

# Service Parts

## Marine Generator Sets



Models:

**11EFOZD/13EOZD**  
**11.5EFOZD/14EOZD**  
**13EFOZD/15.5EOZD**

**KOHLER**<sup>®</sup>  
POWER SYSTEMS

**ISO 9001**  
**KOHLER**  
POWER SYSTEMS  
NATIONALLY REGISTERED

TP-6271 5/04a



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# Introduction

This manual lists service replacement parts for 13EOZD/11EFOZD and 15.5EOZD/13EFOZD generator sets.

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

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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.

**Specification Number Index.** Lists the generator set specs and groups.

**Group Parts Lists.** List the part numbers of parts in the groups.

**Kit Sections.** List modules and accessories and their parts.

**Appendices.** Include Abbreviations, Common Hardware Application Guidelines, General Torque Specifications, Common Hardware Identification, and Common Hardware List.

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## Numbering System Significance

This manual uses the following numbering systems:

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

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

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

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

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## Illustrations

Illustrations (or exploded-view drawings) best representing the widest range of variations accompany most groups in this manual. Illustrations do not depict all details and may not show all parts. Do not use illustrations for assembly or disassembly.

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## How to Find Part Numbers

Use the following steps to locate a service replacement part.

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

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## Hardware References

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

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

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

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# Specification Number Index

| Group Title | <i>Cylinder Block</i> | <i>Gear Housing</i> | <i>Oil Pan</i> | <i>Cylinder Head</i> | <i>Intake Manifold</i> | <i>Camshaft &amp; Drive Gear</i> | <i>Turbocharger</i> | <i>Crankshaft &amp; Flywheel</i> | <i>Lub. Oil System</i> | <i>Lub. Oil Line</i> | <i>Cooling Sea Water System</i> |
|-------------|-----------------------|---------------------|----------------|----------------------|------------------------|----------------------------------|---------------------|----------------------------------|------------------------|----------------------|---------------------------------|
| Group No.   | 1                     | 2                   | 3              | 5                    | 6                      | 7                                | 8                   | 9                                | 10                     | 12                   | 13                              |
| Spec No.    | Variation Number      |                     |                |                      |                        |                                  |                     |                                  |                        |                      |                                 |

|                         |   |   |   |   |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|---|---|---|---|
| <b>13EOZD/11EFOZD</b>   |   |   |   |   |   |   |   |   |   |   |   |
| GM33035-GA1             | 2 | 2 | 2 | 2 | 2 | 2 | — | 2 | 2 | 2 | 2 |
| GM32564-GA1             | 4 | 4 | 3 | 4 | 4 | 3 | — | 4 | 3 | — | 4 |
| GM32564-GA2             | 4 | 4 | 3 | 4 | 4 | 3 | — | 4 | 3 | — | 6 |
| <b>15.5EOZD/13EFOZD</b> |   |   |   |   |   |   |   |   |   |   |   |
| GM33035-GA2             | 3 | 3 | 2 | 3 | 3 | 2 | 2 | 3 | 2 | 3 | 3 |
| GM32564-GA3             | 5 | 5 | 3 | 5 | 5 | 3 | 3 | 5 | 4 | — | 5 |
| GM32564-GA4             | 5 | 5 | 3 | 5 | 5 | 3 | 3 | 5 | 4 | — | 7 |
| GM32564-GA5             | 5 | 5 | 3 | 5 | 5 | 3 | 3 | 5 | 4 | — | 5 |
| GM32564-GA6             | 5 | 5 | 3 | 5 | 5 | 3 | 3 | 5 | 4 | — | 7 |

— Not applicable.

| Group Title | <i>Cooling Fresh Water Pump</i> | <i>Cooling Fresh Water Cooler</i> | <i>Fuel Injection Pump</i> | <i>Fuel Injection Lines</i> | <i>Fuel Line &amp; Filter</i> | <i>Governor</i> | <i>Starting Motor</i> | <i>Gasket Set</i> |
|-------------|---------------------------------|-----------------------------------|----------------------------|-----------------------------|-------------------------------|-----------------|-----------------------|-------------------|
| Group No.   | 14                              | 15                                | 16                         | 17                          | 18                            | 19              | 20                    | 21                |
| Spec No.    | Variation Number                |                                   |                            |                             |                               |                 |                       |                   |

|                         |   |   |   |   |   |   |   |   |
|-------------------------|---|---|---|---|---|---|---|---|
| <b>13EOZD/11EFOZD</b>   |   |   |   |   |   |   |   |   |
| GM33035-GA1             | 2 | 2 | 2 | 2 | 2 | 2 | 1 | 2 |
| GM32564-GA1             | 5 | 4 | 4 | 4 | 3 | — | 2 | 4 |
| GM32564-GA2             | 6 | 4 | 5 | 4 | 3 | — | 3 | 4 |
| <b>15.5EOZD/13EFOZD</b> |   |   |   |   |   |   |   |   |
| GM33035-GA2             | 4 | 3 | 3 | 3 | 2 | 4 | 1 | 3 |
| GM32564-GA3             | 7 | 5 | 6 | 5 | 3 | — | 2 | 5 |
| GM32564-GA4             | 8 | 5 | 7 | 5 | 3 | — | 3 | 5 |
| GM32564-GA5             | 7 | 5 | 6 | 5 | 3 | — | 2 | 5 |
| GM32564-GA6             | 8 | 5 | 7 | 5 | 3 | — | 3 | 5 |

— Not applicable.

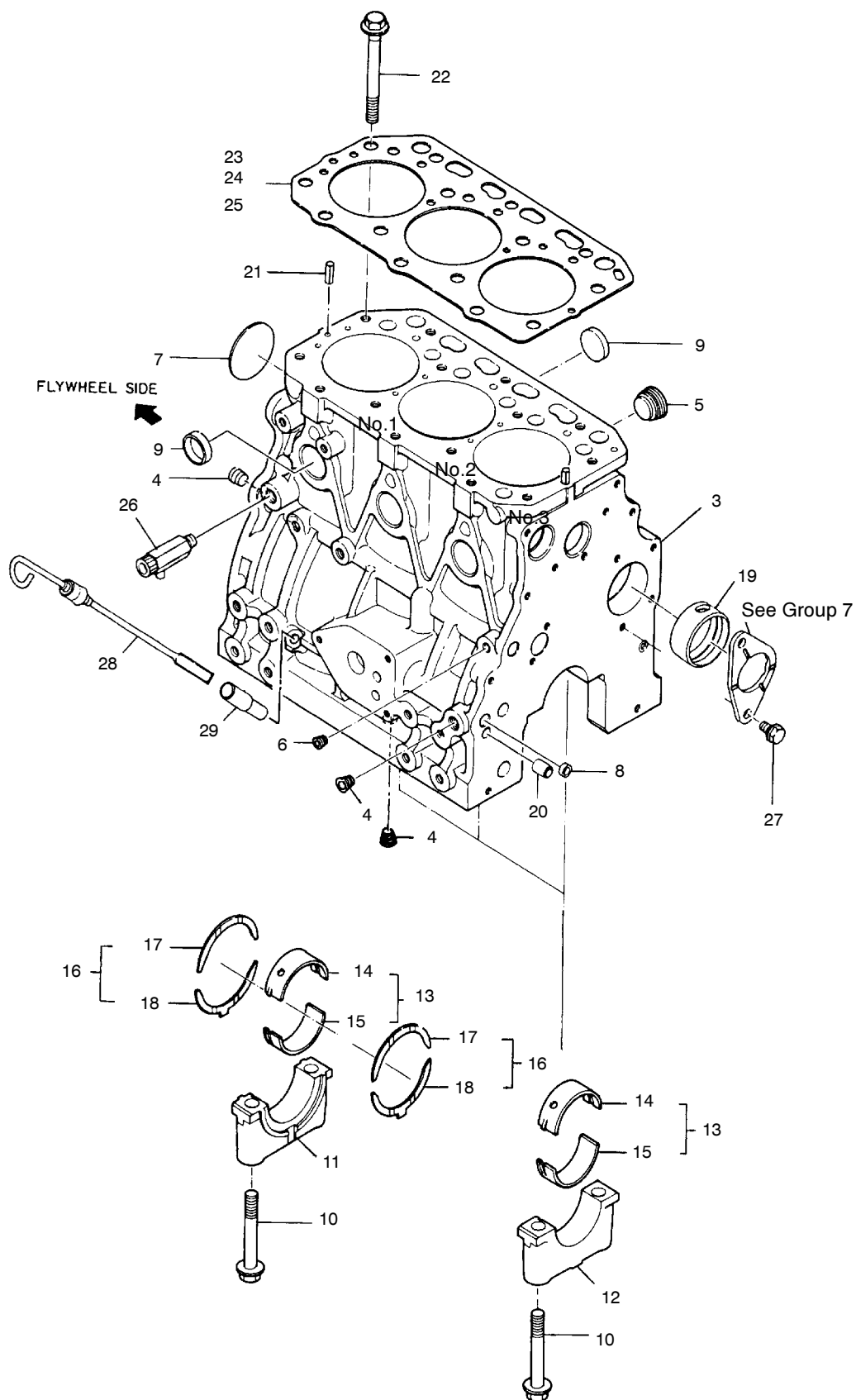
# Specification Number Index

| Group Title      | <i>Air Intake</i>       | <i>Fuel System</i> | <i>Cooling System</i> | <i>Engine</i> | <i>Nameplates and Decals</i> | <i>Skid and Plant Mounting</i> | <i>Generator and Mounting</i> | <i>Controller and Mounting</i> | <i>Literature</i> |  |  |  |  |
|------------------|-------------------------|--------------------|-----------------------|---------------|------------------------------|--------------------------------|-------------------------------|--------------------------------|-------------------|--|--|--|--|
| <b>Group No.</b> | <b>101</b>              | <b>103</b>         | <b>104</b>            | <b>105</b>    | <b>107</b>                   | <b>109</b>                     | <b>201</b>                    | <b>301</b>                     | <b>701</b>        |  |  |  |  |
| <b>Spec No.</b>  | <b>Variation Number</b> |                    |                       |               |                              |                                |                               |                                |                   |  |  |  |  |

|                         |      |       |       |       |       |      |       |       |    |  |  |  |  |
|-------------------------|------|-------|-------|-------|-------|------|-------|-------|----|--|--|--|--|
| <b>13EOZD/11EFOZD</b>   |      |       |       |       |       |      |       |       |    |  |  |  |  |
| GM33035-GA1             | 35-1 | 35-2  | 35-3  | 35-4  | 35-6  | 35-7 | 35-8  | 35-10 | 56 |  |  |  |  |
| GM32564-GA1             | 64-1 | 64-2  | 64-3  | 64-4  | 64-6  | 64-7 | 64-8  | 64-10 | 45 |  |  |  |  |
| GM32564-GA2             | 64-1 | 64-11 | 64-12 | 64-13 | 64-6  | 64-7 | 64-8  | 64-14 | 45 |  |  |  |  |
| <b>15.5EOZD/13EFOZD</b> |      |       |       |       |       |      |       |       |    |  |  |  |  |
| GM33035-GA2             | —    | 35-2  | 35-3  | 35-5  | 35-6  | 35-7 | 35-9  | 35-10 | 57 |  |  |  |  |
| GM32564-GA3             | —    | 64-2  | 64-3  | 64-5  | 64-16 | 64-7 | 64-17 | 64-10 | 46 |  |  |  |  |
| GM32564-GA4             | —    | 64-11 | 64-12 | 64-15 | 64-16 | 64-7 | 64-17 | 64-14 | 46 |  |  |  |  |
| GM32564-GA5             | —    | 64-2  | 64-3  | 64-5  | 64-6  | 64-7 | 64-9  | 64-10 | 47 |  |  |  |  |
| GM32564-GA6             | —    | 64-11 | 64-12 | 64-15 | 64-6  | 64-7 | 64-9  | 64-14 | 47 |  |  |  |  |

— Not applicable.

# Group 1: Cylinder Block



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## Group 1: Cylinder Block

| Item | Part Number | Description                                              | Quantity         |    |
|------|-------------|----------------------------------------------------------|------------------|----|
|      |             |                                                          | Variation Number |    |
|      |             |                                                          | 2                | 3  |
| 1    | GM13338     | Block assembly, cylinder (includes items 3-21)           | 1                |    |
| 1    | GM13341     | Block assembly, cylinder (includes items 3-21)           |                  | 1  |
| 2    | X           | Refer to item 1                                          | 1                | 1  |
| 3    | X           | Block, cylinder                                          | 1                | 1  |
| 4    | 252771      | Plug, PT 1/4                                             | 3                | 3  |
| 5    | 252566      | Plug                                                     | 1                | 1  |
| 6    | 256515      | Plug, PT 1/8 screw                                       | 1                | 1  |
| 7    | 225827      | Plug 50                                                  | 1                | 1  |
| 8    | 252728      | Plug 12                                                  | 2                | 2  |
| 9    | 252731      | Plug 30                                                  | 8                | 8  |
| 10   | 252803      | Bolt, bearing cap                                        | 8                | 8  |
| 11   | X           | Bearing cap                                              | 1                | 1  |
| 12   | X           | Bearing cap                                              | 4                | 4  |
| 13   | GM13297     | Main bearing (includes items 14 and 15)                  | 4                | 4  |
| 13   | 256585      | Main bearing under size 0.25 (includes items 14 and 15)  | 4                | 4  |
| 14   | X           | Main bearing                                             | 4                | 4  |
| 15   | X           | Main bearing                                             | 4                | 4  |
| 16   | 252977      | Bearing, thrust (includes items 17 and 18)               | 2                | 2  |
| 16   | 256765      | Bearing, thrust 0.25 oversize (includes items 17 and 18) | 2                | 2  |
| 17   | X           | Bearing, thrust                                          | 2                | 2  |
| 18   | X           | Bearing, thrust                                          | 2                | 2  |
| 19   | 252933      | Bush, camshaft                                           | 1                | 1  |
| 20   | —           | Not used                                                 | —                | —  |
| 21   | —           | Not used                                                 | —                | —  |
| 22   | 252797      | Stud, cylinder head                                      | 14               | 14 |
| 23   | GM13296     | Gasket, cylinder head                                    | 1                |    |
| 23   | GM13304     | Gasket, cylinder head                                    |                  | 1  |
| 24   |             | Refer to item 23                                         | —                | —  |
| 25   |             | Refer to item 23                                         | —                | —  |
| 26   | 252394      | Petcock                                                  | 1                | 1  |
| 27   | 225818      | Bolt, M8 x 14 plated                                     | 2                | 2  |
| 28   | 252951      | Dipstick                                                 | 1                | 1  |
| 29   | 252759      | Guide, dipstick                                          | 1                | 1  |

X Item not sold separately

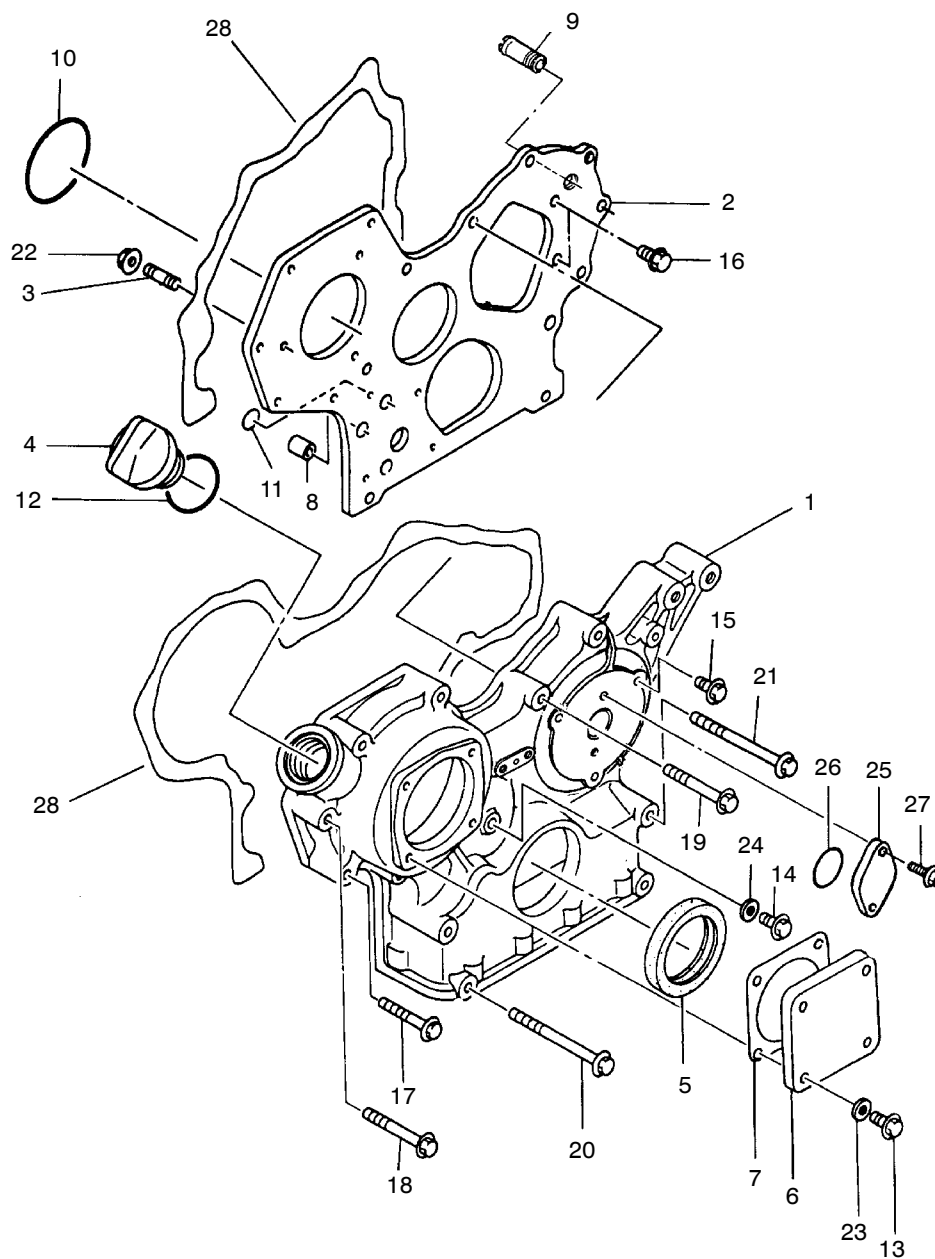
This diagram illustrates the exploded view of a 4-cylinder engine assembly. The components are numbered as follows:

- 32**: A long bolt used for the cylinder head.
- 33**: The cylinder head gasket.
- 6**: A circular gasket for the cylinder head.
- 15**: A circular gasket for the cylinder head.
- 7**: A small bolt or pin.
- 31**: A timing chain cover.
- 5**: A small bolt or pin.
- 8**: A small bolt or pin.
- 13**: A circular gasket for the cylinder head.
- 14**: A small bolt or pin.
- 9**: A small bolt or pin.
- 28 (37)**: A timing chain guide.
- 25 (34)**: A timing chain guide.
- 10**: A timing chain guide.

