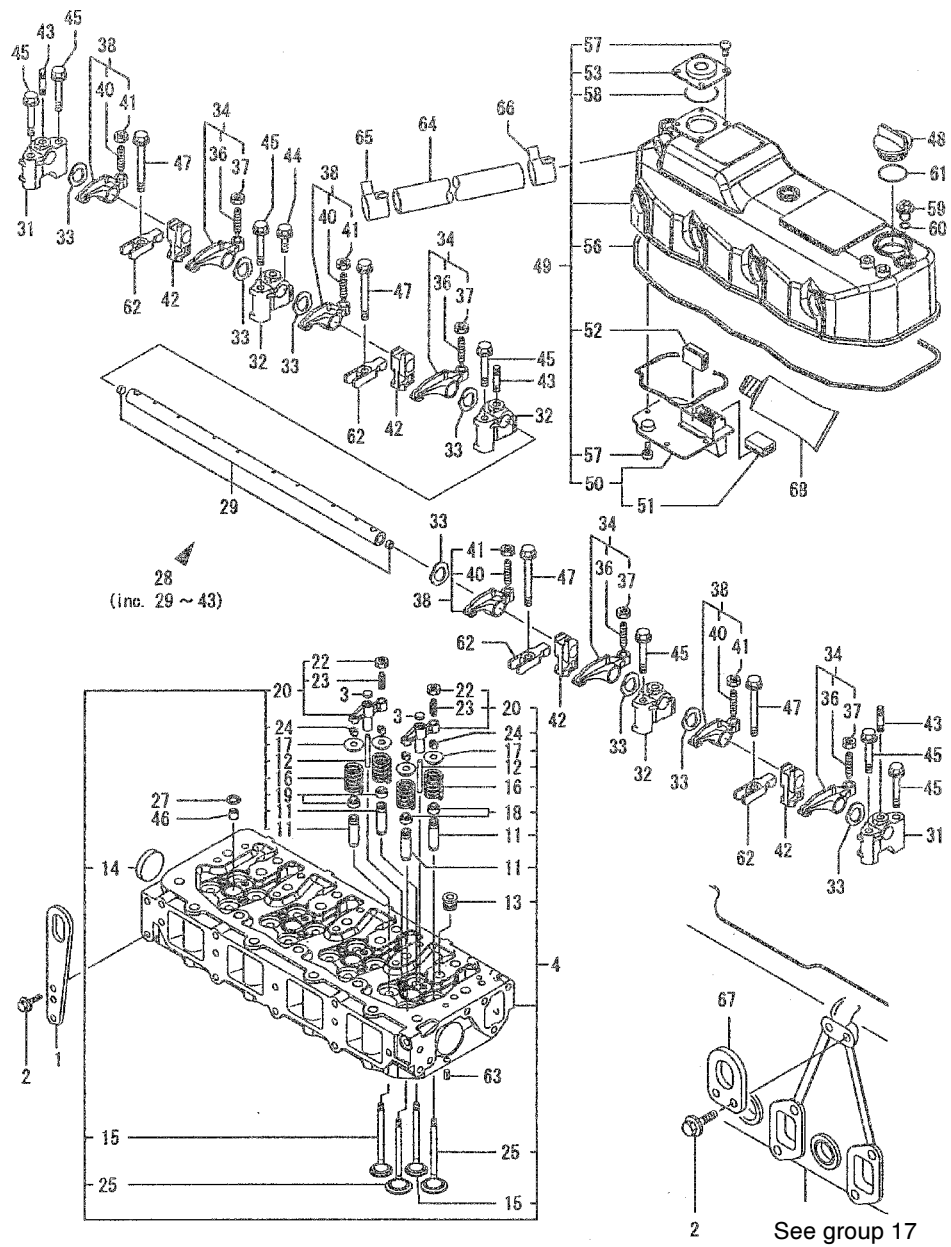


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Group 4: Cylinder Head

Item	Part Number	Description	Quantity
			Variation Number
			1
1	GM35629	Head assembly, cylinder	1
5	256736	Guide, suction valve	4
7	256768	Guide, exhaust valve	4
9	252732	Plug	2
10	GM35526	Valve, intake	4
11	252779	Valve, exhaust	4
12	252934	Spring, valve	8
13	252935	Retainer, spring	8
14	252737	Cotter 8	8
16	252754	Seal, valve stem	4
17	256578	Seal, valve stem	4
18	256717	Cap, valve	8
19	GM35450	Protector, nozzle	4
20	252744	Seat	4
21	GM35533	Retainer, nozzle	4
22	250963	Pin, spring, 6 x 12	2
23	GM35495	Washer	4
24	252701	Bolt, M8 x 35	4
25	GM35625	Shaft assembly, rocker	1
26	GM35442	Support, rocker arm	2
27	GM35443	Support, rocker arm	3
28	252815	Spring	4
29	GM35626	Shaft	1
31	GM35531	Arm assembly, rocker	8
32	229844	Valve screw	8
34	252817	Nut, M8	8
35	252722	Stud	3
36	252699	Bolt, M8 x 25, plated	3
37	252704	Bolt	7
38	GM35628	Bonnet assembly	1
39	GM35524	Plate, baffle	1
40	252805	Baffle	1
41	GM35434	Plate, diaphragm	1
42	GM35435	Cover, diaphragm	1
43	GM35436	Diaphragm	1
44	GM35437	Spring, diaphragm	1
47	GM35627	Gasket, cover	1
48	363201	Screw, tapping, 5 x 10	4
49	363201	Screw, tapping, 5 x 10	4
50	250837	Cap	1
51	252684	O-ring	1
52	252470	Nut, cap	3
53	250801	O-ring	3
54	363110	Lifter, engine	1
55	252696	Bolt, M8 x 12	4
56	252998	Gasket	1
57	256542	Lifter, engine	1

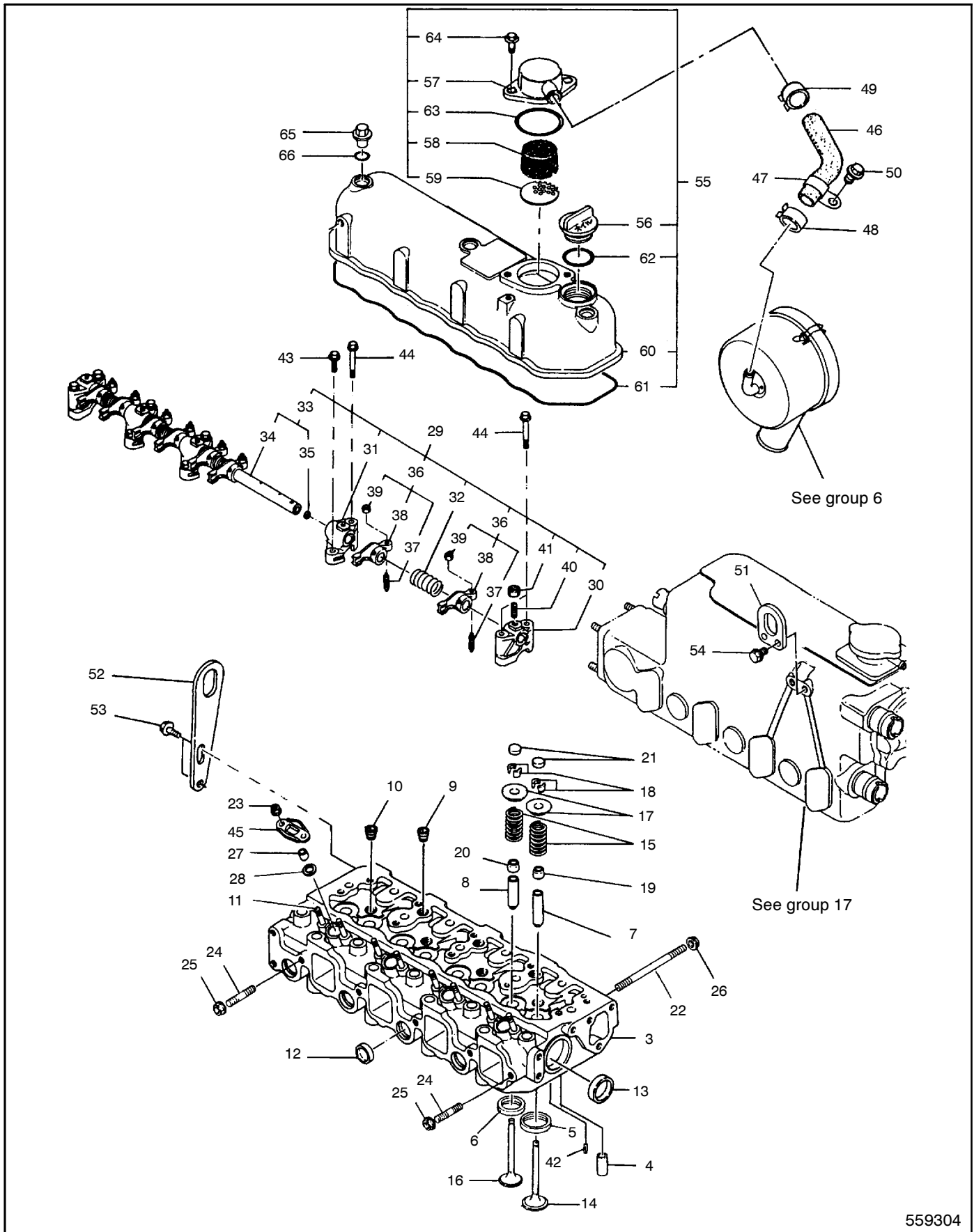
Group 4: Cylinder Head, continued



Group 4: Cylinder Head, continued

Item	Part Number	Description	Quantity
			Variation Number
			2
1	363110	Lifter, engine	1
2	252696	Bolt, M8 x 12	4
3	GM35600	Seat, valve bridge	8
4	GM35597	Head assembly, cylinder	1
11	GM35426	Guide, valve	16
12	GM35599	Guide, valve bridge	8
13	GM35719	Plug, screw	4
14	252732	Plug 40	2
15	GM35585	Valve, exhaust	8
16	GM35586	Spring, valve	16
17	GM35587	Retainer, spring	16
18	GM35424	Seal, valve stem	8
19	GM35425	Seal, valve stem	8
20	GM35598	Bridge assembly, valve	8
22	252817	Nut, M8 x P1.0	8
23	GM35508	Screw, valve bridge	8
24	GM35423	Cotter, valve	32
25	GM35584	Valve, intake	8
27	252744	Seat	4
28	GM35588	Shaft assembly, rocker	1
29	GM35589	Shaft	1
31	GM35590	Support, rocker arm	2
32	GM35591	Support, rocker arm	3
33	GM35592	Washer	8
34	GM35595	Arm assembly, rocker	4
36	229844	Valve screw	4
37	252817	Nut, M8 x p1.0	4
38	GM35596	Arm assembly, rocker	4
40	229844	Valve screw	4
41	252817	Nut, M8 x p1.0	4
42	GM35602	Pedestal, retainer	4
43	GM35731	Stud, M8 x 35, plated	3
44	252699	Bolt, M8 x 25, plated	3
45	252704	Bolt	7
46	GM35450	Protector, nozzle	4
47	GM35681	Bolt, retainer	4
48	250837	Cap	1
49	GM35594	Bonnet assembly	1
50	GM35583	Plate, baffle	1
51	GM35432	Baffle, breather	1
52	252805	Baffle	1
53	GM35552	Cover, diaphragm	1
56	GM35593	Packing	1
57	363201	Screw, tapping, 5 x 10	8
58	GM35723	O-ring	1
59	252470	Nut, cap	3
60	250801	O-ring	3
61	252684	O-ring	1
62	GM35601	Retainer, valve	4
63	250963	Pin, spring, 6 x 12	2
64	229414	Breather pipe	1
65	GM13316	Clamp	1
66	GM35708	Hose clip	1
67	256542	Lifter, engine	1
68	252998	Gasket	1

Group 4: Cylinder Head, continued



559304

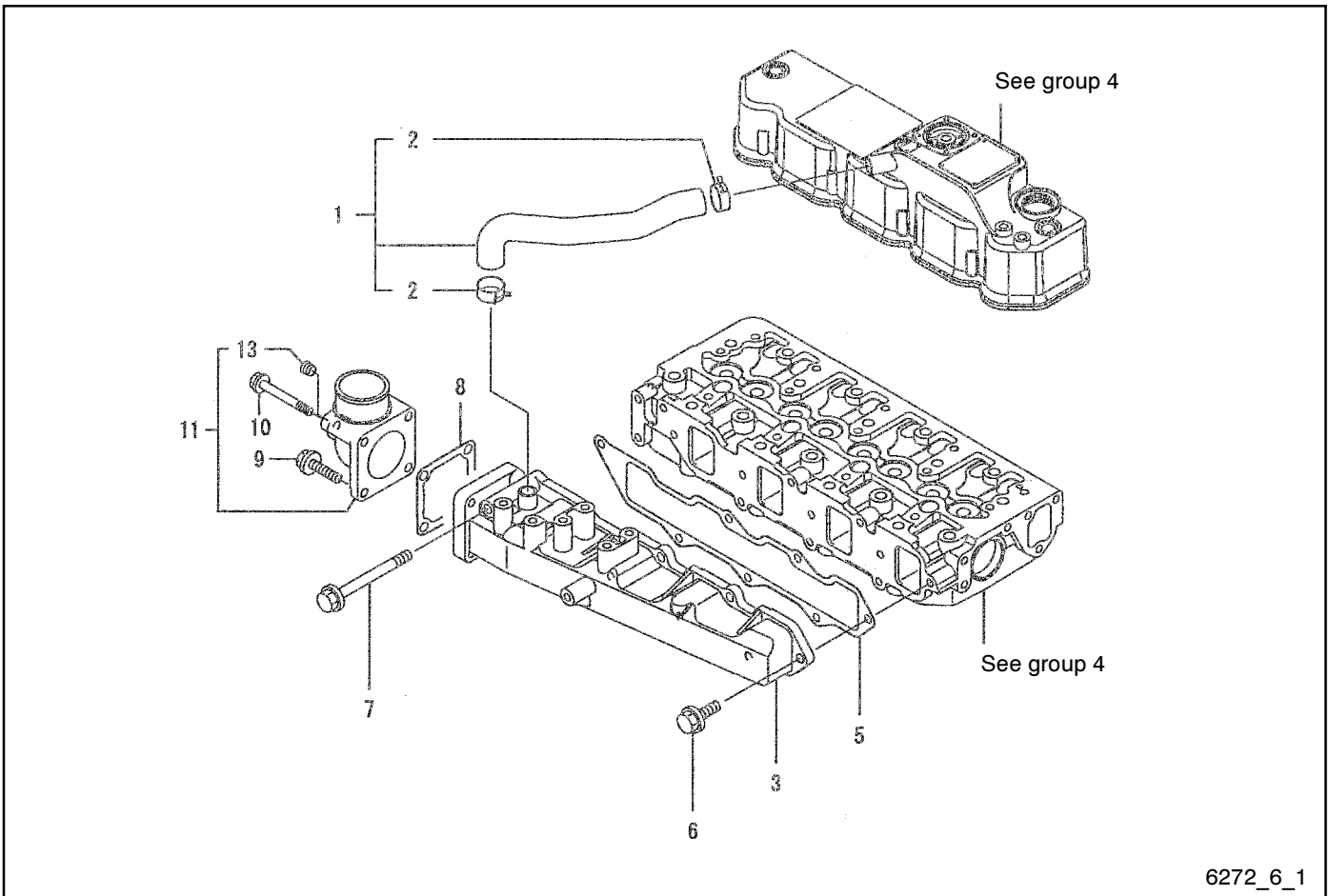
Group 4: Cylinder Head, continued

Item	Part Number	Description	Quantity	
			Variation Number	
			3	4
1	GM13317	Head assembly, cylinder	1	
1	363431	Head assembly, cylinder		1
2	X	Head assembly, cylinder (includes items 3-13)	1	1
3	X	Head, cylinder	1	1
4	X	Plug		1
5	252871	Seat, intake valve		4
6	252872	Seat, exhaust valve		4
7	256736	Guide, intake valve	4	4
8	252811	Guide, exhaust valve	4	4
9	250974	Plug		3
10	250975	Plug		4
11	252717	Stud, M6 x 20, plated	8	8
12	252729	Plug		4
13	252732	Plug	2	2
14	252778	Valve, intake	4	4
15	252934	Spring, valve	8	8
16	252779	Valve, exhaust	4	
16	252780	Valve, exhaust		4
17	252935	Retainer, spring	8	8
18	363216	Cotter	8	8
19	252754	Seal, intake valve stem	4	4
20	256578	Seal, exhaust valve stem	4	4
21	256717	Cap, valve	8	8
22	—	Not used		
23	229507	Nut, M6	8	
23	250989	Nut, M6		8
24	—	Not used		
25	—	Not used		
26	—	Not used		
27	252743	Protector, nozzle	4	4
28	252744	Seat, nozzle	4	4
29	229444	Shaft, assembly, rocker (includes items 30-41)	1	1
30	252843	Support, rocker arm	2	2
31	252844	Support, rocker arm	3	3
32	252815	Spring	4	4

Item	Part Number	Description	Quantity	
			Variation Number	
			3	4
33	225891	Shaft, rocker arm (includes items 34 and 35)	1	1
34	X	Shaft, rocker arm	1	1
35	X	Plug	2	2
36	225869	Arm assembly, rocker (includes items 37-39)	8	8
37	229844	Screw, valve	8	8
38	X	Arm, rocker	8	8
39	252817	Nut, M8	8	8
40	252722	Stud, M8 x 18, plated	3	3
41	250804	Lock nut, M8, plated	3	3
42	250963	Pin, spring	2	2
43	252699	Bolt, M8 x 25, plated	3	3
44	252704	Bolt, M8 x 50, plated	7	7
45	252745	Retainer	4	4
46	229414	Pipe, breather	1	1
47	—	Not used		
48	GM13316	Clamp 16	1	1
49	229425	Clamp 24	1	1
50	—	Not used		
51	256542	Lifter, engine	1	1
52	363110	Lifter, engine	1	1
53	225818	Bolt, M8 x 14, plated		
54	252696	Bolt, M8 x 16, plated	4	4
55	225935	Bonnet assembly (includes items 58-66)	1	1
56	250837	Cap, lub. oil supply	1	1
57	225773	Cover, breather	1	1
58	252805	Baffle, breather	1	1
59	252806	Plate, shelter	1	1
60	X	Bonnet	1	1
61	252914	Gasket, bonnet	1	1
62	252684	O-ring	1	1
63	225812	O-ring	1	1
64	252696	Bolt, M8 x 16, plated	2	2
65	252470	Knob	3	3
66	250801	O-ring	3	3

X Item not sold separately.

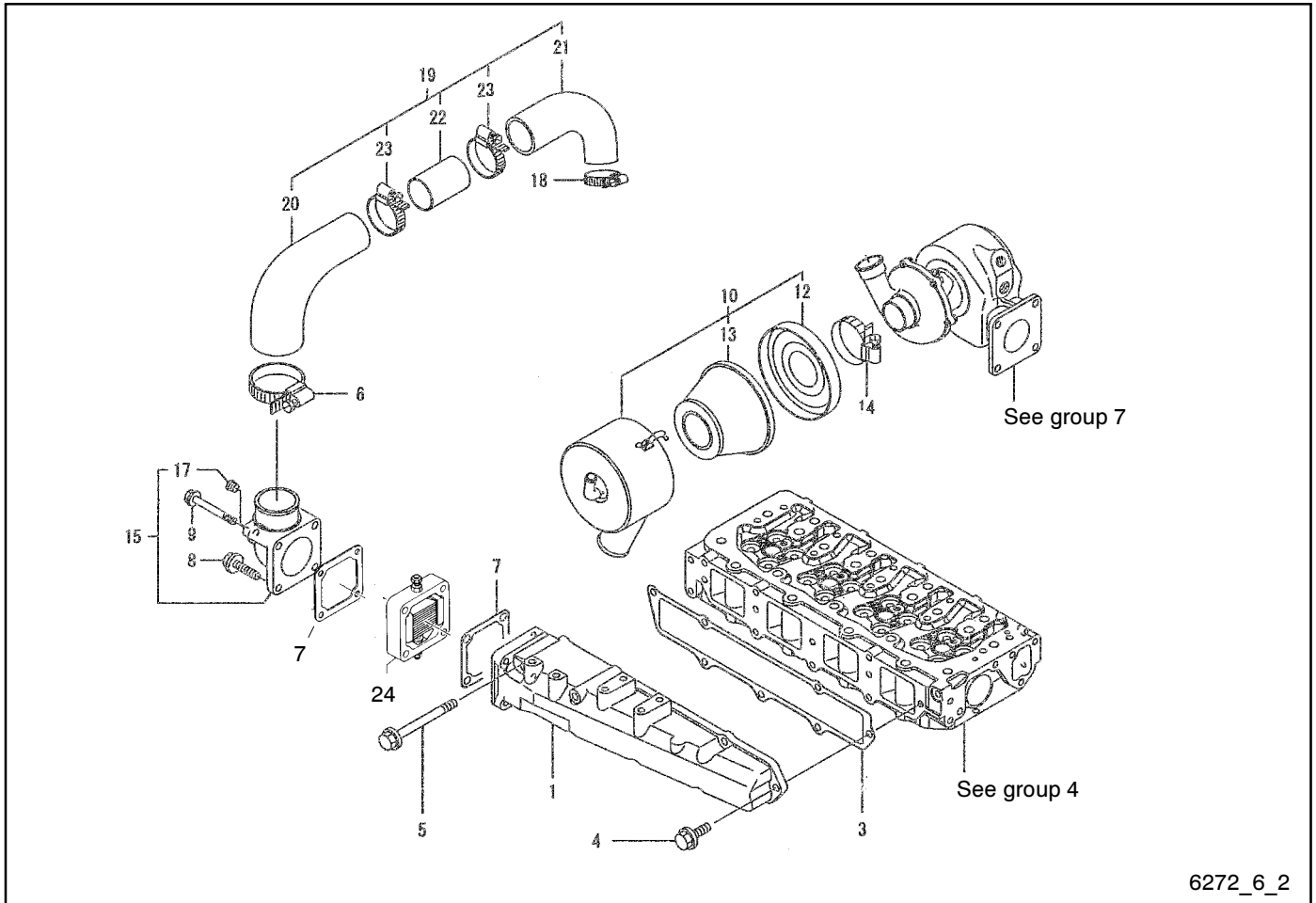
Group 6: Intake Manifold



6272_6_1

Item	Part Number	Description	Quantity
			Variation Number
1	GM35624	Pipe, breather	1
2	229425	Clamp	2
3	GM35630	Manifold, intake	1
5	GM35575	Gasket, intake manifold	1
6	252697	Bolt	6
7	252707	Bolt	1
8	225778	Gasket	1
9	252697	Bolt	2
10	252706	Bolt	2
11	GM35639	Joint assembly	1
13	GM13812	Plug, PT 1/8, screw	1

Group 6: Intake Manifold



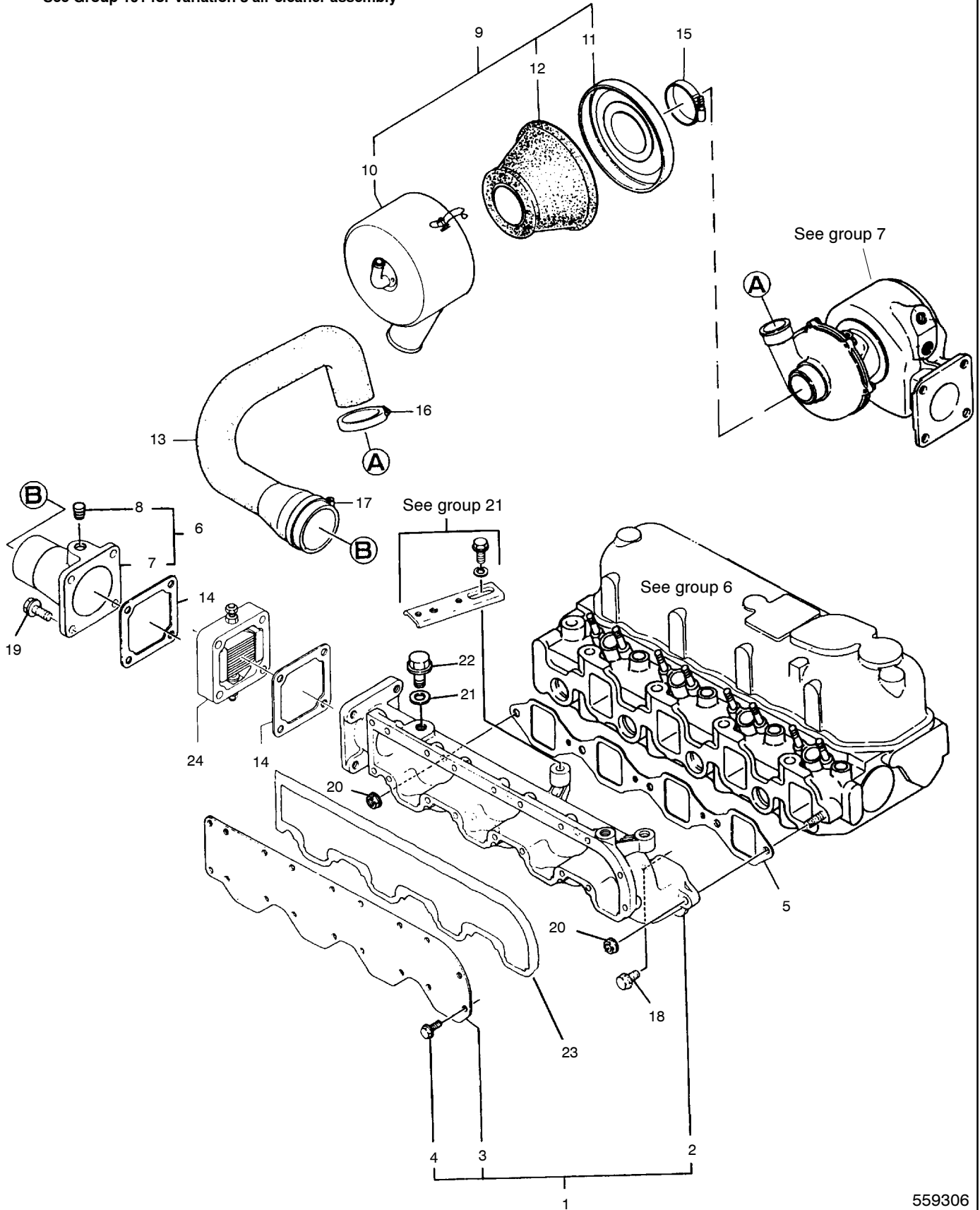
6272_6_2

Item	Part Number	Description	Quantity		
			Variation Number		
			2	5	6
1	GM35603	Manifold, intake	1	1	1
3	GM35604	Gasket, manifold	1	1	1
4	252697	Bolt	5	5	5
5	252707	Bolt	2	2	2
6	229494	Clamp	1	1	1
7	225778	Gasket	1		1
7	344904	Gasket, air heater		2	
8	252697	Bolt	2		2
8	M931-08040-60	Bolt, hex head		2	
8	M125A-08-80	Washer, plain		2	
9	252706	Bolt	2		2
9	M931-08080-60	Bolt, hex head		2	
9	M125A-08-80	Washer, plain		2	
10	229442	Silencer assy	1	1	1
12	229443	Plate, bottom	1	1	1
13	250902	Element	1	1	1
14	229493	Clamp	1	1	1
15	GM35639	Joint assembly	1	1	1
17	GM13812	Plug, PT 1/8, screw	1	1	1
16	229493	Clamp	1	1	1
18	GM35643	Hose assembly, intake	1	1	1
20	GM35640	Hose, air intake	1	1	1
21	GM35641	Hose, air intake	1	1	1
22	GM35642	Joint	1	1	1
23	229846	Clamp	2	2	2
24	GM47221	Heater, air		1	
24	-	Heater, air (see group 401)			2

See Group 401 for additional preheater parts

Group 6: Intake Manifold, continued

See Group 101 for variation 3 air cleaner assembly



Group 6: Intake Manifold, continued

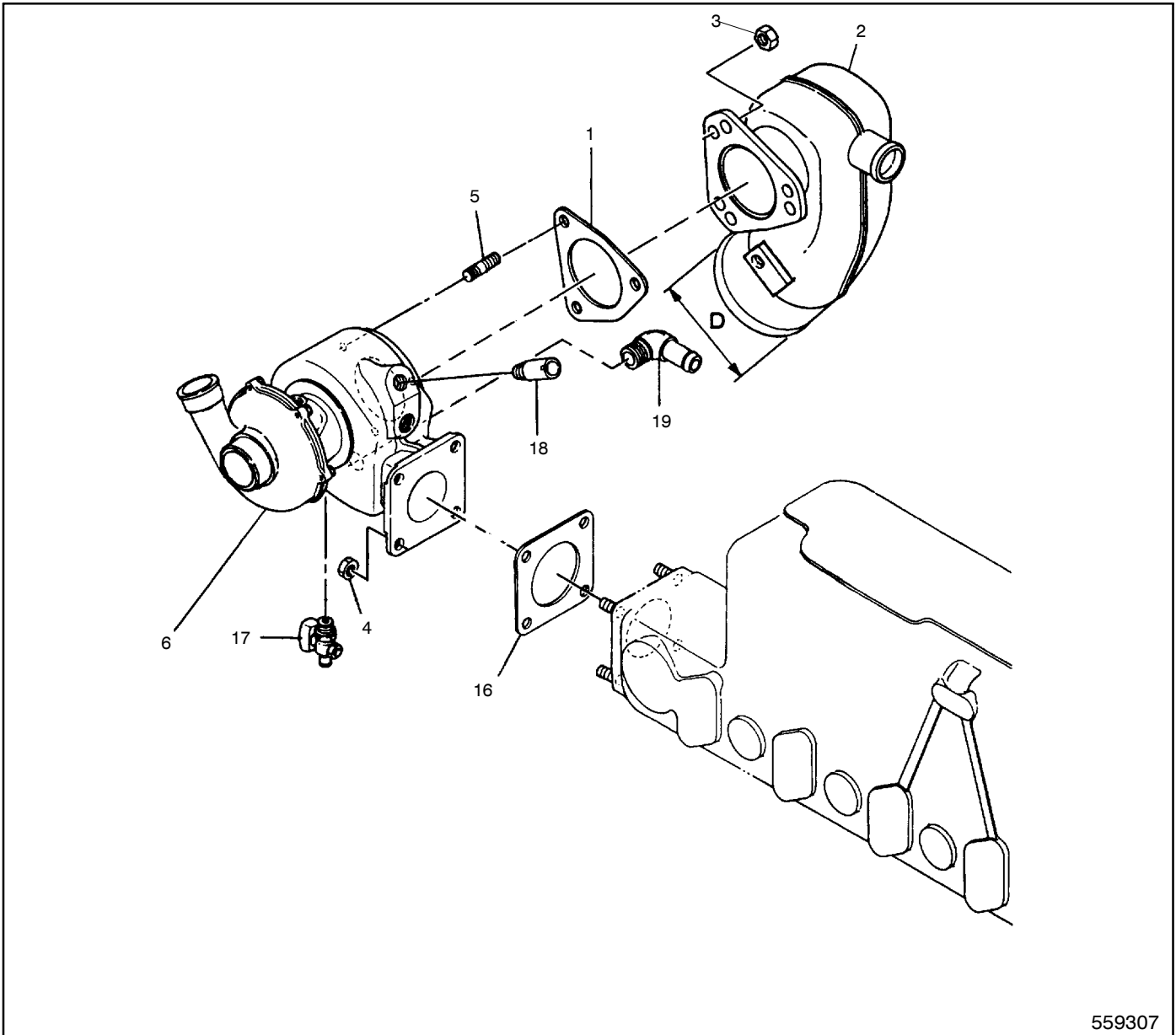
See Group 101 for variation 3 air cleaner assembly

Item	Part Number	Description	Quantity	
			Variation Number	
			3	4
1	GM13331	Manifold assembly, intake (includes items 2-4)	1	1
2	X	Manifold, intake	1	1
3	252874	Cap	1	1
4	229508	Bolt, M6 x 14, tapping	18	18
5	229428	Gasket	1	1
6	229429	Joint assembly (includes items 7 & 8)		1
6	GM13327	Joint, air heater	1	
7	X	Joint		1
8	256515	Plug, PT 1/8, screw		1
9	229442	Silencer assembly (includes item10-12)		1
10	X	Body, silencer		1
11	229443	Plate, bottom		1
12	250902	Element, cleaner		1
13	256627	Pipe		1
14	229719	Gasket	1	1
15	229493	Clamp 48		1
16	229493	Clamp 48		1
17	229494	Clamp 60		1
18	252697	Bolt, M8 x 20, plated	3	3
19	252702	Bolt, M8 x 40, plated		4
19	252703	Bolt, M8 x 20, plated	4	
20	252723	Nut, M8	2	2
21	250968	Gasket 10, round	1	1
21	252734	Seal washer	1	1
22	229502	Bolt, M10 x 12, plated	1	1
22	252695	Bolt, M10 x 12, plated	1	1
23	252998	Gasket, liquid	AR	AR
24	229825	Heater, air	1	1

X Item not sold separately.

AR As Required

Group 7: Turbocharger

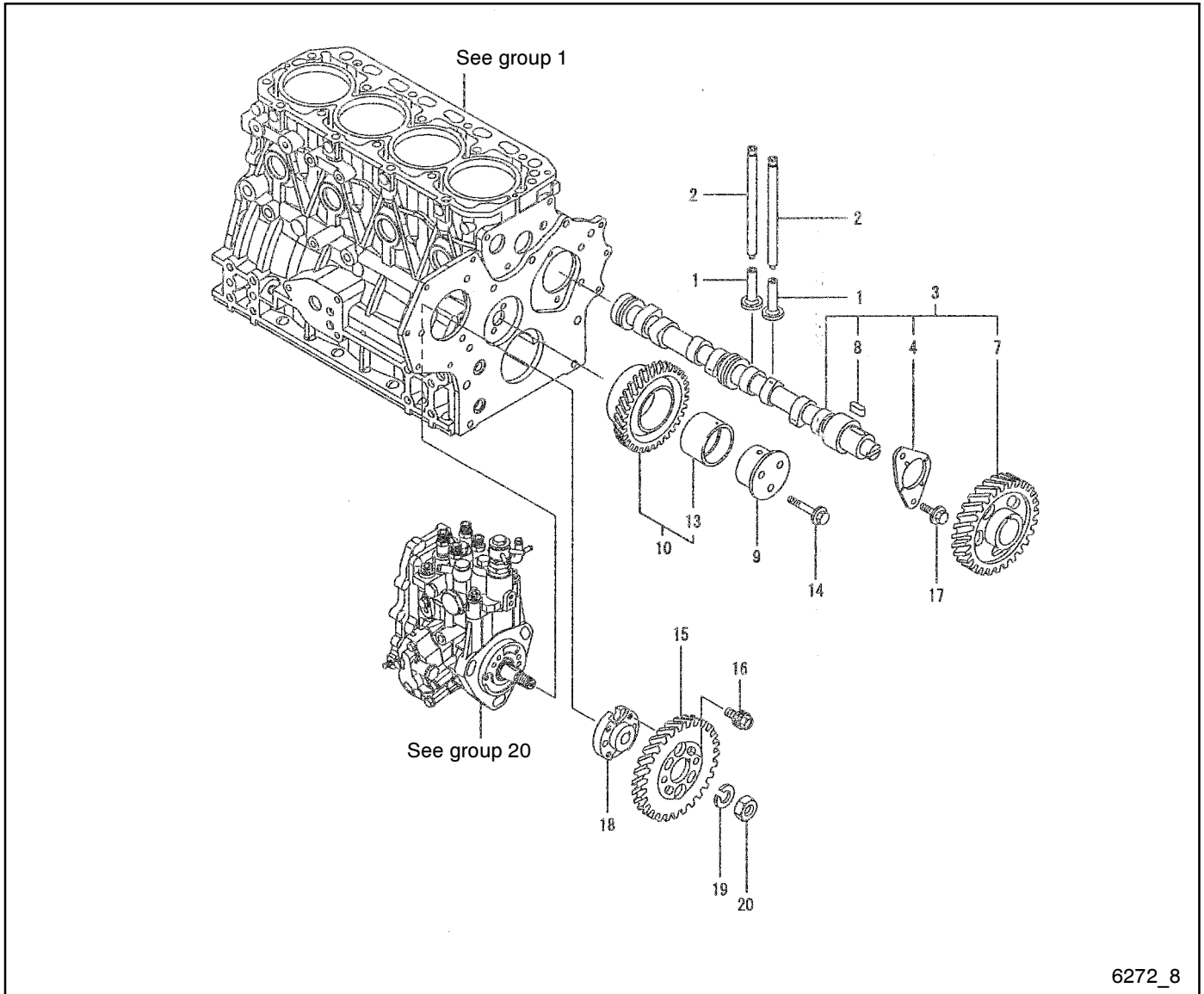


559307

Item	Part Number	Description	Quantity		
			Variation Number		
			1	2	3
1	256653	Gasket	1	1	1
2	256651	Elbow, mixing	1	1	1
3	229509	Nut, M8	3	3	3
4	229509	Nut, M8	4	4	4
5	256579	Stud	3	3	3
6	GM13324	Turbocharger assembly	1		1
6	GM40982	Turbocharger assembly		1	
16	GM13332	Gasket	1	1	1
17	252329	Cock, PT 1/8			1
17	GM13330	Valve assembly	1	1	
18	229403	Joint	1	1	1
19	229317	Joint			1
19	249836	Fitting, elbow	1	1	

X Item not sold separately.

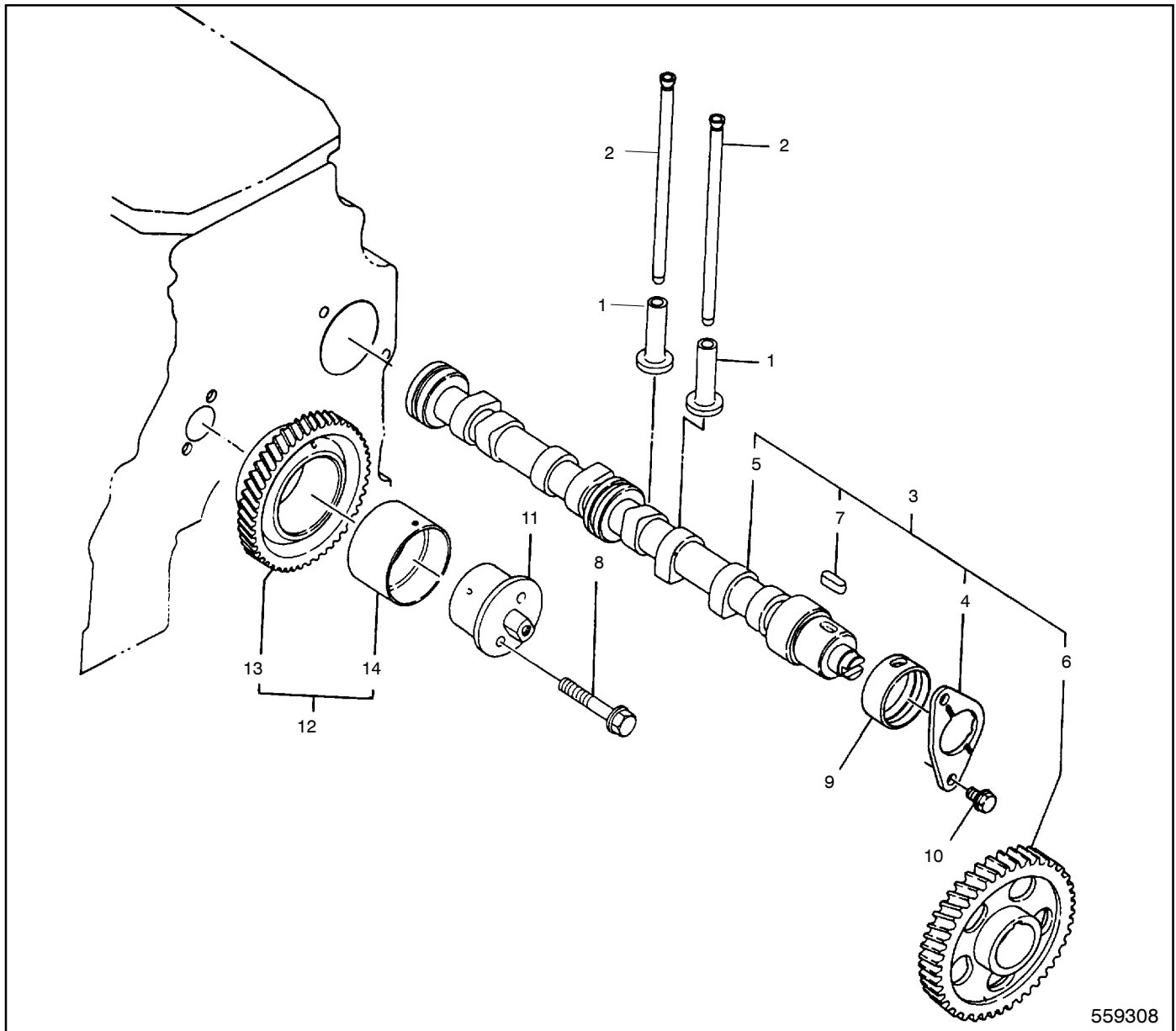
Group 8: Camshaft and Drive Gear



6272_8

Item	Part Number	Description	Quantity	
			Variation Number 1	Variation Number 2
1	252819	Tappet	8	8
2	252820	Rod, push	8	8
3	GM35755	Camshaft assembly	1	
3	GM35605	Camshaft assembly		1
4	252804	Metal, thrust	1	1
7	256587	Gear, camshaft	1	1
8	252669	Key, 7 x 14	1	1
9	GM35459	Shaft, idle gear	1	1
10	GM35461	Gear assembly, idle	1	1
13	GM35460	Bush, idle gear	1	1
14	252702	Bolt	3	3
15	GM35462	Gear, pump	1	1
16	GM19682	Bolt, gear	4	4
17	225818	Bolt, M8 x 14	2	2
18	GM35711	Flange	1	1
19	GM35714	Washer, spring	1	1
20	GM35734	Nut, lock, M14, plated	1	1

Group 8: Camshaft and Drive Gear, continued

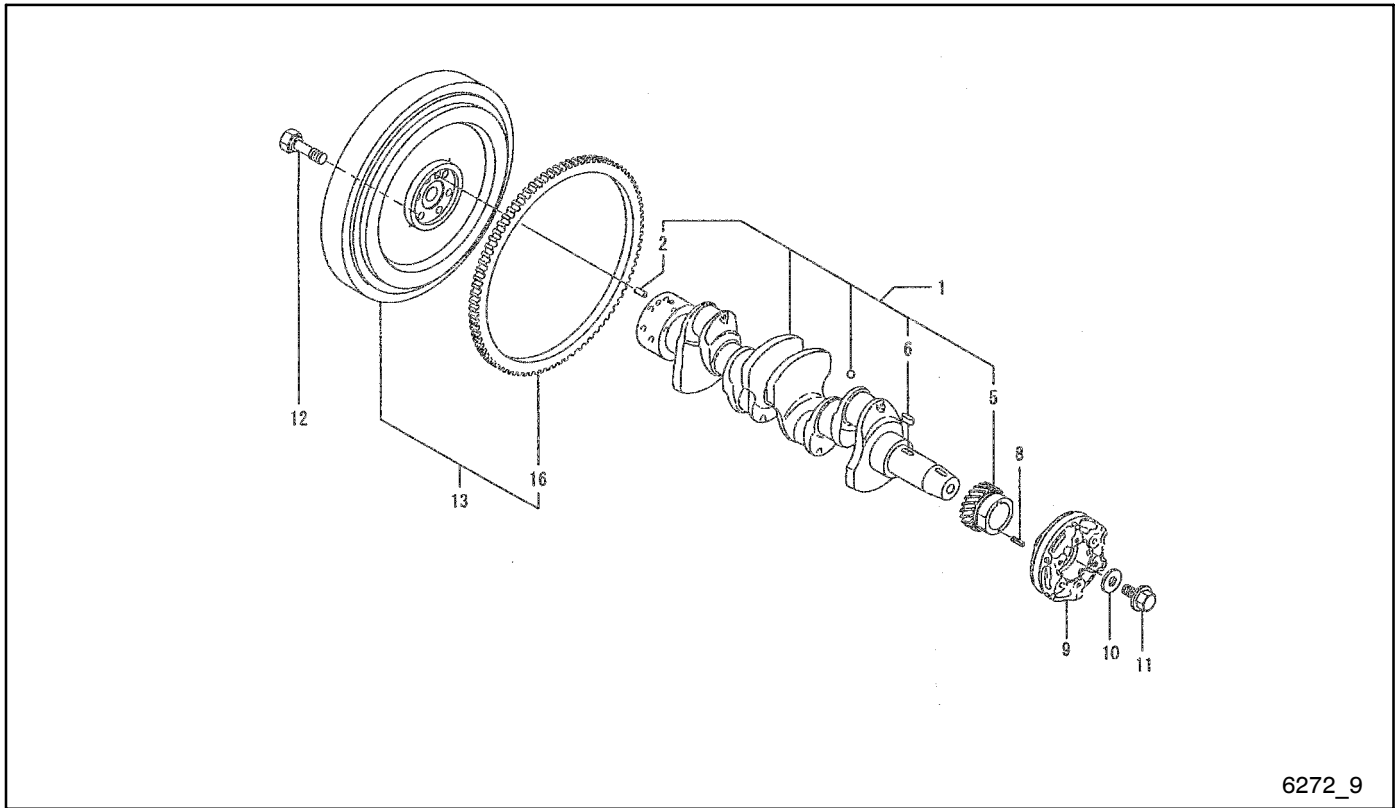


559308

Item	Part Number	Description	Quantity
			Variation Number
			3
1	252819	Tappet	8
2	229404	Rod, push	8
3	225930	Camshaft assembly (includes item 4-7)	1
4	252804	Bearing, thrust	1
5	X	Camshaft	1
6	256587	Gear, camshaft	1
7	252669	Key	1
8	252703	Bolt, M8 x 45, plated	2
9	—	Not used	
10	252696	Bolt, M8 x 16, plated	2
11	252782	Shaft, idle gear	1
12	256590	Gear, idle (includes items 13 and 14)	1
13	X	Gear, idle	1
14	252825	Bush, idle gear	1
15	252666	Washer, spring (not shown)	1
16	252725	Nut, 12 (not shown)	1

X Item not sold separately.

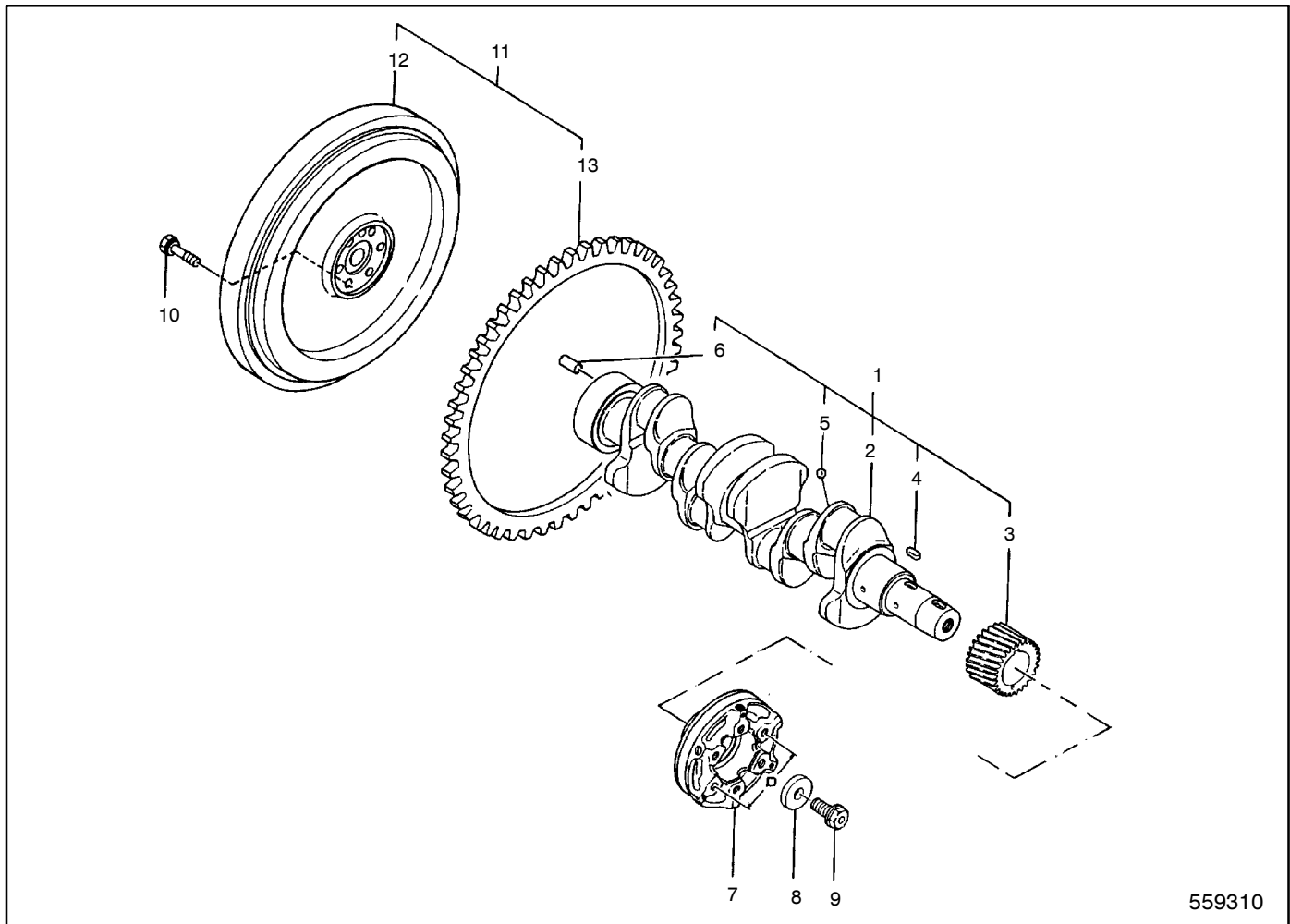
Group 9: Crankshaft and Flywheel



6272_9

Item	Part Number	Description	Quantity	
			Variation Number 1	Variation Number 2
1	GM35631	Crankshaft assembly	1	
1	GM35606	Crankshaft assembly		1
2	256750	Parallel pin, 8 x 16	1	1
5	GM35455	Gear, crankshaft	1	1
6	252669	Key, 7 x 14	1	1
8	256654	Pin, spring	1	1
9	229476	V-pulley	1	1
10	252937	Washer	1	1
11	252763	Bolt, V-pulley	1	1
12	252401	Bolt, flywheel	6	6
13	229857	Flywheel assembly	1	1
16	252774	Gear, ring	1	1

Group 9: Crankshaft and Flywheel, continued

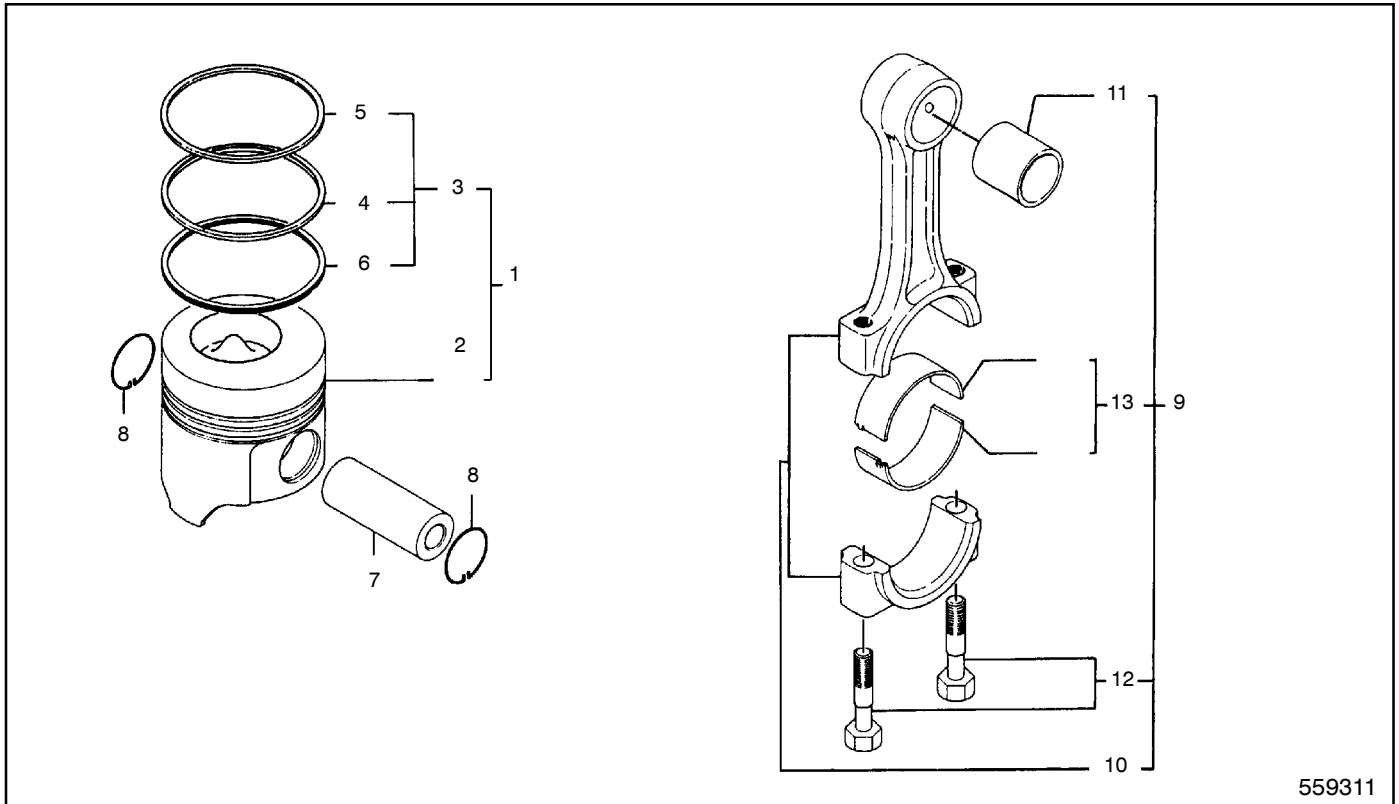


559310

Item	Part Number	Description	Quantity
			Variation Number
1	363436	Crankshaft assembly (Includes items 2-6)	1
2	X	Crankshaft	1
3	252821	Gear, crankshaft	1
4	252669	Key	1
5	X	Ball, steel	4
6	256750	Parallel pin, 8 x 16	1
7	229476	V-pulley	1
8	252937	Washer	1
9	252763	Bolt, V-pulley	1
10	252401	Bolt, flywheel	6
11	229857	Flywheel assembly (Includes items 12 and 13)	1
12	X	Flywheel	1
13	252774	Gear, ring	1

X Item not sold separately.

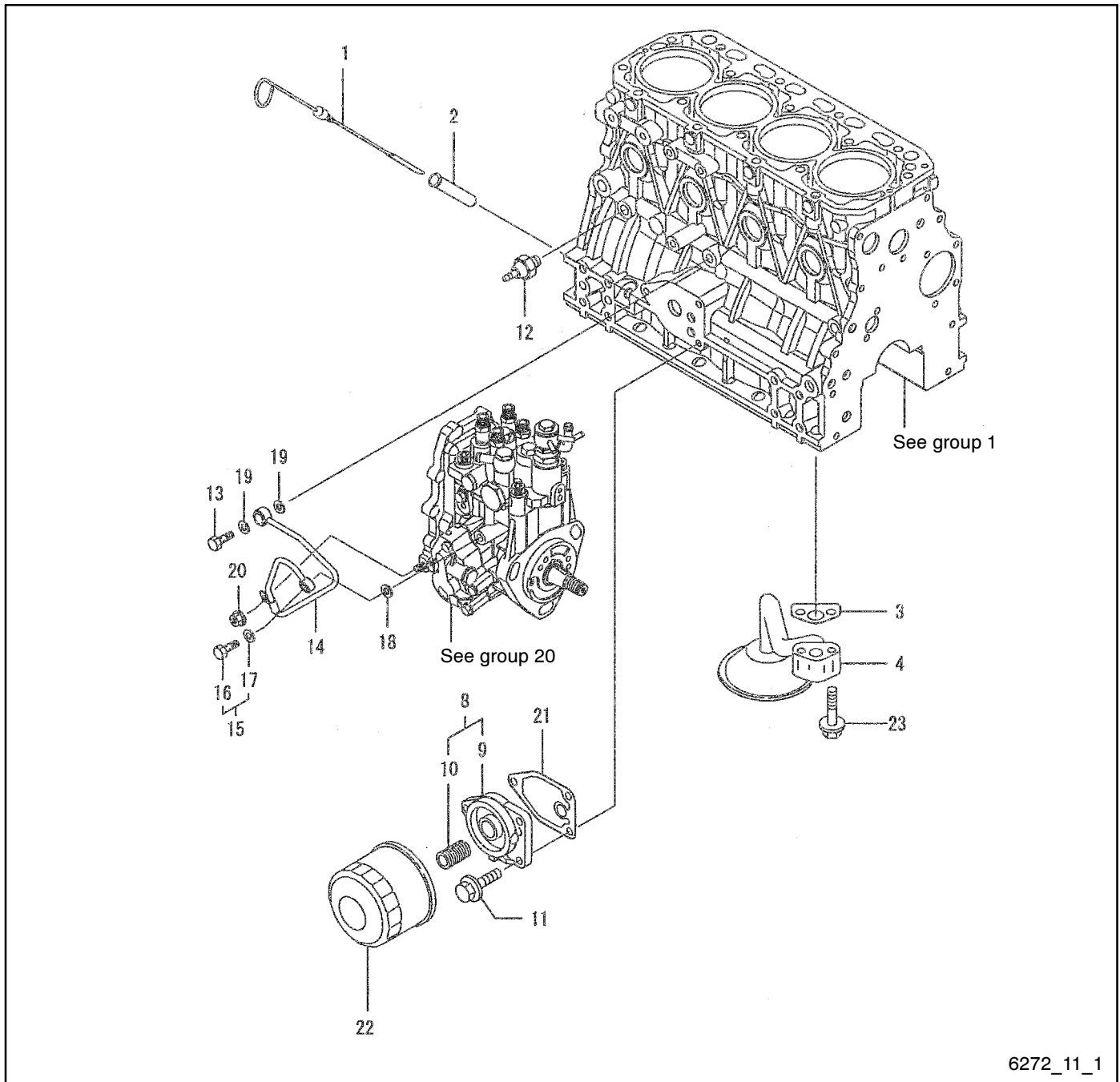
Group 10: Piston and Connecting Rod



Item	Part Number	Description	Quantity		
			Variation Number		
			1	2	3
1	363437	Piston w/rings (includes items 2 and 3)			4
1	363438	Piston w/rings, oversized 0.25 (includes items 2 and 3)			4
1	GM35545	Piston w/rings	4		
1	GM35547	Piston w/ring, oversized 0.25	4		
1	GM35607	Piston w/rings		4	
1	GM35608	Piston w/ring, oversized 0.25		4	
2	X	Piston	4	4	4
3	363439	Ring set (includes items 4-6)			4
3	GM11305	Ring set, oversized 0.25 (Includes items 4-6)			4
3	GM35546	Ring set	4		
3	GM35548	Ring set, oversized 0.25	4		
3	GM35538	Ring set		4	
3	GM35540	Ring set, oversized 0.25		4	
4	X	Ring, second	4	4	4
5	X	Ring, top	4	4	4
6	X	Ring, oil	4	4	4
7	363440	Pin, piston	4	4	4
8	363441	Circlip	4	4	8
9	252980	Rod assembly, connecting (includes items 10-13)	4	4	4
10	X	Rod, connecting	4	4	4
11	X	Bushing, piston pin	4	4	4
11	256580	Bushing, piston pin	4	4	
12	250889	Bolt, connecting rod	4	4	8
13	252979	Bearing, crankpin	4	4	4
13	256588	Bearing, pin, undersized 0.25	4	4	4

X Item not sold separately.

Group 11: Lube Oil System

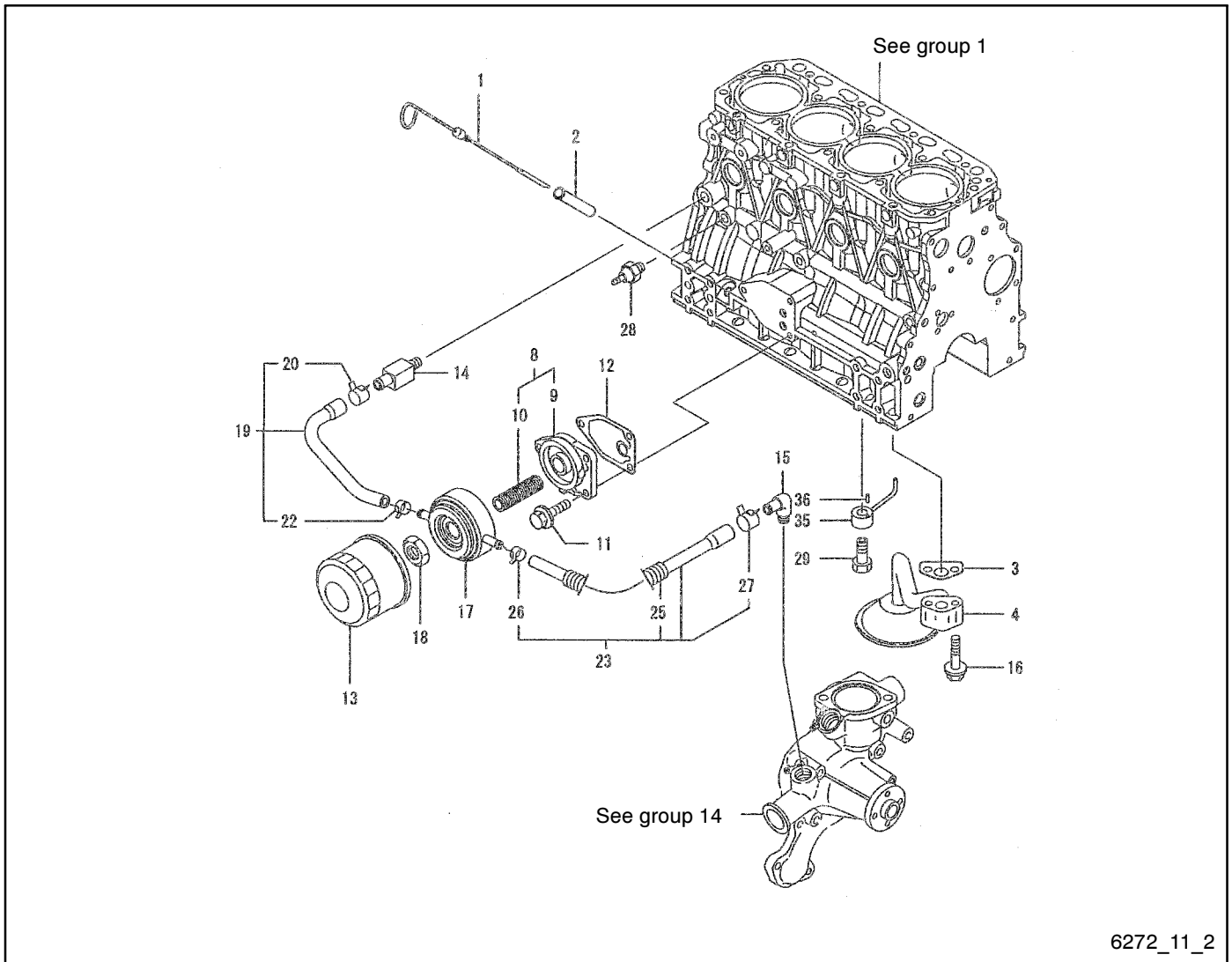


6272_11_1

Item	Part Number	Description	Quantity
			Variation Number
1	GM35549	Dipstick	1
2	252759	Guide, dipstick	1
3	225775	Gasket	1
4	252831	Pipe, oil inlet	1
8	GM35469	Bracket assembly, filter	1
9	GM35470	Bracket, filter	1
10	256582	Stud	1
11	252697	Bolt	3
12	GM35419	Switch, oil pressure	1
13	252084	Bolt	1

Item	Part Number	Description	Quantity
			Variation Number
14	GM35471	Pipe assembly, oil	1
15	GM35550	Bolt assembly, joint	1
16	252677	Joint bolt	1
17	252734	Washer, seal	1
18	252734	Washer, seal	1
19	363452	Washer, seal	2
20	250989	Nut, M6	1
21	225776	Gasket	1
22	GM47465	Filter, oil	1
23	252701	Bolt, M8 x 35	2

Group 11: Lube Oil System

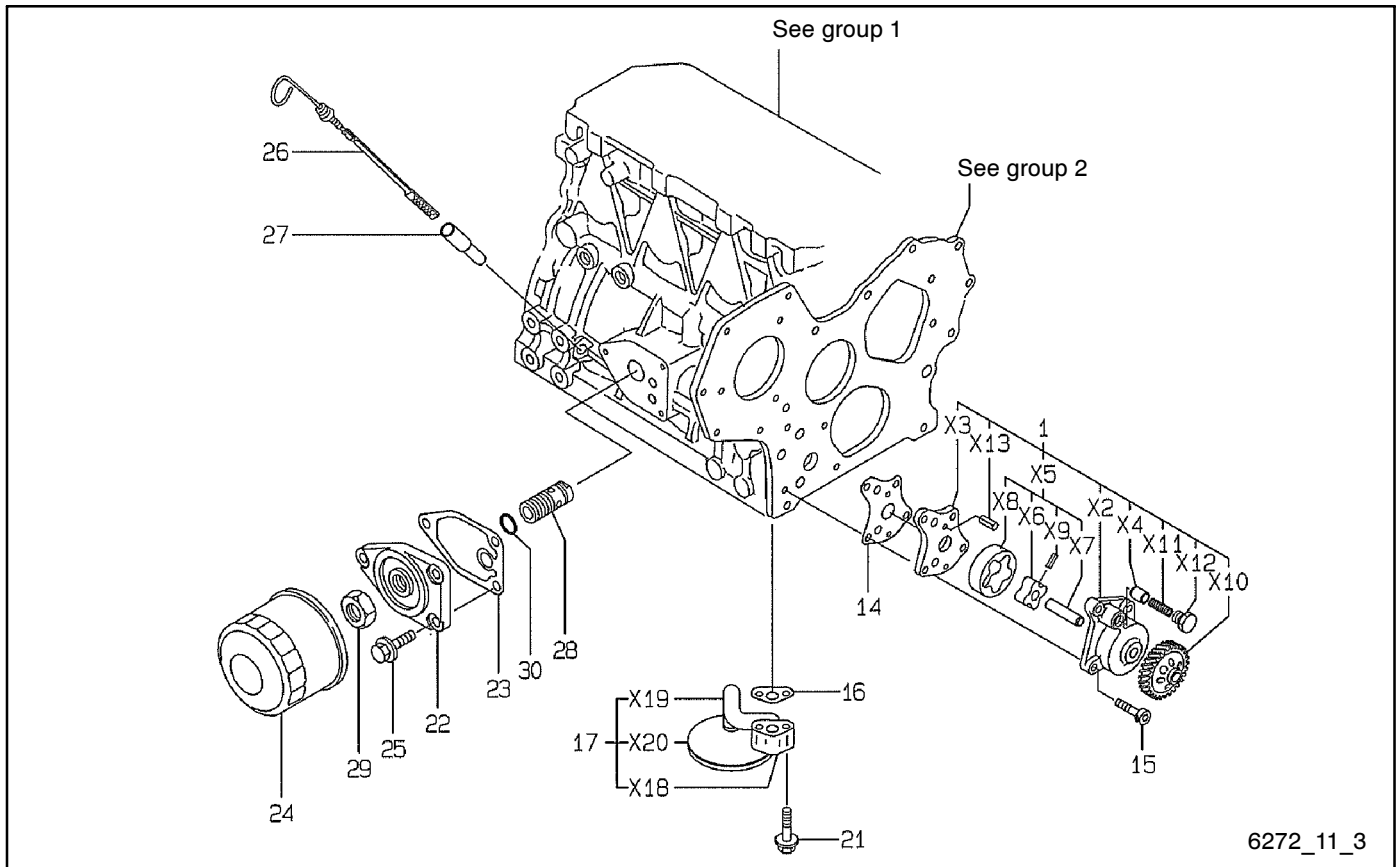


6272_11_2

Item	Part Number	Description	Quantity
			Variation Number
1	GM35549	Dipstick	1
2	252759	Guide, dipstick	1
3	225775	Gasket	1
4	252831	Pipe, oil inlet	1
8	GM35556	Bracket assembly, filter	1
9	GM35470	Bracket, filter	1
10	GM35577	Stud	1
11	252697	Bolt	3
12	225776	Gasket	1
13	GM47465	Filter, oil	1
14	GM35557	Joint	1
15	GM35562	Elbow	1
16	252701	Bolt, M8 x 35	2

Item	Part Number	Description	Quantity
			Variation Number
17	GM35611	Cooler assembly, oil	1
18	GM35576	Nut oil cooler	1
19	GM35612	Pipe, cooler	1
20	GM35713	Clamp	1
22	GM35716	Clamp	1
23	GM35613	Pipe, cooler	1
25	GM35493	Protector, pipe	1
26	GM35716	Clamp	1
27	GM35717	Clamp	1
28	GM35419	Switch, oil pressure	1
29	GM35648	Valve assembly, check	4
35	256649	Nozzle	4
36	256654	Pin, spring	4

Group 11: Lube Oil System, continued

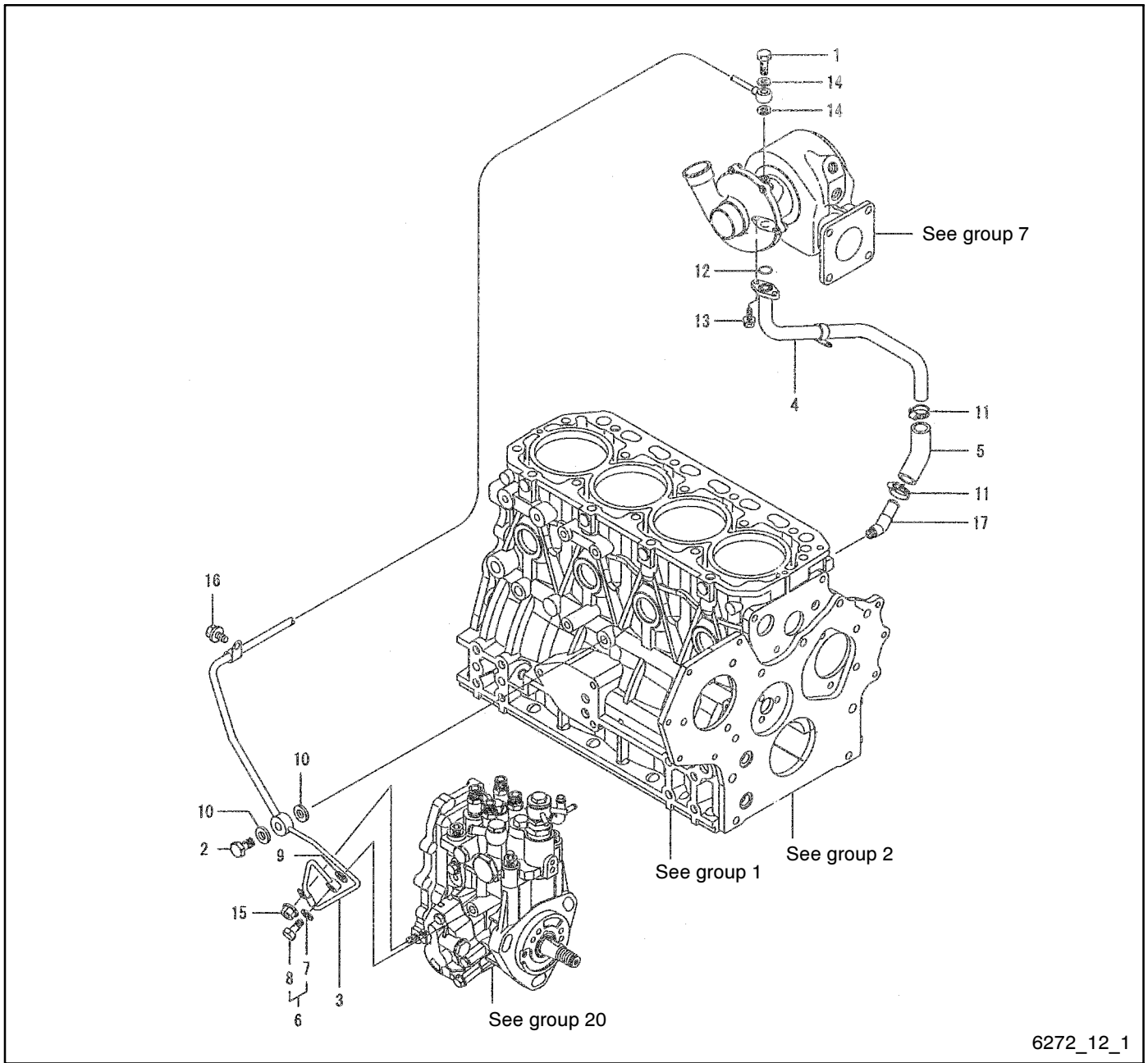


6272_11_3

Item	Part Number	Description	Quantity
			Variation Number
1	363442	Pump, lube oil	1
2	X	Body	1
3	X	Cover	1
4	X	Valve	1
5	X	Rotor	1
6	X	Rotor	1
7	X	Shaft	1
8	X	Rotor	1
9	X	Pin	1
10	X	Gear	1
11	X	Spring	1
12	X	Plug	1
13	X	Spring	1
14	252829	Gasket, lub. oil pump	1
15	252724	Bolt, M6 x 25	4
16	225775	Gasket	1
17	252831	Pipe assembly, oil inlet (includes items 6-8)	1
18	X	Cap	1
19	X	Pipe	1
20	X	Flange	1
21	252701	Bolt, M8 x 35, plated	2
22	256591	Bracket, strainer	1
23	225776	Gasket	1
24	GM47465	Filter, oil	1
25	252697	Bolt, M8 x 20, plated	3
26	252951	Dipstick	1
27	252759	Guide, dipstick	1
28	225413	Bolt, lube oil strainer	1
29	252835	Nut	1
30	250981	O-ring	1

X Item not sold separately.