## Group 1: Cylinder Block, continued

| Item | Part Number | Description              | Quantity    |          |
|------|-------------|--------------------------|-------------|----------|
|      |             |                          | Variation 4 | Number 5 |
| 1    | GM35745     | Block assembly, cylinder | 1           | 1        |
| 5    | 252078      | Plug                     | 1           | 1        |
| 6    | GM35519     | Plug 50                  | 1           | 1        |
| 7    | 252771      | Plug PT 1/4              | 2           | 2        |
| 8    | 252771      | Plug PT 1/4              | 1           | 1        |
| 9    | 252566      | Plug                     | 1           | 1        |
| 10   | 252803      | Bolt                     | 8           | 8        |
| 13   | 252933      | Bush                     | 1           | 1        |
| 14   | 252728      | Plug                     | 2           | 2        |
| 15   | 225924      | Plug 30                  | 6           | 6        |
| 25   | GM13297     | Main bearing set         | 4           | 4        |
| 28   | 252977      | Thrust bearing           | 2           | 2        |
| 31   | GM35523     | Spacer                   | 1           | 1        |
| 32   | 252797      | Stud, cylinder head      | 14          | 14       |
| 33   | GM13296     | Gasket, cylinder head    | 1           |          |
| 33   | GM13304     | Gasket, cylinder head    |             | 1        |
| 34   | 256585      | Bearing, main (0.25 US)  | 4           | 4        |
| 37   | 256765      | Bearing, thrust (0.25)   | 1           | 1        |

## Group 2: Gear Housing

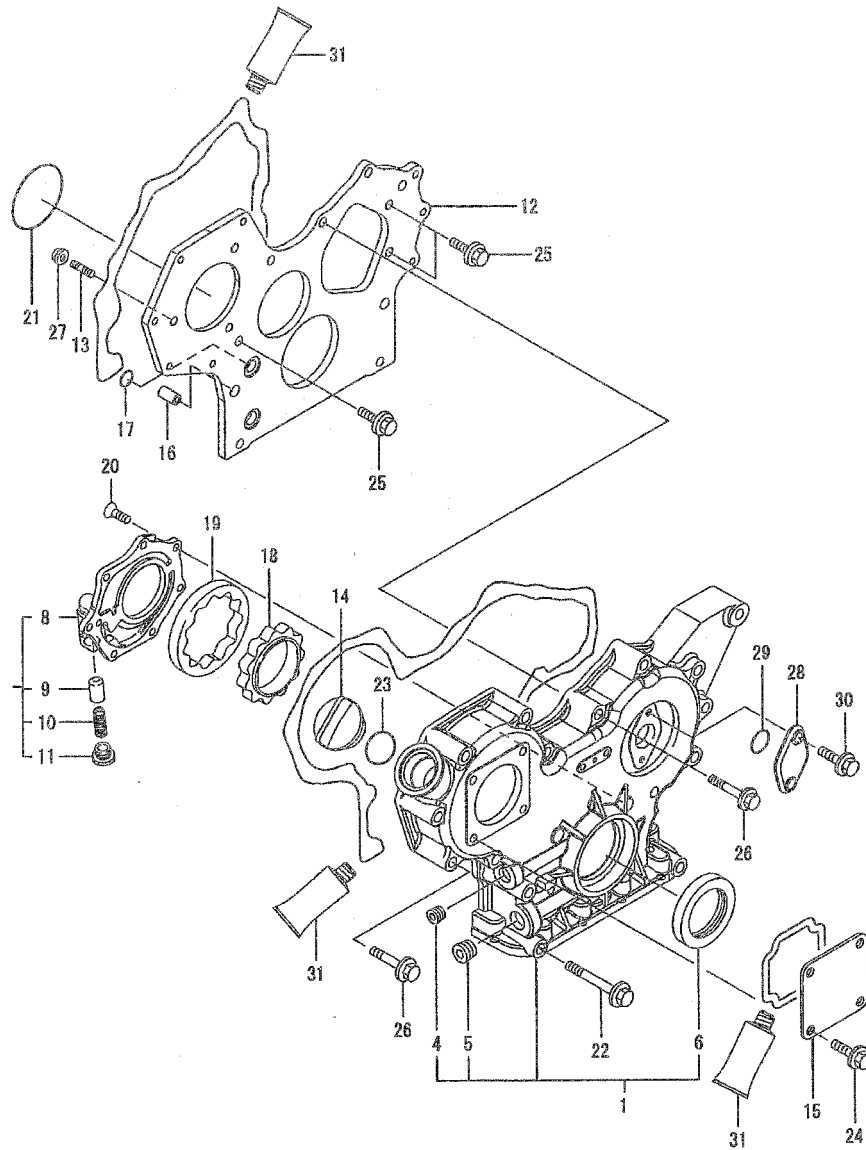


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| Item | Part Number | Description                     | Quantity  |        |
|------|-------------|---------------------------------|-----------|--------|
|      |             |                                 | Variation | Number |
| 1    | 229799      | Housing, gear (includes item 5) | 1         | 1      |
| 2    | 229720      | Plate, gear cover               | 1         | 1      |
| 3    | 252861      | Flange, gear housing            | 1         | 1      |
| 4    | 252409      | Stud, M8 x 22                   | 3         | 3      |
| 5    | 250837      | Cap, lub. oil supply            | 1         | 1      |
| 6    | 252931      | Seal, oil                       | 1         | 1      |
| 7    | 256531      | Cover                           | 1         | 1      |
| 8    | 252085      | Gasket                          | 1         | 1      |
| 9    | 252932      | Pipe, knock                     | 2         | 2      |
| 10   | 229721      | Joint                           | 1         | 1      |
| 11   | 252764      | O-ring, F.I. pump               | 1         | 1      |
| 12   | 250981      | O-ring                          | 2         | 2      |
| 13   | 252684      | O-ring                          | 1         | 1      |
| 14   | 252695      | Bolt, M8 x 12 plated            | 4         | 4      |
| 15   | 252696      | Bolt, M8 x 16 plated            | 3         | 3      |
| 16   | 252697      | Bolt, M8 x 20 plated            | 2         | 2      |
| 17   | 252703      | Bolt, M8 x 45 plated            | 4         | 4      |
| 18   | 252704      | Bolt, M8 x 50 plated            | 2         | 2      |
| 19   | 256798      | Bolt, M8 x 55 plated            | 3         | 3      |
| 20   | 256799      | Bolt, M8 x 85 plated            | 2         | 2      |
| 21   | 229500      | Bolt, M8 x 90 plated            | 2         | 2      |
| 22   | 252723      | Nut, M8                         | 3         | 3      |
| 23   | 252734      | Seal, washer 8                  | 4         | 4      |
| 24   | 252734      | Seal, washer 8                  | 1         | 1      |
| 25   | 252750      | Cover, blind                    | 1         | 1      |
| 26   | 256796      | O-ring                          | 1         | 1      |
| 27   | 252693      | Bolt, M6 x 16 plated            | 2         | 2      |
| 28   | 252998      | Liquid gasket                   | AR        | AR     |

AR As Required

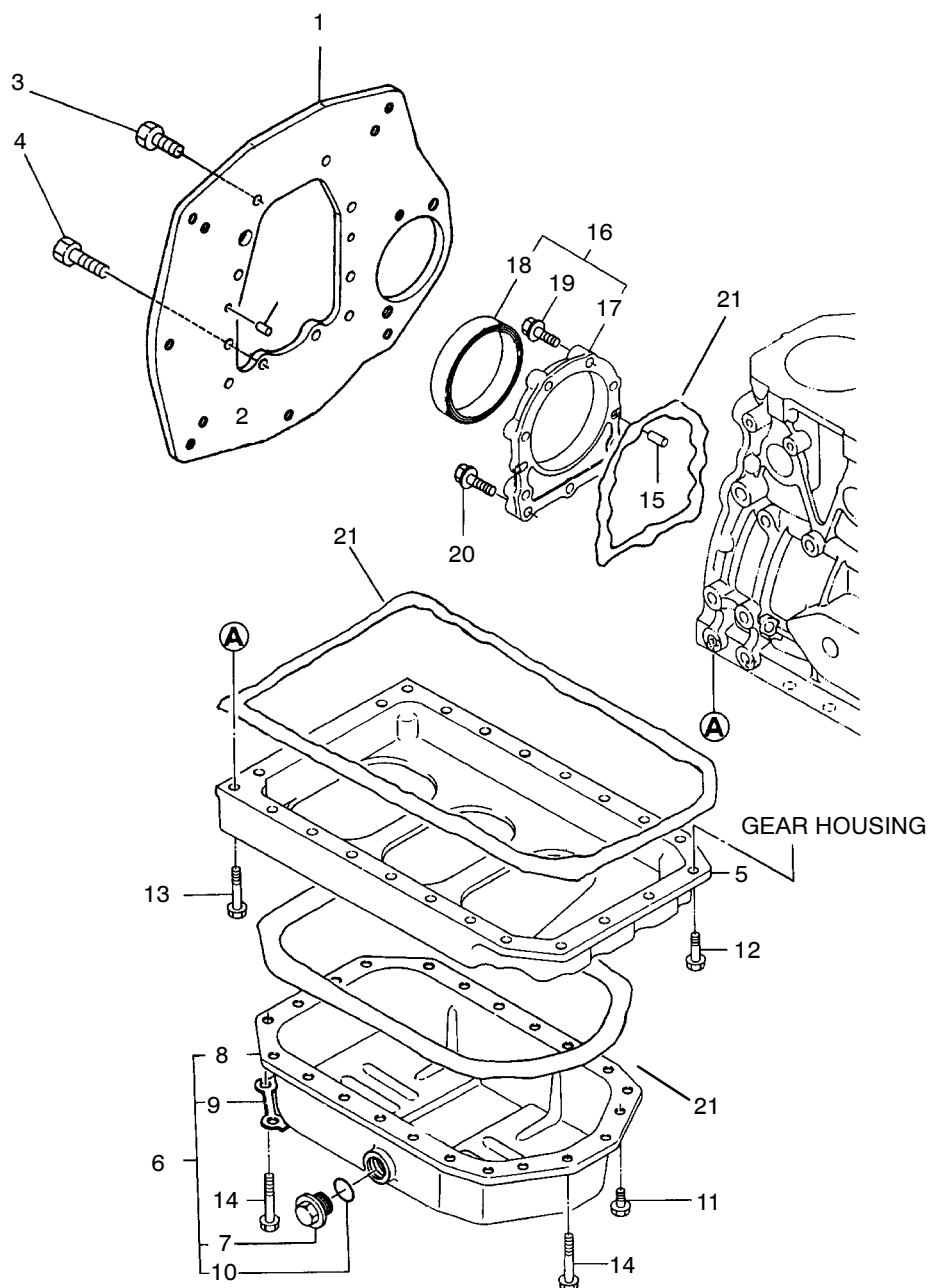
## Group 2: Gear Housing



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| Item | Part Number | Description            | Quantity      |   | Item | Part Number | Description          | Quantity      |    |
|------|-------------|------------------------|---------------|---|------|-------------|----------------------|---------------|----|
|      |             |                        | Variation No. |   |      |             |                      | Variation No. |    |
|      |             |                        | 4             | 5 |      |             |                      | 4             | 5  |
| 1    | GM35736     | Housing assembly, gear | 1             | 1 | 17   | GM35421     | O-ring               | 4             | 4  |
| 4    | GM35720     | Plug, screw            | 1             | 1 | 18   | GM35465     | Rotor, inner         | 1             | 1  |
| 5    | GM35721     | Plug                   | 1             | 1 | 19   | GM35466     | Rotor, outer         | 1             | 1  |
| 6    | 252931      | Oil seal               | 1             | 1 | 20   | GM35467     | Screw, M6 x 16       | 7             | 7  |
| 7    | GM35464     | Cover assembly, pump   | 1             | 1 | 21   | 252764      | O-ring, pump         | 1             | 1  |
| 8    | GM35463     | Cover, lube oil pump   | 1             | 1 | 22   | GM35522     | Bolt, M8 x 85        | 3             | 3  |
| 9    | GM35653     | Valve, relief          | 1             | 1 | 23   | 252684      | O-ring               | 1             | 1  |
| 10   | GM35578     | Spring                 | 1             | 1 | 24   | 252696      | Bolt, M8 x 16        | 4             | 4  |
| 11   | GM35520     | Plug                   | 1             | 1 | 25   | 252696      | Bolt, M8 x 16        | 3             | 3  |
| 12   | GM35429     | Flange, gear case      | 1             |   | 26   | 256798      | Bolt, M8 x 55 plated | 12            | 12 |
| 12   | GM35551     | Plate, gear case       |               | 1 | 27   | GM35732     | Nut                  | 3             | 3  |
| 13   | GM35430     | Stud, M8 x 25          | 3             | 3 | 28   | 252750      | Cover, blind         | 1             | 1  |
| 14   | 250837      | Cap                    | 1             | 1 | 29   | 256796      | O-ring               | 1             | 1  |
| 15   | GM35515     | Cover                  | 1             | 1 | 30   | 252693      | Bolt                 | 2             | 2  |
| 16   | 252932      | Knock, pipe            | 2             | 2 | 31   | 252998      | Gasket               | 1             | 1  |

## Group 3: Oil Pan



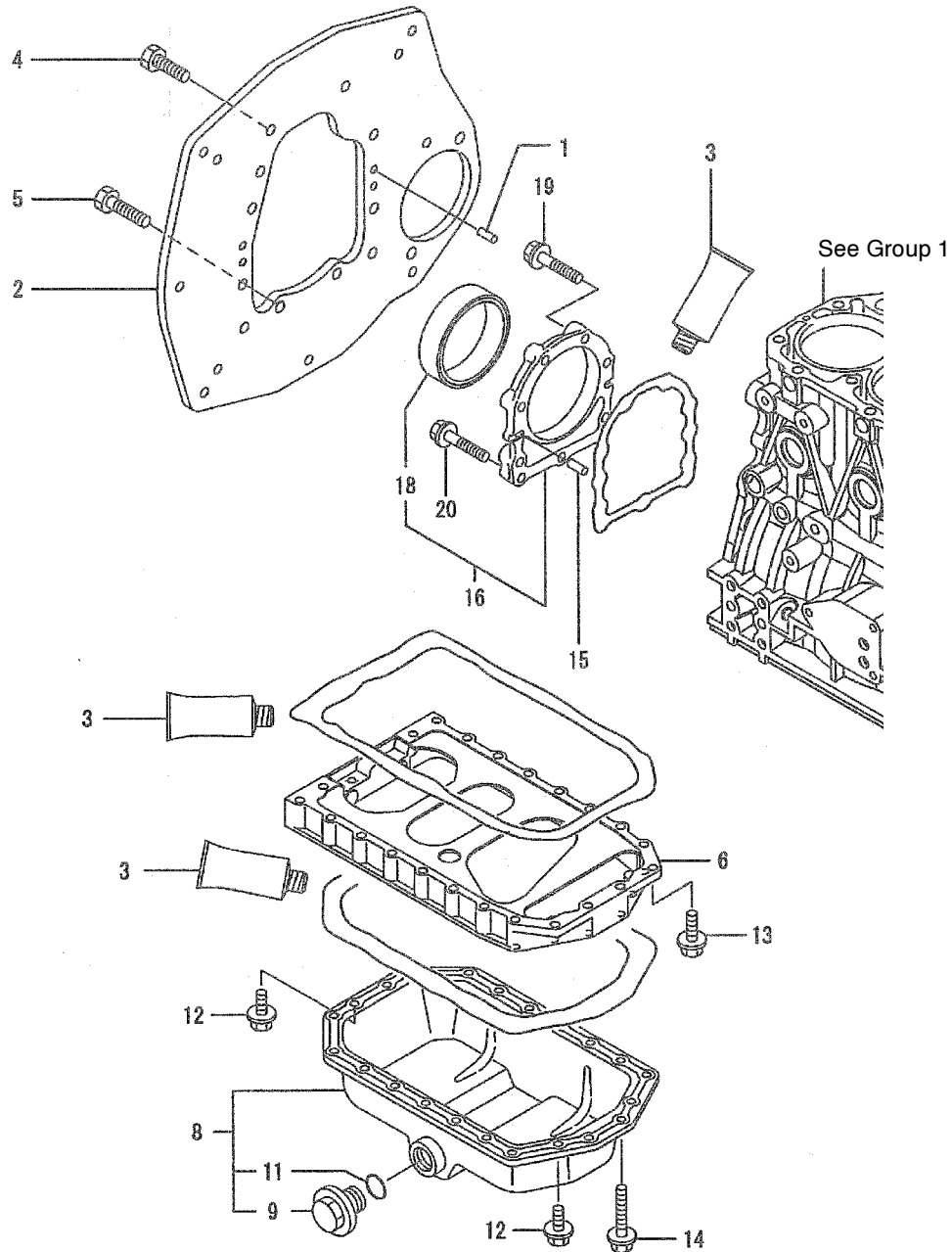
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| Item | Part Number | Description             | Quantity         | Item | Part Number | Description                                       | Quantity         |
|------|-------------|-------------------------|------------------|------|-------------|---------------------------------------------------|------------------|
|      |             |                         | Variation Number |      |             |                                                   | Variation Number |
| 1    | 229114      | Back plate              | 1                | 12   | 252696      | Bolt, M8 x 16 plated                              | 4                |
| 2    | 256750      | Parallel pin 8 x 20     | 2                | 13   | 252703      | Bolt, M8 x 45 plated                              | 20               |
| 3    | 225923      | Bolt, M10 x 20          | 6                | 14   | 252699      | Bolt, M8 x 25 plated                              | 2                |
| 4    | 363210      | Bolt, M10 x 25          | 4                | 15   | 256750      | Parallel pin 8 x 16                               | 2                |
| 5    | 256751      | Spacer, oil sump        | 1                | 16   | 225866      | Case assembly, oil seal (includes item 17 and 18) | 1                |
| 6    | 229729      | Sump assembly, lub. oil | 1                | 17   | X           | Case, oil seal                                    | 1                |
| 7    | 252943      | Plug 22                 | 1                | 18   | 252930      | Seal, oil                                         | 1                |
| 8    | X           | Refer to item 12        | 1                | 19   | 363430      | Bolt, M8 x 30                                     | 6                |
| 9    | —           | Not used                | —                | 20   | 252701      | Bolt, M8 x 35 plated                              | 3                |
| 10   | 252687      | O-ring                  | 1                | 21   | 252998      | Liquid gasket                                     | AR               |
| 11   | 252703      | Bolt, M8 x 45 plated    | 20               |      |             |                                                   |                  |

X Item not sold separately

AR As Required

## Group 3: Oil Pan

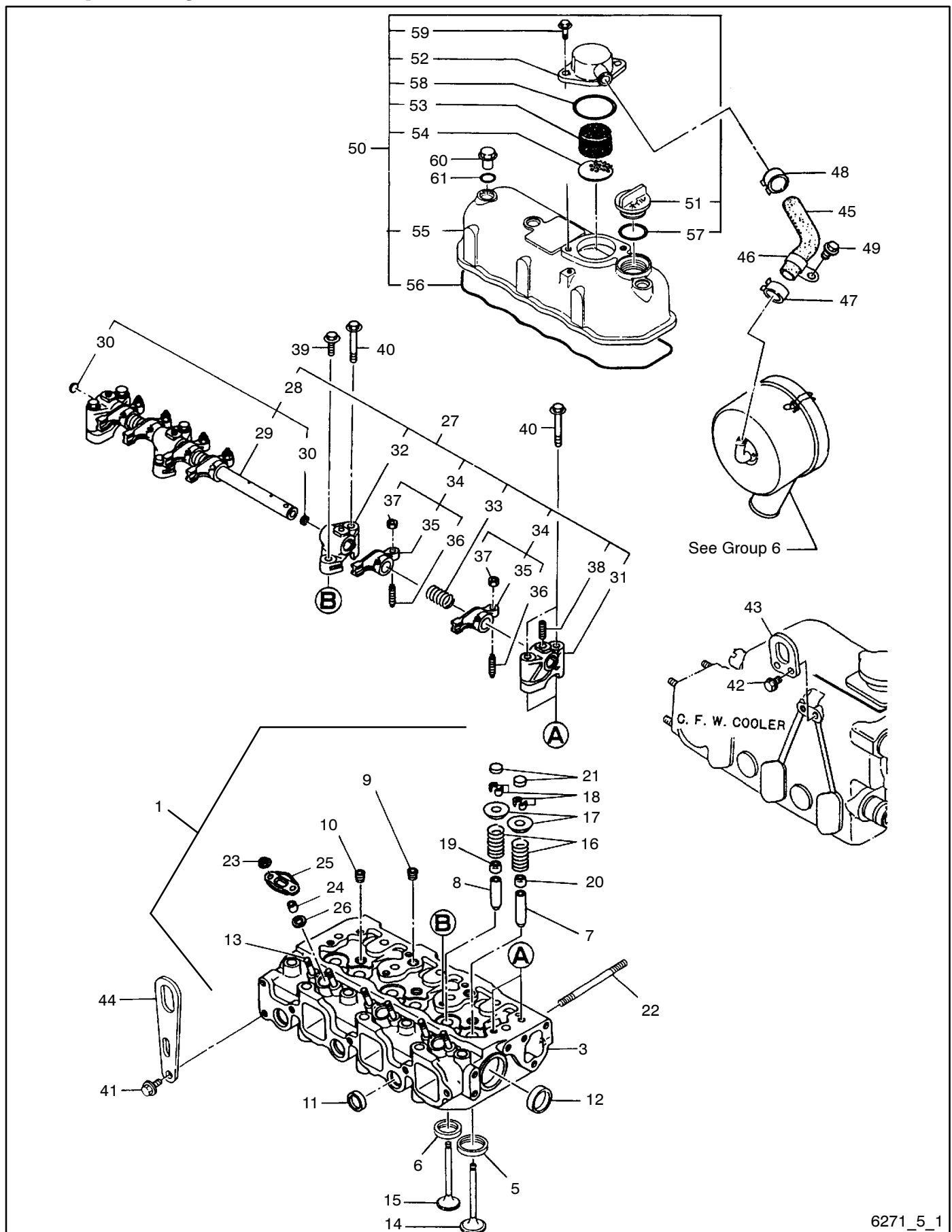


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| Item | Part Number | Description             | Quantity<br>Variation<br>Number |
|------|-------------|-------------------------|---------------------------------|
| 1    | 256750      | Parallel pin 8 x 16     | 2                               |
| 2    | 229114      | Mounting flange         | 1                               |
| 3    | 252998      | Gasket                  | 1                               |
| 4    | 229505      | Bolt, M10 x 20          | 6                               |
| 5    | 252714      | Bolt                    | 4                               |
| 6    | 256751      | Spacer, sump            | 1                               |
| 8    | 229729      | Sump assembly, lube oil | 1                               |
| 9    | 252943      | Plug, drain             | 1                               |
| 11   | 252687      | O-ring                  | 1                               |

| Item | Part Number | Description          | Quantity<br>Variation<br>Number |
|------|-------------|----------------------|---------------------------------|
| 12   | 252696      | Bolt, M8 x 16        | 4                               |
| 13   | 252699      | Bolt, M8 x 25 plated | 2                               |
| 14   | 252703      | Bolt                 | 20                              |
| 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 5: Cylinder Head

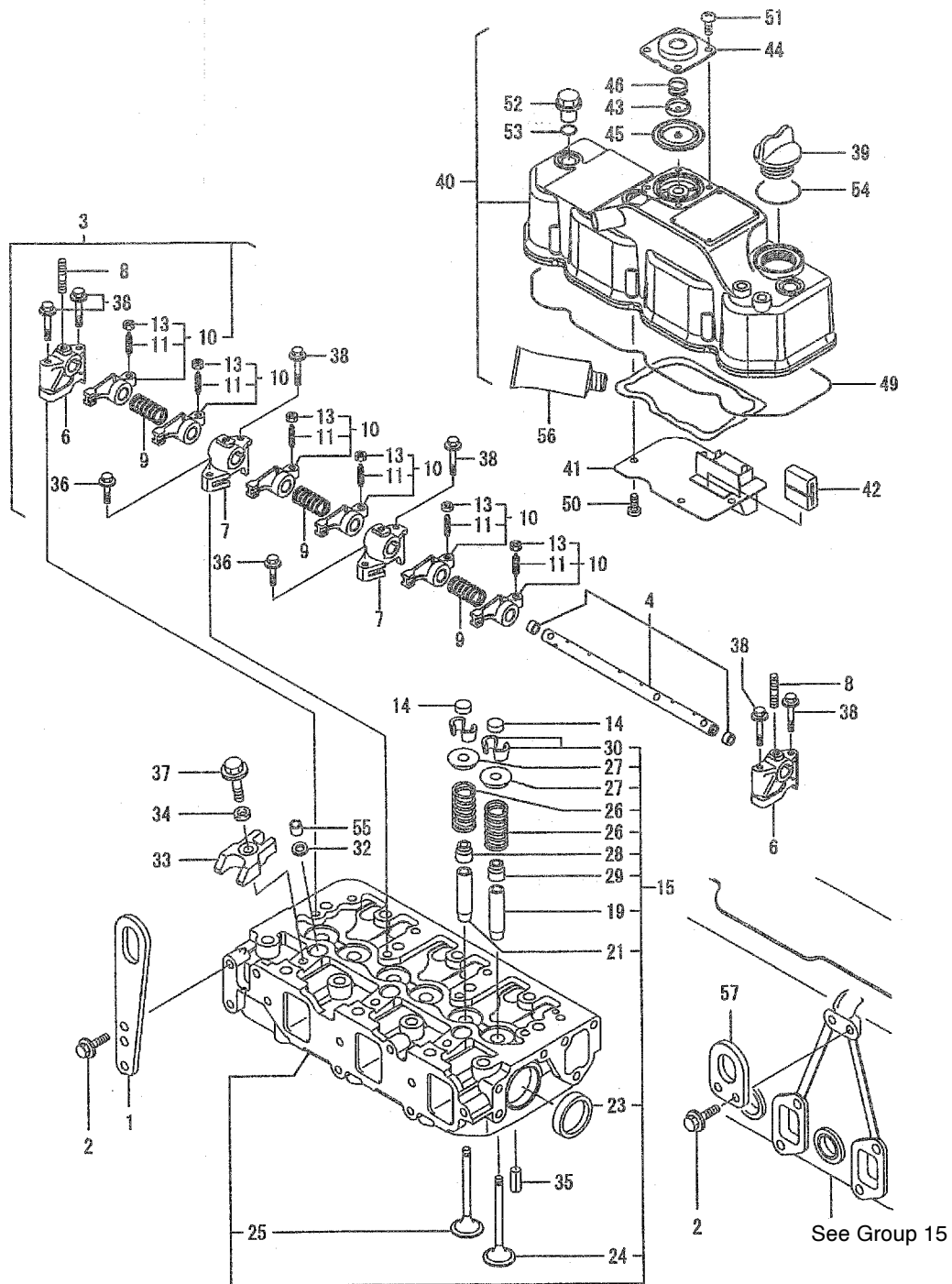


## Group 5: Cylinder Head

| Item | Part Number | Description                                    | Quantity         |   |
|------|-------------|------------------------------------------------|------------------|---|
|      |             |                                                | Variation Number | 2 |
|      |             |                                                | 2                | 3 |
| 1    | GM13298     | Head assembly, cylinder (includes items 2-23)  | 1                |   |
| 1    | GM13337     | Head assembly, cylinder (includes items 2-23)  |                  | 1 |
| 2    |             | Refer to item 1                                | 1                | 1 |
| 3    | X           | Head, cylinder                                 | 1                | 1 |
| 3    | 250963      | Spring pin, 6 x 12 (not shown)                 | 1                | 1 |
| 4    | —           | Not used                                       |                  |   |
| 5    | 252871      | Seat, intake valve                             | 3                | 3 |
| 6    | 252872      | Seat, exhaust valve                            | 3                | 3 |
| 7    | 256736      | Guide, intake valve                            | 3                | 3 |
| 8    | 252811      | Guide, exhaust valve                           | 3                | 3 |
| 9    | 250974      | Plug, Pt 1/4                                   | 2                | 2 |
| 10   | 250975      | Plug Pt 3/8, screw                             | 3                | 3 |
| 11   | 252729      | Plug 22                                        | 3                | 3 |
| 12   | 252732      | Plug 40                                        | 2                | 2 |
| 13   | 252717      | Stud, M6 x 20 plated                           | 6                | 6 |
| 14   | 252778      | Valve, intake                                  | 3                | 3 |
| 15   | 252780      | Valve, exhaust                                 | 3                | 3 |
| 16   | 252934      | Spring, valve                                  | 6                | 6 |
| 17   | 252935      | Retainer, spring                               | 6                | 6 |
| 18   | 363216      | Cotter 8                                       | 6                | 6 |
| 19   | 252754      | Seal, valve stem                               | 3                | 3 |
| 20   | 256578      | Seal, valve stem                               | 3                | 3 |
| 21   | 256717      | Cap, valve                                     | 6                | 6 |
| 22   | —           | Not used                                       |                  |   |
| 23   | 250989      | Nut, M6                                        | 8                | 8 |
| 24   | 252743      | Protector, nozzle                              | 3                | 3 |
| 25   | 252745      | Retainer                                       | 3                | 3 |
| 26   | 252744      | Seat, nozzle                                   | 3                | 3 |
| 27   | 225867      | Shaft, assembly, rocker (includes items 28-38) | 1                | 1 |
| 28   | 256766      | Shaft, rocker arm (includes items 29 and 30)   | 1                | 1 |
| 29   | X           | Shaft, rocker arm                              | 1                | 1 |
| 30   | X           | Plug 10                                        | 2                | 2 |
| 31   | 252843      | Support, rocker arm                            | 2                | 2 |
| 32   | 252844      | Support, rocker arm                            | 2                | 2 |
| 33   | 252815      | Spring                                         | 3                | 3 |
| 34   | 225869      | Arm assembly, rocker (includes items 35-37)    | 6                | 6 |
| 35   | X           | Arm, rocker                                    | 6                | 6 |
| 36   | 229844      | Screw, valve                                   | 6                | 6 |
| 37   | 252817      | Nut, M8                                        | 6                | 6 |
| 38   | 252722      | Stud, M8 x 18 plated                           | 3                | 3 |
| 39   | 252699      | Bolt, M8 x 25 plated                           | 2                | 2 |
| 40   | 252704      | Bolt, M8 x 50 plated                           | 6                | 6 |
| 41   | 252696      | Bolt, M8 x 16 plated                           | 1                | 1 |
| 42   | 252696      | Bolt, M8 x 16 plated                           | 1                | 1 |
| 43   | 256542      | Lifter, engine                                 | 1                | 1 |
| 44   | 363110      | Lifter, engine                                 | 1                | 1 |
| 45   | 229414      | Pipe, breather                                 | 1                | 1 |
| 46   | —           | Not used                                       |                  |   |
| 47   | GM13316     | Clamp 16                                       | 1                | 1 |
| 48   | 229425      | Clamp                                          | 1                | 1 |
| 49   | —           | Not used                                       |                  |   |
| 50   | 225868      | Bonnet assembly (includes items 51-59)         | 1                | 1 |
| 51   | 250837      | Cap, lub. oil supply                           | 1                | 1 |
| 52   | 225773      | Cover, breather                                | 1                | 1 |
| 53   | 252805      | Baffle, breather                               | 1                | 1 |
| 54   | 252806      | Plate, shelter                                 | 1                | 1 |
| 55   | X           | Bonnet                                         | 1                | 1 |
| 56   | 256767      | Gasket, bonnet                                 | 1                | 1 |
| 57   | 252684      | O-ring                                         | 1                | 1 |
| 58   | 225812      | O-ring                                         | 1                | 1 |
| 59   | 252696      | Bolt, M8 x 16 plated                           | 2                | 2 |
| 60   | 252470      | Knob                                           | 3                | 3 |
| 61   | 250801      | O-ring                                         | 3                | 3 |

X Item not sold separately

## Group 5: Cylinder Head, continued

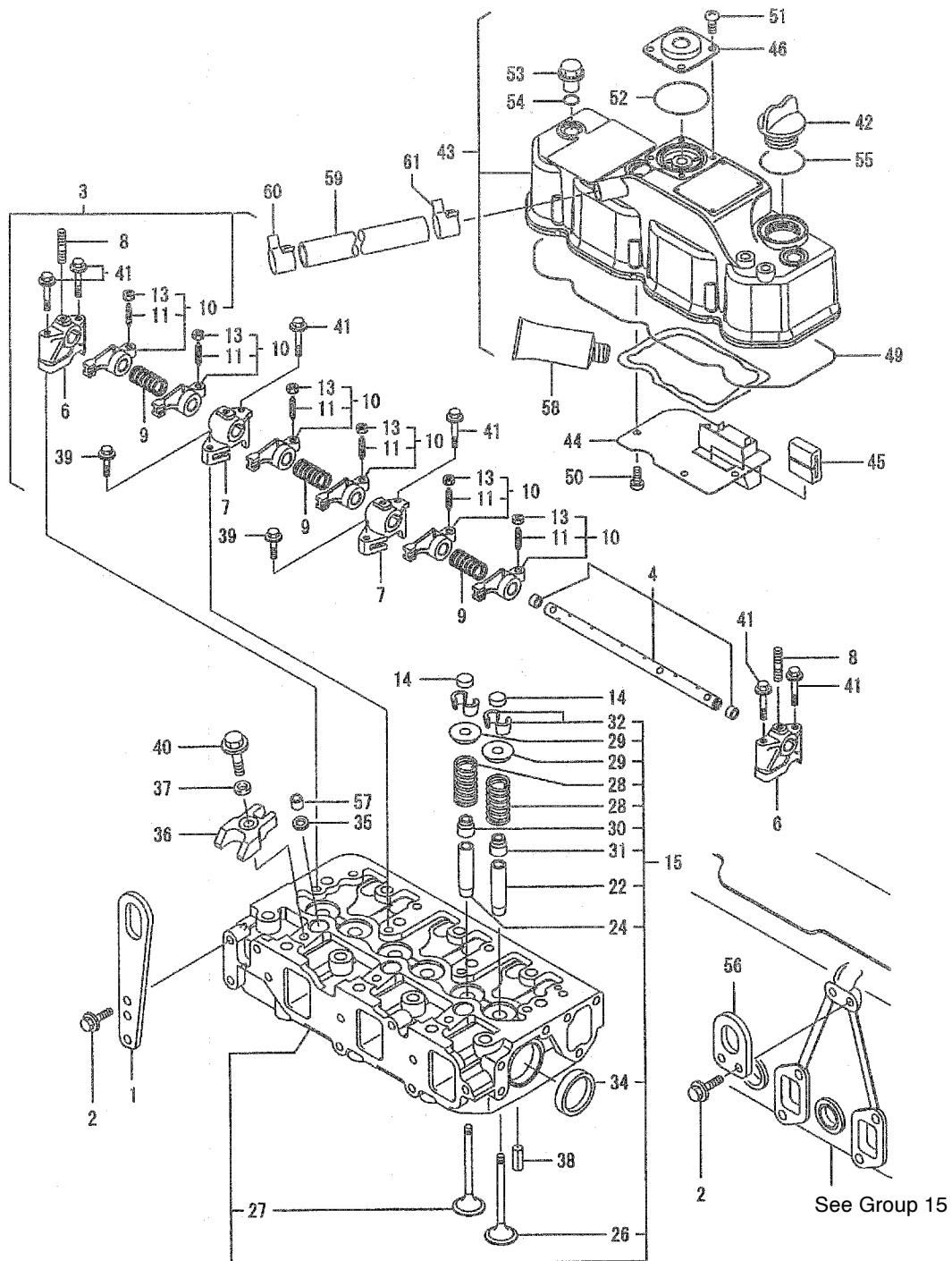


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## Group 5: Cylinder Head, continued

| Item | Part Number | Description             | Quantity         |
|------|-------------|-------------------------|------------------|
|      |             |                         | Variation Number |
| 1    | 363110      | Lifter, engine          | 1                |
| 2    | 252696      | Bolt, M8 x 16           | 4                |
| 3    | GM35527     | Shaft assembly, rocker  | 1                |
| 4    | GM35528     | Shaft, rocker arm       | 1                |
| 6    | GM35442     | Support, rocker arm     | 2                |
| 7    | GM35443     | Support, rocker arm     | 2                |
| 8    | GM35444     | Stud                    | 3                |
| 9    | 252815      | Spring                  | 3                |
| 10   | GM35531     | Arm assembly, rocker    | 6                |
| 11   | 229844      | Valve screw             | 6                |
| 13   | 252817      | Nut, M8                 | 6                |
| 14   | 256717      | Cap, valve              | 6                |
| 15   | GM35532     | Head assembly, cylinder | 1                |
| 19   | 256736      | Guide, suction valve    | 3                |
| 21   | 256768      | Guide, exhaust valve    | 3                |
| 23   | 252732      | Plug 40                 | 2                |
| 24   | GM35526     | Valve, intake           | 3                |
| 25   | 252779      | Valve, exhaust          | 3                |
| 26   | 252934      | Spring, valve           | 6                |
| 27   | 252935      | Retainer, spring        | 6                |
| 28   | 252754      | Seal, valve stem        | 3                |
| 29   | 256578      | Seal, valve stem        | 3                |
| 30   | 252737      | Cotter                  | 6                |
| 32   | 252744      | Seat                    | 3                |
| 33   | GM35533     | Retainer, nozzle        | 3                |
| 34   | GM35495     | Washer                  | 3                |
| 35   | 250963      | Spring pin 6 x 12       | 2                |
| 36   | 252699      | Bolt, M8 x 25 plated    | 2                |
| 37   | 252701      | Bolt, M8 x 35           | 3                |
| 36   | 252704      | Bolt                    | 6                |
| 39   | 250837      | Cap                     | 1                |
| 40   | GM35530     | Bonnet assembly, head   | 1                |
| 41   | GM35524     | Plate, baffle           | 1                |
| 42   | 252805      | Baffle                  | 1                |
| 43   | GM35434     | Plate, diaphragm        | 1                |
| 44   | GM35435     | Cover, diaphragm        | 1                |
| 45   | GM35436     | Diaphragm               | 1                |
| 46   | GM35437     | Spring, diaphragm       | 1                |
| 49   | GM35529     | Gasket, bonnet          | 1                |
| 50   | 363201      | Screw, tapping 5 x 10   | 4                |
| 51   | 363201      | Screw, tapping 5 x 10   | 4                |
| 52   | 252470      | Cap nut                 | 3                |
| 53   | 250801      | O-ring                  | 3                |
| 54   | 252684      | O-ring                  | 1                |
| 55   | GM35450     | Protector, nozzle       | 3                |
| 56   | 252998      | Gasket                  | 1                |
| 57   | 256542      | Lifter, engine          | 1                |