Group 12: Lube Oil Line

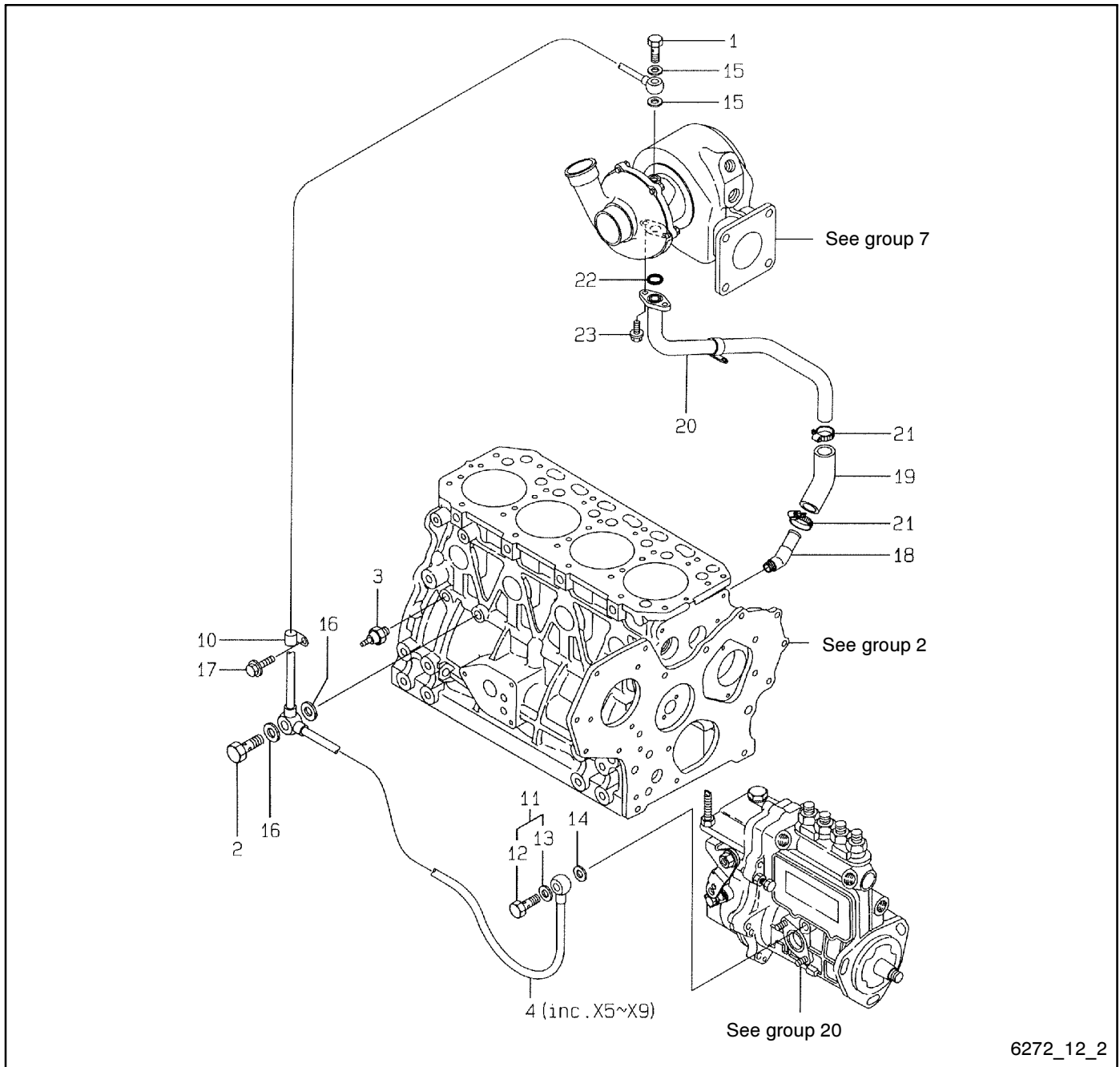


6272_12_1

Item	Part Number	Description	Quantity
			Variation Number
1	256568	Bolt, pipe joint	1
2	252084	Bolt	1
3	GM35644	Pipe assembly, oil	1
4	GM13323	Pipe, return	1
5	229735	Joint, rubber	1
6	GM35550	Bolt assembly, joint	1
7	252734	Washer, seal	1
8	252677	Joint bolt	1
9	252734	Washer, seal	1

Item	Part Number	Description	Quantity
			Variation Number
10	363452	Washer, seal	2
11	229490	Clamp	2
12	256660	O-ring	1
13	252693	Bolt	2
14	250967	Gasket 8, round	2
15	250989	Nut, M6	1
16	252695	Bolt, M8 x 12	1
17	229412	Pipe joint	1

Group 12: Lube Oil Line, continued

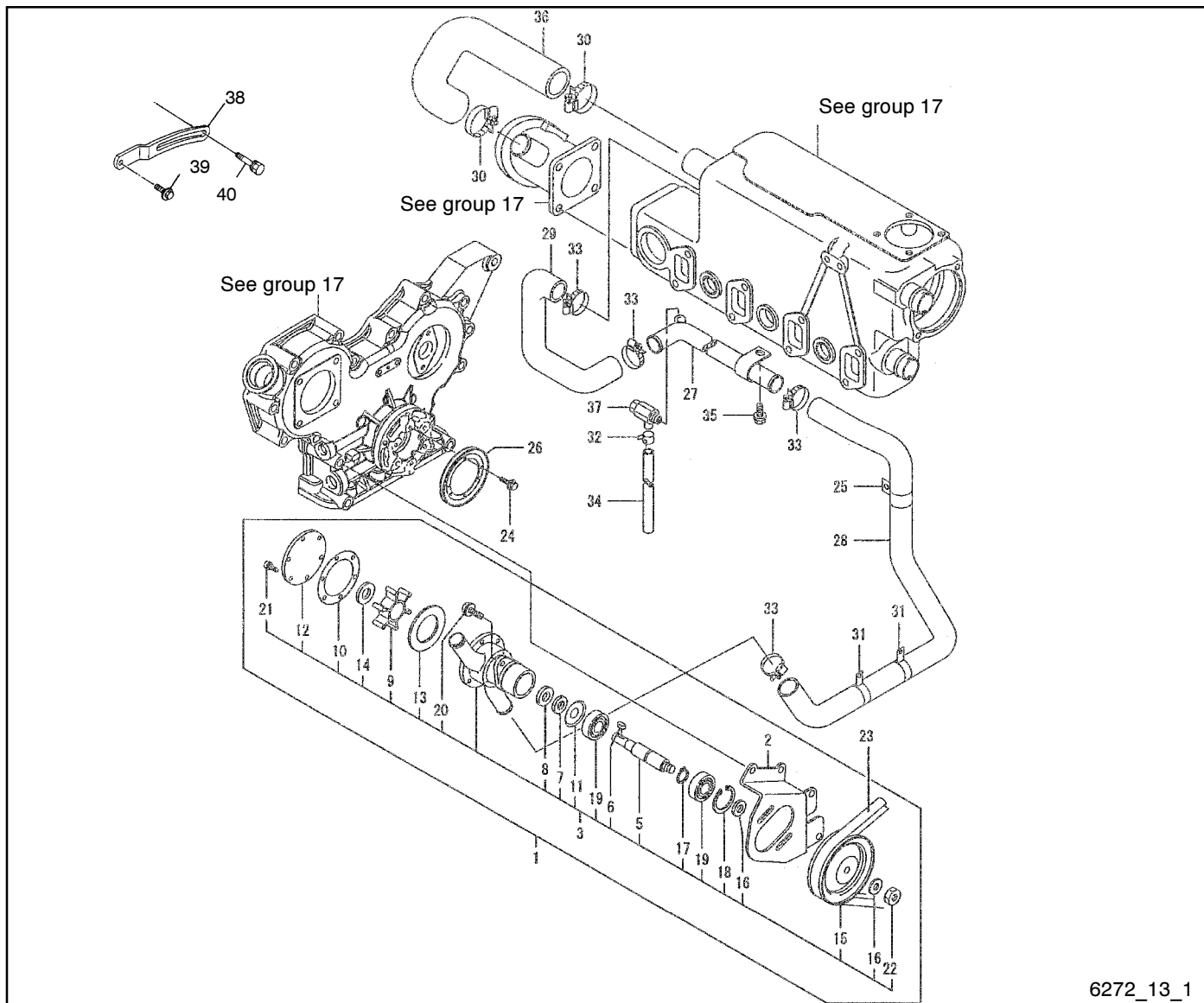


Item	Part Number	Description	Quantity	
			3	4
1	256568	Bolt, pipe joint		1
2	252084	Bolt, joint 10	1	1
3	256530	Switch, oil pressure		1
4	GM13319	Pipe assy (incl. items 5, 6, 8)	1	
4	GM13325	Pipe assy (incl. items 5-9)		1
5	X	Joint		1
6	X	Joint 10		1
7	X	Pipe		1
8	X	Pipe, lub. oil		1
9	X	Joint		1
10	229865	Retainer, pipe		1
11	GM13295	Bolt with seal washer		1

Item	Part Number	Description	Quantity	
			3	4
12	252090	Bolt 8, pipe joint	1	1
13	252734	Washer, seal 8	1	1
14	252734	Washer, seal 8	1	1
15	250967	Gasket 8, round		2
16	250968	Gasket 10, round	2	2
17	252694	Bolt, retainer		1
18	229412	Joint PT 3/8, pipe		1
19	229735	Joint, rubber		1
20	GM13323	Pipe, return		1
21	229490	Clamp 22		2
22	256660	O-ring		1
23	252693	Bolt, M6 x 16, plated		2

X Item not sold separately.

Group 13: Cooling Seawater System



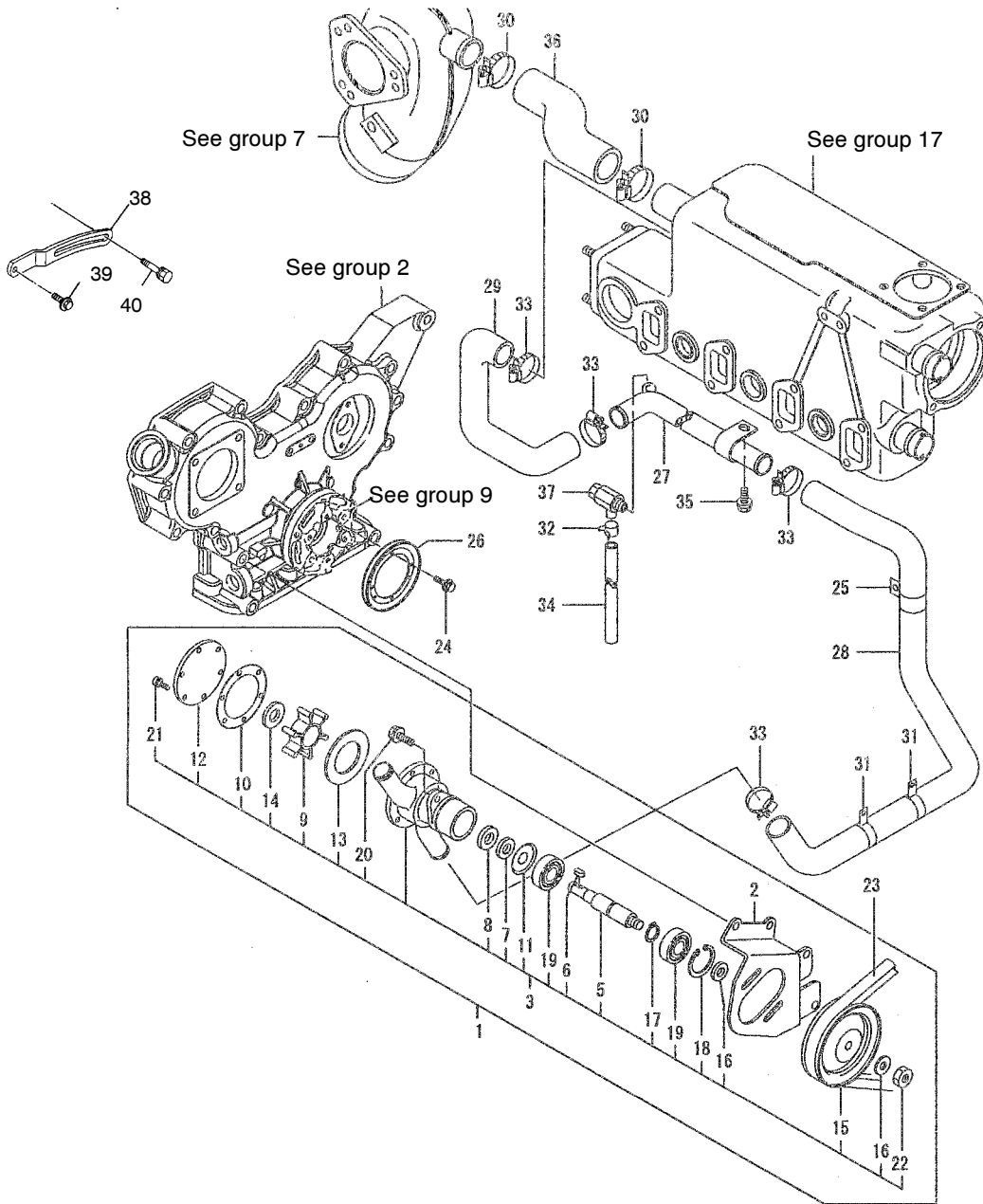
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Item	Part Number	Description	Quantity	
			Variation Number 1	Variation Number 3
1	GM35638	Pump assembly, water (includes item 2)	1	1
2	GM35637	Bracket, water pump	1	1
3	GM35622	Pump assembly, water	1	1
5	GM35496	Shaft, impeller	1	1
6	252473	Key	1	1
7	252474	Washer	1	1
8	250871	Seal	1	1
9	250872	Impeller*	1	1
10	252475	Gasket*	1	1
11	252438	Retainer	1	1
12	252439	Cover	1	1
13	229324	Plate	1	1
14	GM28580	Seal	1	1
15	252464	V-pulley	1	1
16	252466	Washer	2	2
17	252346	Circlip	1	1
18	252348	Circlip	1	1
19	252364	Bearing, ball	2	2
20	229496	Bolt, M8 x 16	2	2
21	229504	Bolt	6	6

Item	Part Number	Description	Quantity	
			Variation Number 1	Variation Number 3
22	GM35623	Nut, lock	1	1
23	256503	Belt	1	1
24	229497	Bolt, M6 x 8	4	4
25	229307	Retainer	1	1
26	229306	V-pulley	1	1
27	GM13326	Pipe, cooling water	1	1
26	229318	Pipe, cooling water	1	1
29	252902	Pipe	1	1
30	229491	Clamp	2	2
31	229316	Retainer	2	2
32	229409	Retainer	2	2
33	229491	Clamp	4	4
34	252350	Pipe	2	2
35	252696	Bolt, M8 x 12	1	1
36	252903	Pipe	1	1
37	GM13330	Valve assembly	1	1
38	229426	Adjuster, belt	1	
38	359554	Arm, alternator adjusting (24V models)		1
39	252703	Bolt	1	1
40	#	Bolt	1	1

* Impeller kit 229955 includes items 9 and 10.

Group 13: Cooling Seawater System, continued



6272_13_2

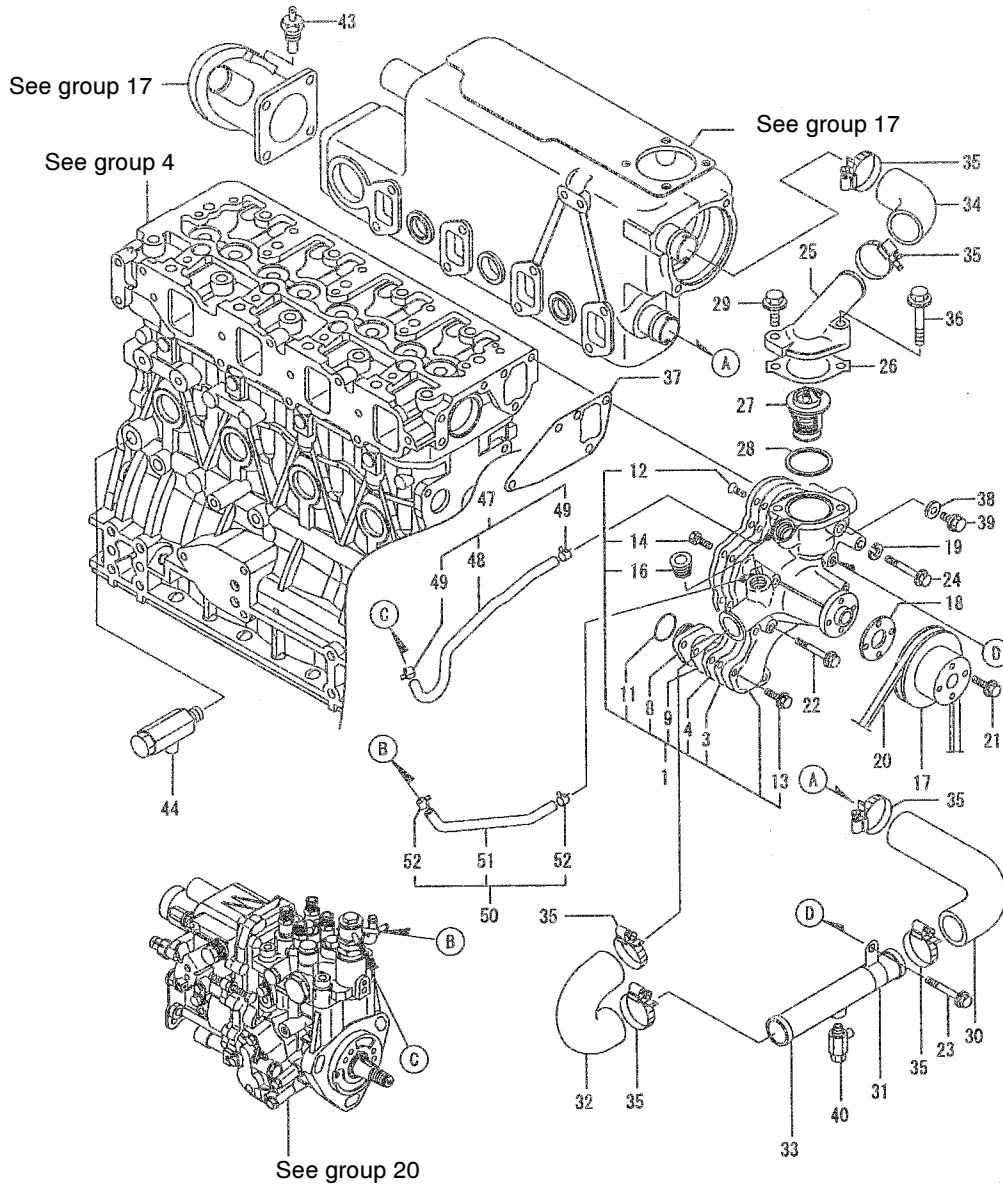
Group 13: Cooling Seawater System, continued

Item	Part Number	Description	Quantity	
			Variation 2	Number 4
1	GM35638	Pump assembly, water (includes item 2)	1	1
2	GM35637	Bracket, water pump	1	1
3	GM35622	Pump assembly, water	1	1
5	GM35496	Shaft, impeller	1	1
6	252473	Key	1	1
7	252474	Washer	1	1
8	250871	Seal	1	1
9	250872	Impeller*	1	1
10	252475	Gasket*	1	1
11	252438	Retainer	1	1
12	252439	Cover	1	1
13	229324	Plate	1	1
14	GM28580	Seal	1	1
15	252464	V-pulley	1	1
16	252466	Washer	2	2
17	252346	Circlip	1	1
18	252348	Circlip	1	1
19	252364	Bearing, ball	2	2
20	229496	Bolt, M8 x 16	2	2
21	229504	Bolt	6	6
22	GM35623	Nut, lock	1	1
23	256503	Belt	1	1
24	229497	Bolt, M6 x 8	4	4
25	229307	Retainer	1	1
26	229306	V-pulley	1	1
27	GM13326	Pipe, cooling water	1	1
28	229318	Pipe, cooling water	1	1
29	252902	Pipe	1	1
30	229491	Clamp	2	2
31	229316	Retainer	2	2
32	229409	Retainer	2	2
33	229491	Clamp	4	4
34	252350	Pipe	2	2
35	252696	Bolt, M8 x 12	1	1
36	256614	Pipe, cooling water	1	1
37	GM13330	Valve assembly	1	1
38	229426	Adjuster, belt	1	
38	359554	Arm, alternator adjusting (24V models)		1
39	252703	Bolt	1	1
40	#	Bolt	1	1

Common hardware; procure locally.

* Impeller kit 229955 includes items 9 and 10.

Group 14: Cooling Freshwater System

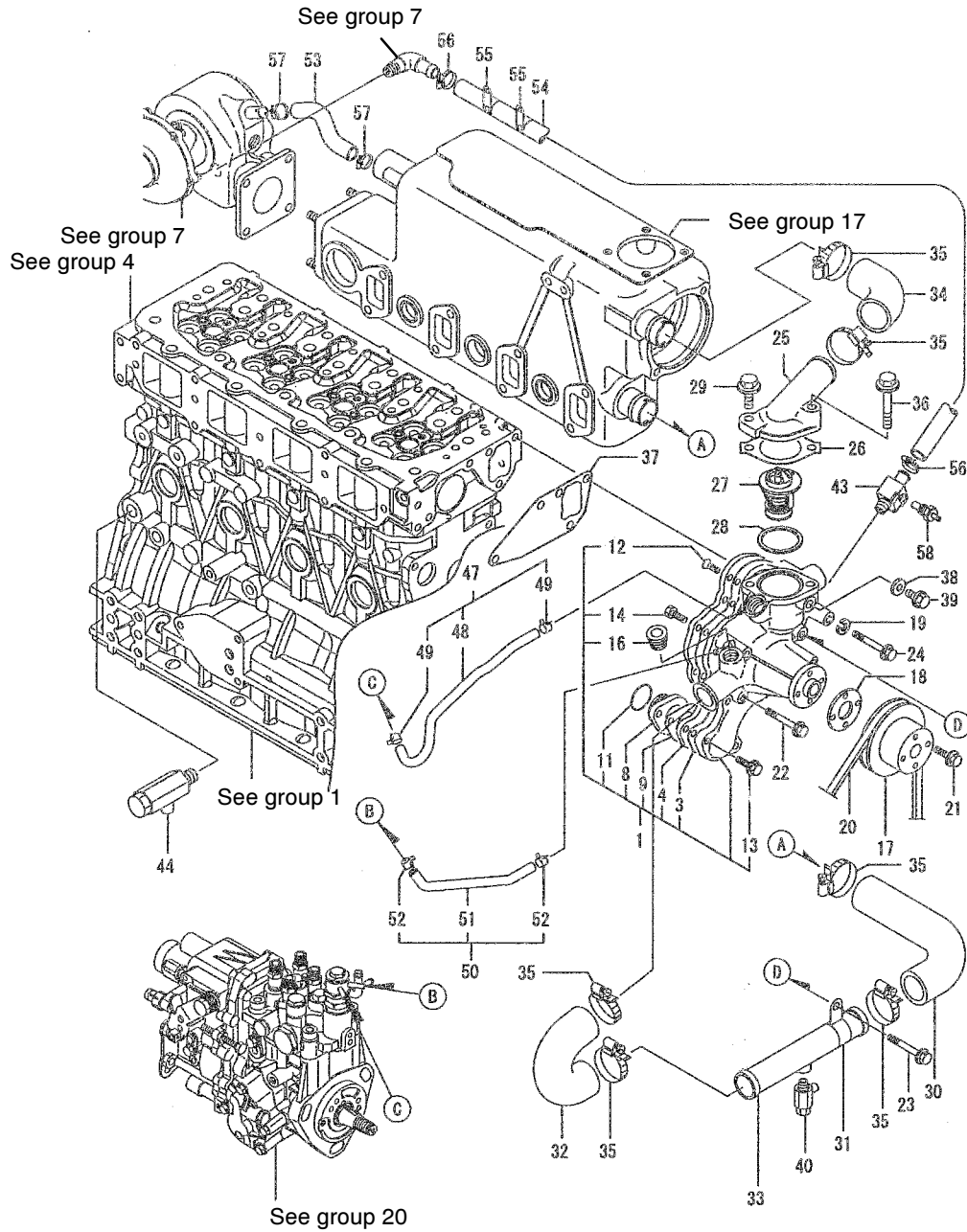


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Group 14: Cooling Freshwater System

Item	Part Number	Description	Quantity	
			Variation 1	Variation 3
1	GM35568	Pump assembly, water	1	1
3	GM35563	Packing	1	1
4	GM35564	Plate	1	1
8	GM35565	Pipe, water pump	1	1
9	GM35566	Packing	1	1
11	GM35561	O-ring	1	1
12	GM35733	Screw, M6 x 15	3	3
13	225817	Bolt, M6 x 20	2	2
14	252709	Bolt	3	3
16	GM35704	Plug, drain	2	2
17	252920	V-pulley	1	1
18	252858	Washer	1	1
19	229487	Washer, spring	1	1
20	GM11551	V-belt	1	
20	344829	V-belt (24V models)		1
21	229498	Bolt, M6 x 10, plated	4	4
22	256798	Bolt, M8 x 55, plated	2	2
23	256798	Bolt, M8 x 55, plated	1	1
24	252706	Bolt	1	1
25	252895	Cover, thermostat	1	1
26	249865	Gasket	1	1
27	GM34387	Thermostat	1	1
28	229433	Gasket	1	1
29	252699	Bolt, M8 x 25, plated	1	1
30	252890	Joint	1	1
31	252891	Clamp	1	1
32	252892	Joint	1	1
33	252893	Pipe	1	1
34	252894	Joint	1	1
35	229492	Clamp	6	6
36	252701	Bolt, M8 x 35	1	1
37	GM35580	Gasket	1	1
38	250967	Gasket 8, round	1	1
39	252695	Bolt, M8 x 12	1	1
40	GM13330	Valve assembly	1	1
43	252095	Switch	1	1
44	252394	Valve with drain	1	1
47	GM35569	Pipe, cooling water	1	1
48	GM35571	Pipe, cooling water	1	1
49	229411	Clamp	2	2
50	GM35570	Pipe, cooling water	1	1
51	GM35572	Pipe, cooling water	1	1
52	229411	Clamp	4	4

Group 14: Cooling Freshwater System, continued

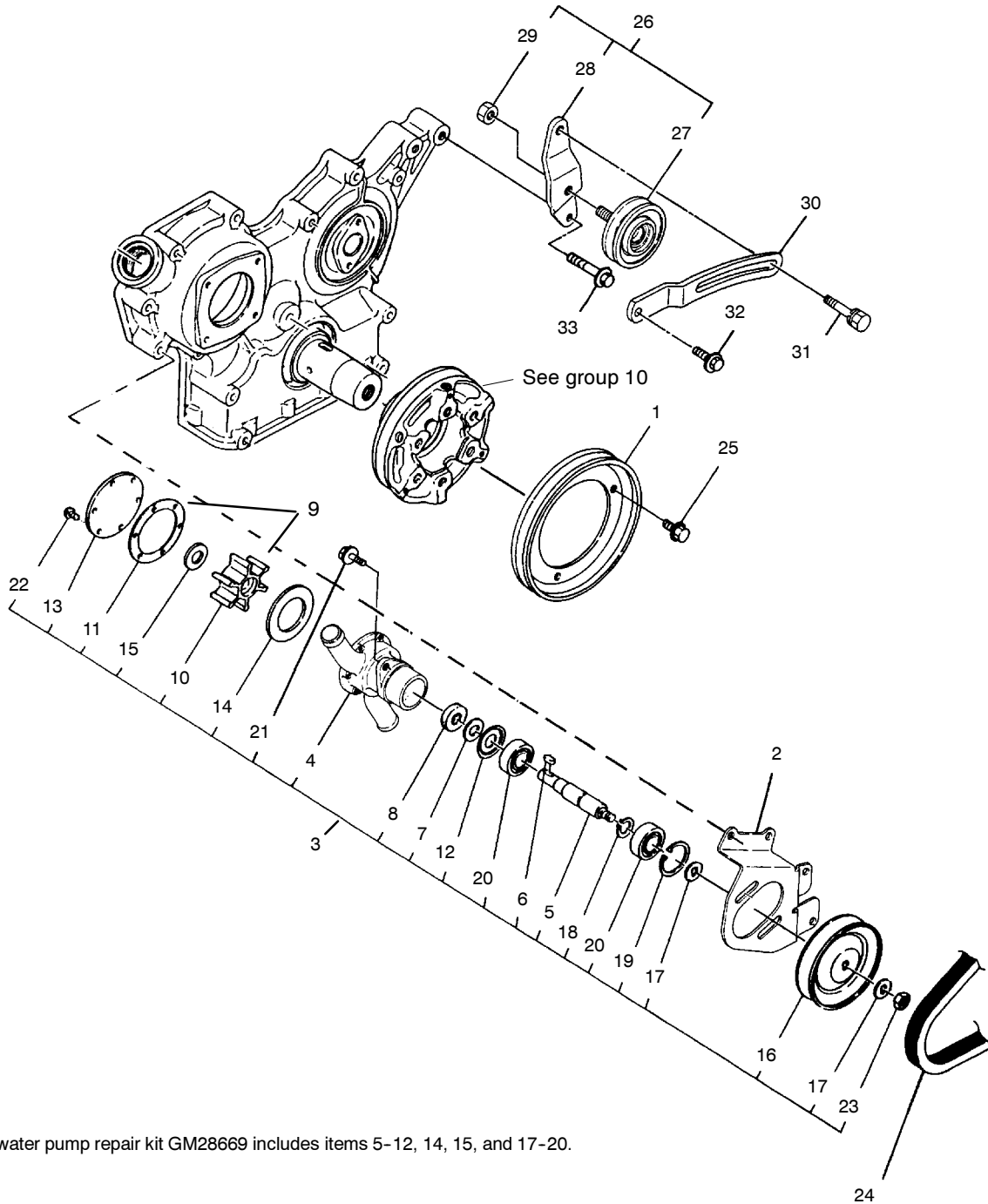


6272_14_2

Group 14: Cooling Freshwater System, continued

Item	Part Number	Description	Quantity	
			Variation 2	Variation 4
1	GM35568	Pump assembly, water	1	1
3	GM35563	Packing	1	1
4	GM35564	Plate	1	1
8	GM35565	Pipe, water pump	1	1
9	GM35566	Packing	1	1
11	GM35561	O-ring	1	1
12	GM35733	Screw, M6 x 15	3	3
13	225817	Bolt, M6 x 20	2	2
14	252709	Bolt	3	3
16	GM35704	Plug, drain	2	2
17	252920	V-pulley	1	1
18	252858	Washer	1	1
19	229487	Washer, spring	1	1
20	GM11551	V-belt	1	
20	344829	V-belt (24V models)		1
21	229498	Bolt, M6 x 10, plated	4	4
22	256798	Bolt, M8 x 55, plated	2	2
23	256798	Bolt, M8 x 55, plated	1	1
24	252706	Bolt	1	1
25	252895	Cover, thermostat	1	1
26	249865	Gasket	1	1
27	GM34387	Thermostat	1	1
28	229433	Gasket	1	1
29	252699	Bolt, M8 x 25, plated	1	1
30	252890	Joint	1	1
31	252891	Clamp	1	1
32	252892	Joint	1	1
33	252893	Pipe	1	1
34	252894	Joint	1	1
35	229492	Clamp	6	6
36	252701	Bolt, M8 x 35	1	1
37	GM35580	Gasket	1	1
38	250967	Gasket 8, round	1	1
39	252695	Bolt, M8 x 12	1	1
40	GM13330	Valve assembly	1	1
43	249845	Tee, pipe	1	1
44	252394	Valve with drain	1	1
47	GM35569	Pipe, cooling water	1	1
48	GM35571	Pipe, cooling water	1	1
49	229411	Clamp	2	2
50	GM35570	Pipe, cooling water	1	1
51	GM35572	Pipe, cooling water	1	1
52	229411	Clamp	4	4
53	249838	Hose	1	1
54	249842	Hose	1	1
55	249846	Strap, hose	2	2
56	249843	Clamp, hose	2	2
57	249839	Clamp, hose	2	2
58	252095	Switch	1	1

Group 15: Cooling Seawater Pump



Seawater pump repair kit GM28669 includes items 5-12, 14, 15, and 17-20.