## Group 5: Cylinder Head, continued

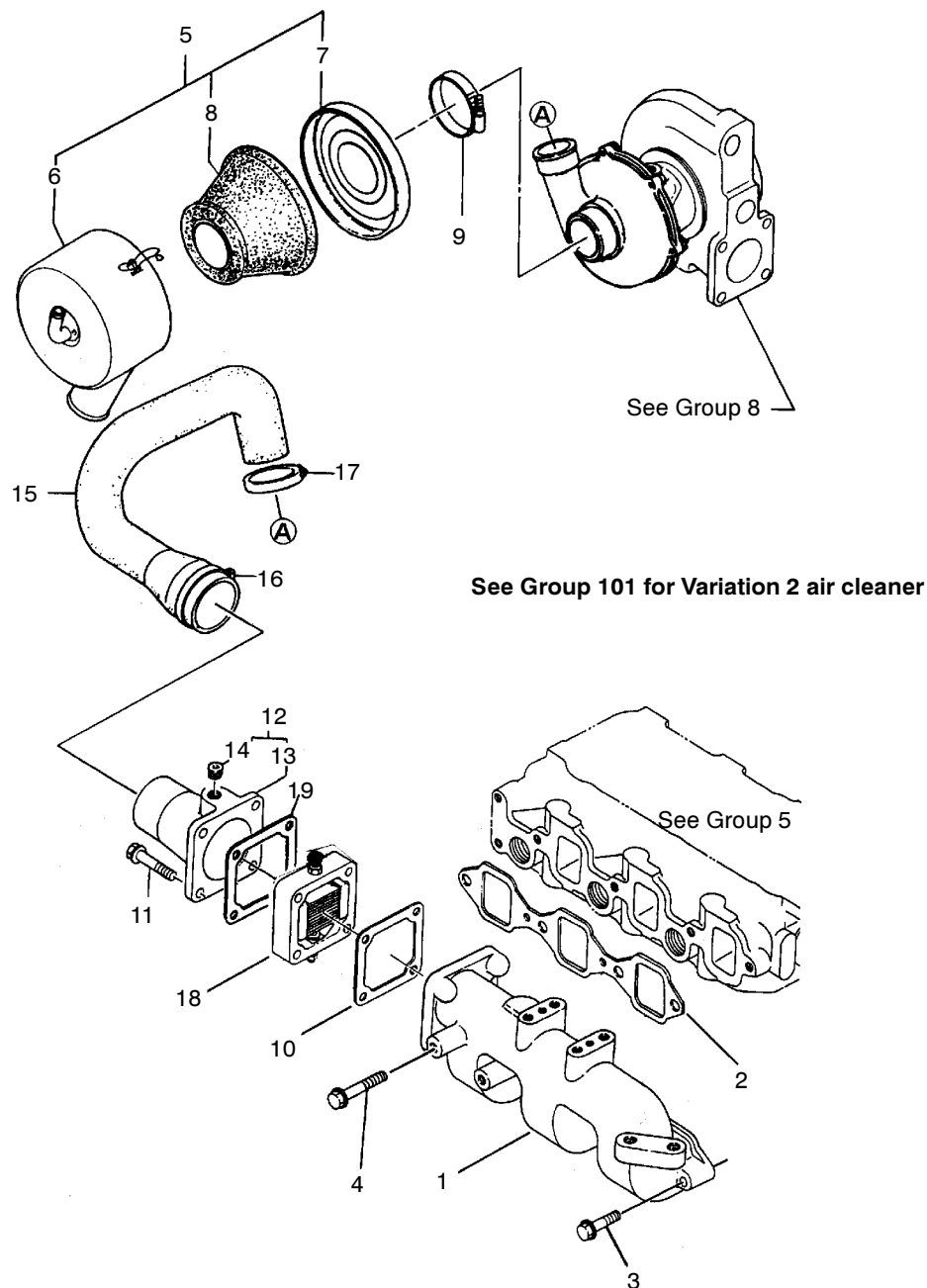


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## Group 5: Cylinder Head, continued

| Item | Part Number | Description             | Quantity         |
|------|-------------|-------------------------|------------------|
|      |             |                         | Variation Number |
|      |             |                         | 5                |
| 1    | 363110      | Lifter, engine          | 1                |
| 2    | 252696      | Bolt, M8 x 16           | 4                |
| 3    | GM35527     | Shaft assembly, rocker  | 1                |
| 4    | GM35528     | Shaft, rocker arm       | 1                |
| 6    | GM35442     | Support, rocker arm     | 2                |
| 7    | GM35443     | Support, rocker arm     | 2                |
| 8    | GM35444     | Stud                    | 3                |
| 9    | 252815      | Spring                  | 3                |
| 10   | GM35531     | Arm assembly, rocker    | 6                |
| 11   | 229844      | Valve screw             | 6                |
| 13   | 252817      | Nut, M8 x p1.0          | 6                |
| 14   | 256717      | Cap, valve              | 6                |
| 15   | GM35554     | Head assembly, cylinder | 1                |
| 22   | 256736      | Guide, suction valve    | 3                |
| 24   | 256768      | Guide, exhaust valve    | 3                |
| 26   | GM35526     | Valve, intake           | 3                |
| 27   | 252780      | Valve, exhaust          | 3                |
| 26   | 252934      | Spring, valve           | 6                |
| 29   | 252935      | Retainer, spring        | 6                |
| 30   | 252754      | Seal, valve stem        | 3                |
| 31   | 256578      | Seal, valve stem        | 3                |
| 32   | 252737      | Cotter 8                | 6                |
| 34   | 252732      | Plug 40                 | 2                |
| 35   | 252744      | Seat                    | 3                |
| 36   | GM35533     | Retainer, nozzle        | 3                |
| 37   | GM35495     | Washer                  | 3                |
| 36   | 250963      | Spring pin 6 x 12       | 2                |
| 39   | 252699      | Bolt, M8 x 25 plated    | 2                |
| 40   | 252701      | Bolt, M8 x 35           | 3                |
| 41   | 252704      | Bolt                    | 6                |
| 42   | 250837      | Cap                     | 1                |
| 43   | GM35553     | Bonnet assembly, head   | 1                |
| 44   | GM35524     | Plate, baffle           | 1                |
| 45   | 252805      | Baffle                  | 1                |
| 46   | GM35552     | Cover, diaphragm        | 1                |
| 49   | GM35529     | Gasket, bonnet          | 1                |
| 50   | 363201      | Screw, tapping 5 x 10   | 4                |
| 51   | 363201      | Screw, tapping 5 x 10   | 4                |
| 52   | GM35723     | O-ring                  | 1                |
| 53   | 252470      | Cap nut                 | 3                |
| 54   | 250801      | O ring                  | 3                |
| 55   | 252684      | O-ring                  | 1                |
| 56   | 256542      | Lifter, engine          | 1                |
| 57   | GM35450     | Protector, nozzle       | 3                |
| 56   | 252998      | Gasket                  | 1                |
| 59   | 229414      | Breather pipe           | 1                |
| 60   | GM13316     | Clamp 16                | 1                |
| 61   | GM35708     | Hose clip               | 1                |

## Group 6: Intake Manifold



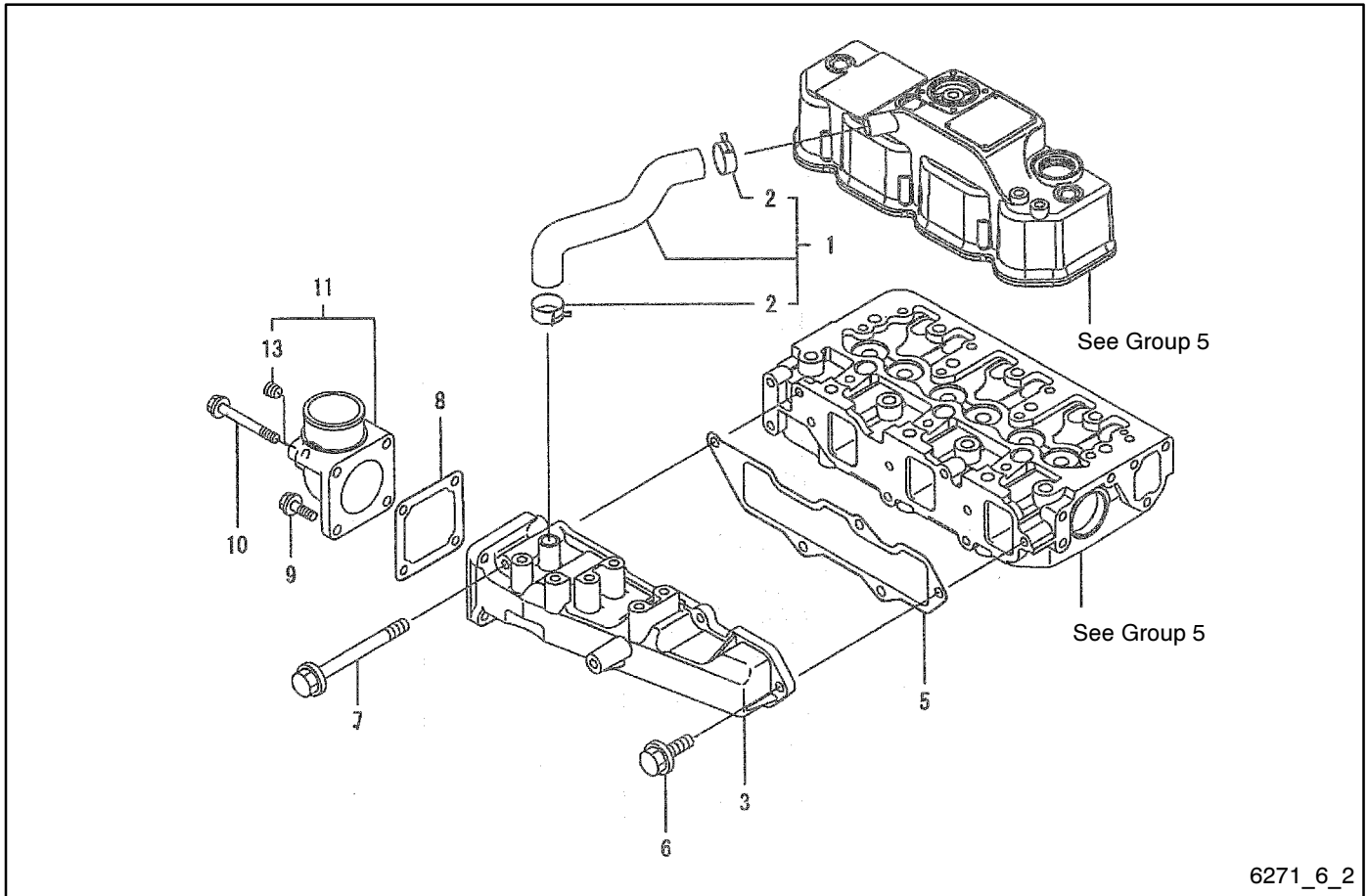
6271\_6\_1

| Item | Part Number | Description                            | Quantity        |                 |
|------|-------------|----------------------------------------|-----------------|-----------------|
|      |             |                                        | Variation No. 2 | Variation No. 3 |
| 1    | 229723      | Manifold assembly, intake              | 1               | 1               |
| 2    | 225874      | Gasket                                 | 1               | 1               |
| 3    | 252699      | Bolt, M8 x 25 plated                   | 3               | 3               |
| 4    | 252701      | Bolt, M8 x 35 plated                   | 1               | 1               |
| 5    | 229442      | Silencer assembly (includes items 6-8) |                 |                 |
| 6    | X           | Body, silencer                         |                 | 1               |
| 7    | 229443      | Plate, bottom                          |                 | 1               |
| 8    | 250902      | Element, cleaner                       |                 | 1               |
| 9    | 229493      | Clamp 48                               |                 | 1               |
| 10   | 229434      | Gasket                                 |                 |                 |
| 10   | 229719      | Gasket                                 | 1               | 1               |

| Item | Part Number | Description                             | Quantity        |                 |
|------|-------------|-----------------------------------------|-----------------|-----------------|
|      |             |                                         | Variation No. 2 | Variation No. 3 |
| 11   | 252702      | Bolt, M8 x 40 plated                    |                 | 4               |
| 11   | 252703      | Bolt, M8 x 45 plated                    | 4               |                 |
| 12   | 229429      | Joint assembly (includes items 13 & 14) |                 | 1               |
| 13   | X           | Joint                                   |                 | 1               |
| 13   | GM13327     | Joint, air heater                       | 1               |                 |
| 14   | 256515      | Plug, PT 1/8 screw                      |                 | 1               |
| 15   | 256627      | Pipe                                    |                 | 1               |
| 16   | 229494      | Clamp 60                                |                 | 1               |
| 17   | 229493      | Clamp 48                                |                 | 1               |
| 18   | 229825      | Air heater                              | 1               | 1               |
| 19   | 229434      | Gasket                                  | 1               | 1               |

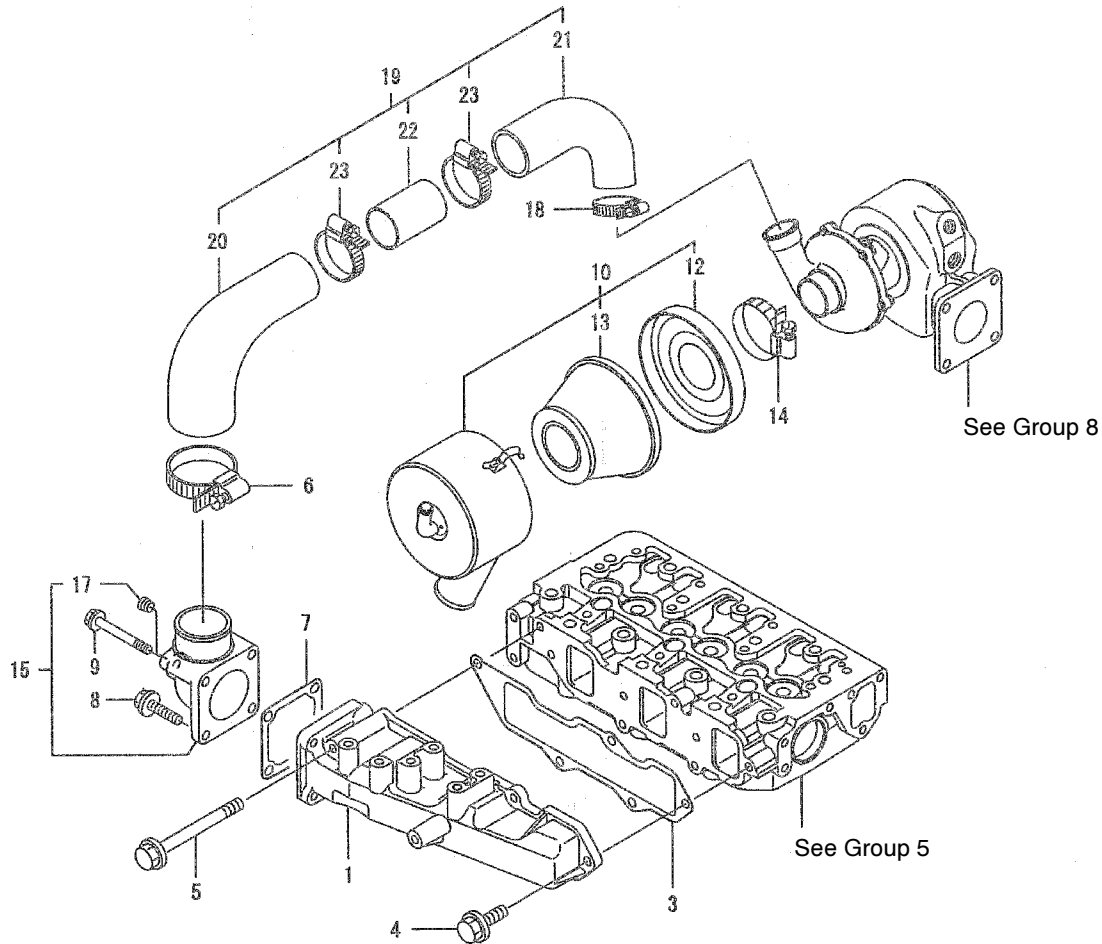
X Item not sold separately

## Group 6: Intake Manifold



| Item | Part Number | Description             | Quantity         |
|------|-------------|-------------------------|------------------|
|      |             |                         | Variation Number |
| 1    | GM35525     | Pipe, breather          | 1                |
| 2    | 229425      | Clamp                   | 2                |
| 3    | GM35534     | Manifold, intake        | 1                |
| 5    | GM19699     | Gasket, intake manifold | 1                |
| 6    | 252697      | Bolt                    | 4                |
| 7    | GM35725     | Bolt, M8 x 80 plated    | 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                |

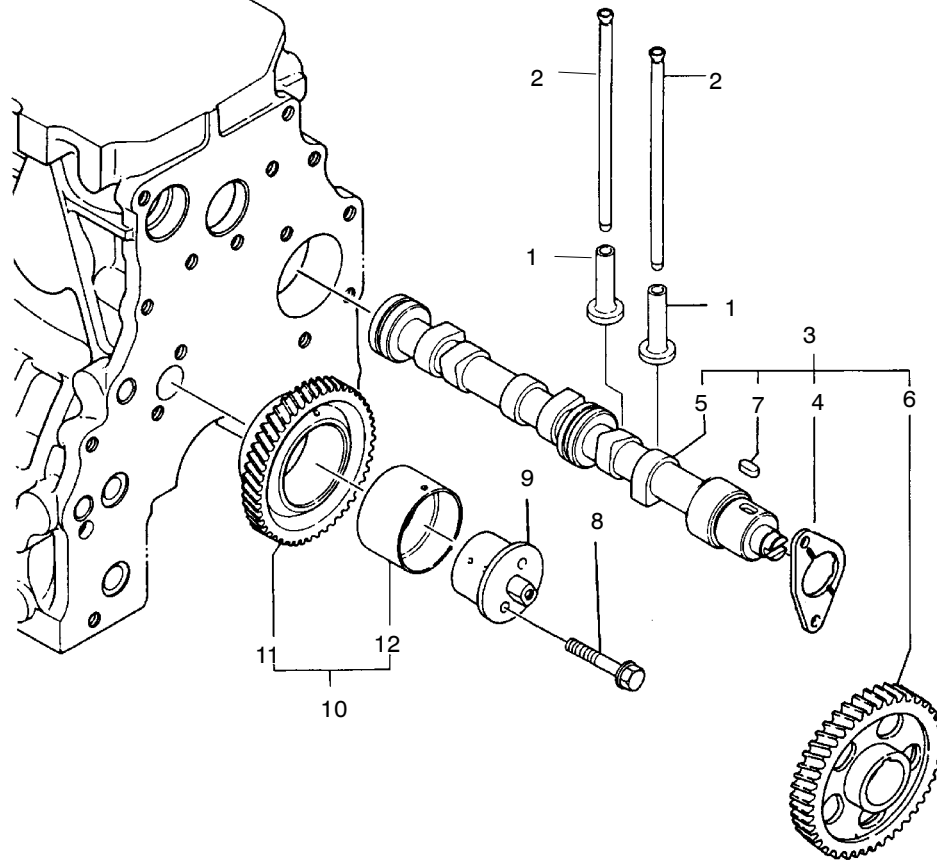
## Group 6: Intake Manifold, continued



6271\_6\_3

| Item | Part Number | Description             | Quantity         |
|------|-------------|-------------------------|------------------|
|      |             |                         | Variation Number |
| 1    | GM35555     | Manifold, intake        | 1                |
| 3    | GM19699     | Gasket, intake manifold | 1                |
| 4    | 252697      | Bolt                    | 4                |
| 5    | 252707      | Bolt                    | 1                |
| 6    | 229494      | Clamp 60                | 1                |
| 7    | 225778      | Gasket                  | 1                |
| 8    | 252697      | Bolt                    | 2                |
| 9    | 252706      | Bolt                    | 2                |
| 10   | 229442      | Silencer assembly       | 1                |
| 12   | 229443      | Bottom plate            | 1                |
| 13   | 250902      | Element                 | 1                |
| 14   | 229493      | Clamp 48                | 1                |
| 15   | GM35639     | Joint assembly          | 1                |
| 17   | GM13812     | Plug, PT 1/8, screw     | 1                |
| 18   | 229493      | Clamp 48                | 1                |
| 19   | GM35643     | Hose assembly, intake   | 1                |
| 20   | GM35640     | Hose, air intake        | 1                |
| 21   | GM35641     | Hose, air intake        | 1                |
| 22   | GM35642     | Joint                   | 1                |
| 23   | 229846      | Clamp                   | 2                |

## Group 7: Camshaft and Drive Gear

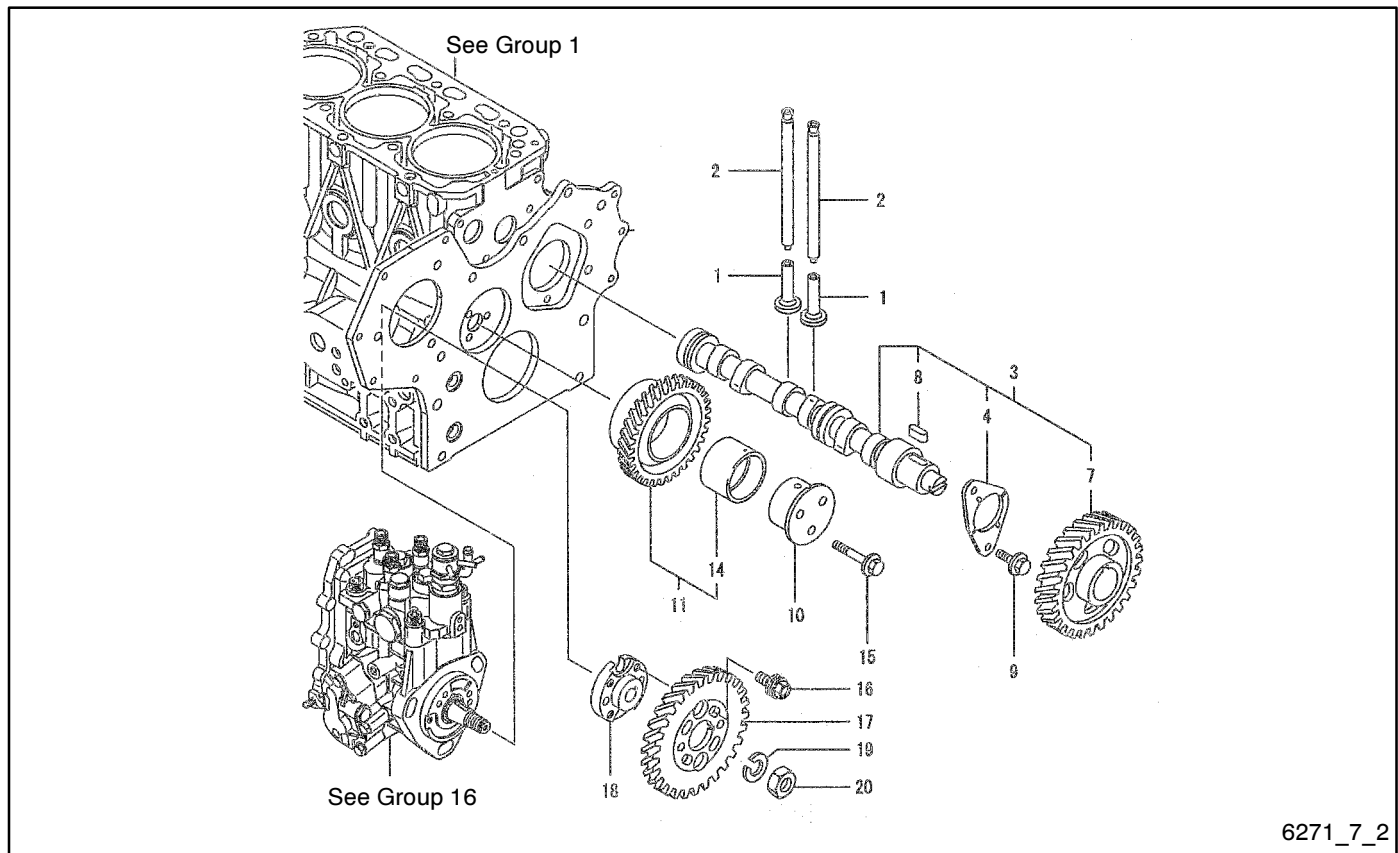


6271\_7\_1

| Item | Part Number | Description                           | Quantity         |
|------|-------------|---------------------------------------|------------------|
|      |             |                                       | Variation Number |
| 1    | 252819      | Tappet                                | 2                |
| 2    | 252820      | Push rod                              | 6                |
| 3    | 225873      | 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    | 252782      | Shaft, idle gear                      | 1                |
| 10   | 256590      | Gear, idle (includes items 13 and 14) | 1                |
| 11   | X           | Gear, idle                            | 1                |
| 12   | 252825      | Bus, idle gear                        | 1                |

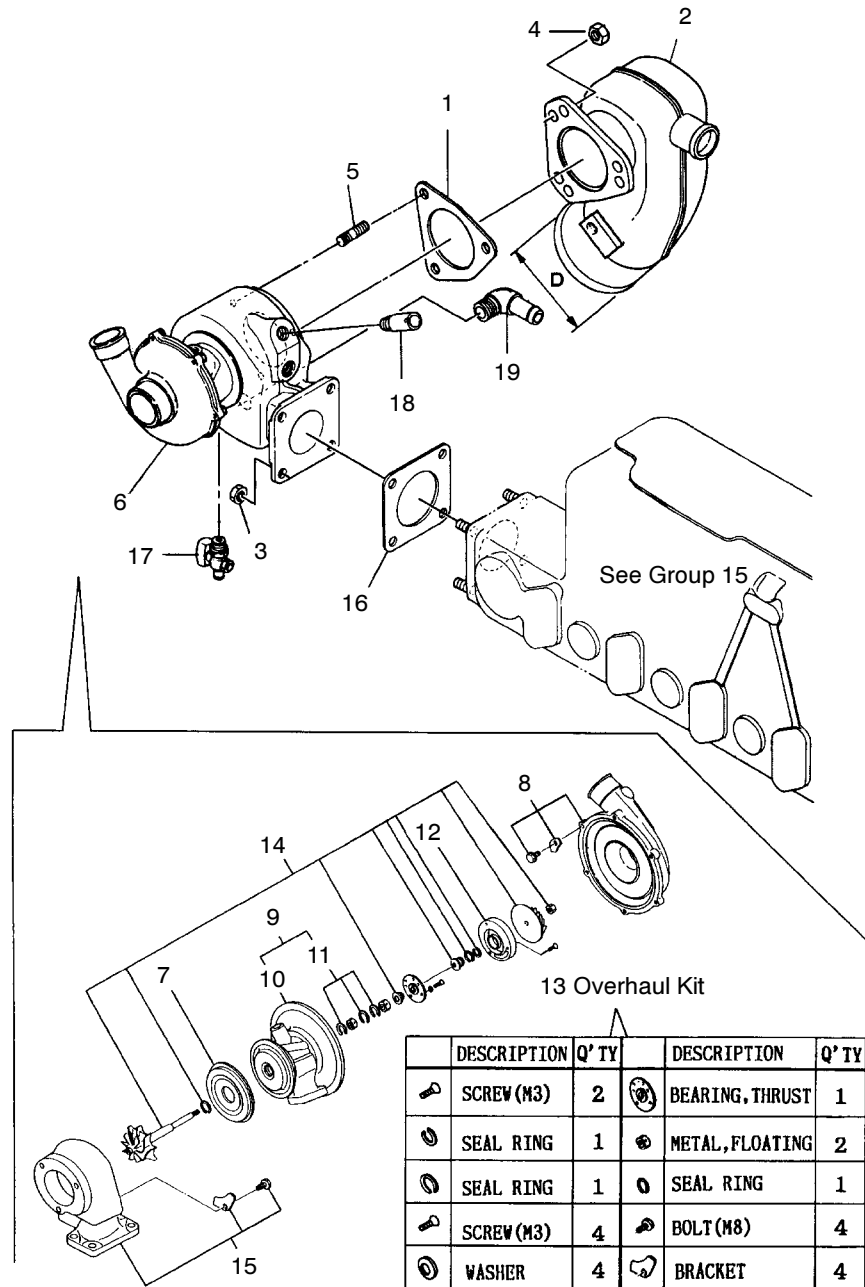
X Item not sold separately

## Group 7: Camshaft and Drive Gear, continued



| Item | Part Number | Description          | Quantity         |
|------|-------------|----------------------|------------------|
|      |             |                      | Variation Number |
| 1    | 252819      | Tappet               | 3                |
| 2    | 252820      | Rod, push            | 6                |
| 3    | GM35535     | Camshaft assembly    | 1                |
| 4    | 252804      | Metal, thrust        | 1                |
| 7    | 256587      | Gear, camshaft       | 1                |
| 8    | 252669      | Key 7 x 14           | 1                |
| 9    | 225818      | Bolt, M8 x 14        | 2                |
| 10   | GM35459     | Shaft, idle gear     | 1                |
| 11   | GM35461     | Gear assembly, idle  | 1                |
| 14   | GM35460     | Bush, idle gear      | 1                |
| 15   | 252702      | Bolt                 | 3                |
| 16   | GM19682     | Bolt, gear           | 4                |
| 17   | GM35462     | Gear, pump           | 1                |
| 18   | GM35711     | Flange               | 1                |
| 19   | GM35714     | Washer, spring       | 1                |
| 20   | GM35734     | Nut, lock M14 plated | 1                |

## Group 8: Turbocharger



| DESCRIPTION | Q' TY | DESCRIPTION     | Q' TY |
|-------------|-------|-----------------|-------|
| SCREW (M3)  | 2     | BEARING, THRUST | 1     |
| SEAL RING   | 1     | METAL, FLOATING | 2     |
| SEAL RING   | 1     | SEAL RING       | 1     |
| SCREW (M3)  | 4     | BOLT (M8)       | 4     |
| WASHER      | 4     | BRACKET         | 4     |

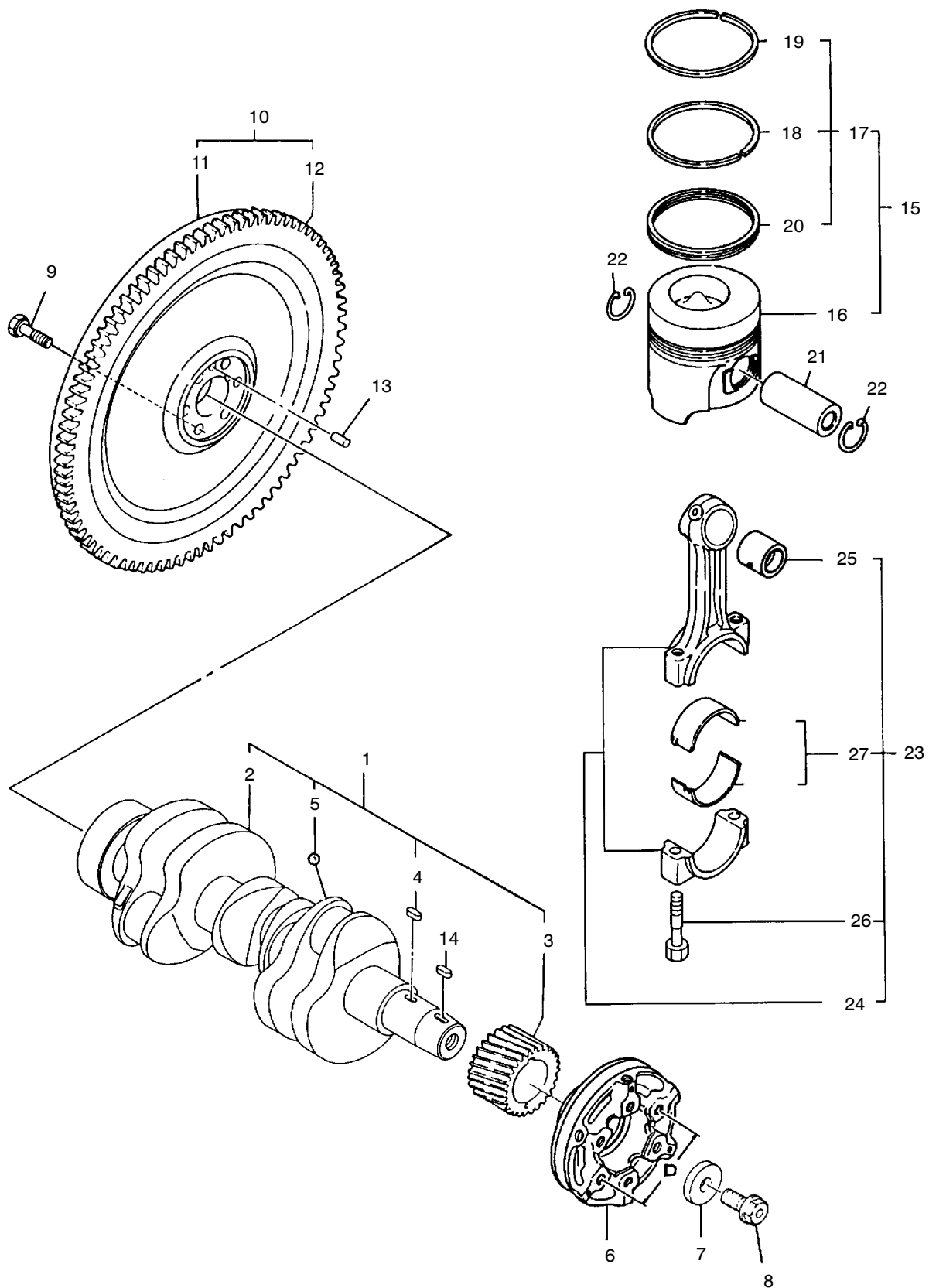
6271\_8

| Item | Part Number | Description                                             | Quantity      |   |
|------|-------------|---------------------------------------------------------|---------------|---|
|      |             |                                                         | Variation No. |   |
|      |             |                                                         | 2             | 3 |
| 1    | 256653      | Gasket                                                  | 1             | 1 |
| 2    | 256651      | Elbow, mixing                                           | 1             | 1 |
| 3    | 229509      | Nut, M8                                                 | 3             | 3 |
| 4    | 229509      | Nut, M8                                                 | 4             | 4 |
| 5    | 256579      | Stud                                                    | 3             | 3 |
| 6    | 229309      | Turbocharger assembly<br>(includes items 7-15)          | 1             | 1 |
| 7    | 256686      | Protector, heat                                         | 1             | 1 |
| 8    | 229473      | Housing assembly, blower                                | 1             | 1 |
| 9    | 229424      | Housing assembly, bearing<br>(includes items 12 and 13) | 1             | 1 |

| Item | Part Number | Description             | Quantity      |   |
|------|-------------|-------------------------|---------------|---|
|      |             |                         | Variation No. |   |
|      |             |                         | 2             | 3 |
| 10   | X           | Housing, bearing        | 1             | 1 |
| 11   | X           | Circlip                 | 3             | 3 |
| 12   | 229475      | Plate assembly, seal    | 1             | 1 |
| 13   | 229311      | Overhaul Kit            | 1             | 1 |
| 14   | 229312      | Rotor assembly, turbo   | 1             | 1 |
| 15   | 229737      | Housing assembly, turbo | 1             | 1 |
| 16   | GM13332     | Gasket                  | 1             | 1 |
| 17   | 252329      | Valve                   | 1             | 1 |
| 17   | GM13330     | Valve                   |               | 1 |
| 18   | 229403      | Joint                   | 1             | 1 |
| 19   | 229317      | Joint                   | 1             | 1 |