559315

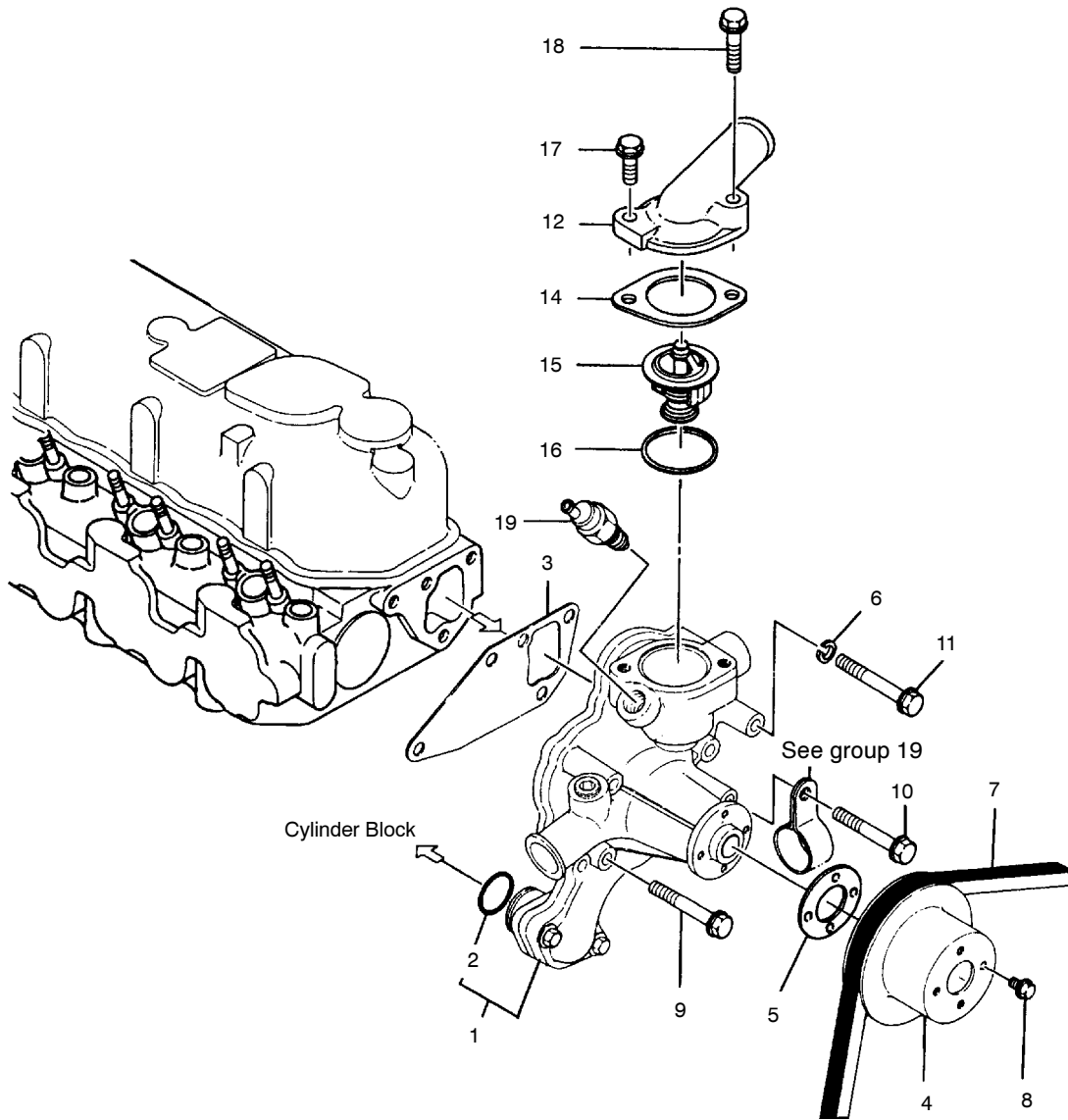
Group 15: Cooling Seawater Pump

Item	Part No.	Description	Quantity
			Var. No. 2
1	229306	V-pulley	1
2	229313	Bracket	1
3	256504	Pump assembly, cooling water (includes item 4-22)	1
4	X	Body	1
5	252437	Shaft*	1
6	252473	Key*	1
7	252474	Piece*	1
8	250871	Seal, oil*	1
9	229955	Kit, impeller (includes items 10 and 11)	1
10	250872	Impeller, cooling water*	1
11	252475	Gasket*	1
12	252438	Cover*	1
13	252439	Cover	1
14	229324	Plate*	1
15	GM28580	Seal, oil*	1
16	252464	V-pulley, C.W. pump	1
17	252466	Washer*	2
18	252346	Circlip*	1
19	252348	Circlip*	1
20	252364	Bearing, ball*	2
21	229496	Bolt, M8 x 16	2
22	229504	Bolt, M4 x 8	6
23	229506	Nut, M8	1
24	256503	V-belt	1
25	229497	Bolt, M6 x 8, plated	3
26	229484	Pulley assembly, tension (includes items 26-28)	1
27	229483	Pulley assembly, tension	1
28	229485	Bracket, pulley	1
29	229510	Nut, M10	1
30	229426	Adjuster, V-belt	1
31	252692	Bolt, M8 x 25	1
32	229499	Bolt, M8 x 18, plated	1
33	229503	Bolt, M10 x 35, plated	1

X Item not sold separately.

* Seawater pump repair kit GM28669 includes items 5-8, 10-12, 14, 15, and 17-20.

Group 16: Cooling Freshwater Pump

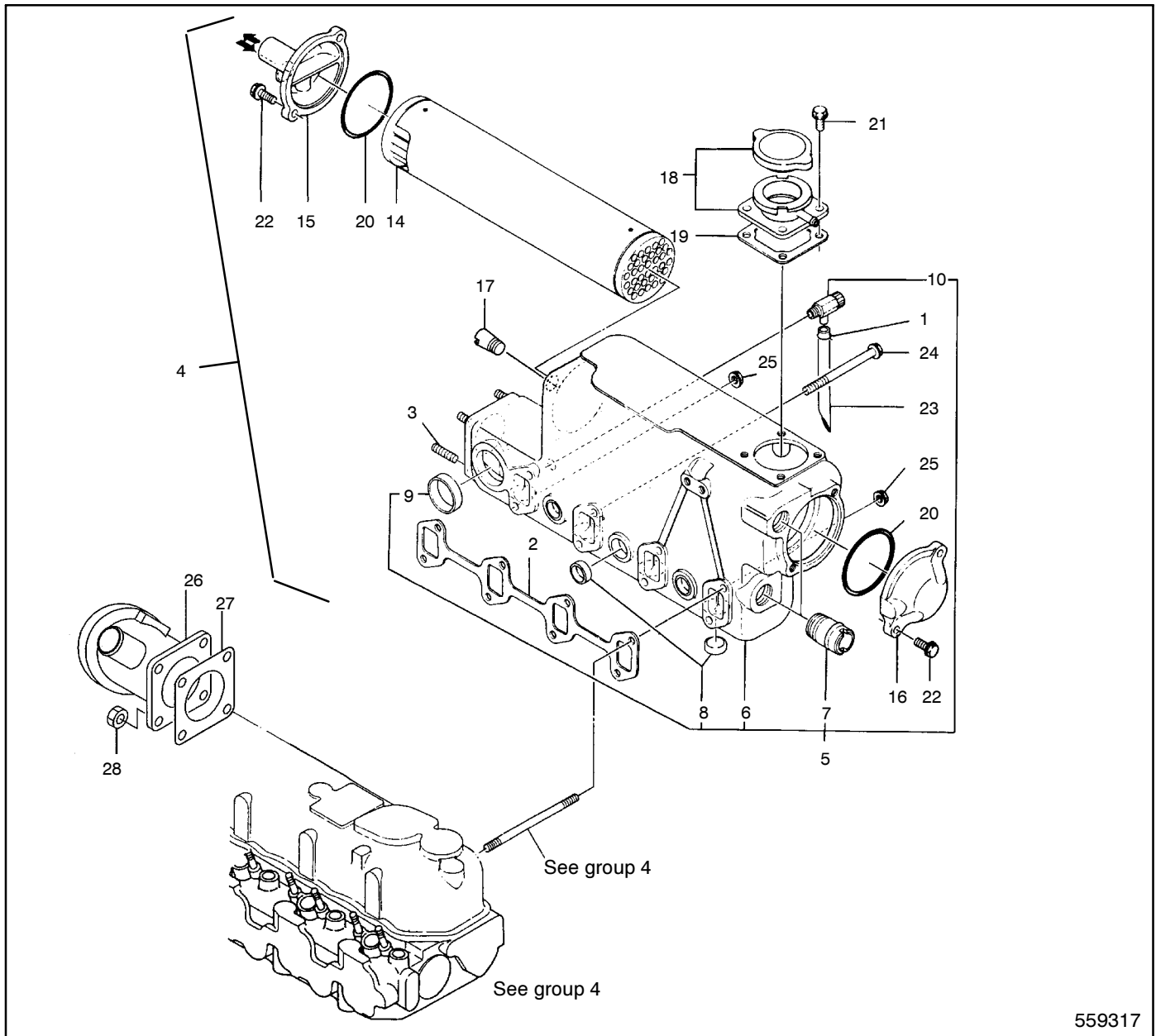


559316

Group 16: Cooling Freshwater Pump

Item	Part Number	Description	Quantity
			Variation Number
			3
1	252879	Pump assembly, cooling pump (includes item 2)	1
2	252839	O-ring	1
3	252838	Gasket, water pump	1
4	252920	V-pulley	1
5	252858	Washer	1
6	229487	Washer, spring	1
7	GM11551	Alternator V-belt	1
8	229498	Bolt, M6 x 10, plated	4
9	256798	Bolt, M8 x 55, plated	2
10	256798	Bolt, M8 x 55, plated	1
11	252706	Bolt, M8 x 65, plated	1
12	252895	Cover, thermostat	1
14	229432	Gasket	1
15	252896	Thermostat	1
16	229433	Gasket	1
17	252699	Bolt, M8 x 25, plated	1
18	252701	Bolt, M8 x 35, plated	1
19	252095	Switch, water temperature	1

Group 17: Cooling Freshwater Cooler



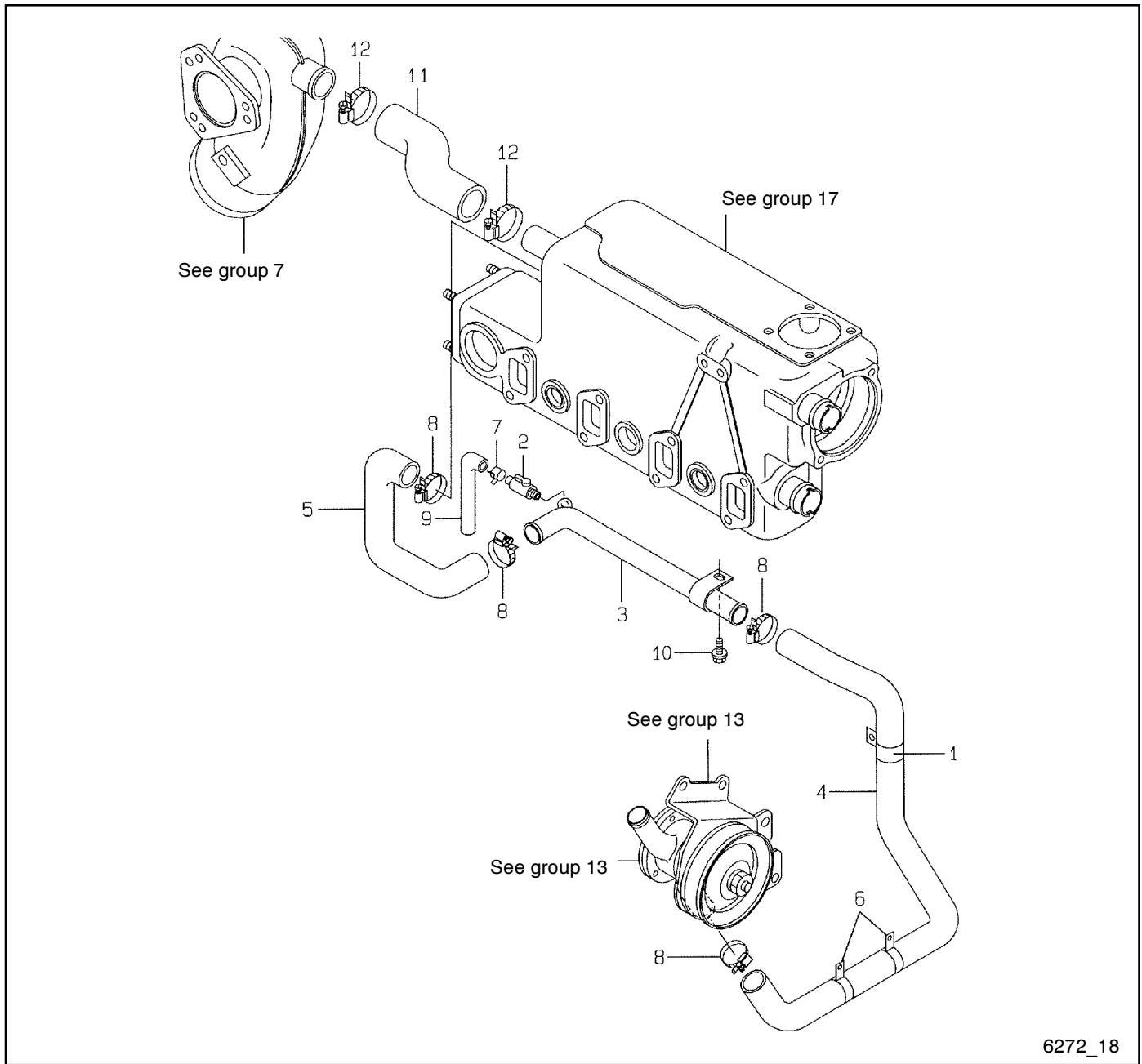
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Group 17: Cooling Freshwater Cooler

Item	Part Number	Description	Quantity			
			Var. No.			
			1	2	3	4
1	GM13334	Clamp 13	1	1	1	1
2	256770	Gasket, exhaust manifold	1			
2	252916	Gasket, exhaust manifold		1	1	1
3	256579	Stud		4	1	1
3	GM35727	Bolt, M8 x 20	4			
4	GM13329	Cooler assembly, fresh water (includes items 5-22)	1			
4	229464	Cooler assembly, fresh water (includes items 5-22)		1	1	1
5	252973	Cooler, freshwater (includes items 6-10)	1	1	1	1
6	X	Body, cooler	1	1	1	1
7	252472	Joint, pipe	2	2	2	2
8	252730	Plug 28	3	3	7	7
9	252732	Plug 40			1	1
10	252735	Cock 3/8 (includes items 11-13)	1	1	1	1
11	X	O-ring	1	1	1	1
12	X	Body, cock 3/8	1	1	1	1
13	X	Valve	1	1	1	1
14	229436	Core assembly	1	1	1	1
15	252887	Cover	1	1	1	1
16	256544	Cover	1	1	1	1
17	GM35720	Plug, screw	1			
17	229403	Joint		1		1
17	250975	Plug, PT 3/8, screw	1		1	
18	252748	Filler assembly	1	1	1	1
19	252749	Gasket, filler	1	1	1	1
20	252685	O-ring	2	2	2	2
21	252696	Bolt, M8 x 16, plated	4	4	4	4
22	252699	Bolt, M8 x 25, plated	4	4	4	4
23	252672	Pipe	1	1	1	1
24	252708	Bolt, M8 100, plated	6	6	6	6
25	GM35732	Nut		2		2
25	252723	Nut, M8	2		2	
26	GM13328	Elbow, water mixing	1		1	
27	252929	Gasket	1		1	
28	229509	Nut, M8	4		4	

X Item not sold separately.

Group 18: Cooling Seawater Line

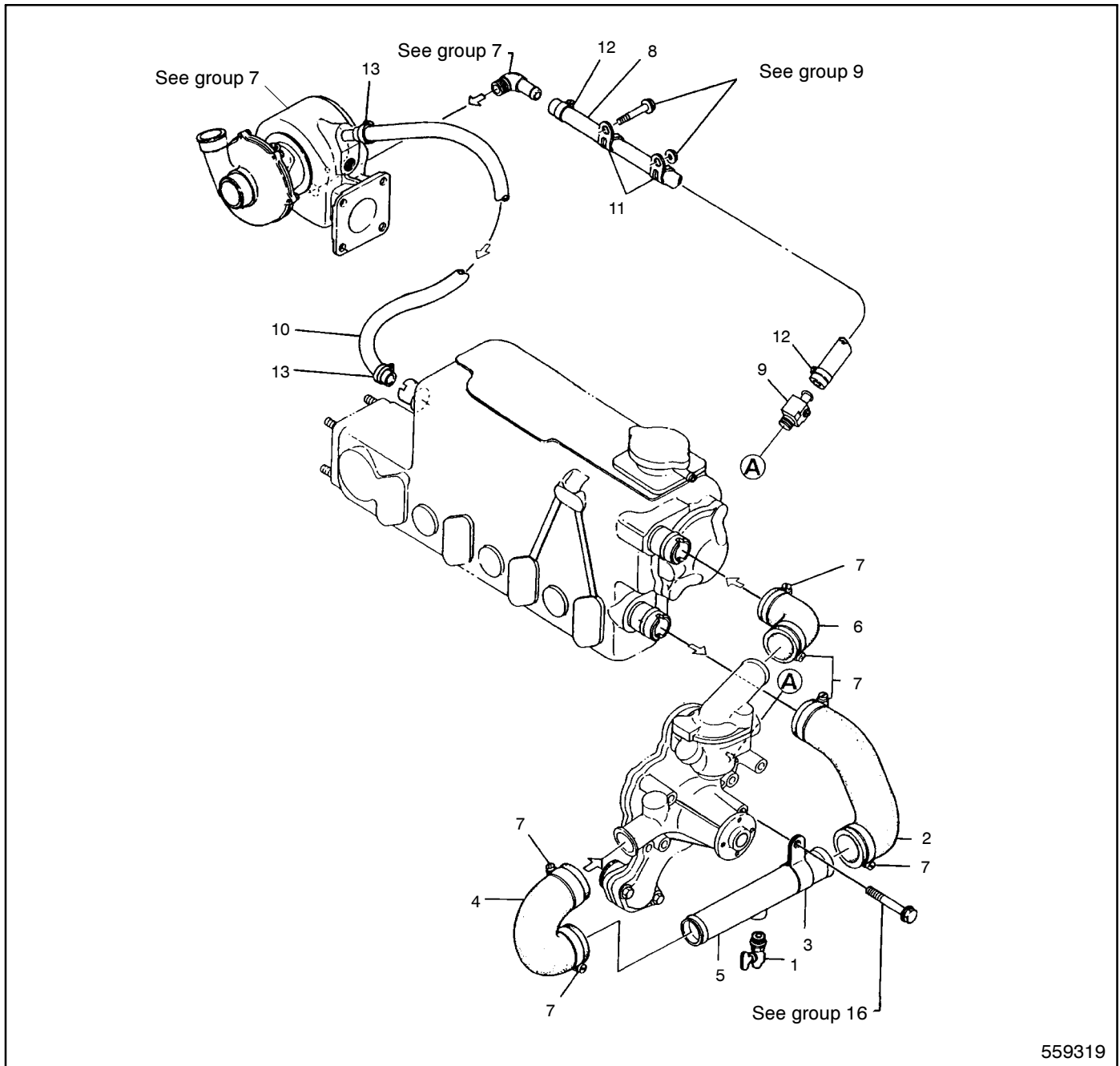


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Group 18: Cooling Seawater Line

Item	Part Number	Description	Quantity	
			Variation Number	
			3	4
1	229307	Retainer	1	1
2	252329	Cock PT 1/8	1	1
3	GM13326	Pipe, cooling water	1	1
4	229318	Pipe, cooling water	1	1
5	252902	Pipe	1	1
6	229327	Retainer	2	2
7	229409	Retainer	1	1
8	229491	Clamp 35	4	2
9	252350	Pipe	1	1
10	252696	Bolt, M8 x 16, plated	1	1
11	256614	Pipe, cooling water		1
11	252903	Pipe, cooling water	1	
12	229491	Clamp 35	1	1

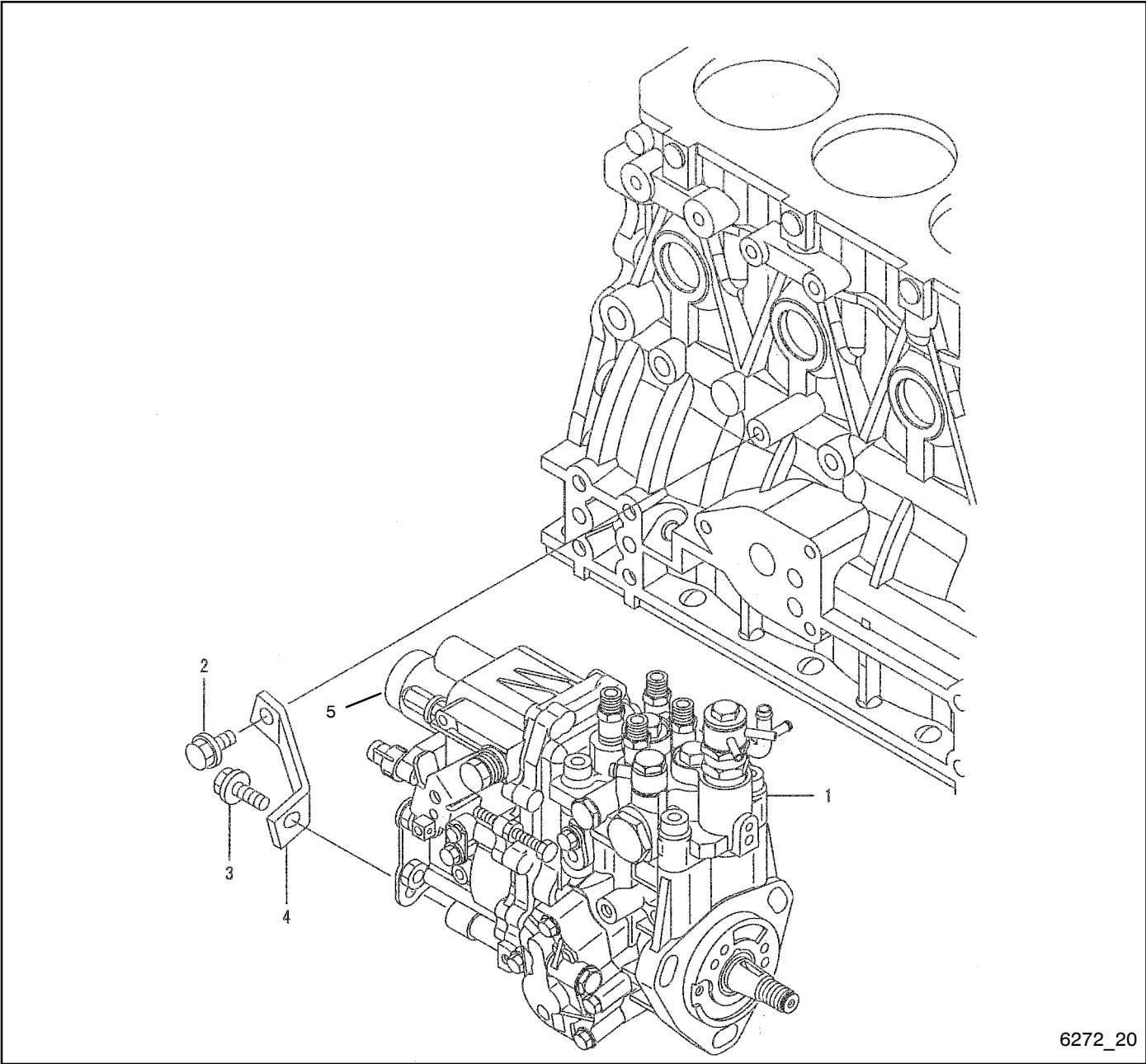
Group 19: Cooling Freshwater Lines



559319

Item	Part Number	Description	Quantity	
			2	3
1	252329	Cock Pt 1/8	1	
1	GM13330	Cock Pt 1/8		1
2	252890	Joint	1	1
3	252891	Retainer	1	1
4	252892	Joint 28	1	1
5	252893	Pipe, cooling water	1	1
6	252894	Joint	1	1
7	229492	Clamp	6	6
8	249842	Pipe	1	6
9	249845	Joint	1	
10	249838	Hose, rubber	1	
11	249846	Clamp, wire harness	2	
12	249843	Clamp	2	
13	249839	Clamp	2	

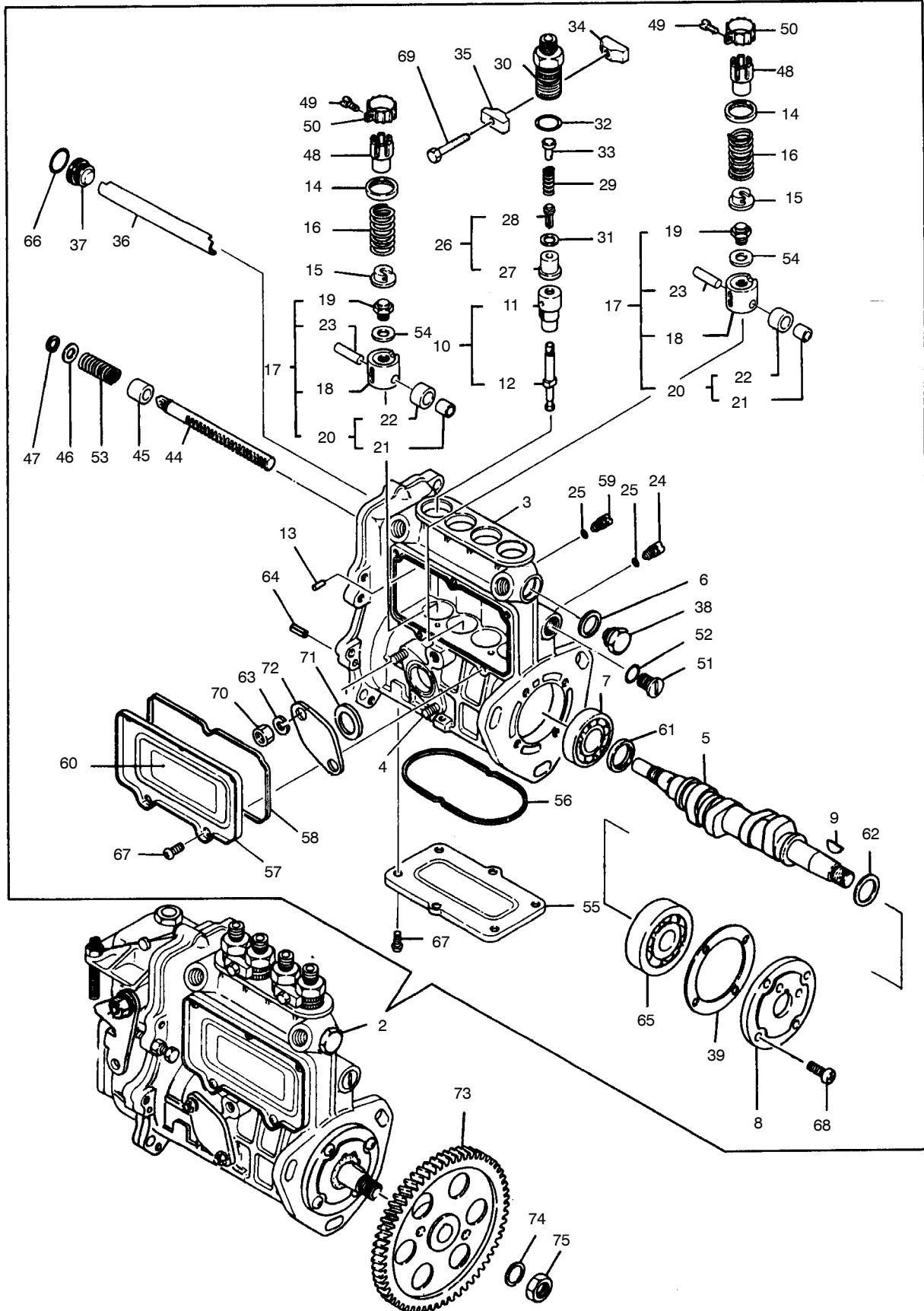
Group 20: Fuel Injection Pump



6272_20

Item	Part Number	Description	Quantity			
			Variation Number			
			1	2	5	6
1	GM35758	Injection pump assembly	1	1		
1	GM35759	Injection pump assembly			1	1
2	252696	Bolt, M8 x 12	1	1	1	1
3	252697	Bolt	1	1	1	1
4	GM35632	Support	1	1	1	1
5	344746	Solenoid (24V models)		1		1

Group 20: Fuel Injection Pump, continued



559320

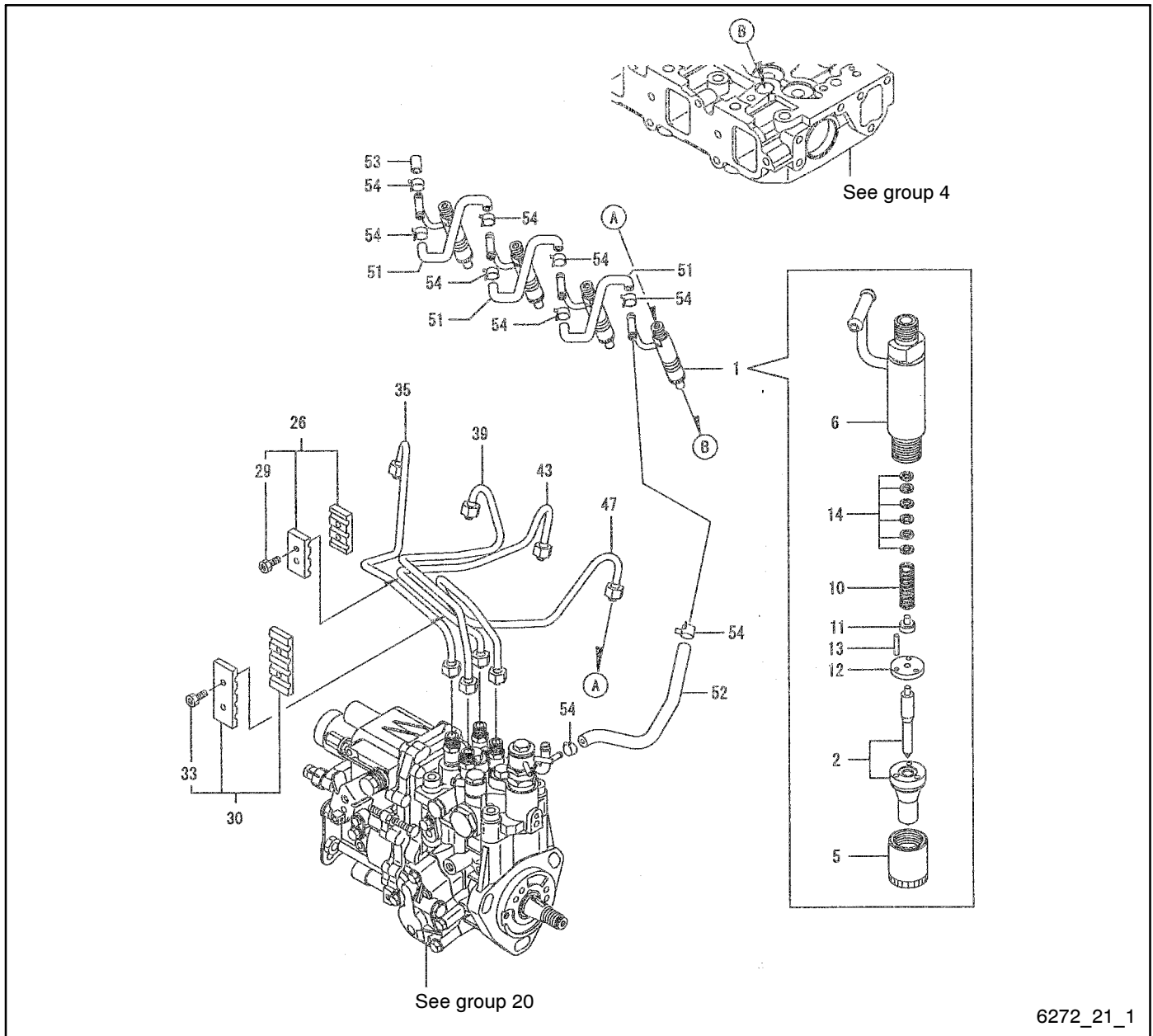
Group 20: Fuel Injection Pump, continued

Item	Part Number	Description	Quantity	
			Variation Number	
			3	4
2	GM13346	Pump, fuel injection (includes items 3-72)	1	
2	GM13344	Pump, fuel injection (includes items 3-72)		1
3	X	Body, fuel injection pump	1	
4	256776	Stud, feed pump	2	2
5	252897	Camshaft	1	1
6	363448	Washer, seal	1	1
7	256534	Bearing, thrust ball	1	1
8	256535	Retainer, bearing	1	1
9	256528	Key	1	1
10	256608	Plunger w/barrel (includes items 11 and 12)	4	4
11	X	Barrel	4	4
12	X	Plunger	4	4
13	256721	Pin, barrel locking	4	4
14	252589	Retainer	4	4
15	256536	Spring shoe, plunger	4	4
16	252490	Spring, plunger	4	4
17	252848	Tappet assembly (includes item 18-23)	4	4
18	X	Guide, roller	4	4
19	X	Bolt, adjusting	4	4
20	X	Roller assembly (includes items 21 and 22)	4	4
21	X	Roller, inner	4	4
22	X	Roller, outer	4	4
23	X	Pin, roller	4	4
24	256537	Locking, tappet	4	4
25	252849	O-ring	4	4
26	256583	Valve w/seat, delivery (includes items 27 and 28)	4	4
27	X	Seat	4	4
28	X	Valve, delivery	4	4
29	256777	Spring, valve	4	4
30	256724	Guard, valve delivery	4	4
31	250839	Gasket, delivery	4	4
32	250840	O-ring	4	4
33	256725	Stopper, valve	4	4
34	256726	Locking	2	2
35	256727	Locking	2	2
36	256728	Deflector	1	1

Item	Part Number	Description	Quantity	
			Variation Number	
			3	4
37	256778	Bolt, check deflector	1	1
38	256779	Plug	1	1
39	256729	Shim set, adjusting (includes items 40-43)	1	1
40	X	Packing, 0.5mm	1	1
41	X	Packing, 0.4mm	1	1
42	X	Packing, 0.3mm	1	1
43	X	Packing, 0.15mm	1	1
44	256730	Rack, control	1	1
45	256780	Bush, rack	1	1
46	256694	Spacer, aux. spring	1	1
47	256695	Circlip	1	1
48	256696	Pinion, control	4	4
49	256697	Screw, pinion	4	4
50	256698	Pinion	4	4
51	256781	Plug	1	1
52	252850	O-ring	1	1
53	256699	Spring, rack	1	1
54	256700	Shim pack	4	4
55	225893	Cover	1	1
56	252926	Gasket	1	1
57	225894	Cover, side	1	1
58	252927	Gasket	1	1
59	256701	Locking, rack	1	1
60	225791	Label, caution	1	1
61	256702	Spacer 3.25 mm	1	1
62	256703	Spacer 1.5 mm	1	1
63	225804	Washer, spring	2	2
64	225808	Pin, spring	2	2
65	256556	Bearing, ball	1	1
66	252686	O-ring	1	1
67	225814	Screw, M5 x 10	11	11
68	225815	Screw, M6 x 16	4	4
69	225821	Bolt, M5 x 30, plated	2	2
69	229741	Nut (not shown)	2	2
70	225824	Nut, M6	2	2
71	252851	Gasket	1	1
72	256755	Cover, blind	1	1
73	252827	Gear	1	1
74	252665	Washer 12, spring	1	1
75	252725	Nut, M12	1	1

X Item not sold separately.

Group 21: Fuel Injection Lines

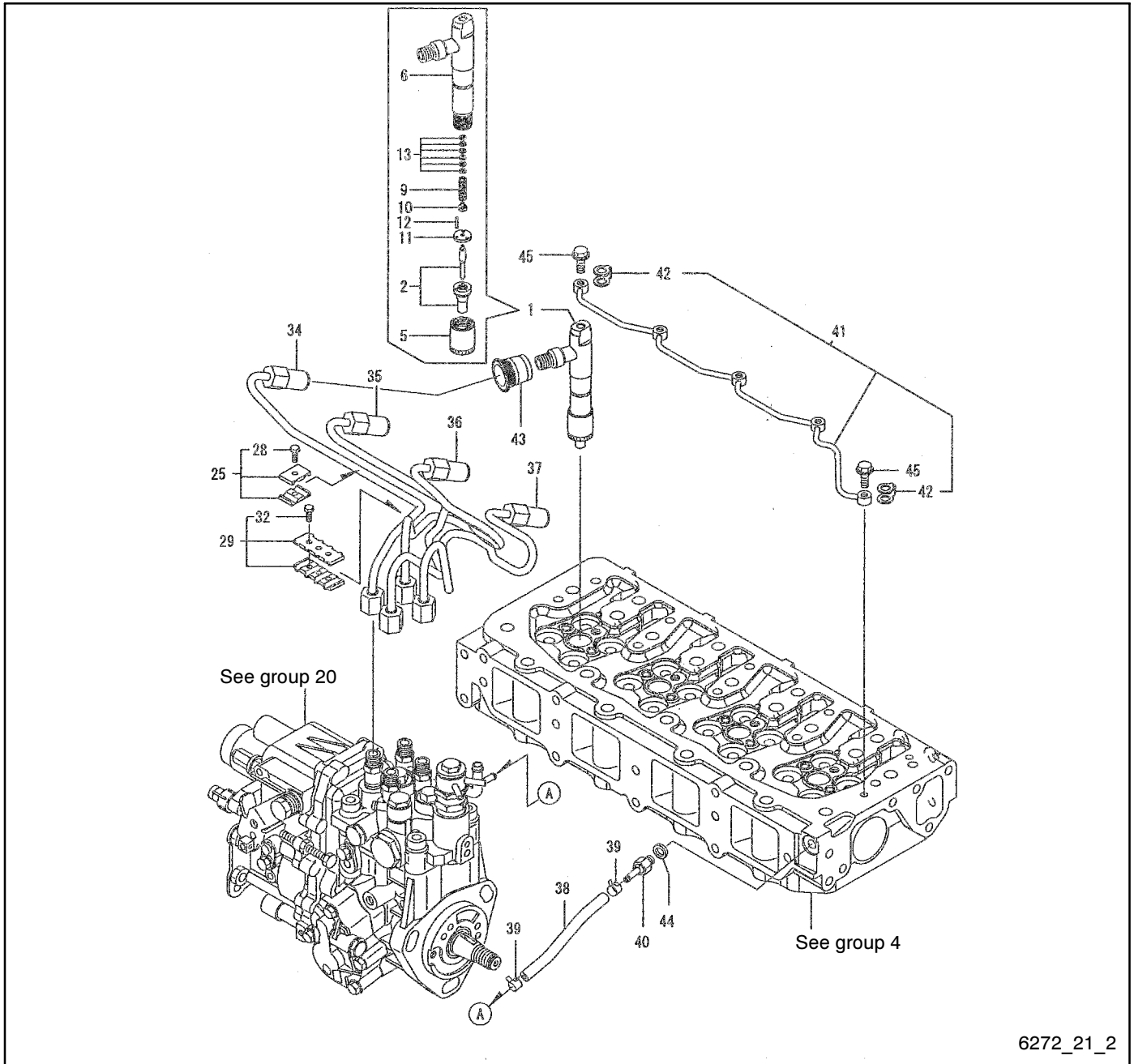


6272_21_1

Item	Part Number	Description	Quantity	
				Var. No.
1	GM35749	Valve assembly, injector	1	
2	GM35567	Nozzle	4	
5	256520	Nut, nozzle case	4	
6	GM35479	Holder assembly, nozzle	4	
10	256521	Spring nozzle	4	
11	256522	Seat, nozzle spring	4	
12	256523	Plate, stop	4	
13	256707	Pin	8	
14	256524	Shim set	4	
26	256774	Clamp assembly, line	1	
29	225418	Bolt, M4 x 14 hex socket	2	

Item	Part Number	Description	Quantity	
				Var. No.
30	256708	Retainer	1	
33	225418	Bolt, M4 x 14 hex socket	2	
35	GM35633	Pipe assembly, injection	1	
39	GM35634	Pipe assembly, injection	1	
43	GM35635	Pipe assembly, Injection	1	
47	GM35636	Pipe assembly, injection	1	
51	GM35573	Pipe, fuel oil	3	
52	GM35483	Pipe, fuel oil	1	
53	GM35574	Cap	1	
54	249843	Clamp, hose	9	

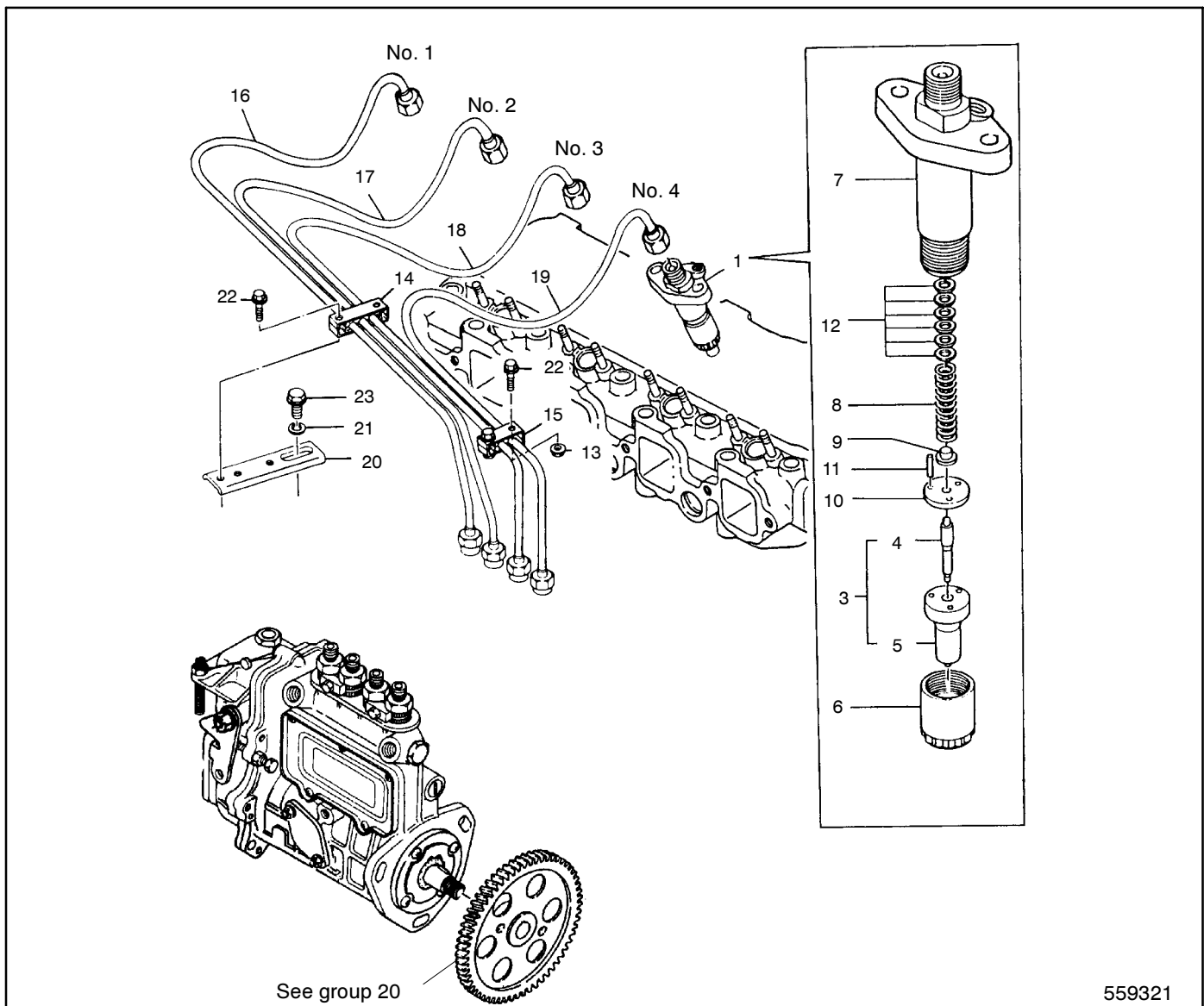
Group 21: Fuel Injection Lines



6272_21_2

Item	Part Number	Description	Quantity		Item	Part Number	Description	Quantity	
				Var. No.					Var. No.
1	GM35760	Fuel injector	4		34	GM35616	Pipe assembly, injection	1	
2	GM35645	Nozzle assembly	4		35	GM35617	Pipe assembly, Injection	1	
5	256520	Nut, nozzle case	4		36	GM35618	Pipe assembly, injection	1	
6	GM35614	Holder assembly, nozzle	4		37	GM35619	Pipe assembly, Injection	1	
9	256521	Spring nozzle	4		38	GM35647	Pipe, fuel oil	1	
10	256522	Seat, nozzle spring	4		39	249843	Clamp, hose	2	
11	256523	Plate, stop	4		40	GM35513	Joint, hose	1	
12	256707	Pin	8		41	GM35615	Pipe assembly, return	1	
13	256524	Shim set	4		42	GM35512	Packing, fuel return	5	
25	225374	Retainer	2		43	GM35506	Pipe seal	4	
28	225418	Bolt, M4 x 14 hex socket	2		44	252734	Washer, seal	1	
29	256708	Retainer	1		45	GM35511	Joint bolt, M6	5	
32	225418	Bolt, M4 x 14 hex socket	2						

Group 21: Fuel Injection Lines, continued



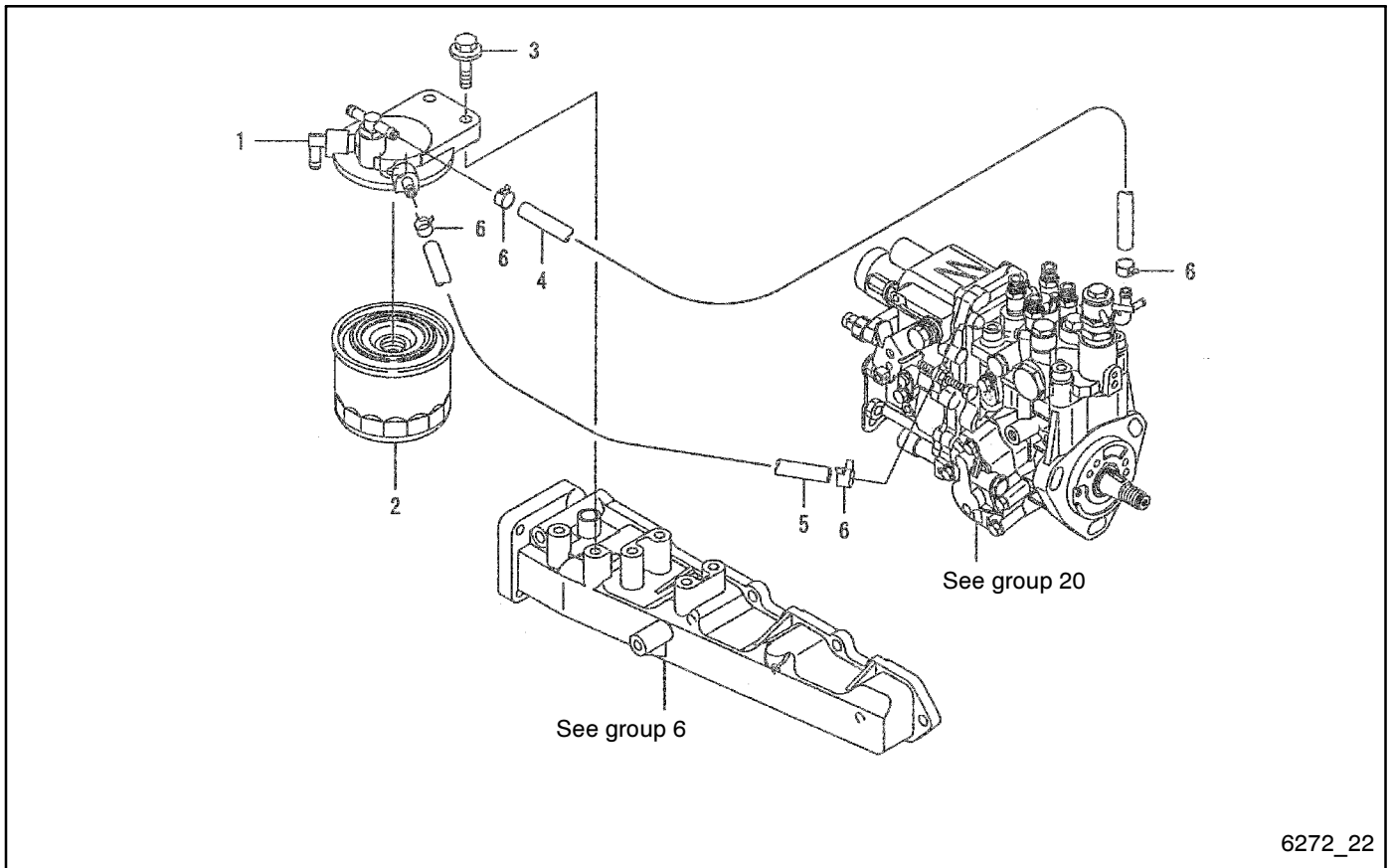
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Item	Part No.	Description	Quantity	
			3	4
1	224360	Valve assembly, fuel injection (includes items 3-5)	4	
1	229872	Valve assembly, fuel injection (includes items 3-5)		4
3	225004	Nozzle assembly, fuel injection (includes items 4 and 5)	4	
3	229873	Nozzle assembly, fuel injection (includes items 4 and 5)		4
4	X	Valve	4	4
5	X	Body	4	4
6	256520	Nut, nozzle case	4	4
7	256706	Holder	4	4
8	256521	Spring, nozzle	4	4
9	256522	Seat, nozzle spring	4	4

Item	Part No.	Description	Quantity	
			3	4
10	256523	Plate, stop	4	4
11	256707	Pin	8	8
12	256524	Shim pack	4	4
13	250989	Nut, M6	2	2
14	252453	Retainer	2	2
15	252455	Clamp	2	2
16	252905	Pipe, fuel injection	1	1
17	252906	Pipe, fuel injection	1	1
18	252907	Pipe, fuel injection	1	1
19	252908	Pipe, fuel injection	1	1
20	229406	Stay	1	1
21	229487	Washer, spring	1	1
22	225817	Bolt, M6 x 20, plated	1	1
23	252697	Bolt, M8 x 20, plated	1	1

X Item not sold separately.

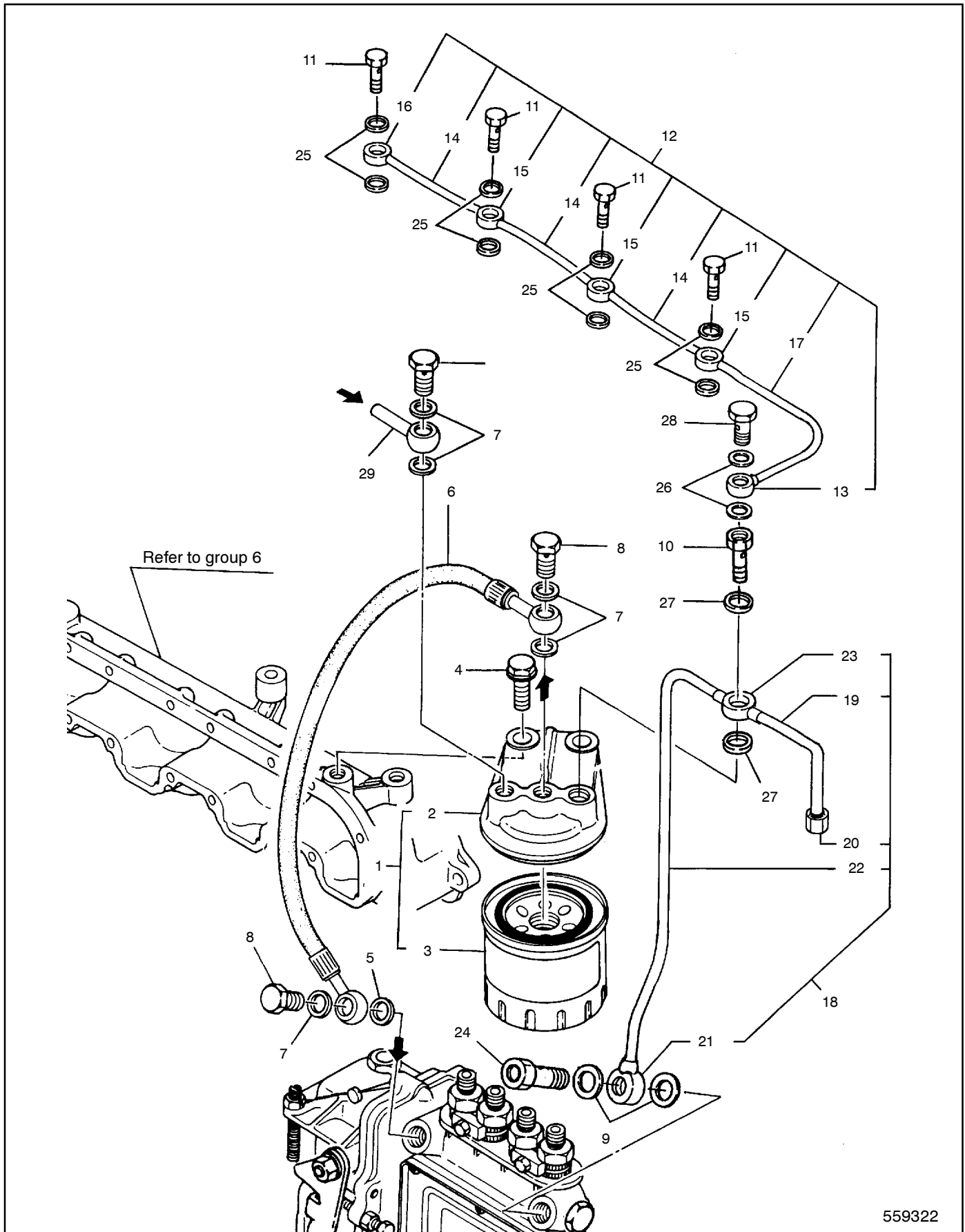
Group 22: Fuel Line and Filter



6272_22

Item	Part Number	Description	Quantity
			Variation Number
1	GM35541	Bracket, filter	1
2	GM32359	Filter, fuel	1
3	225819	Bolt, M8 x 30, plated	2
4	GM35646	Pipe, fuel return	1
5	GM35518	Pipe, fuel oil	1
6	252670	Clamp	4

Group 22: Fuel Line and Filter, continued

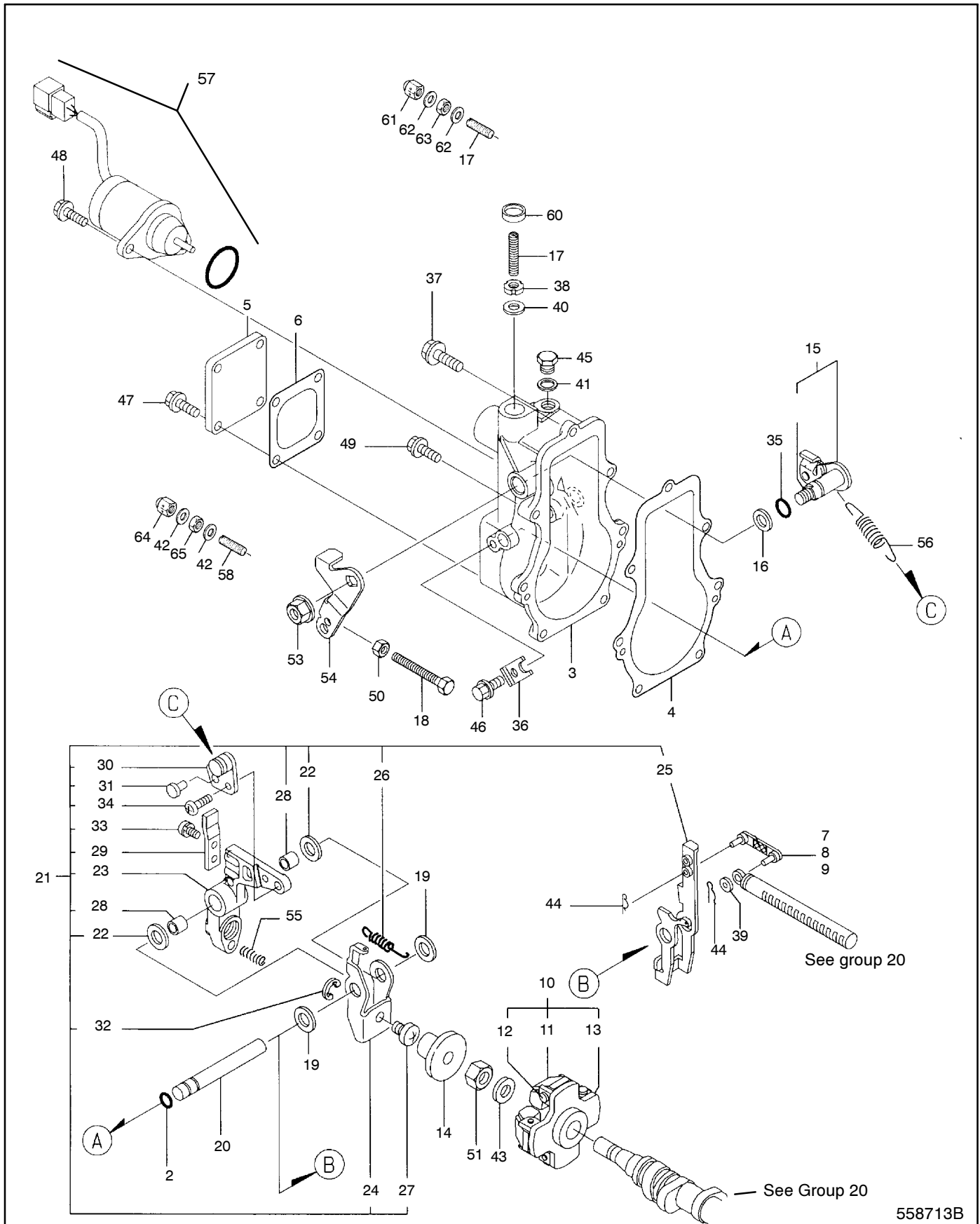


Group 22: Fuel Line and Filter, continued

Item	Part Number	Description	Quantity
			Variation Number
			3
1	256609	Filter assembly, fuel (includes items 2 and 3)	1
2	X	Body, fuel filter	1
3	252898	Filter, fuel	1
4	225820	Bolt, M10 x 30, plated	2
5	225424	Washer, seal 12	1
6	229842	Pipe, fuel	1
7	250969	Gasket 12, round	5
8	250972	Bolt, M6, joint	2
8	229768	Bolt, M10, joint	2
8	229552	Bolt, pipe joint	1
9	252739	Gasket	2
10	225796	Bolt, pipe joint	1
11	256713	Bolt, pipe joint	4
12	229465	Pipe, fuel return (includes item 13-17)	1
13	X	Joint	1
14	X	Pipe	3
15	X	Joint, pipe	3
16	X	Joint, pipe	1
17	X	Pipe, return	1
18	229466	Pipe, return (includes items 19-23)	1
19	X	Pipe	1
20	X	Joint	1
21	X	Pipe joint	1
22	X	Pipe, return	1
23	X	Pipe joint	1
24	252792	Valve assembly, check	1
25	252355	Gasket 6, round	8
26	250967	Gasket 8, round	2
27	252675	Gasket 14, round	2
28	252677	Bolt, pipe joint	1
29	256567	Joint 12, pipe	1
30	229552	Bolt, pipe joint	1

X Item not sold separately.

Group 23: Governor



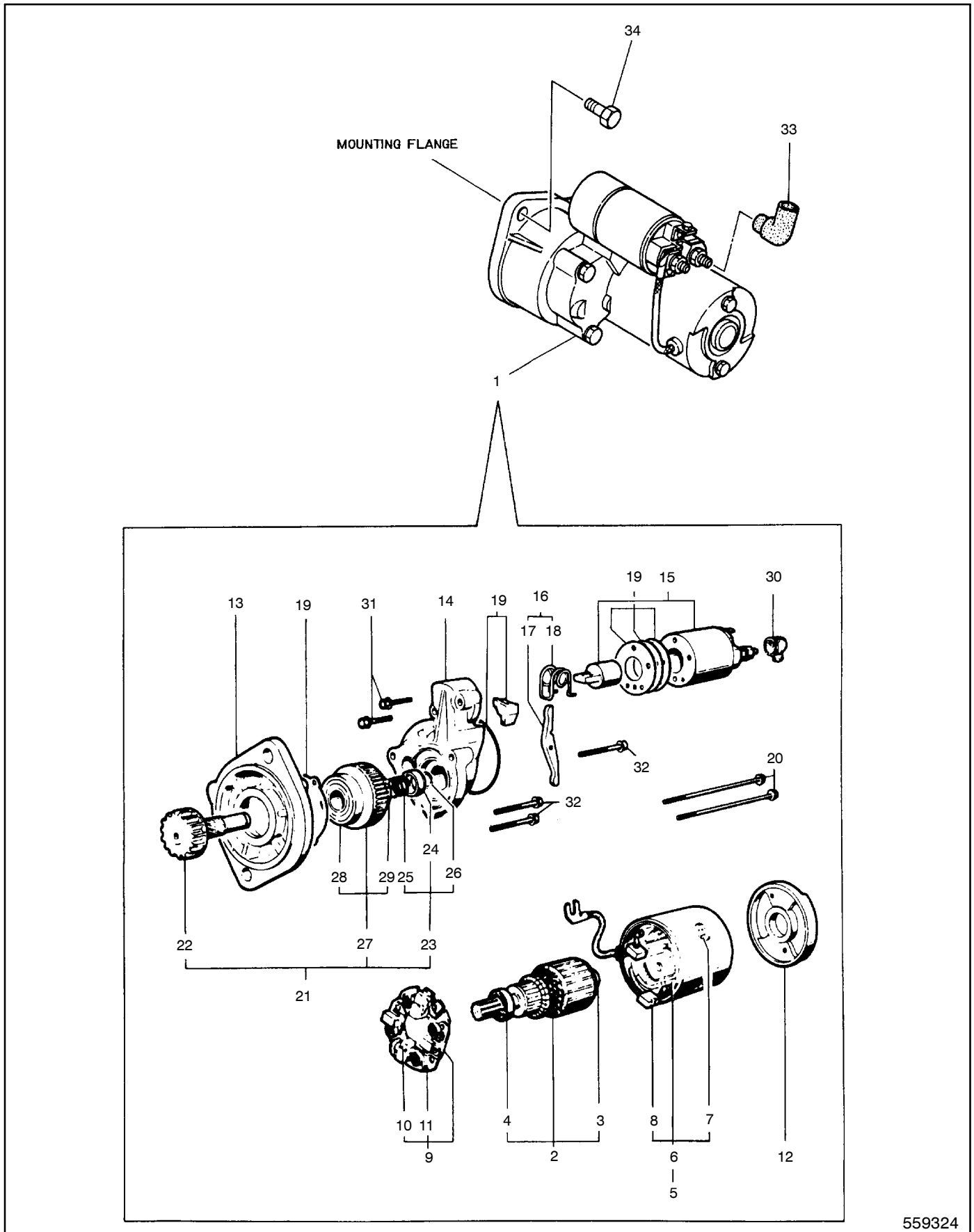
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Group 23: Governor

Item	Part Number	Description	Quantity	
			Variation Number 3	Variation Number 4
1	X	Governor assembly (includes items 2-52)	1	1
2	252849	O-ring	1	1
3	X	Case, governor	1	1
4	225417	Gasket, spacer	1	1
5	225414	Cover	1	1
6	363450	Packing	1	1
7	256787	Link 30 mm	1	1
8	256558	Link 31 mm	1	1
9	256559	Link 30.5 mm	1	1
10	252974	Weight assembly, governor (includes items 11-13)	1	1
11	X	Weight	4	4
12	X	Pin, governor weight	4	4
13	X	Support	1	1
14	225781	Sleeve	1	1
15	252794	Shaft assy., control	1	1
16	225782	Spacer, shaft	1	1
17	225784	Bolt, revol. limit	1	1
18	225783	Bolt, idle limit	1	2
19	229722	Spacer assembly	2	2
20	225415	Shaft, governor lever	1	1
21	225421	Lever assembly, governor (includes items 22-34)	1	1
22	252592	Shim set	2	2
23	X	Lever	1	1
24	X	Lever, governor	1	1
25	X	Lever, governor	1	1
26	225407	Spring	1	1
27	X	Shifter	1	1
28	X	Bush	2	2
29	X	Fitting	1	1
30	X	Hook, tension lever	1	1
31	X	Pin	1	1
32	X	Circlip	1	1
33	X	Screw, M6 x 12	1	1
34	X	Screw, M5 x 10	2	2
35	252856	O-ring	1	1
36	229692	Retainer, shaft	1	1
37	225790	Bolt, washer based	1	1
38	225767	Nut, lock	1	1
39	225803	Washer 4	1	1
40	—	Not used		
41	363452	Washer, seal 10	1	1
42	225424	Washer, seal 12	2	2
43	256704	Washer 12	1	1
44	225809	Pin, snap 4	2	2
45	256517	Plug	1	1
46	229498	Bolt, M6 x 10, plated	1	1
47	229498	Bolt, M6 x 10, plated	4	4
48	225818	Bolt, M6 x 14, plated	2	2
49	225817	Bolt, M6 x 20, plated	6	6
50	225825	Nut, lock M6, plated	1	1
51	225826	Nut, lock M12, plated	2	2
53	252723	Nut, M8	1	1
54	225800	Lever, control	1	1
55	GM13320	Spring, fuel control	1	1
56	225795	Governor, spring	1	1
57	225461	Kit, fuel solenoid (includes O-ring 225427)	1	1
58	225785	Bolt, fuel control	1	1
61	225702	Nut, cap		1
62	225423	Washer, seal 6		2
63	225825	Nut, lock 6		2
64	225770	Nut, cap		1
65	225826	Nut, lock M2, plated		2

X Item not sold separately.