X Item not sold separately

## Group 9: Crankshaft and Flywheel



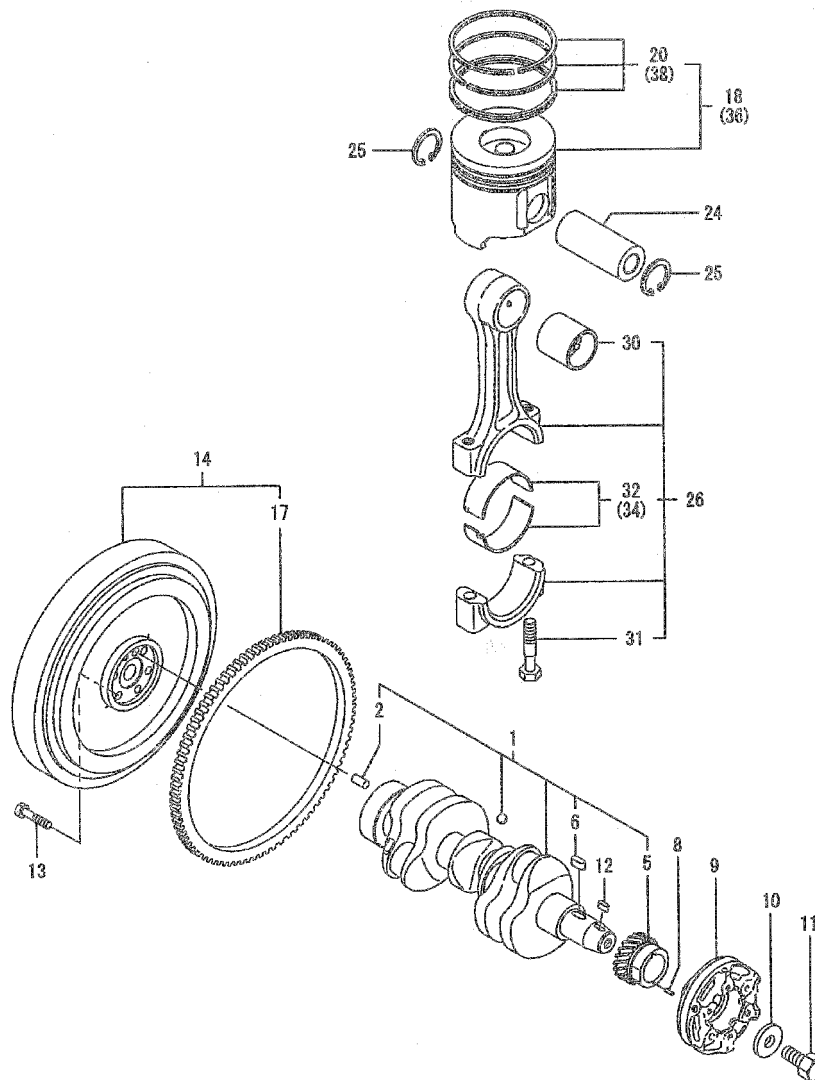
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## Group 9: Crankshaft and Flywheel

| Item | Part Number | Description                                              | Quantity         |   |
|------|-------------|----------------------------------------------------------|------------------|---|
|      |             |                                                          | Variation Number |   |
|      |             |                                                          | 2                | 3 |
| 1    | GM13299     | Crankshaft assembly (includes items 2-5)                 | 1                | 1 |
| 2    | X           | Crankshaft                                               | 1                | 1 |
| 3    | 252821      | Gear, crankshaft                                         | 1                | 1 |
| 4    | 252669      | Key                                                      | 1                | 1 |
| 5    | X           | Ball, steel                                              | 3                | 3 |
| 6    | 229730      | V-pulley                                                 | 1                | 1 |
| 7    | 252937      | Washer                                                   | 1                | 1 |
| 8    | 252763      | Bolt, V-pulley                                           | 1                | 1 |
| 9    | 252401      | Bolt, flywheel                                           | 6                | 6 |
| 10   | 229116      | Flywheel assembly (includes items 12 and 13)             | 1                | 1 |
| 11   | X           | Flywheel                                                 | 1                | 1 |
| 12   | 252774      | Gear, ring                                               | 1                | 1 |
| 13   | 256750      | Parallel pin 8 x 16                                      | 1                | 1 |
| 14   | 229749      | Key 7 x 16                                               | 1                | 1 |
| 15   | GM13300     | Piston w/rings (includes items 16 and 17)                | 3                |   |
| 15   | 363437      | Piston w/rings (includes items 16 and 17)                |                  | 3 |
| 15   | GM13302     | Piston w/rings oversized 0.25 (includes items 16 and 17) | 3                |   |
| 15   | 363438      | Piston w/rings oversized 0.25 (includes items 16 and 17) |                  | 3 |
| 16   | X           | Piston                                                   | 3                | 3 |
| 17   | GM13301     | Ring Set (includes items 18-20)                          | 3                |   |
| 17   | 363439      | Ring Set (includes items 18-20)                          |                  | 3 |
| 17   | GM13303     | Ring Set oversized 0.25 (includes items 18-20)           | 3                |   |
| 17   | GM13305     | Ring Set oversized 0.25 (includes items 18-20)           |                  | 3 |
| 18   | X           | Ring, second                                             | 3                | 3 |
| 19   | X           | Ring, top                                                | 3                | 3 |
| 20   | X           | Ring, oil                                                | 3                | 3 |
| 21   | 363440      | Pin, piston                                              | 3                | 3 |
| 22   | 363441      | Circlip                                                  | 8                | 8 |
| 23   | 252980      | Rod assembly, connecting (includes items 24-27)          | 3                | 3 |
| 24   | X           | Rod, connecting                                          | 3                | 3 |
| 25   | 252781      | Bush, piston pin                                         | 3                | 3 |
| 26   | 250889      | Bolt, connecting rod                                     | 6                | 6 |
| 27   | 252979      | Bearing, crankpin                                        | 3                | 3 |
| 27   | 256588      | Bearing, pin undersized 0.25                             | 3                | 3 |

X Item not sold separately

## Group 9: Crankshaft and Flywheel, continued

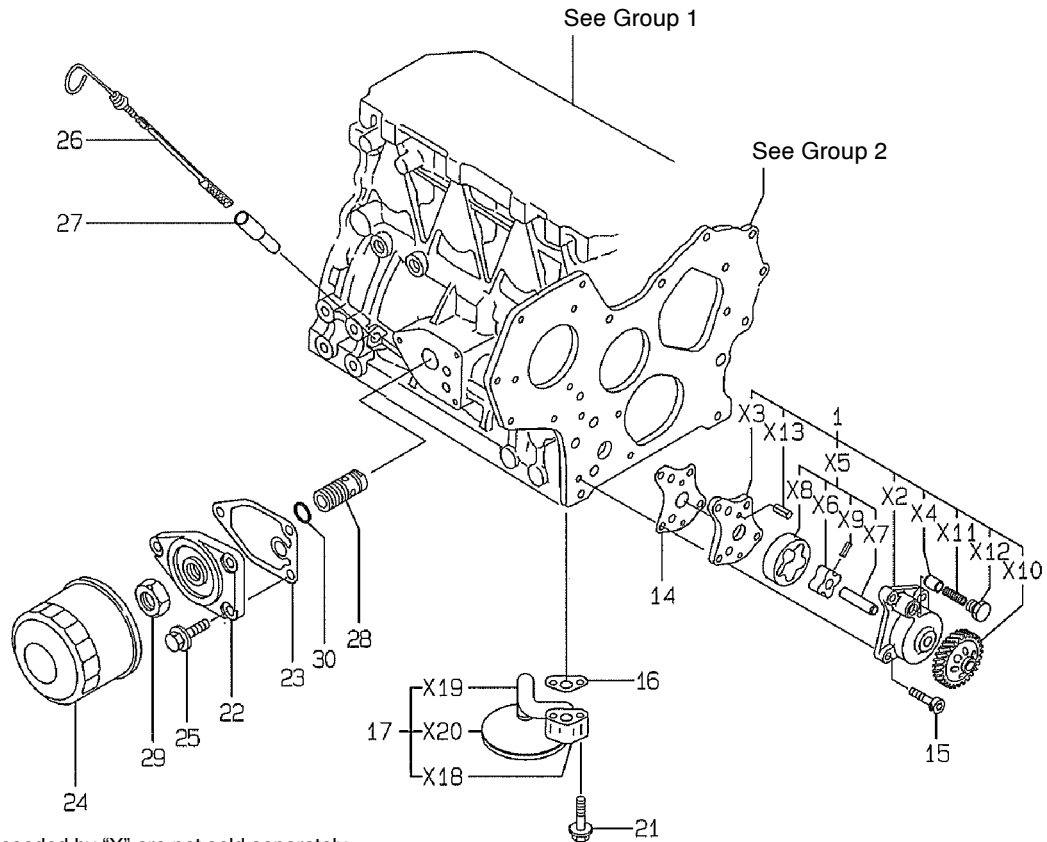


6271\_9\_2

| Item | Part Number | Description         | Quantity      |   |
|------|-------------|---------------------|---------------|---|
|      |             |                     | Variation No. |   |
|      |             |                     | 4             | 5 |
| 1    | GM35536     | Crankshaft assembly | 1             | 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      | Spring pin          | 1             | 1 |
| 9    | 229730      | V-pulley            | 1             | 1 |
| 10   | 252937      | Washer              | 1             | 1 |
| 11   | 252763      | Bolt, V-pulley      | 1             | 1 |
| 12   | 229749      | Key, 7 x 16         | 1             | 1 |
| 13   | 252401      | Bolt, flywheel      | 6             | 6 |
| 14   | 229116      | Flywheel            | 1             | 1 |
| 17   | 252774      | Gear, ring          | 1             | 1 |
| 18   | GM35537     | Piston w/ring       |               | 3 |
| 18   | GM35545     | Piston w/ring       | 3             |   |

| Item | Part Number | Description              | Quantity      |   |
|------|-------------|--------------------------|---------------|---|
|      |             |                          | Variation No. |   |
| 4    | 5           |                          |               |   |
| 20   | GM35538     | Ring set                 |               | 3 |
| 20   | GM35546     | Ring set                 | 3             |   |
| 24   | 363440      | Pin, piston              | 3             | 3 |
| 25   | 363441      | Clip 26                  | 6             | 6 |
| 26   | 252980      | Rod assembly, connecting | 3             | 3 |
| 30   | 256580      | Bushing, piston pin      | 3             | 3 |
| 31   | 250889      | Rod bolt                 | 6             | 6 |
| 32   | 252979      | Bearing pin              | 3             | 3 |
| 34   | 256588      | Pin, bearing             | 3             | 3 |
| 36   | GM35539     | Piston w/ring OS=0.25    |               | 3 |
| 36   | GM35547     | Piston w/ring OS=0.25    | 3             |   |
| 38   | GM35540     | Ring set OS=0.25         |               | 3 |
| 38   | GM35548     | Ring set OS=0.25         | 3             |   |

# Group 10: Lube Oil System



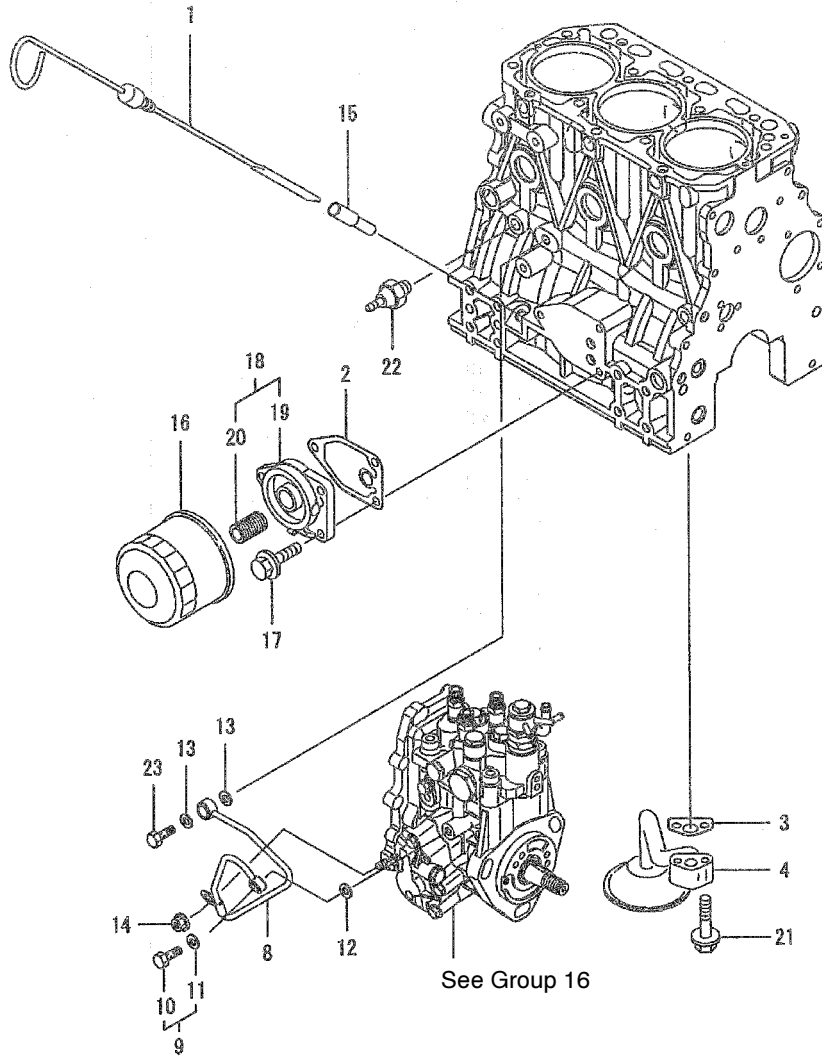
Item numbers preceded by "X" are not sold separately.

6271\_10\_1

| Item | Part Number | Description                                   | Quantity           |
|------|-------------|-----------------------------------------------|--------------------|
|      |             |                                               | Variation Number 2 |
| 1    | 225412      | 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   | 252834      | 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

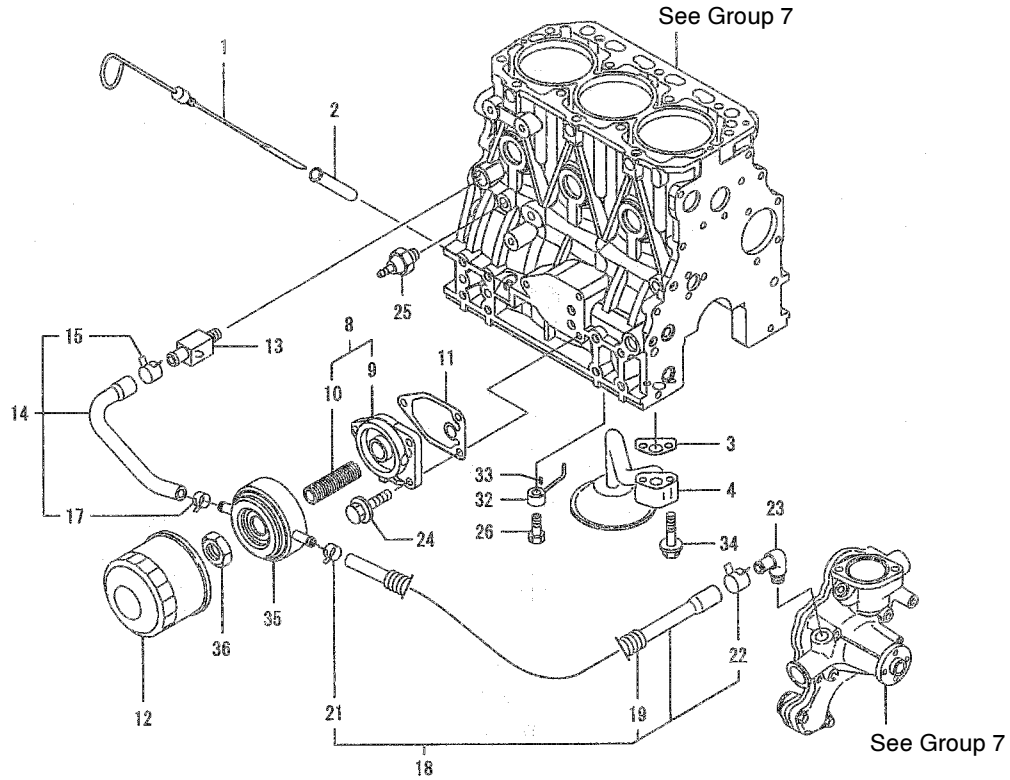
## Group 10: Lube Oil System, continued



6271\_10\_2

| Item | Part Number              | Description              | Quantity<br>Variation<br>Number |
|------|--------------------------|--------------------------|---------------------------------|
| 1    | 252951                   | Dipstick, lube oil       | 1                               |
| 2    | 225776                   | Gasket                   | 1                               |
| 3    | 225775                   | Gasket                   | 1                               |
| 4    | 252831                   | Pipe, oil inlet          | 1                               |
| 8    | GM35471                  | Pipe assembly, oil       | 1                               |
| 9    | GM35550                  | Bolt assembly, joint     | 1                               |
| 10   | 252677                   | Joint bolt               | 1                               |
| 11   | 252734                   | Washer, seal             | 1                               |
| 12   | 252734                   | Washer, seal             | 1                               |
| 13   | 363452                   | Washer, seal             | 2                               |
| 14   | 250989                   | Nut, M6                  | 1                               |
| 15   | 252759                   | Guide, dipstick          | 1                               |
| 16   | <del>252834</del> 252834 | Filter, oil GM47465      | 1                               |
| 17   | 252697                   | Bolt                     | 3                               |
| 18   | GM35469                  | Bracket assembly, filter | 1                               |
| 19   | GM35470                  | Bracket, filter          | 1                               |
| 20   | 256582                   | Stud                     | 1                               |
| 21   | 252701                   | Bolt, M8 x 35            | 2                               |
| 22   | GM35419                  | Switch, oil pressure     | 1                               |
| 23   | 252084                   | Bolt                     | 1                               |