Group 24: Starting Motor

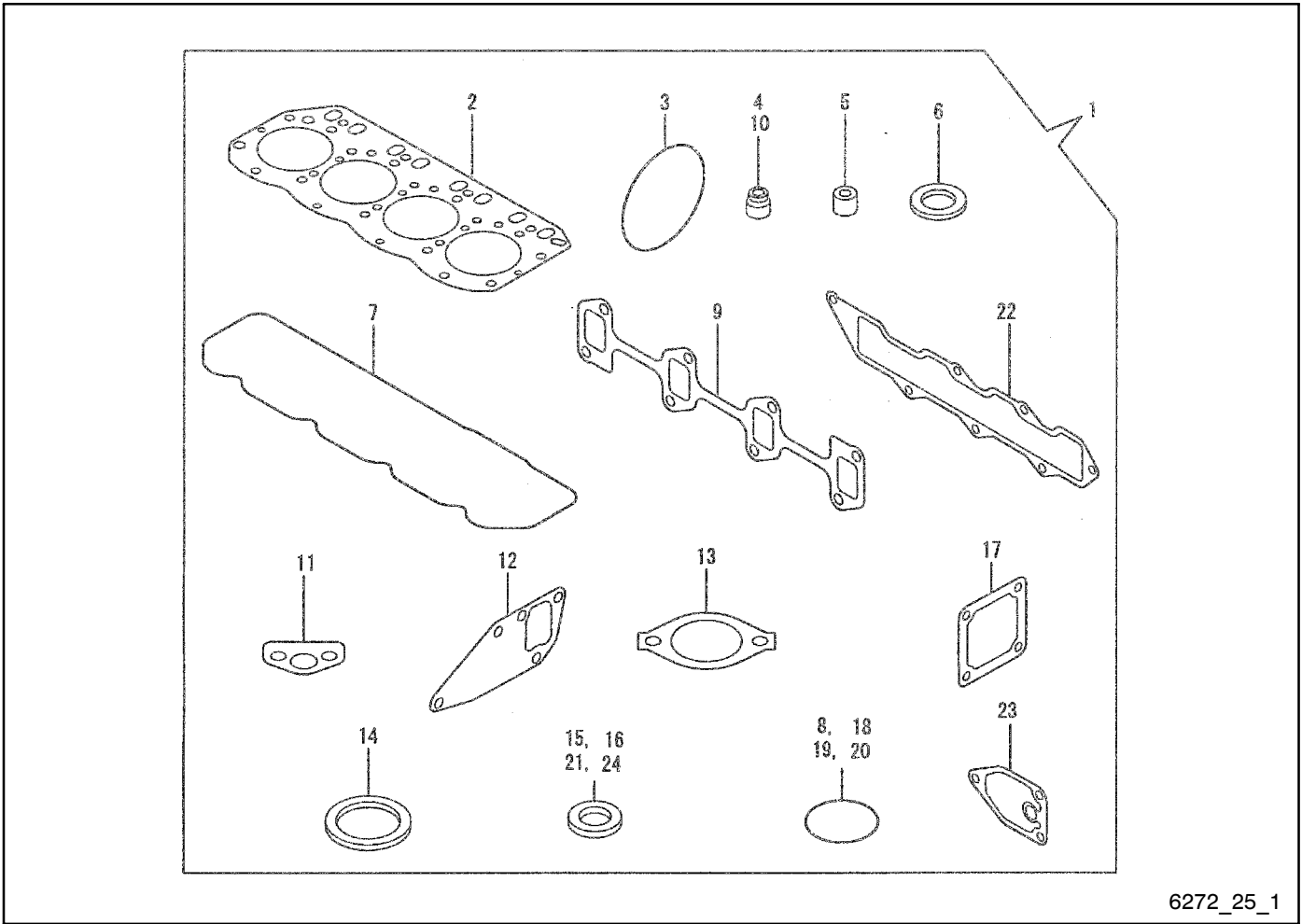


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Group 24: Starting Motor

Item	Part Number	Description	Quantity	
			Variation 3	Variation 4
1	344743-P	Starter (includes items 2-32)	1	
1	GM39020	Starter (24V models)		1
2	225895	Armature assembly (includes items 3 and 4)	1	
3	225896	Bearing	1	
4	225897	Bearing	1	
5	229477	Yoke assembly (Includes items 6-8)	1	
6	225989	Coil assembly, field	1	
7	225899	Screw, pole core set	4	
8	225900	Brush (+)	2	
9	225901	Holder assembly, brush (includes items 10 and 11)	1	
10	225902	Brush (-)	2	
11	225903	Spring, brush	4	
12	225904	Cover, rear	1	
13	225905	Housing assembly, gear	1	
14	225906	Housing, center	1	
15	225907	Switch, magnetic	1	
16	225908	Lever set, shift (includes items 177 and 18)	1	
17	229478	Lever	1	
18	229479	Spring	1	
19	225909	Cover, dust	1	
20	225910	Bolt, through	2	
21	225911	Pinion assembly (includes items 22-29)	1	
22	225912	Shaft, pinion	1	
23	225913	Stopper set, pinion (Includes items 24-26)	1	
24	229480	Stopper, pinion	1	
25	229481	Spring	1	
26	229482	Clip, pinion stopper	1	
27	225914	Clutch assembly (includes items 28 and 29)	1	
28	225915	Bearing, ball	1	
29	225916	Bearing, ball	1	
30	225917	Cover, terminal	1	
31	225920	Bolt, M6 x 32, plated	2	
32	225921	Bolt, M6 x 40, plated	3	
33	252481	Cover, terminal	1	
34	252713	Bolt, M12 x 30, plated	2	

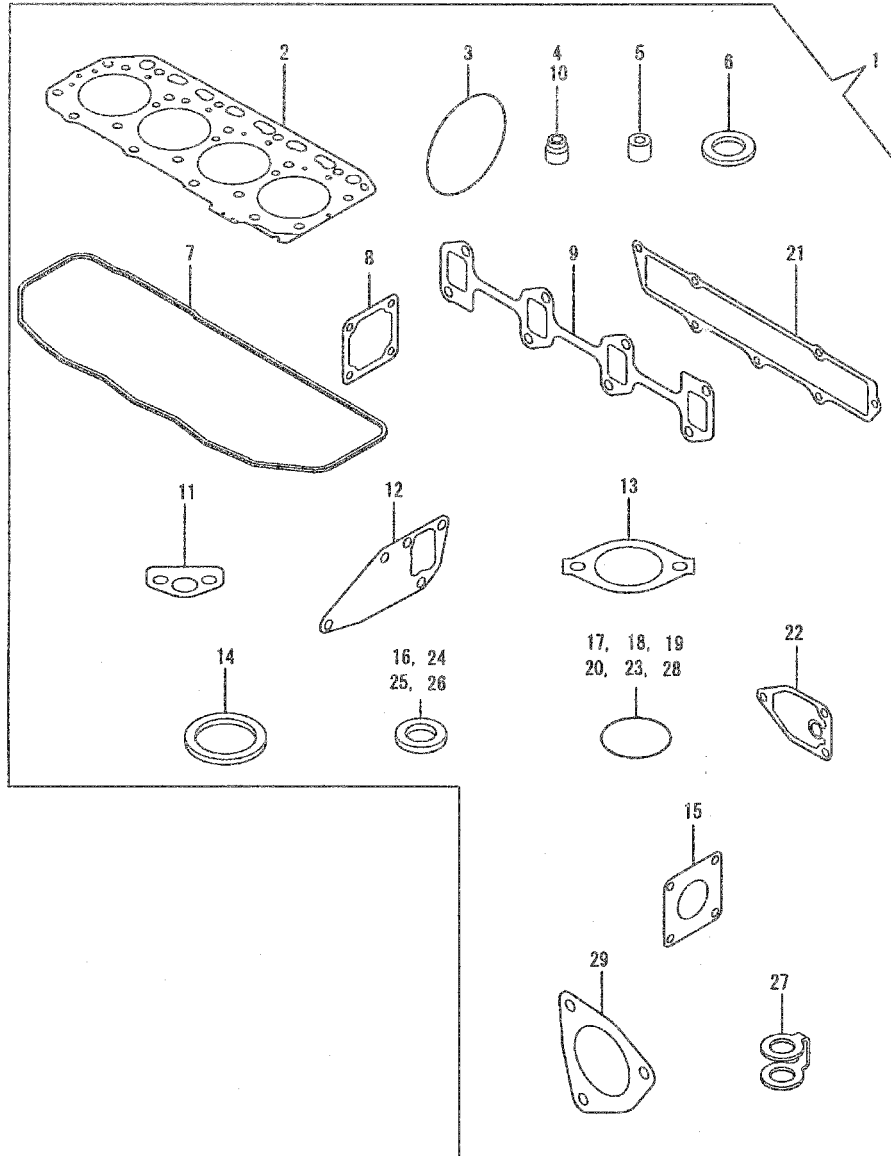
Group 25: Gasket Set



6272_25_1

Item	Part Number	Description	Quantity
			Variation Number
1	GM35756	Gasket set (includes items 2-24 shown in the illustration)	1
			1

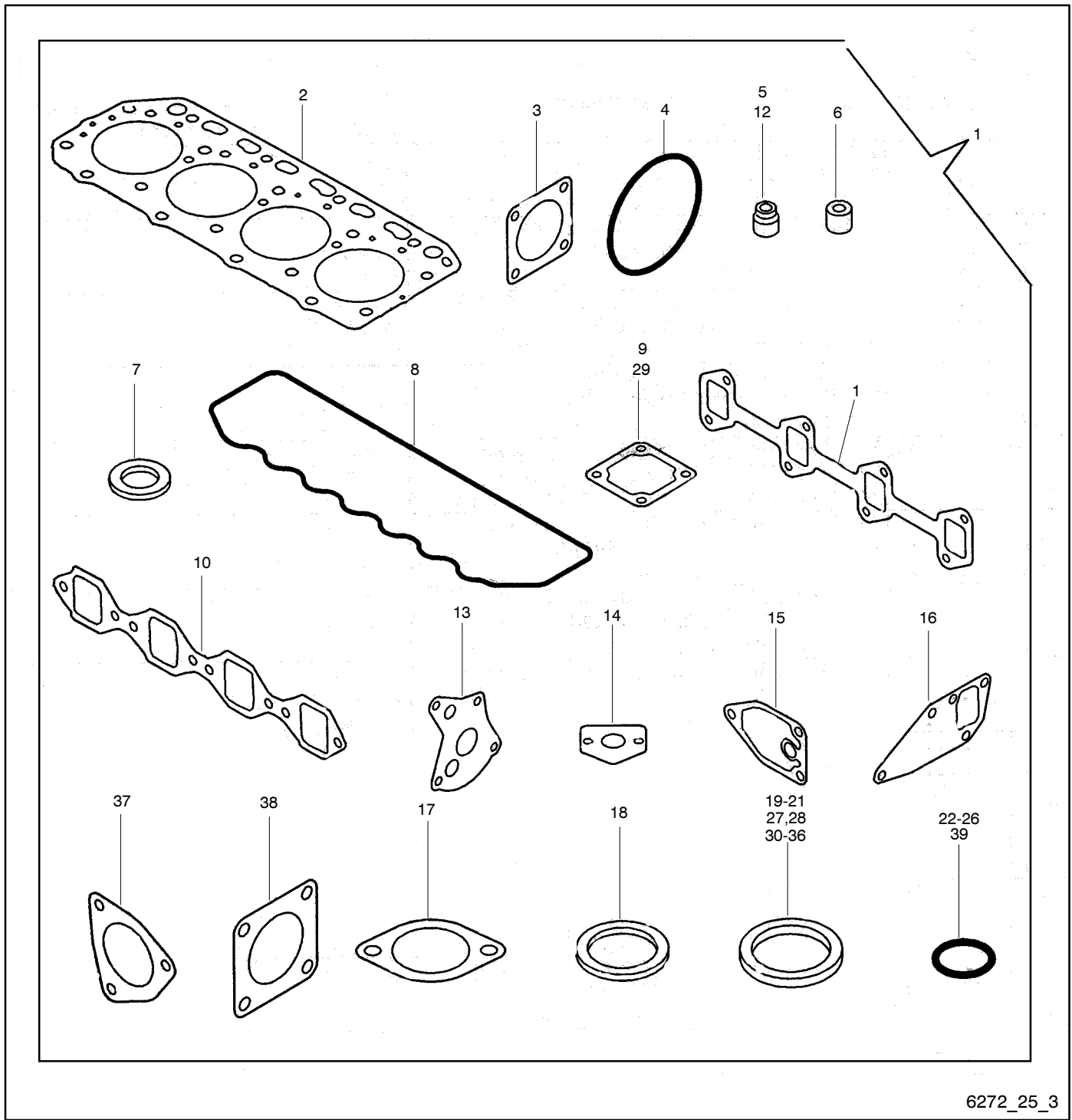
Group 25: Gasket Set



6272_25_2

Item	Part Number	Description	Quantity Variation Number
1	GM35754	Gasket set (includes items 2-29 shown in the illustration)	2 1

Group 25: Gasket Set, continued

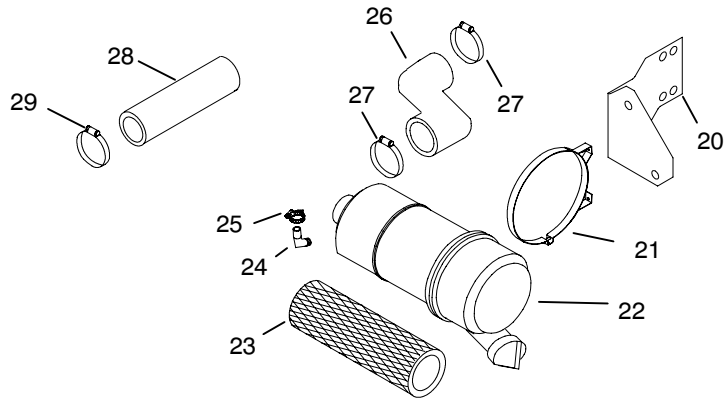


6272_25_3

Item	Part Number	Description	Quantity	
			Variation Number 3	Variation Number 4
1	GM13343	Gasket set (includes items 2-39 shown in the illustration)	1	1
1	GM13342	Gasket set (includes items 2-39 shown in the illustration)	1	1

Group 101: Air Intake

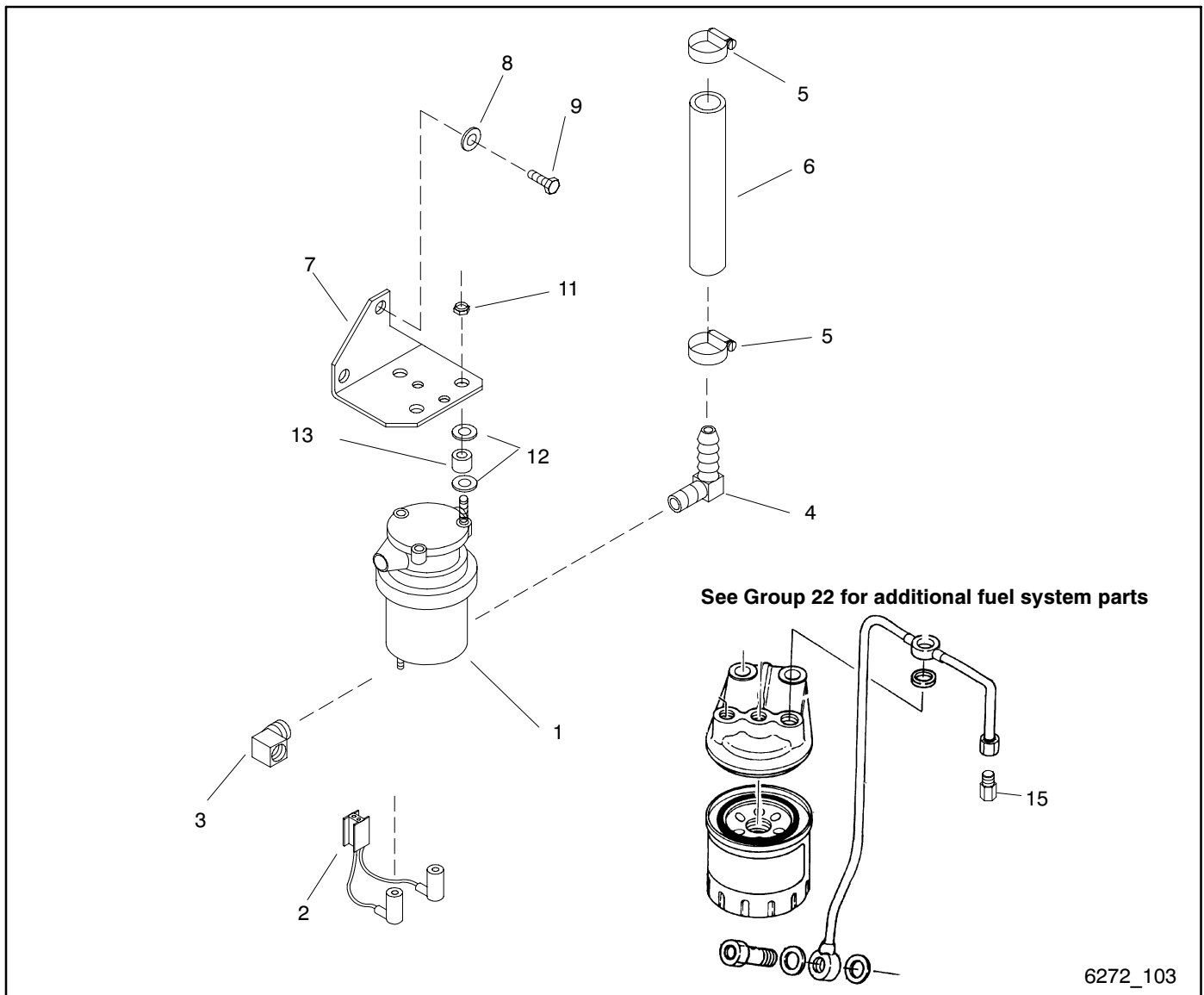
See Group 6 for 23EOZD/20EFOZD air cleaner



6272_101

Item	Part Number	Description	Quantity	
			Variation Number 36-1	Variation Number 65-1
20	GM22513	Bracket, air cleaner	1	
21	GM21380	Mount, air cleaner, 4.77 in. ID	1	1
22	GM22512	Air cleaner assembly	1	
22	GM21379	Air cleaner assembly		1
23	GM24456	Element, air cleaner	1	1
24	X-391-12	Connector, 3/8 in. ID hose	1	
25	X-426-9	Clamp, hose, 0.25/0.70 in.	1	
26	GM22748	Hose, molded, air cleaner	1	
26	GM32662	Hose, air intake		1
27	X-426-6	Clamp, hose, 1.56/2.5 in.	2	1
27	X-426-16	Clamp, hose, 1.81/2.75 in.		1
28	X-6292-2	Hose, flexible air	1	1
29	X-426-4	Clamp, hose, 1.31/2.25 in.	2	2

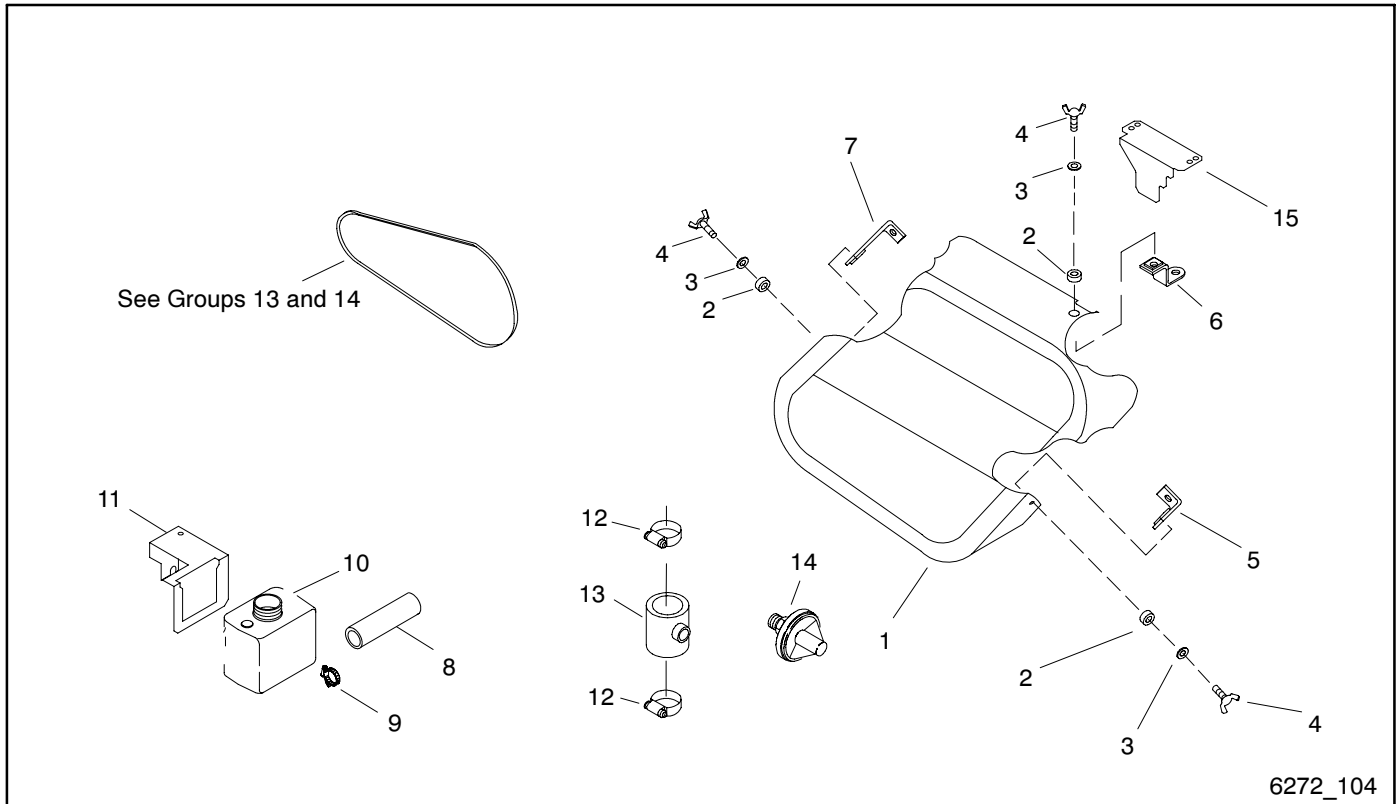
Group 103: Fuel System



6272_103

Item	Part Number	Description	Quantity		
			Variation Number		
			36-2	65-2	65-12
1	229051	Pump, fuel	1	1	
1	344740	Pump, fuel (24 V)			1
2	229168	Lead assembly	1	1	1
3	X-555-1	Elbow, street, 1/4 x 1/4	1	1	1
4	X-391-20	Connector, 90 deg.	1		
4	X-391-25	Connector, 90 deg.		1	1
5	X-426-9	Clamp, hose	2	2	2
6	X-386-97	Line, fuel	1		
6	X-386-32	Line, fuel		1	1
7	229053	Bracket, fuel pump	1	1	1
8	M125A-10-80	Washer, plain	2	2	2
9	M933-10020-60	Screw, hex cap	2	2	2
11	X-101-25	Nut, lock	3	3	3
12	X-25-40	Washer, plain	6	6	6
13	X-284-39	Grommet	3	3	3
15	229331	Adapter, pipe	1		

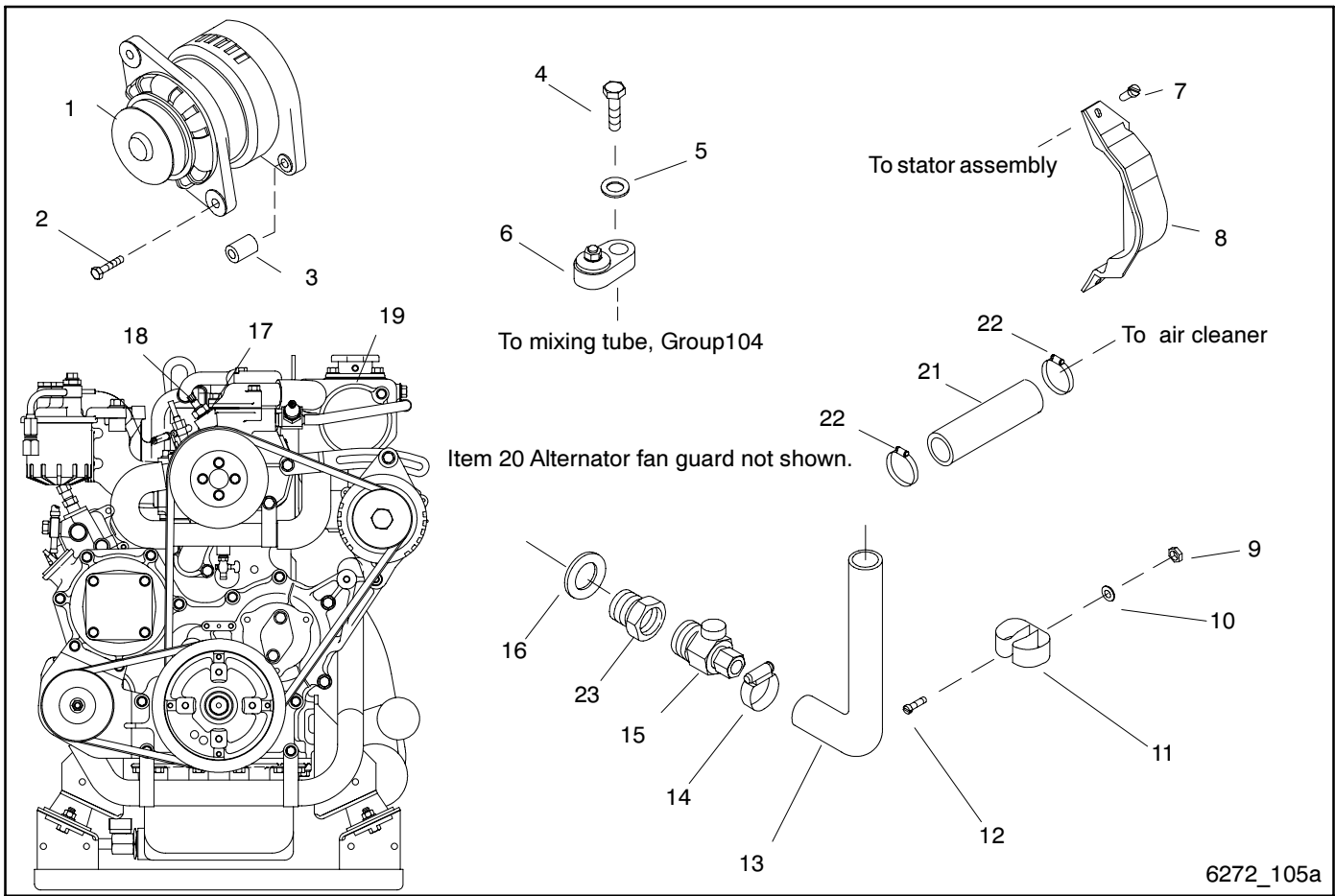
Group 104: Cooling System



Item	Part Number	Description	Quantity		
			Variation Number		
			36-3	65-3	65-13
1	344320	Guard, belt	1		
1	GM35373	Guard, belt		1	1
2	X-284-39	Grommet	3	3	3
3	X-25-40	Washer, plain	3	3	3
4	229330	Screw, wing	3	3	3
5	229201	Bracket, belt guard, RS	1		
5	GM35368	Bracket, belt guard, RS		1	
5	344820	Bracket, belt guard, RS			1
6	229199	Bracket, belt guard, upper	1		
6	GM35366	Bracket, belt guard, upper		1	
6	GM35367	Bracket, belt guard, upper			1
7	229286	Bracket, belt guard	1		
7	GM35372	Bracket, belt guard, LS		1	
7	GM35369	Bracket, belt guard, LS			1
8	X-386-34	Line, flex. fuel, 5/16 x 28	1		
8	X-386-36	Line, flex. fuel		1	1
9	X-426-9	Clamp, hose, .25/.70 in.	2	2	2
10	359037	Bottle, overflow	1	1	1
11	359568	Bracket, water bottle	1		
11	GM32749	Bracket, water bottle		1	1
12	X-426-20	Clamp, hose, .63/1.5 in.	2	2	2
13	GM30882	Tube, seawater	1	1	1
14	GM30263	Switch, pressure	1	1	1
15	GM49307	Guard, belt top		1	1

Note: Items 1-7 are not used when an optional sound shield is installed.

Group 105: Engine



6272_105a

Item	Part Number	Description	Quantity							
			Variation Number							
			36-4	36-5	4	5	17	14	15	18
1	256924	Alternator, 12 V (see group 13 for alternator adjust. arm)	1	1	1	1	1			
1	344742	Alternator, 24 V						1	1	1
2	X-125-22	Bolt, hex cap	1	1	1	1	1	1	1	1
3	X-400-184	Spacer	1	1						
3	X-400-258	Spacer			1	1	1			
3	X-400-260	Spacer						1	1	1
4	M933-08016-60	Screw, hex cap	1	1	1	1	1	1	1	1
5	X-25-44	Washer, .562 x .328 x .062	1	1	1	1	1	1	1	1
6	249872	Switch, high temperature cutout	1	1	1	1	1	1	1	1
7	X-67-113	Screw, self tapping	2	2	2	2	2	2	2	2
8	229113	Guard, generator fan	1	1	1	1	1	1	1	1
9	X-101-11	Nut, elastic stop 8-32	1	1	1	1	1	1	1	1
10	X-25-48	Washer, plain	1	1	1	1	1	1	1	1
11	267959	Clip, hose	1	1	1	1	1	1	1	1
12	X-51-15	Screw, RHM, 8-32 x 1/2	1	1	1	1	1	1	1	1
13	X-651-32	Hose	1	1	1	1	1	1	1	1
14	X-426-9	Clamp, hose	1	1	1	1	1	1	1	1
15	344828	Valve, drain	1							
15	359653	Valve, drain		1	1	1	1	1	1	1
16	X-25-145	Washer, 1.25 x .875 x .062	1	1	1	1	1	1	1	1
17	GM30245	Bushing, adapter	1	1						
17	D-228	Bushing, reducing, 1/8 x 3/8 in. NPT			1	1	1	1	1	1
18	GM28823	Sensor, temperature	1	1	1	1	1	1	1	1
19	A-359562	Engine assembly (4TNE88)	1							
19	GM29464	Engine assembly (4TNE88)			1			1		
19	A-359569	Engine assembly (4TNE84T)		1						
19	GM29466	Engine assembly (4TNE84T)				1	1			
19	GM41004	Engine assembly (4TNE84T)							1	1
20	344815	Guard, alternator fan						1	1	1
21	X-6292-2	Hose, flexible air		1		1	1		1	1
22	X-426-4	Clamp, hose, 1.31/2.25 in.		2		2	2		2	2
23	249959	Adapter, bushing	1	1	1	1	1	1	1	1

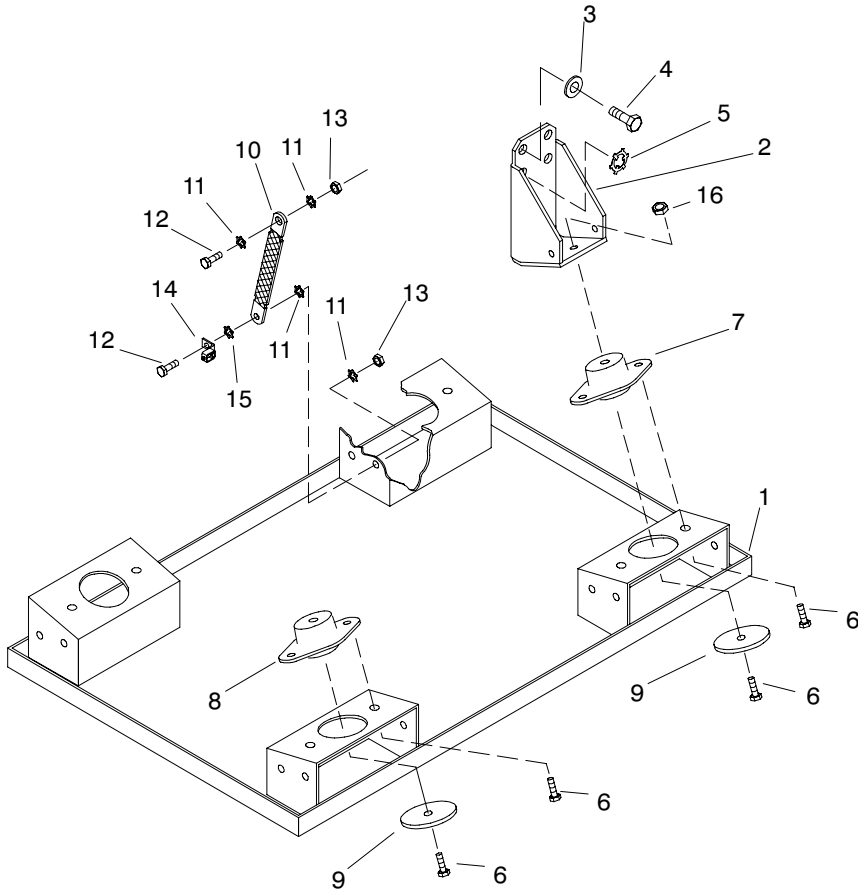
Note: Item 13 is not used when an optional sound shield is installed.

Group 107: Nameplate and Decals

Item	Part Number	Description	Quantity		
			Variation Number		
			36-6	65-6	65-10
1	249810	Decal, warning "hot coolant"	1	1	1
2	226917	Decal, negative battery connection	1	1	1
3	344295	Decal, equipment ground	1	1	1
4	GM14167	Decal, drain	3	3	3
5	249808	Decal, warning "rotating parts"	1	1	1
6	224233	Decal, 1-800 number	1	1	1
7	249809	Decal, warning "hot engine"	1	1	1
8	X-6348-6	Decal, Kohler logo	1	1	1
9	GM35838	Decal, reconnection 1-phase	1	1	
9	229883	Decal, reconnection 3-phase			1
10	344486	Decal, CE	1	1	1
11	246242	Decal, notice voltage change	1	1	1
12	294520	Decal, danger "high voltage"			1

Nameplate and decals are not illustrated.

Group 109: Skid and Plant Mounting



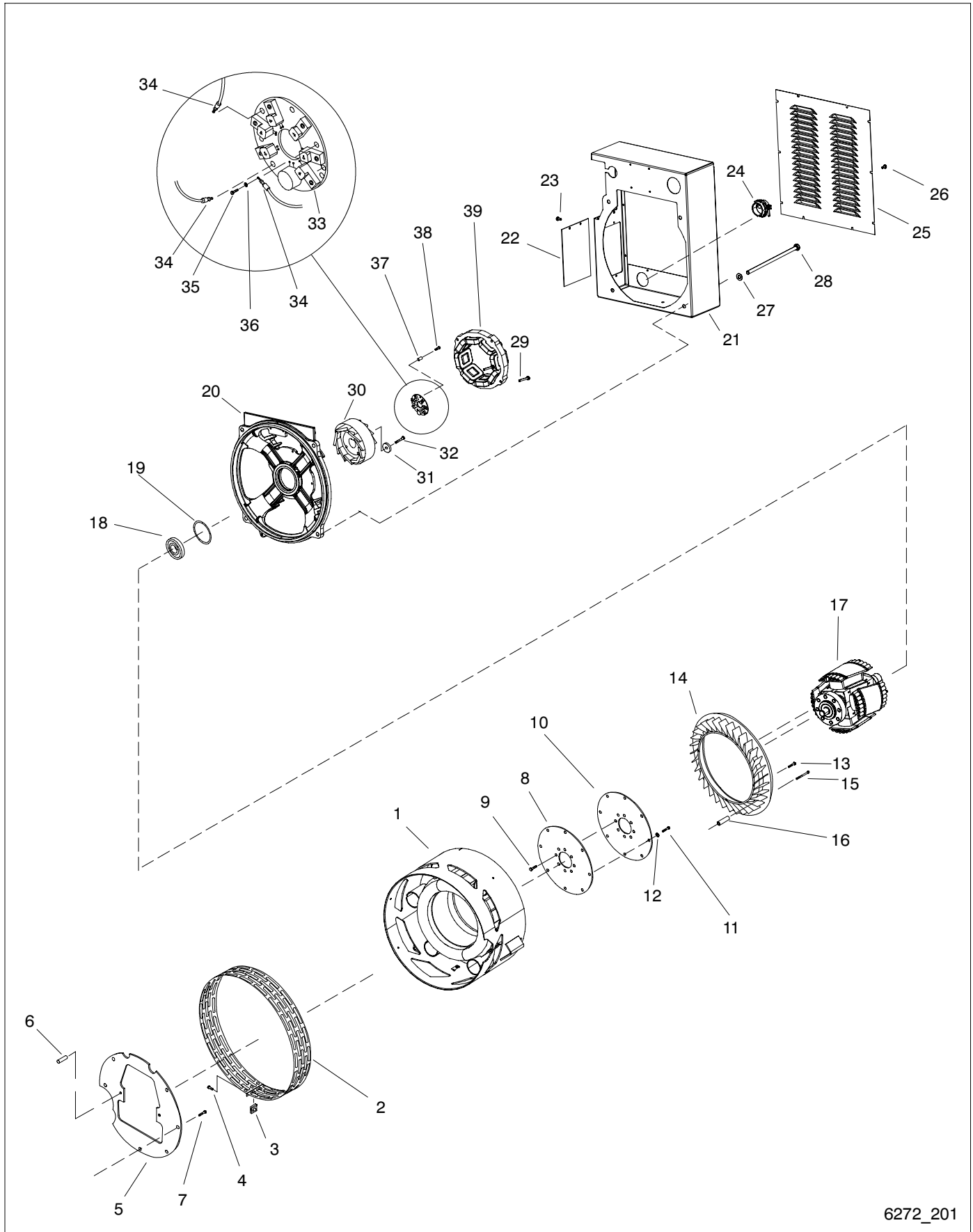
109-125-10

Group 109: Skid and Plant Mounting

Item	Part Number	Description	Quantity	
			Variation Number	
			36-7	65-7
1	GM31909	Tray	1	1
2	GM29465	Support, engine	2	2
3	M125A-10-80	Washer, plain	7	7
4	M933-10020-60	Screw, hex cap	8	8
5	X-22-14	Washer, lock	1	1
6	#	Hardware, M8-1.25	4	4
7	278322	Mount, vibro (engine end)	2	2
8	225125	Mount, vibro (generator end)	2	2
9	X-25-96	Washer, plain	4	4
10	245297	Strap, ground	1	
10	LK-0606-1515	Lead	1	1
11	X-22-12	Washer, shakeproof	4	1
12	#	Hardware, M6-1.00	2	2
13	#	Hardware, M6-1.00	2	2
14	X-377-12	Connector, cable	1	
15	X-22-11	Washer, lock 1/4	1	
16	M982-08-80	Nut, hex elastic stop	4	4

Common hardware; procure locally

Group 201: Generator and Mounting



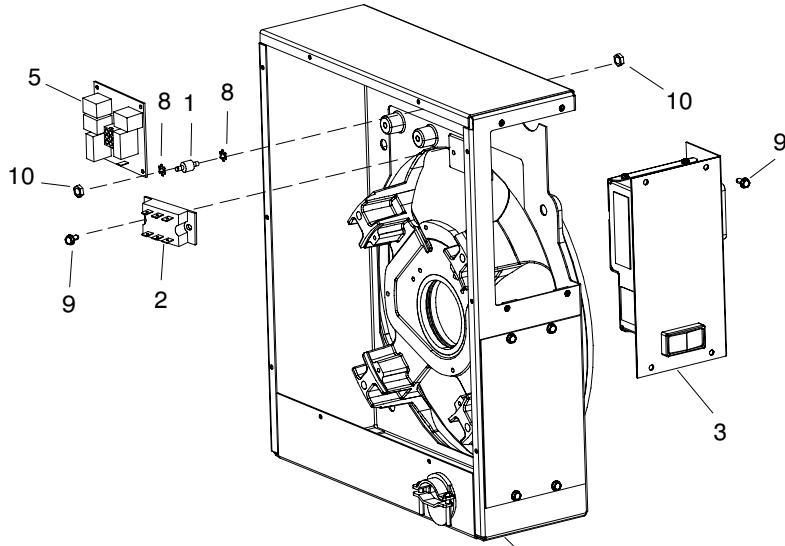
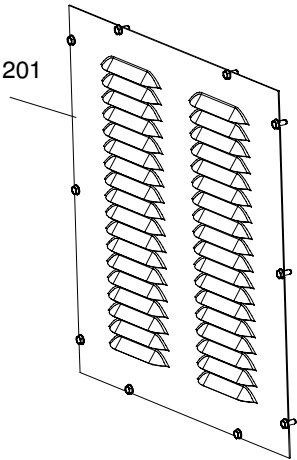
6272_201

Group 201: Generator and Mounting

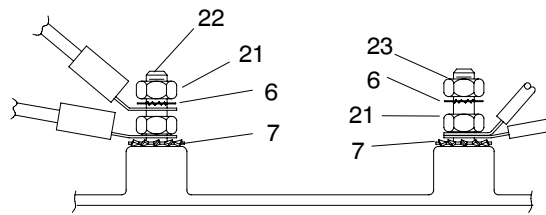
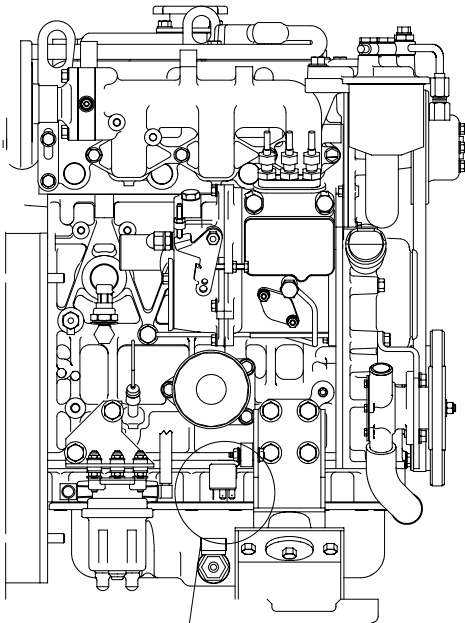
Item	Part Number	Description	Quantity		
			Variation Number		
			36-8	65-8	65-11
1	GM29345	Stator assembly	1	1	
1	GM29789	Stator assembly			1
2	229109	Guard, generator fan	1	1	1
3	257442	Clip, speed	1	1	1
4	X-67-125	Screw, tapping, 10-24	1	1	1
5	229097	Plate, locator	1	1	1
6	229356	Pin, knurled	2	2	2
7	M933-10012-60	Screw, M10-1.50	6	6	6
8	257017	Disc, drive	1	1	1
9	X-6238-3	Screw, 3/8-16 x .875	8	8	8
10	257017	Disc, drive	1	1	1
11	M933-08016-60	Screw, HC M8-1.25	8	8	8
12	M125A-08-80	Washer	8	8	8
13	X-6284-1	Screw, M5 x .8 x 10 mm	4	4	4
14	225214	Fan, generator	1	1	1
15	X-6284-2	Screw, M5 x .8 x 45 mm	4	4	4
16	X-400-189	Spacer	4	4	4
17	GM29685	Rotor assembly (includes item 18)	1	1	
17	GM29686	Rotor assembly (includes item 18)			1
18	X-758-15	Bearing, ball	1	1	1
19	229110	O-ring	1	1	1
20	GM24810	Bracket, end	1	1	1
21	GM29688	Box, junction	1		
21	GM37367	Box, junction		1	1
22	GM30021	Plate, circuit breaker	1	1	1
23	X-6216-1	Screw, Phillips hex crimplite	4	4	4
24	X-6266-1	Connector, cable	1	1	1
25	GM29690	Panel, junction box louver	1	1	1
26	X-6216-1	Screw, Phillips hex crimplite	10	10	10
27	X-801-3	Washer, hardened	4	3	3
27	X-22-14	Washer, lock, .391 ID x .975 in. OD		1	1
28	X-6051-17	Screw, hex head	4	4	4
29	X-97-14	Screw, hex, 10-24	4	4	4
30	344568	Exciter, armature	1	1	1
31	X-25-129	Washer, plain	1	1	1
32	X-6238-3	Screw, 3/8-16 x .875	1	1	1
32	X-22-1	Washer, lock	1	1	1
33	A-229152	Circuit board, diode board	1	1	1
34	X-283-3	Terminal	3	3	3
35	X-51-8	Screw, 8-32 x .75	5	5	5
36	X-22-7	Washers, #8	5	5	5
37	X-712-17	Spacer	3	3	3
38	X-67-135	Screw, tapping, 10-24	3	3	3
39	GM31594	Exciter assembly, field	1	1	1

Group 301: Controller and Mounting

See Group 201

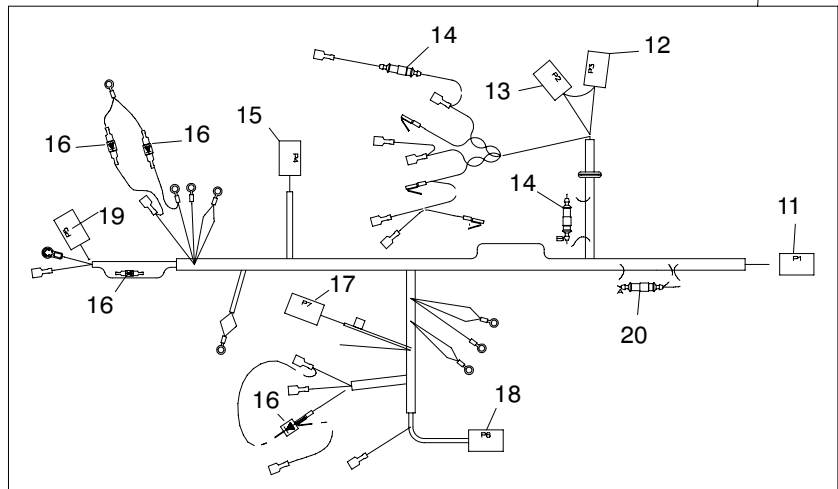
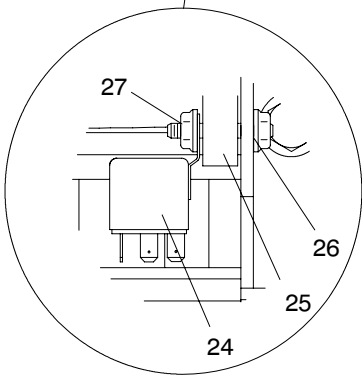


See Group 201



LO & GRD Lead Connection

4

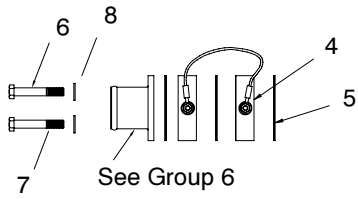


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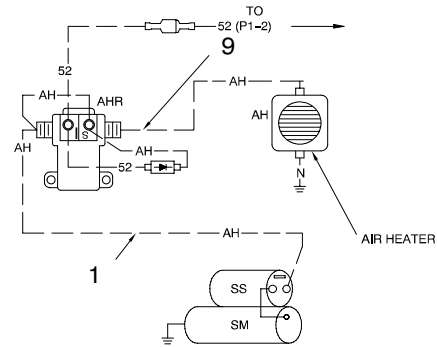
Group 301: Controller and Mounting

Item	Part Number	Description	Quantity		
			Variation Number		
			36-9	65-9	65-16
1	282829	Vibromount	4	4	4
2	GM28483	SCR module	1	1	1
3	GM34969	Controller assembly kit, ADC 2100	1	1	1
4	GM29566	Harness, engine, Yanmar 13-32EOZD	1	1	1
5	GM29671	PCB assembly, relay board, 12 V	1	1	
5	GM29778	PCB assembly, relay board, 24 V			1
6	X-22-11	Washer, lock, .262 ID x .469 in. OD	2	2	2
7	X-22-12	Washer, lock, .262 ID x .743 in. OD	2	2	2
8	X-22-20	Washer, lock, .172 ID x .373 in. OD	8	8	8
9	X-67-64	Screw, self-tapping	6	6	6
10	X-6210-4	Nut, flange whiz, 8-32	8	8	8
11	GM28678	Connector, weathertight	1	1	1
12	320711	Connector, 9-position	1	1	1
13	GM29998	Connector, 6-position, blk, male	1	1	1
14	223316	Fuse, 10 A, 250 V	2	2	2
15	229989	Connector, receptacle	1	1	1
16	233959	Diode, 6 A	4	4	4
17	GM15493	Connector, weathertight, 3-position	1	1	1
18	292370	Connector, plug, 2-position	1	1	1
19	GM29249	Connector	1	1	1
20	358337	Fuse, 10 A, 250 V	1	1	1
21	M934-06-60	Nut, hex 6 mm	3		
21	X-6210-2	Nut, hex		3	3
22	X-6054-22	Stud, metric	2		
23	M934-06-64	Nut, hex, 6mm	1		
23	X-81-8	Nut, hex		1	1
24	259391	Relay, 12 VDC	1	1	
24	272684	Relay, 24 VDC			1
25	200705	Grommet, round		1	1
25	282829	Vibromount	1		
26	M7985A-05012-20	Screw, pan head machine		1	1
26	X-22-20	Washer, lock, .172 ID x .373 in. OD	1		
27	M934-05-50	Nut, hex, 5 mm		1	1
27	#	Nut, hex	1		

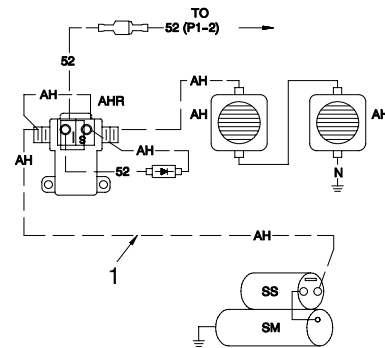
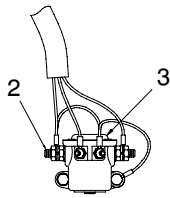
Group 401: Preheat



24 Volt Models



12 Volt Models



24 Volt Models

tp6272_401

Item	Part Number	Description	Quantity	
			Variation Number 5	Variation Number 11
1	229233	Wiring harness	1	
1	GM47601	Wiring harness		1
1	X-545-195	Cable, battery		1
2	238915	Boot	1	3
3	344741	Relay, 24 V	1	
3	233442	Relay, 12 V		1
4	344903	Heater, air	2	
4	—	Heater, air (see group 6)		1
5	344904	Gasket, air heater	3	
6	M931-08100-60	Bolt, hex head	2	
7	M931-08060-60	Bolt, hex head	2	
8	M125A-08-80	Washer, plain	4	
9	X-545-81	Cable, battery		1

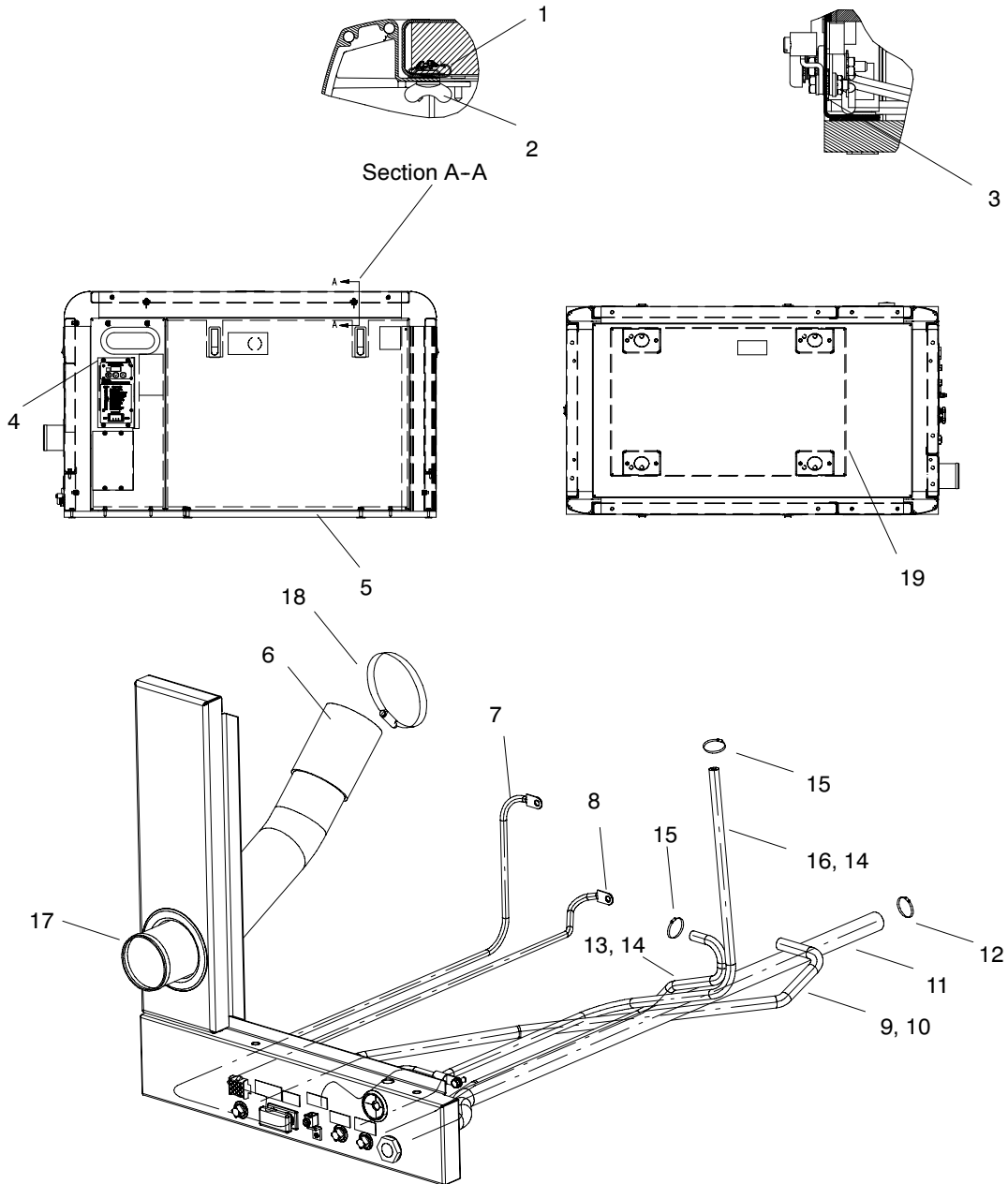
Group 701: Literature

Item	Part Number	Description	Quantity					
			Variation Number					
			48	49	50	51	58	59
1	TP-5375	Warranty, Marine	1	1	1	1	1	1
2	TP-5620	Safety Precautions, Marine	1	1	1	1	1	1
3	TP-6252	O/M 5-32EOZD (Yanmar TNV, ADC)	1	1	1	1	1	1
4	TP-6253	I/M 5-32EOZD (Yanmar TNV, ADC)	1	1	1	1	1	1
5	TP-6255	S/M 8-32EOZD/6.5-27EFOZD	1	1	1	1	1	1
6	TP-6272	P/C 20-24EOZD/17-20EFOZD	1	1	1	1	1	1
7	TP-6292	O/M Yanmar TNV Series	1	1	1	1		
7	TP-6067	O/M Yanmar TNE Series					1	1
8	TP-6293	S/M Yanmar TNV Series	1	1	1	1		
9	TP-5876	S/M Yanmar TNE Series					1	1

Paint and Miscellaneous Parts

Item	Part Number	Description
1	221334	White paint, gallon can
1	221335	White paint, spray can

Sound Shield



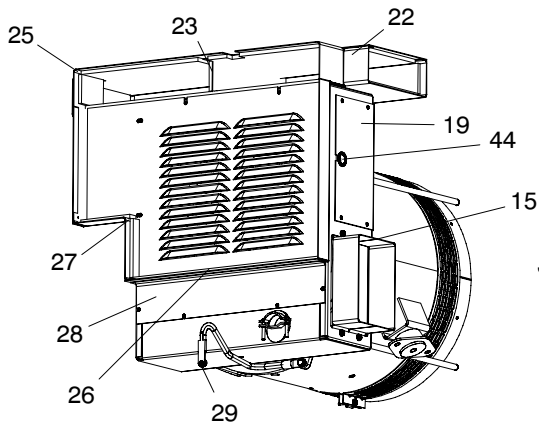
GM33040_1

Sound Shield

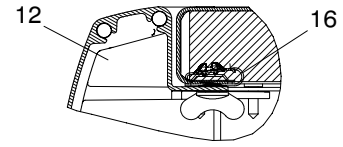
Item	Part Number	Description	Quantity			
			Kit Number			
			GM32546-KA3	GM32546-KA4	GM33040-KA3	GM33040-KA4
1	GM29918	Retainer	2	2	2	2
2	GM29920	Stud, wing head	2	2	2	2
3	X-22-12	Washer, lock, .262 ID x .743 in. OD	1	1	1	1
4	X-50-15	Screw, pan head, 10-24 x 1/2	8	8	8	8
5	GM31927	Base, sound shield	1	1	1	1
6	GM32638	Hose, radiator	1	1	1	1
7	X-545-177	Cable, battery (+)	1	1		
7	X-545-163	Cable, battery (+)			1	1
8	X-545-174	Cable, battery (-)	1	1		
8	X-545-162	Cable, battery (-)			1	1
9	X-651-6	Hose, rubber, straight, .375 in. ID	1	1	1	1
10	X-426-9	Clamp, hose, .25/.70 in.	1	1	1	1
11	X-6014-117	Hose, wire inserted radiator	1	1	1	1
12	X-426-15	Clamp, hose	2	2	2	2
13	X-6251-15	Fuel line, flexible	1	1		
13	X-386-75	Fuel line, flexible			1	1
14	X-380-4	Connector, hose + vibra seal	1	1		
14	X-652-3	Connector, hose + vibra seal			2	2
15	X-426-9	Clamp, hose, .25/.70 in.	4	4	4	4
16	X-6251-14	Hose	1	1		
16	X-386-103	Hose			1	1
17	GM32620	Tube, exhaust	1		1	
17	GM32552	Tube, exhaust		1		1
18	X-426-1	Clamp, hose, 2.81/3.75 in.	4	4	4	4
19	X-6047-7	Channel, U	1	1	1	1
—	X-25-142	Washer, plain, .281 ID x.625 in. OD	9	9	9	9
—	X-465-22	Bolt, hex cap	4	4	4	4
—	X-465-24	Bolt, hex cap	5	5	5	5
—	X-6278-15	Washer, nylon	2	2	2	2
—	X-794-5	Screw, drill #8 stainless steel	24	24	24	24

Sound Shield, continued

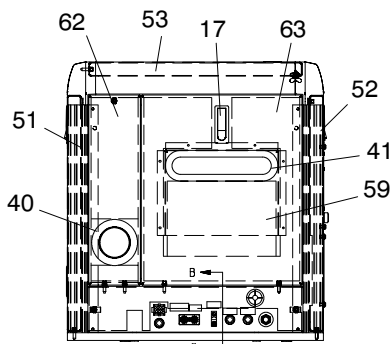
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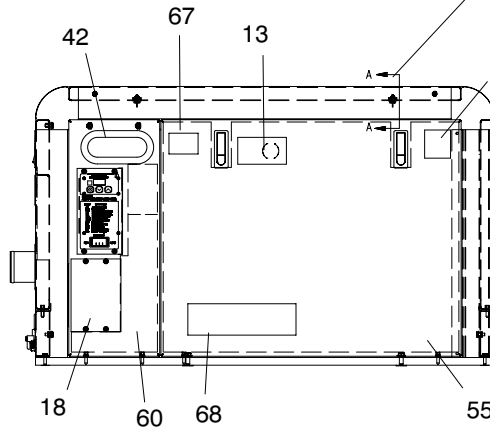
Junction Box Detail



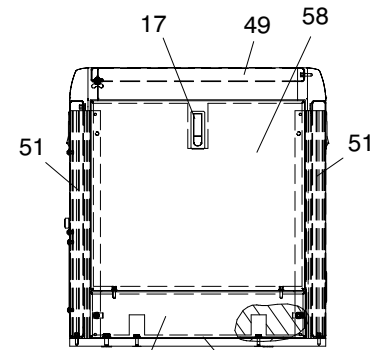
Section A-A



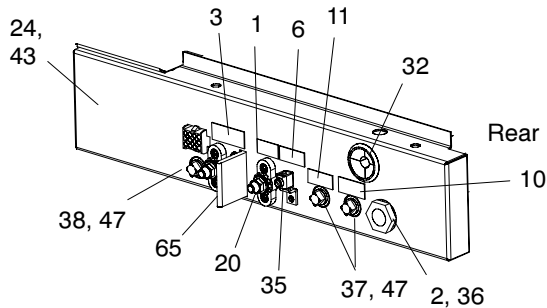
Rear View



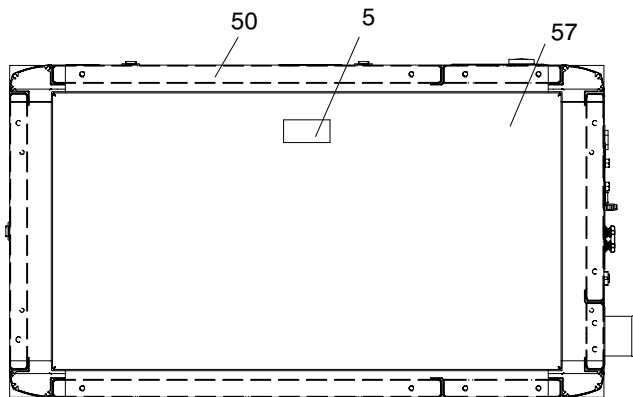
Right Side View



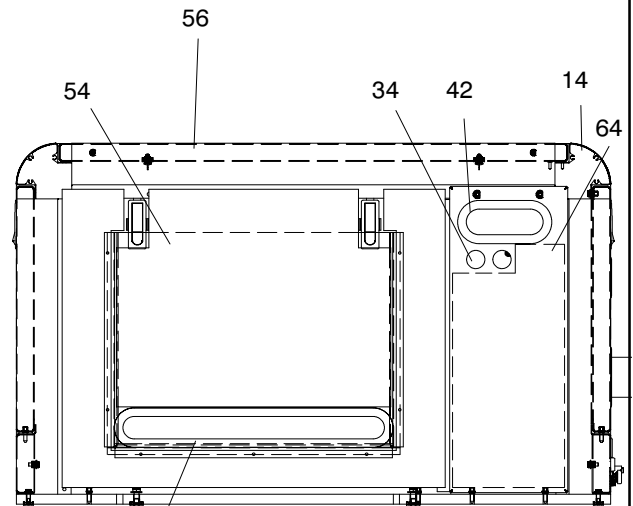
Front View



Rear Panel Detail



Top View



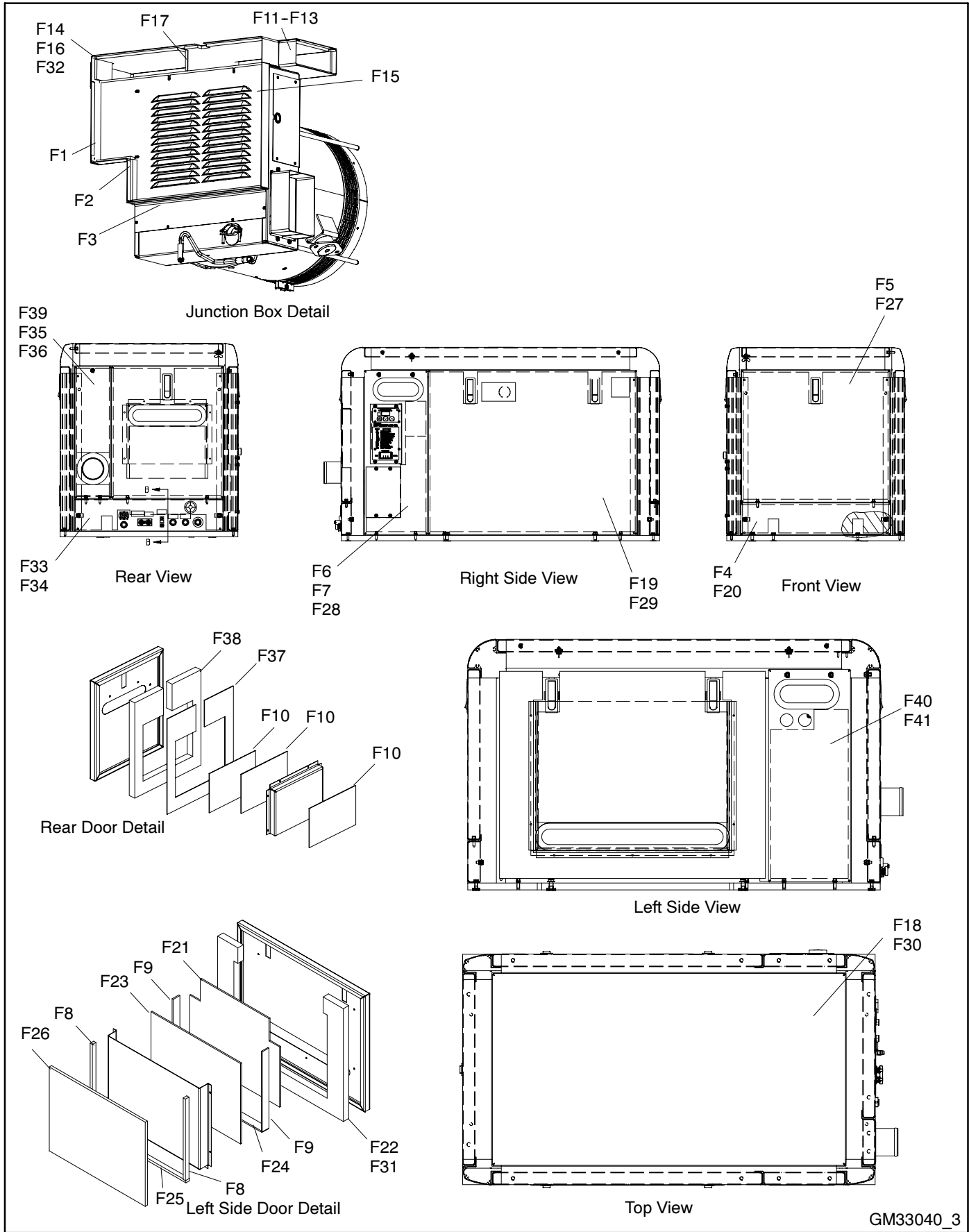
Left Side View

GM33040_2a

Sound Shield, continued

Item	Part Number	Description	Quantity			
			Kit Number			
			GM32546-KA3	GM32546-KA4	GM33040-KA3	GM33040-KA4
1	226917	Decal, negative battery connection	1	1	1	1
2	229291	Coupling, bulkhead pipe	1	1	1	1
3	238162	Marker, adhesive	1	1	1	1
4	249808	Decal, warning "Rotating Parts"	1	1	1	1
5	343165	Decal, "Caution-Not A Step"	1	1	1	1
6	344295	Decal, equipment ground	1	1	1	1
7	344484	Insert, threaded, 1/4-20 in.	21	21	21	21
8	345283	Pin, threaded, 1/4-20 x 1.18 in.	16	16	16	16
9	346258	Insert, threaded, #10-24	8	8	8	8
10	359278	Decal, fuel inlet	1	1	1	1
11	359279	Decal, fuel return	1	1	1	1
12	359584	Foam, acoustic insulation	3	3	3	3
13	GM10148	Decal, warning fire port	1	1	1	1
14	GM15486	Connector, outside corner	4	4	4	4
15	GM29899	Frame, circuit breaker	2	2	2	2
16	GM29919	Clip, speed	2	2	2	2
17	GM29980	Latch, lockable	6	6	6	6
18	GM30021	Plate, circuit breaker	1	1	1	1
19	GM30251	Panel, sound shield ADC lead	1	1	1	1
20	GM33684	Block, junction	2	2	2	2
20	GM33684	Boot, battery lug (not shown)	1	1		
21	GM30665	Seal, dampening	2	2	2	2
22	GM30697	Duct, air intake	1	1	1	1
23	GM30699	Baffle, air intake duct	1	1	1	1
24	GM32111	Panel, bulkhead connection	1	1	1	1
25	GM32179	Duct, air intake	1	1	1	1
26	GM32688	Duct, junction box	1	1	1	1
27	GM32689	Duct, junction box (corner)	1	1	1	1
28	GM32690	Duct, air intake (bottom)	1	1	1	1
29	LK-0616-1515	Lead	1	1	1	1
30	X-22-11	Washer, lock, .262 ID x .469 OD	1	1	1	1
31	X-22-12	Washer, lock, .262 ID x .743 in. OD	1	1	1	1
32	X-284-44	Grommet, round	1	1	1	1
33	X-30-2	Screw, slotted flat machine	1	1	1	1
34	X-301-35	Button, plug	2	2	2	2
35	X-377-12	Connector, cable	1	1	1	1
36	X-582-16	Connector, hose + vibra seal	1	1	1	1
37	X-582-38	Connector, hose			2	2
37	X-582-39	Connector, hose	2	2		
38	X-582-9	Connector, hose + vibra seal	1	1	1	1
39	X-6047-3	Channel, U	1	1	1	1
40	X-6047-33	Channel, U	1	1	1	1
41	X-6047-44	Channel, U	1	1	1	1
42	X-6047-7	Channel, U	2	2	2	2
43	X-6220-3	Clip, speed	4	4	4	4
44	X-634-25	Bushing, .672 x .875 in. NPT	1	1	1	1
45	X-67-64	Screw, self-tapping	11	11	11	11
46	X-71-2	Nut, hex machine screw, 6-32	1	1	1	1
47	X-75-10	Plug, pipe, 3/8 in. NPT	3	3	3	3
48	X-781-14	Rivet, pop, .187 in.	15	15	15	15
49	359044	Rail, sound shield	1	1	1	1
50	GM29320	Rail, sound shield	2	2	2	2
51	GM30642	Rail, sound shield	3	3	3	3
52	GM30643	Rail, sound shield	1	1	1	1
53	GM32568	Rail, sound shield	1	1	1	1
54	GM25961	Duct, air outlet	1	1	1	1
55	GM29487	Door, sound shield, right side	1	1	1	1
56	GM29490	Door, sound shield, left side	1	1	1	1
57	GM29492	Roof, sound shield	1	1	1	1
58	GM29489	Door, sound shield, front	1	1	1	1
59	GM30723	Duct, air intake	1	1	1	1
60	GM31188	Panel, sound shield, right side	1	1	1	1
61	GM32184	Rail, sound shield, front	1	1	1	1
62	GM32553	Panel, rear exhaust	1	1	1	1
63	GM32554	Door, sound shield, rear	1	1	1	1
64	GM29829	Panel, sound shield, left side	1	1	1	1
65	GM33828	Barrier, battery terminal	1	1	1	1
66	X-6348-3	Decal, Kohler Power Systems	1	1		
67	345331	Decal, warning	1	1		