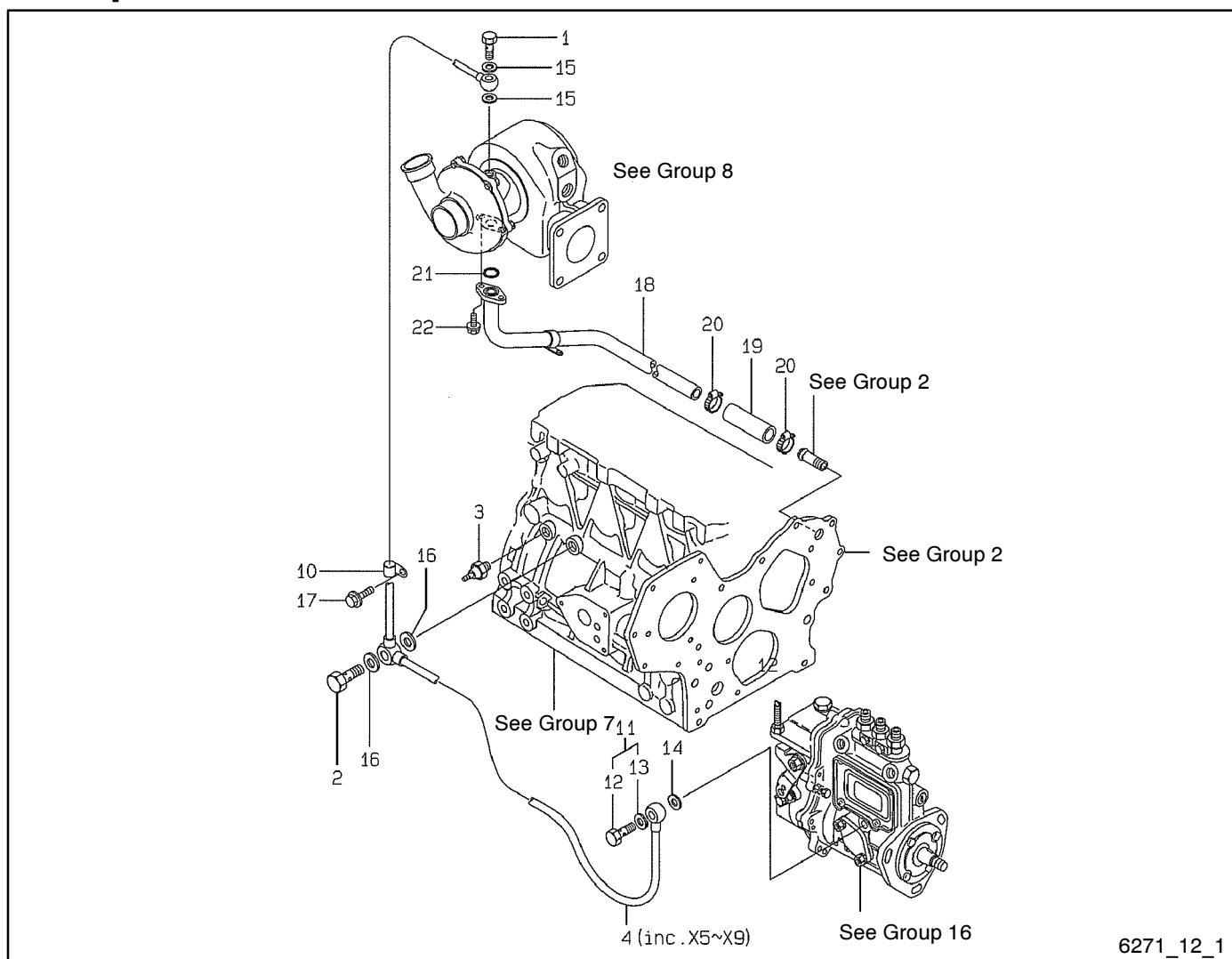
## Group 10: Lube Oil System, continued



6271\_10\_3

| Item | Part Number               | Description              | Quantity           |
|------|---------------------------|--------------------------|--------------------|
|      |                           |                          | Variation Number 4 |
| 1    | 252951                    | Dipstick, lube oil       | 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   | 225776                    | Gasket                   | 1                  |
| 12   | <del>252834</del> GM47465 | Filter, oil              | 1                  |
| 13   | GM35557                   | Joint                    | 1                  |
| 14   | GM35612                   | Pipe, cooler             | 1                  |
| 15   | GM35713                   | Clamp                    | 1                  |
| 17   | GM35716                   | Clamp                    | 1                  |
| 18   | GM35558                   | Pipe, cooler             | 1                  |
| 19   | GM35514                   | Protector, pipe          | 1                  |
| 21   | GM35716                   | Clamp                    | 1                  |
| 22   | GM35717                   | Clamp                    | 1                  |
| 23   | GM35562                   | Elbow                    | 1                  |
| 24   | 252697                    | Bolt                     | 3                  |
| 25   | GM35419                   | Switch, oil pressure     | 1                  |
| 26   | GM35648                   | Valve assembly, check    | 3                  |
| 32   | 256649                    | Nozzle                   | 3                  |
| 33   | 256654                    | Spring pin               | 3                  |
| 34   | 252701                    | Bolt, M8 x 35            | 2                  |
| 35   | GM35611                   | Cooler assembly, oil     | 1                  |
| 36   | GM35576                   | Nut, oil cooler          | 1                  |

## Group 12: Lube Oil Line



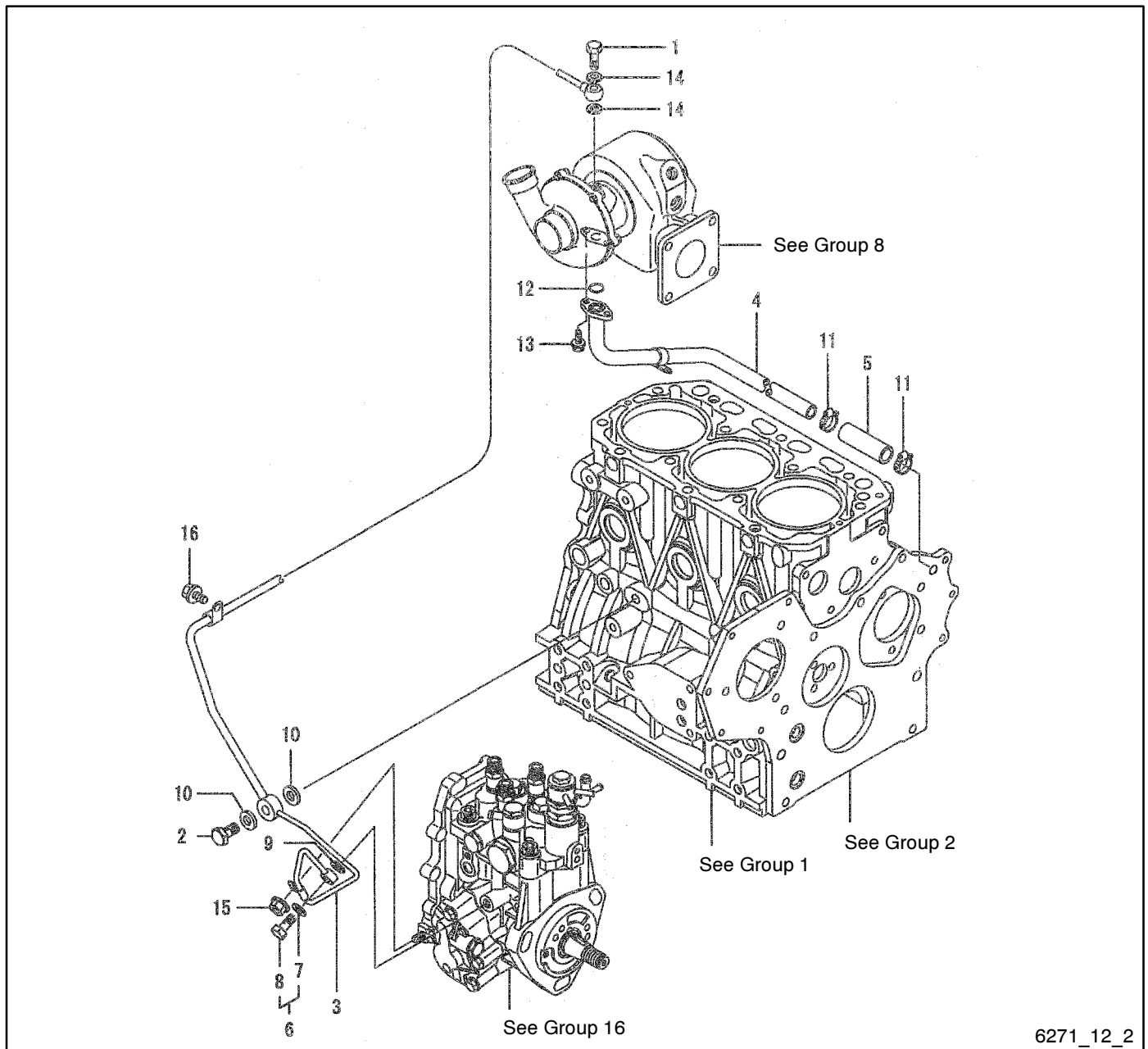
6271\_12\_1

| Item | Part Number | Description           | Quantity         |   |
|------|-------------|-----------------------|------------------|---|
|      |             |                       | Variation Number |   |
|      |             |                       | 2                | 3 |
| 1    | 256568      | Bolt, pipe joint      |                  | 1 |
| 2    | 252084      | Bolt, joint 10        | 1                | 1 |
| 3    | 256530      | Switch, oil pressure  | 1                | 1 |
| 4    | GM13306     | Pipe, lube oil        |                  | 1 |
| 4    | 256773      | Pipe, lube oil        | 1                |   |
| 5    | X           | Joint                 | 1                | 1 |
| 6    | X           | Joint                 | 1                | 1 |
| 7    | X           | Pipe                  | 1                | 1 |
| 8    | X           | Pipe, lube oil        |                  | 1 |
| 9    | X           | Joint                 |                  | 1 |
| 10   | 229865      | Retainer              |                  | 1 |
| 11   | GM13295     | Bolt with seal washer |                  | 1 |

| Item | Part Number | Description          | Quantity         |   |
|------|-------------|----------------------|------------------|---|
|      |             |                      | Variation Number |   |
|      |             |                      | 2                | 3 |
| 12   | 252090      | Bolt 8, pipe joint   | 1                | 1 |
| 13   | 252734      | Seal washer 8        | 1                | 1 |
| 14   | 252734      | Seal washer 8        | 1                | 1 |
| 15   | 250967      | Gasket 8, round      |                  | 2 |
| 16   | 250968      | Gasket 10, round     | 2                | 2 |
| 17   | 252694      | Bolt, M8 x 10 plated |                  | 1 |
| 18   | 229731      | Pipe, return         |                  | 1 |
| 19   | 229735      | Joint rubber         |                  | 1 |
| 20   | 229490      | Clamp 22             |                  | 2 |
| 21   | 256660      | O-ring               |                  | 1 |
| 22   | 252693      | Bolt, M6 x 16 plated |                  | 2 |

X Item not sold separately

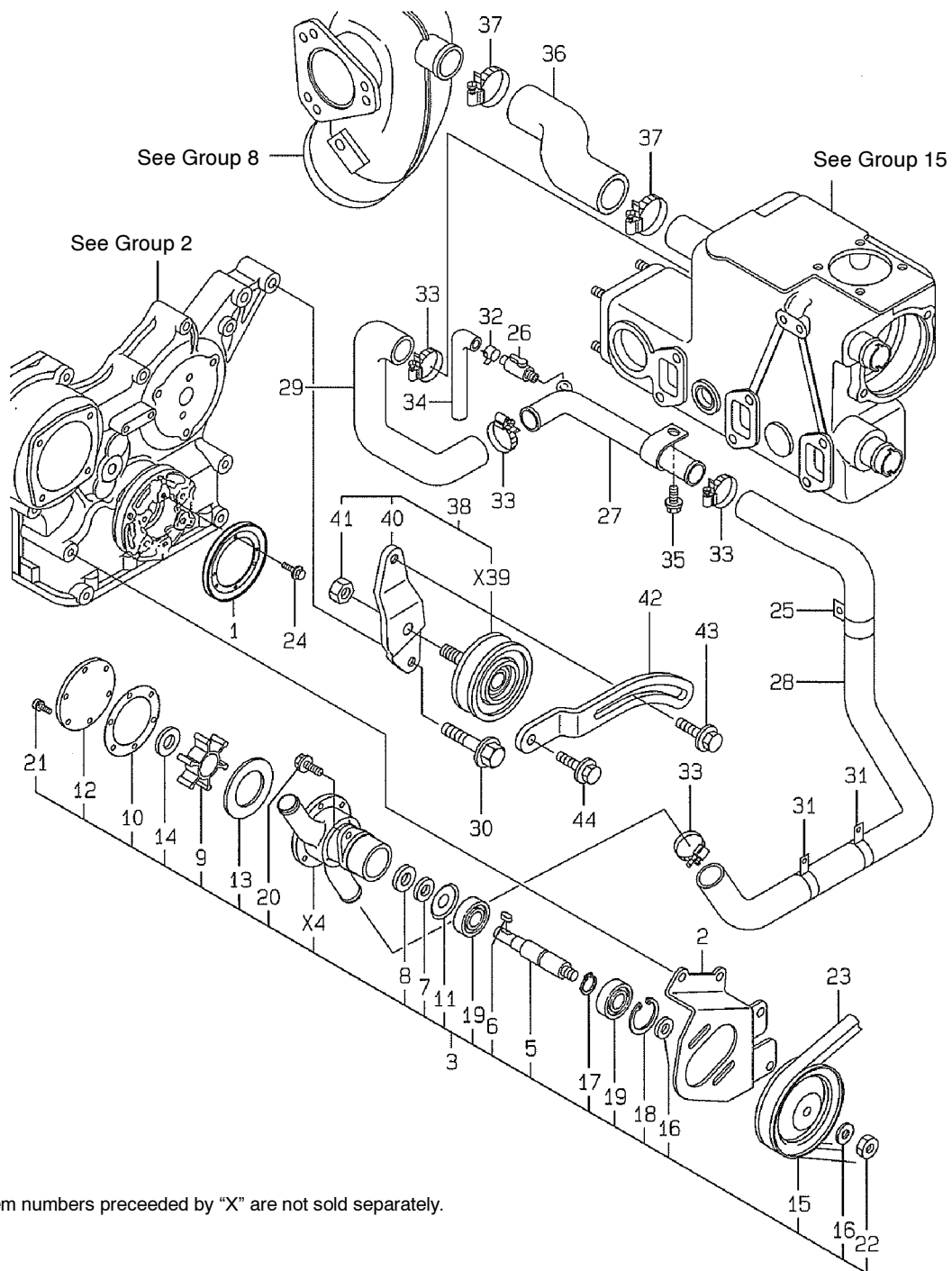
## Group 12: Lube Oil Line



6271\_12\_2

| Item | Part Number | Description          | Quantity         | Item | Part Number | Description     | Quantity         |
|------|-------------|----------------------|------------------|------|-------------|-----------------|------------------|
|      |             |                      | Variation Number |      |             |                 | Variation Number |
| 1    | 256568      | Bolt, pipe joint     | 3                | 9    | 252734      | Washer 8, seal  | 1                |
| 2    | 252084      | Bolt                 | 1                | 10   | 363452      | Washer, seal    | 2                |
| 3    | GM35559     | Pipe assembly, oil   | 1                | 11   | 229490      | Clamp 22        | 2                |
| 4    | 229731      | Pipe, return         | 1                | 12   | 256660      | O-ring          | 1                |
| 5    | 229735      | Joint, rubber        | 1                | 13   | 252693      | Bolt            | 2                |
| 6    | GM35550     | Bolt assembly, joint | 1                | 14   | 250967      | Gasket 8, round | 2                |
| 7    | 252734      | Washer 8, seal       | 1                | 15   | 250989      | Nut, M6         | 1                |
| 8    | 252677      | Joint bolt           | 1                | 16   | 252695      | Bolt, M8 x 12   | 1                |

# Group 13: Cooling Seawater System



6271\_13\_1

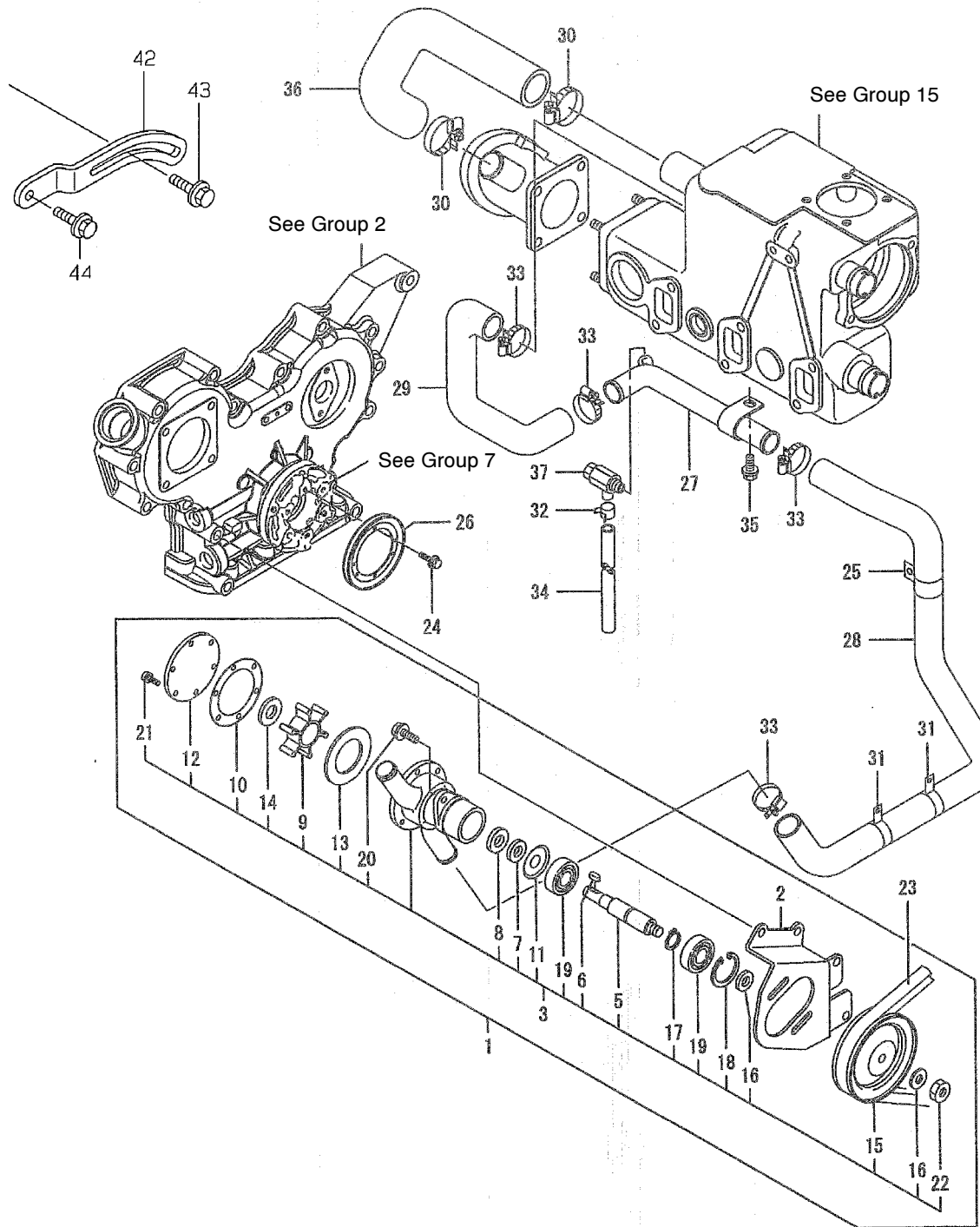
## Group 13: Cooling Seawater System

| Item | Part Number | Description                                                   | Quantity         |   |
|------|-------------|---------------------------------------------------------------|------------------|---|
|      |             |                                                               | Variation Number |   |
|      |             |                                                               | 2                | 3 |
| 1    | 229306      | V-pulley                                                      | 1                | 1 |
| 2    | 229313      | Bracket                                                       | 1                | 1 |
| 3    | 256504      | Pump assembly, cooling water (includes item 4-22)             | 1                | 1 |
| 4    | X           | Body                                                          | 1                | 1 |
| 5    | 252437      | Shaft, pump*                                                  | 1                | 1 |
| 6    | 252473      | Key, feather*                                                 | 1                | 1 |
| 7    | 252474      | Washer, water drip*                                           | 1                | 1 |
| 8    | 250871      | Seal, oil*                                                    | 1                | 1 |
| 9    | 250872      | Impeller* (Impeller kit 229955 includes impeller and item 10) | 1                | 1 |
| 10   | 252475      | Gasket*                                                       | 1                | 1 |
| 11   | 252438      | Cover, bearing*                                               | 1                | 1 |
| 12   | 252439      | Cover                                                         | 1                | 1 |
| 13   | 229324      | Plate*                                                        | 1                | 1 |
| 14   | 252690      | Seal, oil*                                                    | 1                | 1 |
| 15   | 252464      | V-pulley, C.W. pump                                           | 1                | 1 |
| 16   | 252466      | Washer*                                                       | 2                | 2 |
| 17   | 252346      | Circlip*                                                      | 1                | 1 |
| 18   | 252348      | Circlip*                                                      | 1                | 1 |
| 19   | 252364      | Ball bearing*                                                 | 2                | 2 |
| 20   | 229496      | Bolt, M8 x 16                                                 | 2                | 2 |
| 21   | 229504      | Bolt, M4 x 8                                                  | 6                | 6 |
| 22   | 229506      | Nut, M8                                                       | 1                | 1 |
| 23   | 256503      | V-belt                                                        | 1                | 1 |
| 24   | 229497      | Bolt, M6 x 8 plated                                           | 3                | 3 |
| 25   | 229307      | Retainer                                                      | 1                | 1 |
| 26   | 252329      | Petcock PT 1/8                                                | 1                | 1 |
| 27   | GM13307     | Pipe, cooling water                                           | 1                | 1 |
| 28   | 229318      | Pipe, cooling water                                           | 1                | 1 |
| 29   | 252902      | Pipe, cooling water                                           | 1                | 1 |
| 30   | 229503      | Bolt, M10 x 35 plated                                         | 1                | 1 |
| 31   | 229327      | Retainer                                                      | 2                | 2 |
| 32   | 229409      | Clamp                                                         | 1                | 1 |
| 33   | 229491      | Clamp 35                                                      | 4                | 4 |
| 34   | 252350      | Pipe                                                          | 1                | 1 |
| 35   | 252696      | Bolt, M8 x 16 plated                                          | 1                | 1 |
| 36   | 256614      | Pipe, cooling water                                           | 1                | 1 |
| 36   | 252903      | Pipe, cooling water                                           | 1                | 1 |
| 37   | 229491      | Clamp 35                                                      | 2                | 2 |
| 38   | 229484      | Pulley assembly, tension (includes items 39-41)               | 1                | 1 |
| 39   | X           | Pulley                                                        | 1                | 1 |
| 40   | 229485      | Bracket, pulley                                               | 1                | 1 |
| 41   | 229510      | Nut, M10                                                      | 1                | 1 |
| 42   | 229426      | Adjuster, V-belt                                              | 1                | 1 |
| 43   | 252692      | Bolt, M8 x 25                                                 | 1                | 1 |
| 44   | 229499      | Bolt, M8 x 18 plated                                          | 1                | 1 |

X Item not sold separately

\* Seawater pump repair kit GM28669 includes items 5-11, 13, 14, and 16-19.