Sound Shield, continued



GM33040_3

Sound Shield, continued

Item	Part Number	Description	Quantity			
			Kit Number			
			GM32546-KA3	GM32546-KA4	GM33040-KA3	GM33040-KA4
F1	GM29459	Insulation, acoustic foam	1	1	1	1
F2	GM29461	Insulation, acoustic foam	2	2	2	2
F3	GM29463	Insulation, acoustic foam	1	1	1	1
F4	GM30542	Foam, acoustic insulation	1	1	1	1
F5	GM30543	Foam, acoustic insulation	1	1	1	1
F6	GM30547	Foam, acoustic insulation	1	1	1	1
F7	GM30548	Foam, acoustic insulation	1	1	1	1
F8	GM30551	Foam, acoustic insulation	2	2	2	2
F9	GM30557	Foam, acoustic insulation	2	2	2	2
F10	GM30559	Foam, acoustic insulation	3	3	3	3
F11	GM30560	Foam, acoustic insulation	1	1	1	1
F12	GM30561	Foam, acoustic insulation	1	1	1	1
F13	GM30562	Foam, acoustic insulation	2	2	2	2
F14	GM30564	Foam, acoustic insulation	1	1	1	1
F15	GM30866	Foam, acoustic insulation	1	1	1	1
F16	GM30867	Foam, acoustic insulation	2	2	2	2
F17	GM30869	Foam, acoustic insulation	2	2	2	2
F18	GM30545	Foam, acoustic insulation	1	1	1	1
F19	GM30546	Foam, acoustic insulation	1	1	1	1
F20	GM30887	Foam, acoustic insulation	1	1	1	1
F21	GM30554	Foam, acoustic insulation	1	1	1	1
F22	GM30550	Foam, acoustic insulation	1	1	1	1
F23	GM30555	Foam, acoustic insulation	1	1	1	1
F24	GM30556	Foam, acoustic insulation	1	1	1	1
F26	GM30553	Foam, acoustic insulation	1	1	1	1
F27	GM30910	Foam, acoustic insulation	1	1	1	1
F28	GM30914	Foam, acoustic insulation (barrier)	1	1	1	1
F29	GM30913	Foam, acoustic insulation (barrier)	1	1	1	1
F30	GM30912	Foam, acoustic insulation (barrier)	1	1	1	1
F31	GM30916	Foam, acoustic insulation (barrier)	1	1	1	1
F32	GM32180	Insulation, acoustic foam	1	1	1	1
F33	GM32557	Insulation, acoustic foam	1	1	1	1
F34	GM32558	Insulation, acoustic foam (barrier)	1	1	1	1
F35	GM32559	Insulation, acoustic foam (barrier)	1	1	1	1
F36	GM32560	Insulation, acoustic foam (barrier)	1	1	1	1
F37	GM32561	Insulation, acoustic foam	1	1	1	1
F38	GM32562	Insulation, acoustic foam	1	1	1	1
F39	GM32570	Insulation, acoustic foam	1	1	1	1
F40	GM30549	Insulation, acoustic foam	1	1	1	1
F41	GM30915	Insulation, acoustic foam (barrier)	1	1	1	1

Parts List: Accessories

Qty.	Description	Part No.
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Circuit Breakers

Circuit Breaker Kit GM30331-KA(KP)18

1	Boot	238915
1	Plate, circuit breaker	GM30023
4	Screw, pan head, 6-32 x 3/16 in.	X-49-21
1	Circuit breaker, 80 A, 240 VAC, 2-pole	229206
1	Installation Instructions	TT-1394

Circuit Breaker Kit GM30331-KA(KP)19

1	Plate, cover	229208
1	Boot	238915
1	Plate, circuit breaker	GM30023
2	Screw, pan head, 6-32 x 3/16 in.	X-49-21
2	Screw, pan head, 6-32 x 1/4 in.	X-49-25
1	Circuit breaker, 80 A, 240 VAC, 1-pole	229919
2	Nut, flange whiz, 6-32	X-6210-3
1	Installation Instructions	TT-1395
1	Installation Instructions	TT-1394
1	Decal, notice	246242

Circuit Breaker Kit GM30331-KA(KP)21

1	Boot	238915
1	Plate, circuit breaker	GM30023
4	Screw, pan head, 6-32 x 3/16 in.	X-49-21
1	Circuit breaker, 90 A, 240 VAC, 2-pole	229207
1	Installation Instructions	TT-1395
1	Installation Instructions	TT-1394
1	Decal, notice	246242

Circuit Breaker Kit GM30331-KA(KP)22

1	Boot	238915
1	Plate, circuit breaker	GM30023
4	Screw, pan head, 6-32 x 3/16 in.	X-49-21
1	Circuit breaker, 100 A, 240 VAC, 2-pole	359133

Circuit Breaker Kit GM30331-KA(KP)23

1	Plate, cover	229208
1	Boot	238915
1	Plate, circuit breaker	GM30023
2	Screw, pan head, 6-32 x 3/16 in.	X-49-21
2	Screw, pan head, 6-32 x 1/4 in.	X-49-25
1	Circuit breaker, 90 A	359560
2	Nut, flange whiz, 6-32	X-6210-3
1	Installation Instructions	TT-1395
1	Installation Instructions	TT-1394
1	Decal, notice	246242

Circuit Breaker Kit GM30331-KA(KP)24

3	Boot	238915
1	Plate, circuit breaker	GM30024
6	Screw, pan head, 6-32 x 3/16 in.	X-49-21
1	Circuit breaker, 60 A, 600 V, 3-pole	253224
1	Installation Instructions	TT-1395
1	Decal, notice	246242

Circuit Breaker Kit GM30331-KA(KP)36

3	Boot	238915
1	Plate, circuit breaker	GM30024
6	Screw, pan head, 6-32 x 3/16 in.	X-49-21
1	Circuit breaker, 40 A, 600 V, 3-pole	269252
1	Installation Instructions	TT-1395
1	Decal, notice	246242

Qty.	Description	Part No.
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Circuit Breaker Kit GM30331-KA(KP)37

3	Boot	238915
1	Plate, circuit breaker	GM30024
6	Screw, pan head, 6-32 x 3/16 in.	X-49-21
1	Circuit breaker, 70 A, 600 V, 3-pole	258381
1	Installation Instructions	TT-1395
1	Decal, notice	246242

Circuit Breaker Kit GM30331-KA(KP)38

3	Boot	238915
1	Plate, circuit breaker	GM30024
6	Screw, pan head, 6-32 x 3/16 in.	X-49-21
1	Circuit breaker, 80 A, 480 V, 3-pole	253225
1	Installation Instructions	TT-1395
1	Decal, notice	246242

Circuit Breaker Kit GM30331-KA(KP)39

3	Boot	238915
1	Plate, circuit breaker	GM30024
6	Screw, pan head, 6-32 x 3/16 in.	X-49-21
1	Circuit breaker, 90 A, 480 V, 3-pole	344905
1	Installation Instructions	TT-1395
1	Decal, notice	246242

Electrical System

Isolated Ground System, 12 V GM31866-KA(KP)1

1	Adapter, sender	229323
4	Insulator, panel	233269
1	V-belt, 24 in.	344829
1	Sensor, pressure	GM28822
1	Switch, high temperature cut-out	GM29289
1	Solenoid	GM30412
1	Harness, engine	GM35829
1	Bus, isolated ground	GM31868
1	Alternator, battery charging	GM31919
1	Bracket, support	GM33029
1	Cable, battery	X-545-161
1	Cable, battery (black)	X-545-178
2	Stud (metric)	X-6054-23
1	Insulator, standoff	X-6128-35
1	Starter Relay, 12 VDC, 20 A	259391
1	Vibromount	282829
1	Spacer, 406 ID x .625 OD x .297 in.	X-400-75
1	Installation Instructions	TT-1407

Isolated Ground System, 24 V GM31866-KA(KP)2

1	Adapter, sender	229323
4	Insulator, panel	233269
1	V-belt, 24 in.	344829
1	Guard, alternator fan	344815
1	Arm, alternator adjusting	359554
1	Sensor, pressure	GM28822
1	Switch, high temperature cut-out	GM29289
1	Solenoid	GM30413
1	Harness, engine	GM35829
1	Bus, isolated ground	GM31868
1	Alternator, battery charging	GM31920
1	Bracket, support	GM33029
1	Cable, battery	X-545-161
1	Cable, battery (black)	X-545-178
2	Stud (metric)	X-6054-23
1	Insulator, standoff	X-6128-35
1	Starter Relay	272684
1	Vibromount	282829
1	Spacer, 406 ID x .625 OD x .297 in.	X-400-75
1	Installation Instructions	TT-1407

Parts List: Accessories

Qty.	Description	Part No.
Isolated Ground System, 12 V GM31866-KA(KP)3		
1	Adapter, sender	229323
4	Insulator, panel	233269
1	V-belt, 24 in.	344829
1	Sensor, pressure	GM28822
1	Switch, high temperature cut-out	GM29289
1	Solenoid	GM30412
1	Harness, engine	GM35829
1	Bus, isolated ground	GM31868
1	Alternator, battery charging	GM31919
1	Bracket, support	GM33029
1	Cable, battery	X-545-161
1	Cable, battery (black)	X-545-178
1	Cable, battery (black)	X-545-179
2	Stud (metric)	X-6054-23
1	Insulator, standoff	X-6128-35
1	Starter Relay, 12 VDC, 20 A	259391
1	Vibromount	282829
1	Spacer, .406 ID x .625 OD x .297 in.	X-400-75
1	Installation Instructions	TT-1407

Isolated Ground System, 24 V GM31866-KA(KP)4		
1	Adapter, sender	229323
4	Insulator, panel	233269
1	V-belt, 24 in.	344829
1	Guard, alternator fan	344815
1	Arm, alternator adjusting	359554
1	Sensor, pressure	GM28822
1	Switch, high temperature cut-out	GM29289
1	Solenoid	GM30413
1	Harness, engine	GM35829
1	Bus, isolated ground	GM31868
1	Alternator, battery charging	GM31920
1	Bracket, support	GM33029
1	Cable, battery	X-545-161
1	Cable, battery (black)	X-545-178
1	Cable, battery (black)	X-545-179
2	Stud (metric)	X-6054-23
1	Insulator, standoff	X-6128-35
1	Starter Relay	272684
1	Vibromount	282829
1	Spacer, .406 ID x .625 OD x .297 in.	X-400-75
1	Installation Instructions	TT-1407

Harness, 12 in., Pigtail GM32332-KP1		
1	Harness, pigtail	GM32324

Harness, 15 in., Remote Panel GM32333-KP1		
1	Harness, extension	GM30248

Harness, 25 ft., Remote Panel GM32333-KP2		
1	Harness, extension	GM32323

Oil Pressure Sender GM32112-KA(KP)1		
1	Adapter, sender	229323
1	Sensor, pressure	GM28822

Preheat Kit, 12 Volt PA-229240		
1	Washer, shakeproof	X-22-12
2	Washer, plain	X-25-40
1	Screw, HC 1/4-20 x .75	X-465-16
1	Screw, HC 1/4-20 x .50	X-465-2
1	Conduit, convoluted	X-6003-5
2	Nut, whiz lock, 1/4-20	X-6210-2
1	Harness, air heater	229233
1	Relay	233442
1	Boot	238915
1	Installation Instructions	TT-897

Qty.	Description	Part No.
Preheat Kit, 12 Volt GM32117-KA(KP)4		
1	Harness, air heater	229233
1	Relay	233442
1	Boot	238915
1	Heater, air	344903
2	Gasket, air heater	344904
2	Washer, plain	M125A-06-80
4	Washer, plain	M125A-08-80
2	Nut, hex, 6 mm	M6923-06-80
2	Screw, hex cap	M931-08040-60
2	Screw, hex cap	M931-08080-60
2	Screw, hex cap	M933-06020-60
1	Washer, lock, .262 ID x .743 in. OD	X-22-12
1	Conduit, convoluted	X-6003-5
1	Installation Instructions	TT-1397

Preheat Kit, 24 Volt GM32117-KA(KP)5		
1	Harness, air heater	229233
1	Solenoid	344741
1	Boot	238915
2	Heater, air	344903
3	Gasket, air heater	344904
2	Washer, plain	M125A-06-80
4	Washer, plain	M125A-08-80
2	Nut, hex, 6 mm	M6923-06-80
2	Screw, hex cap	M931-08060-60
2	Screw, hex cap	M931-08100-60
2	Screw, hex cap	M933-06020-60
1	Washer, lock, .262 ID x .743 in. OD	X-22-12
1	Conduit, convoluted	X-6003-5
1	Installation Instructions	TT-1397

Preheat Kit, 12 Volt GM32117-KA(KP)8		
1	Harness, air heater	229233
1	Relay	233442
1	Boot	238915
1	Heater, air	344903
2	Gasket, air heater	344904
1	Hose, air heater	GM33014
2	Washer, plain	M125A-06-80
4	Washer, plain	M125A-08-80
2	Nut, hex, 6 mm	M6923-06-80
2	Screw, hex cap	M931-08040-60
2	Screw, hex cap	M931-08080-60
2	Screw, hex cap	M933-06020-60
1	Washer, lock, .262 ID x .743 in. OD	X-22-12
1	Conduit, convoluted	X-6003-5
1	Installation Instructions	TT-1397

Preheat Kit, 24 Volt GM32117-KA(KP)9		
1	Harness, air heater	229233
1	Solenoid	344741
1	Boot	238915
2	Heater, air	344903
3	Gasket, air heater	344904
1	Hose, air heater	GM33014
2	Washer, plain	M125A-06-80
4	Washer, plain	M125A-08-80
2	Nut, hex, 6 mm	M6923-06-80
2	Screw, hex cap	M931-08060-60
2	Screw, hex cap	M931-08100-60
2	Screw, hex cap	M933-06020-60
1	Washer, lock, .262 ID x .743 in. OD	X-22-12
1	Conduit, convoluted	X-6003-5
1	Installation Instructions	TT-1397

Parts List: Accessories, continued

Qty.	Description	Part No.
Remote Digital Gauge GM32337-KP1		
1	Decal, warning	249494
1	Gauge, digital	GM30565
1	Harness, remote	GM32325
1	Installation Instructions	TT-1364
1	Installation Instructions	TT-1379

Remote Start Panel (12 V) GM32335-KP1		
1	Decal, warning	249494
1	Installation instructions	TT-1378
1	Panel assembly, control (includes *)	GM33848-1
1	*Meter, runtime	238736
1	*Panel, control	GM33847
1	*Switch, rocker	GM33849
1	*Harness, wiring	GM33851
2	*Screw, pan head, M3 x 12	M7985A-03012-20
2	*Nut, hex, 3 mm	M934-03-50
2	*Washer, lock, .146 ID x .285 in OD	X-22-6

Remote Start Panel (24 V) GM32335-KP2		
1	Decal, warning	249494
1	Installation instructions	TT-1378
1	Panel assembly, control (includes *)	GM33848-2
1	*Meter, runtime	238736
1	*Panel, control	GM33847
1	*Switch, rocker	GM33850
1	*Harness, wiring	GM33851
2	*Screw, pan head, M3 x 12	M7985A-03012-20
2	*Nut, hex, 3 mm	M934-03-50
2	*Washer, lock, .146 ID x .285 in OD	X-22-6

Ship to Shore Switch PAA-246617		
1	Switch, transfer, 3-pole	A-246617
1	Installation Instructions	TT-535

Miscellaneous Accessories

Fuel Attachment Block GM33129-KA(KP)1		
1	Block, fuel	229835
2	Bolt, hex cap	X-125-29
2	Washer, plain, .344 ID x .687 in. OD	X-25-85
1	Connector, hose	X-380-4
1	Fuel line, flexible	X-6251-12
1	Fuel line, flexible	X-6251-9
2	Connector, 90 deg., 5/16 in. ID hose	X-391-25
2	Spacer, .357 ID x .625 OD x .656 in.	X-400-100
4	Clamp, hose, .25/.70 in.	X-426-9
1	Installation Instructions	TT-1376

Fuel/Water Separator GM31994-KA1		
1	Filter assembly, fuel/water separator	GM32181
1	Element, water separator	GM32182
1	Installation Instructions	TT-1375

Qty.	Description	Part No.
Fuel Filter Conversion Kits, ABYC GM41041-KA(KP)3		
1	Filter, fuel/water separator	GM41013
1	Element, filter	GM41014
1	Bracket, fuel/water separator	GM41017
3	Connector, hose	X-380-4
1	Connector, 90 deg.	X-391-25
1	Elbow, street, 90 deg. x 1/4 in.	X-555-1
1	Fuel line, flex	X-6251-11

Keel Cooling Conversion GM32201-KA(KP)3		
1	Gasket, liquid	252998
1	Gasket	252929
1	Cover	256544
1	Flange, exhaust outlet	GM34471

Keel Cooling Conversion GM32201-KA(KP)4		
1	Gasket, liquid	252998
1	Gasket	256653
1	Cover	256544
1	Flange, exhaust outlet	GM32186

Siphon Break PA-229929		
1	Valve, siphon break	GM34688
1	Valve, duct	328666
1	Cap, siphon valve	GM32984
1	Loop, siphon valve vent	GM34687
1	Tubing, clear flexible plastic	GM34883
1	Clamp, hose, .25/.70 in.	X-426-9
1	Installation Instructions	TT-1268

Stainless Steel Drip Tray GM49018-KA(KP)6		
1	Tray, stainless steel	GM40848

Sound Shield

Siphon Break Hose Connection GM32719-KA(KP)1		
1	Valve, siphon break	GM34688
2	Connector, hose, 90 deg. elbow	344999
1	Hose, molded coolant	GM32639
1	Hose, molded coolant	GM32640
1	Tubing, clear flexible plastic	GM34883
2	Grommet, round	X-284-3
2	Clamp, hose, .75/1.5 in.	X-426-15
1	Clamp, hose, .25/.70 in.	X-426-9
1	Installation Instructions	TT-1390

Siphon Break Hose Connection GM32719-KA(KP)2		
1	Valve, siphon break	GM34688
2	Connector, hose, 90 deg. elbow	344999
1	Hose, molded coolant	GM32641
1	Hose, molded coolant	GM33011
1	Tubing, clear flexible plastic	GM34883
2	Grommet, round	X-284-3
2	Clamp, hose, .75/1.5 in.	X-426-15
1	Clamp, hose, .25/.70 in.	X-426-9
1	Installation Instructions	TT-1390

Appendix A Abbreviations

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

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

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

Appendix B Common Hardware Application Guidelines

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

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

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

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

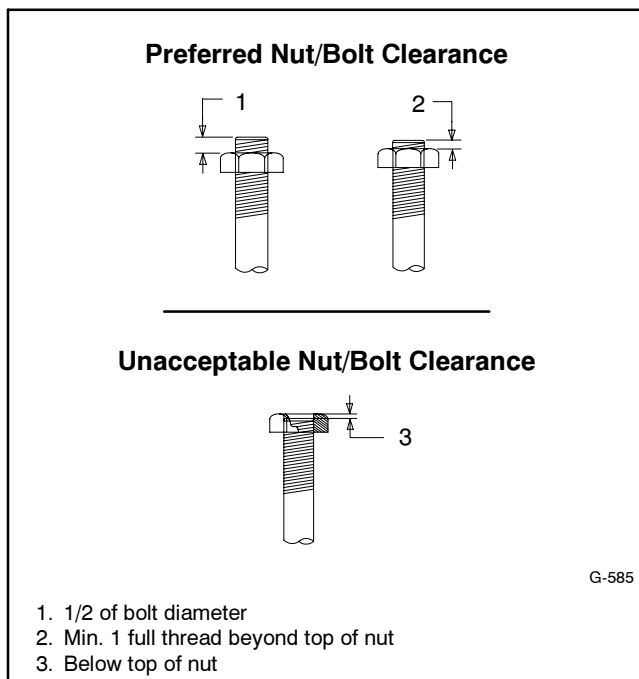


Figure 1 Acceptable Bolt Lengths

Steps for common hardware application:

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

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

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

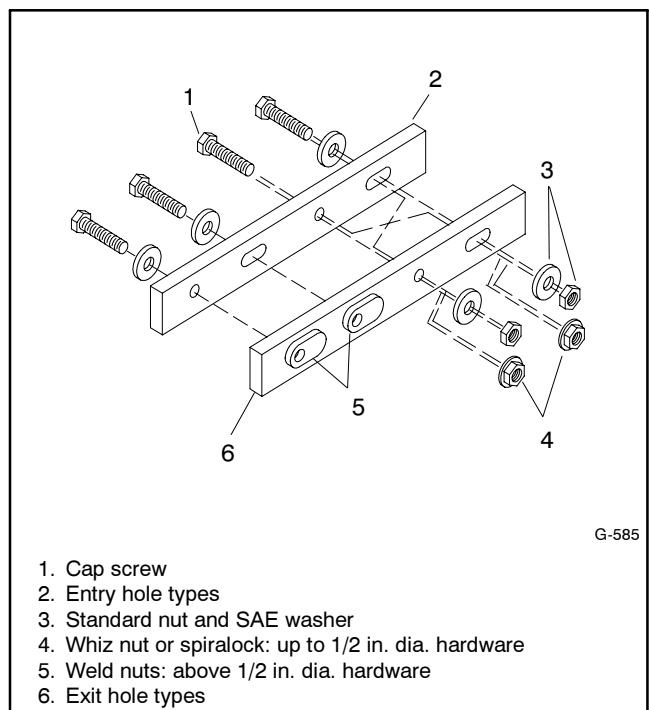


Figure 2 Acceptable Hardware Combinations

Appendix C General Torque Specifications















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












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






Notes:

1. The torque values above are general guidelines. Always use the torque values specified in the service manuals and/or assembly drawings when they differ from the above torque values.
2. The torque values above are based on new plated threads. Increase torque values by 15% if non-plated threads are used.
3. Hardware threaded into aluminum must have either two diameters of thread engagement or a 30% or more reduction in the torque to prevent stripped threads.
4. Torque values are calculated as equivalent stress loading on American hardware with an approximate preload of 90% of the yield strength and a friction coefficient of 0.125.

Appendix D Common Hardware Identification

Screw/Bolts/Studs	
Head Styles	
Hex Head or Machine Head	
Hex Head or Machine Head with Washer	
Flat Head (FHM)	
Round Head (RHM)	
Pan Head	
Hex Socket Head Cap or Allen™ Head Cap	
Hex Socket Head or Allen™ Head Shoulder Bolt	
Sheet Metal Screw	
Stud	
Drive Styles	
Hex	
Hex and Slotted	
Phillips®	
Slotted	
Hex Socket	

Nuts	
Nut Styles	
Hex Head	
Lock or Elastic	
Square	
Cap or Acorn	
Wing	
Washers	
Washer Styles	
Plain	
Split Lock or Spring	
Spring or Wave	
External Tooth Lock	
Internal Tooth Lock	
Internal-External Tooth Lock	

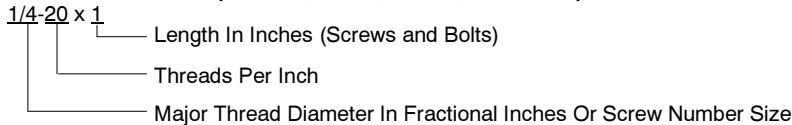
Hardness Grades	
American Standard	
Grade 2	
Grade 5	
Grade 8	
Grade 8/9 (Hex Socket Head)	
Metric	
Number stamped on hardware; 5.8 shown	

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

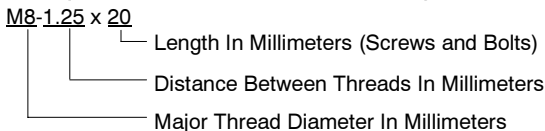
Phillips® screw is a registered trademark of Phillips Screw Company.

Sample Dimensions

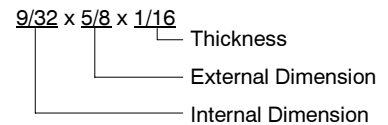
American Standard (Screws, Bolts, Studs, and Nuts)



Metric (Screws, Bolts, Studs, and Nuts)



Plain Washers



Lock Washers



Appendix E Common Hardware List

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

American Standard

Part No. Dimensions Hex Head Bolts (Grade 5)

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

Part No. Dimensions Hex Head Bolts, cont.

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

Part No. Dimensions Type

Hex Nuts

X-6009-1	1-8	Standard
X-6210-3	6-32	Whiz
X-6210-4	8-32	Whiz
X-6210-5	10-24	Whiz
X-6210-1	10-32	Whiz
X-6210-2	1/4-20	Spiralock
X-6210-6	1/4-28	Spiralock
X-6210-7	5/16-18	Spiralock
X-6210-8	5/16-24	Spiralock
X-6210-9	3/8-16	Spiralock
X-6210-10	3/8-24	Spiralock
X-6210-11	7/16-14	Spiralock
X-6210-12	1/2-13	Spiralock
X-6210-15	7/16-20	Spiralock
X-6210-14	1/2-20	Spiralock
X-85-3	5/8-11	Standard
X-88-12	3/4-10	Standard
X-89-2	1/2-20	Standard

Washers

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

Metric

Hex head bolts are hardness grade 8.8 unless noted.

Part No.	Dimensions	Part No.	Dimensions	Part No.	Dimensions
Hex Head Bolts (Partial Thread)		Hex Head Bolts (Partial Thread), continued		Hex Head Bolts (Full Thread), continued	
M931-05055-60	M5-0.80 x 55	M960-16090-60	M16-1.50 x 90	M933-12016-60	M12-1.75 x 16
M931-06040-60	M6-1.00 x 40	M931-16090-60	M16-2.00 x 90	M933-12020-60	M12-1.75 x 20
M931-06055-60	M6-1.00 x 55	M931-16100-60	M16-2.00 x 100	M961-12020-60F	M12-1.50 x 20
M931-06060-60	M6-1.00 x 60	M931-16100-82	M16-2.00 x 100*	M933-12025-60	M12-1.75 x 25
M931-06060-SS	M6-1.00 x 60	M931-16120-60	M16-2.00 x 120	M933-12025-82	M12-1.75 x 25*
M931-06070-60	M6-1.00 x 70	M931-16150-60	M16-2.00 x 150	M961-12030-60	M12-1.25 x 30
M931-06070-SS	M6-1.00 x 70			M933-12030-82	M12-1.75 x 30*
M931-06075-60	M6-1.00 x 75	M931-20065-60	M20-2.50 x 65	M961-12030-82F	M12-1.50 x 30*
M931-06090-60	M6-1.00 x 90	M931-20090-60	M20-2.50 x 90	M933-12030-60	M12-1.75 x 30
M931-06145-60	M6-1.00 x 145	M931-20100-60	M20-2.50 x 100	M933-12035-60	M12-1.75 x 35
M931-06150-60	M6-1.00 x 150	M931-20120-60	M20-2.50 x 120	M961-12040-82	M12-1.25 x 40*
		M931-20140-60	M20-2.50 x 140	M933-12040-60	M12-1.75 x 40
M931-08035-60	M8-1.25 x 35	M931-20160-60	M20-2.50 x 160	M933-12040-82	M12-1.75 x 40*
M931-08040-60	M8-1.25 x 40				
M931-08045-60	M8-1.25 x 45	M931-22090-60	M22-2.50 x 90	M961-14025-60	M14-1.50 x 25
M931-08050-60	M8-1.25 x 50	M931-22120-60	M22-2.50 x 120	M933-14025-60	M14-2.00 x 25
M931-08055-60	M8-1.25 x 55	M931-22160-60	M22-2.50 x 160	M961-14050-82	M14-1.50 x 50*
M931-08055-82	M8-1.25 x 55*				
M931-08060-60	M8-1.25 x 60	M931-24090-60	M24-3.00 x 90	M961-16025-60	M16-1.50 x 25
M931-08070-60	M8-1.25 x 70	M931-24120-60	M24-3.00 x 120	M933-16025-60	M16-2.00 x 25
M931-08070-82	M8-1.25 x 70*	M931-24160-60	M24-3.00 x 160	M961-16030-82	M16-1.50 x 30*
M931-08075-60	M8-1.25 x 75	M931-24200-60	M24-3.00 x 200	M933-16030-82	M16-2.00 x 30*
M931-08080-60	M8-1.25 x 80			M933-16035-60	M16-2.00 x 35
M931-08090-60	M8-1.25 x 90	Hex Head Bolts (Full Thread)			
M931-08095-60	M8-1.25 x 95	M933-04006-60	M4-0.70 x 6	M961-16040-60	M16-1.50 x 40
M931-08100-60	M8-1.25 x 100			M933-16040-60	M16-2.00 x 40
M931-08110-60	M8-1.25 x 110	M933-05030-60	M5-0.80 x 30	M961-16045-82	M16-1.50 x 45*
M931-08120-60	M8-1.25 x 120	M933-05035-60	M5-0.80 x 35	M933-16045-82	M16-2.00 x 45*
M931-08130-60	M8-1.25 x 130	M933-05050-60	M5-0.80 x 50	M933-16050-60	M16-2.00 x 50
M931-08140-60	M8-1.25 x 140			M933-16050-82	M16-2.00 x 50*
M931-08150-60	M8-1.25 x 150	M933-06010-60	M6-1.00 x 10	M933-16060-60	M16-2.00 x 60
M931-08200-60	M8-1.25 x 200	M933-06012-60	M6-1.00 x 12	M933-16070-60	M16-2.00 x 70
		M933-06014-60	M6-1.00 x 14		
M931-10040-82	M10-1.25 x 40*	M933-06016-60	M6-1.00 x 16	M933-18035-60	M18-2.50 x 35
M931-10040-60	M10-1.50 x 40	M933-06020-60	M6-1.00 x 20	M933-18050-60	M18-2.50 x 50
M931-10045-60	M10-1.50 x 45	M933-06025-60	M6-1.00 x 25	M933-18060-60	M18-2.50 x 60
M931-10050-60	M10-1.50 x 50	M933-06030-60	M6-1.00 x 30		
M931-10050-82	M10-1.25 x 50*	M933-06040-60	M6-1.00 x 40	M933-20050-60	M20-2.50 x 50
M931-10055-60	M10-1.50 x 55	M933-06050-60	M6-1.00 x 50	M933-20055-60	M20-2.50 x 55
M931-10060-60	M10-1.50 x 60				
M931-10065-60	M10-1.50 x 65	M933-07025-60	M7-1.00 x 25	M933-24060-60	M24-3.00 x 60
M931-10070-60	M10-1.50 x 70			M933-24065-60	M24-3.00 x 65
M931-10080-60	M10-1.50 x 80	M933-08010-60	M8-1.25 x 10	M933-24070-60	M24-3.00 x 70
M931-10080-82	M10-1.25 x 80*	M933-08012-60	M8-1.25 x 12		
M931-10090-60	M10-1.50 x 90	M933-08016-60	M8-1.25 x 16	Pan Head Machine Screws	
M931-10090-82	M10-1.50 x 90*	M933-08020-60	M8-1.25 x 20	M7985A-03010-20	M3-0.50 x 10
M931-10100-60	M10-1.50 x 100	M933-08025-60	M8-1.25 x 25	M7985A-03012-20	M3-0.50 x 12
M931-10110-60	M10-1.50 x 110	M933-08030-60	M8-1.25 x 30		
M931-10120-60	M10-1.50 x 120	M933-08030-82	M8-1.25 x 30*	M7985A-04010-20	M4-0.70 x 10
M931-10130-60	M10-1.50 x 130			M7985A-04016-20	M4-0.70 x 16
M931-10140-60	M10-1.50 x 140	M933-10012-60	M10-1.50 x 12	M7985A-04020-20	M4-0.70 x 20
M931-10180-60	M10-1.50 x 180	M961-10020-60	M10-1.25 x 20	M7985A-04050-20	M4-0.70 x 50
M931-10235-60	M10-1.50 x 235	M933-10020-60	M10-1.50 x 20	M7985A-04100-20	M4-0.70 x 100
M931-10260-60	M10-1.50 x 260	M933-10025-60	M10-1.50 x 25		
M960-10330-60	M10-1.25 x 330	M961-10025-60	M10-1.25 x 25	M7985A-05010-20	M5-0.80 x 10
		M933-10025-82	M10-1.50 x 25*	M7985A-05012-20	M5-0.80 x 12
M931-12045-60	M12-1.75 x 45	M961-10030-60	M10-1.25 x 30	M7985A-05016-20	M5-0.80 x 16
M960-12050-60	M12-1.25 x 50	M933-10030-60	M10-1.50 x 30	M7985A-05020-20	M5-0.80 x 20
M960-12050-82	M12-1.25 x 50*	M933-10030-82	M10-1.50 x 30*	M7985A-05025-20	M5-0.80 x 25
M931-12050-60	M12-1.75 x 50	M961-10035-60	M10-1.25 x 35	M7985A-05030-20	M5-0.80 x 30
M931-12050-82	M12-1.75 x 50*	M933-10035-60	M10-1.50 x 35	M7985A-05080-20	M5-0.80 x 80
M931-12055-60	M12-1.75 x 55	M933-10035-82	M10-1.50 x 35*	M7985A-05100-20	M5-0.80 x 100
M931-12060-60	M12-1.75 x 60	M961-10040-60	M10-1.25 x 40		
M931-12060-82	M12-1.75 x 60*			M7985A-06100-20	M6-1.00 x 100
M931-12065-60	M12-1.75 x 65				
M931-12075-60	M12-1.75 x 75			Flat Head Machine Screws	
M931-12080-60	M12-1.75 x 80			M965A-04012-SS	M4-0.70 x 12
M931-12090-60	M12-1.75 x 90				
M931-12100-60	M12-1.75 x 100			M965A-05012-SS	M5-0.80 x 12
M931-12110-60	M12-1.75 x 110			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	Spirallock
M982-06-80	M6-1.00	Elastic Stop
M934-08-60	M8-1.25	Standard
M6923-08-80	M8-1.25	Spirallock
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	Spirallock
M6923-10-62	M10-1.50	Spirallock†
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	Spirallock
M982-12-80	M12-1.75	Elastic Stop
M982-14-60	M14-2.00	Elastic Stop
M6923-16-80	M16-2.00	Spirallock
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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