## Group 13: Cooling Seawater System, continued



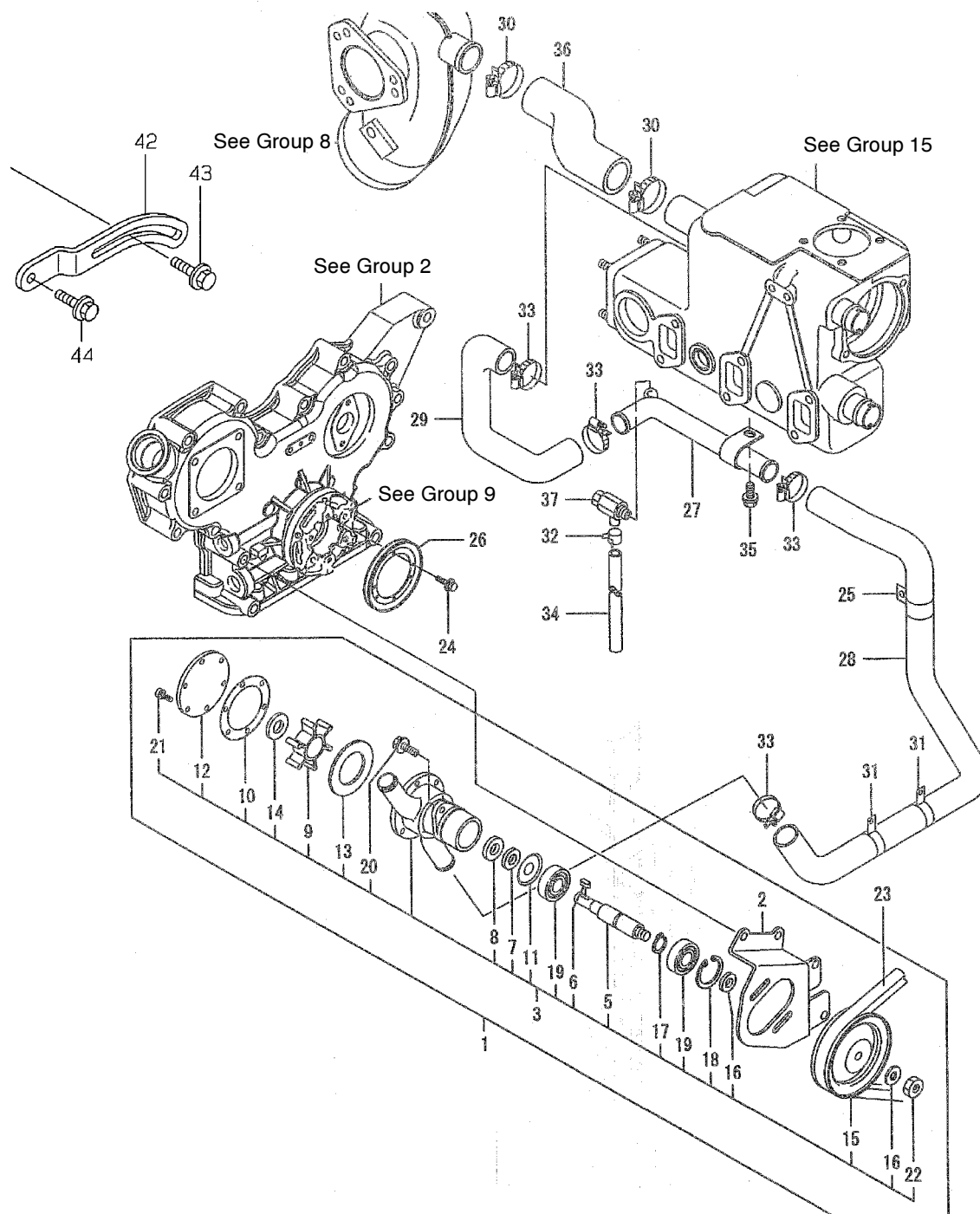
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## Group 13: Cooling Seawater System, continued

| Item | Part Number | Description                                                  | Quantity  |        |
|------|-------------|--------------------------------------------------------------|-----------|--------|
|      |             |                                                              | Variation | Number |
|      |             |                                                              | 4         | 6      |
| 1    | GM35638     | Pump assembly, water (includes bracket)                      | 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 (Impeller kit 229955 includes impeller and item 10) | 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      | Ball bearing                                                 | 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   | GM13307     | Pipe, cooling water                                          | 1         | 1      |
| 26   | 229318      | Pipe, cooling water                                          | 1         | 1      |
| 26   | 229329      | Cooling water pipe                                           | 1         | 1      |
| 29   | 252902      | Pipe                                                         | 1         | 1      |
| 30   | 229491      | Clamp 35                                                     | 2         | 2      |
| 31   | 229316      | Retainer                                                     | 2         | 2      |
| 32   | 229409      | Retainer                                                     | 1         | 1      |
| 33   | 229491      | Clamp 35                                                     | 4         | 4      |
| 34   | 252350      | Pipe                                                         | 1         | 1      |
| 35   | 252696      | Bolt, M8 x 16                                                | 1         | 1      |
| 36   | 252903      | Pipe                                                         | 1         | 1      |
| 37   | GM13330     | Valve assembly                                               | 1         | 1      |
| 42   | 229426      | Adjuster, V-belt                                             | 1         |        |
| 42   | 359554      | Adjuster, V-belt (24 V models)                               |           | 1      |
| 43   | #           | Bolt                                                         | 1         | 1      |
| 44   | 252703      | Bolt                                                         | 1         | 1      |

# Common hardware. Procure locally.

## Group 13: Cooling Seawater System, continued

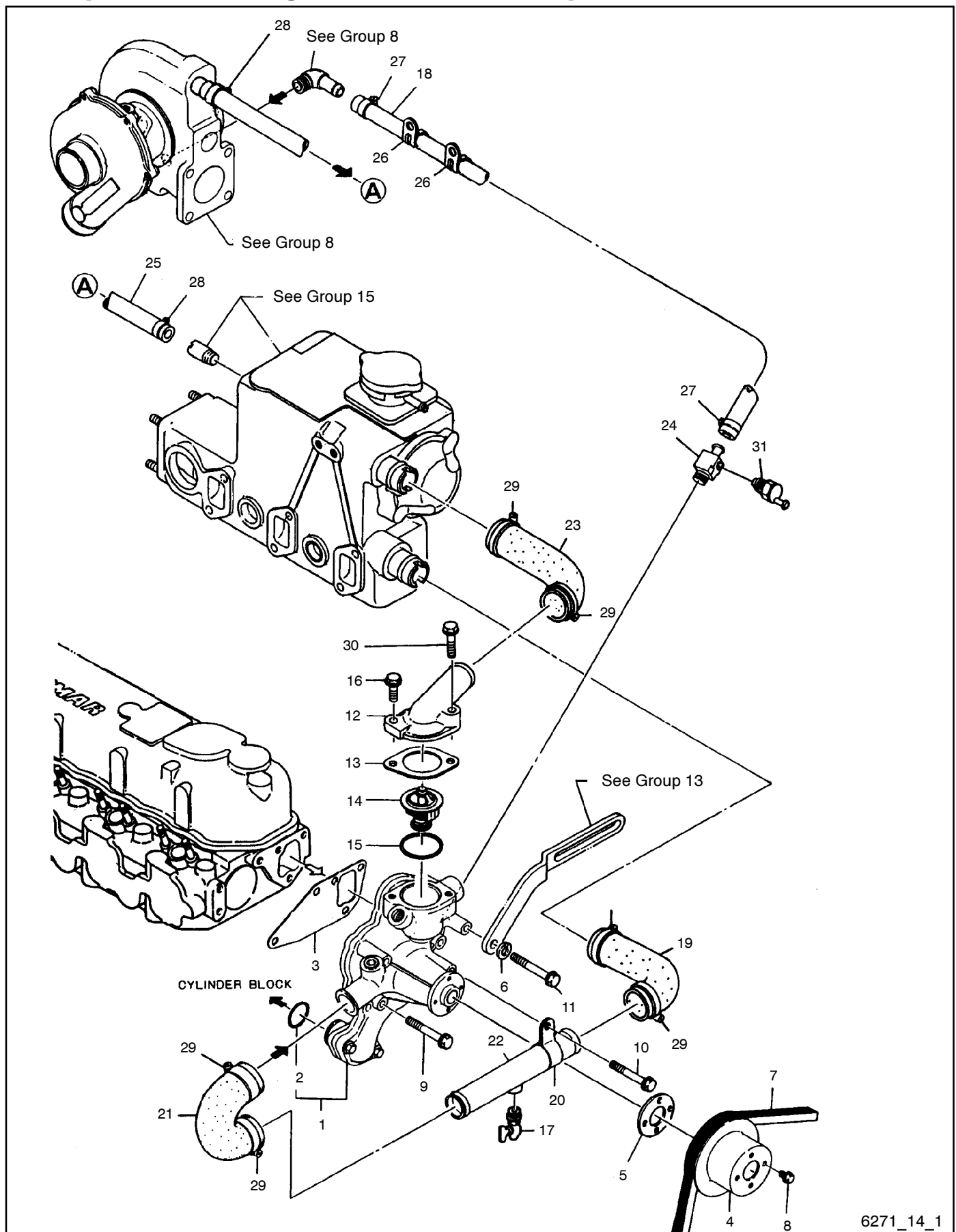


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## Group 13: Cooling Seawater System, continued

| Item | Part Number | Description                             | Quantity  |        |
|------|-------------|-----------------------------------------|-----------|--------|
|      |             |                                         | Variation | Number |
|      |             |                                         | 5         | 7      |
| 1    | GM35638     | Pump assembly, water                    | 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      | Ball bearing                            | 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   | GM13307     | Pipe, cooling water                     | 1         | 1      |
| 28   | 229318      | Pipe, cooling water                     | 1         | 1      |
| 29   | 252902      | Pipe                                    | 1         | 1      |
| 30   | 229491      | Clamp 35                                | 2         | 2      |
| 31   | 229316      | Retainer                                | 2         | 2      |
| 32   | 229409      | Retainer                                | 1         | 1      |
| 33   | 229491      | Clamp 35                                | 4         | 4      |
| 34   | 252350      | Pipe                                    | 1         | 1      |
| 35   | 252696      | Bolt, M8 x 16                           | 1         | 1      |
| 36   | 256614      | Pipe, cooling water                     | 1         | 1      |
| 37   | GM13330     | Valve assembly                          | 1         | 1      |
| 42   | 229426      | Adjuster, V-belt                        | 1         |        |
| 42   | 359554      | Arm, alternator adjusting (24 V models) |           | 1      |
| 43   | #           | Bolt                                    | 1         | 1      |
| 44   | 252703      | Bolt                                    | 1         | 1      |

# Group 14: Cooling Freshwater Pump

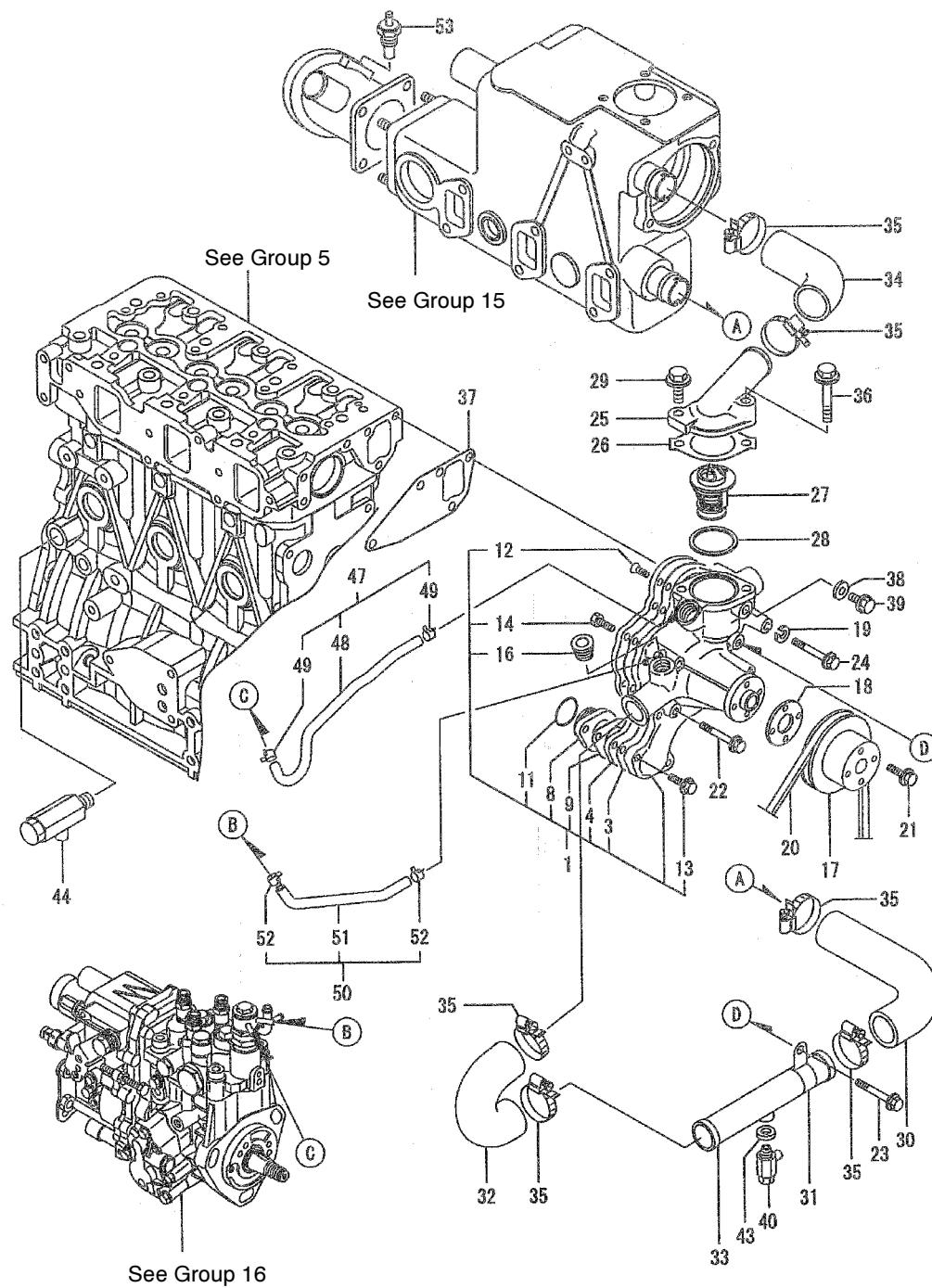


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## Group 14: Cooling Freshwater Pump

| Item | Part Number | Description                                   | Quantity         |   |
|------|-------------|-----------------------------------------------|------------------|---|
|      |             |                                               | Variation Number |   |
|      |             |                                               | 2                | 4 |
| 1    | 252879      | Pump assembly, cooling pump (includes item 2) | 1                | 1 |
| 2    | 252839      | O-ring                                        | 1                | 1 |
| 3    | 252838      | Gasket, water pump                            | 1                | 1 |
| 4    | 252920      | V-pulley                                      | 1                | 1 |
| 5    | 252858      | Washer                                        | 1                | 1 |
| 6    | 229487      | Spring washer                                 | 1                | 1 |
| 7    | GM11551     | Alternator V-belt                             | 1                | 1 |
| 8    | 229498      | Bolt, M6 x 10 plated                          | 4                | 4 |
| 9    | 256798      | Bolt, M8 x 55 plated                          | 2                | 2 |
| 10   | 256798      | Bolt, M8 x 55 plated                          | 1                | 1 |
| 11   | 252706      | Bolt, M8 x 65 plated                          | 1                | 1 |
| 12   | 252895      | Cover, thermostat                             | 1                | 1 |
| 13   | 249865      | Gasket                                        | 1                | 1 |
| 14   | 252896      | Thermostat                                    | 1                | 1 |
| 15   | 229433      | Gasket                                        | 1                | 1 |
| 16   | 252699      | Bolt, M8 x 25 plated                          | 1                | 1 |
| 17   | 252329      | Petcock Pt 1/8                                |                  | 1 |
| 17   | GM13327     | Petcock R1/8                                  | 1                |   |
| 18   | GM13313     | Pipe                                          |                  | 1 |
| 19   | 252890      | Joint                                         | 1                | 1 |
| 20   | 252891      | Retainer                                      | 1                | 1 |
| 21   | 252892      | Joint 28                                      | 1                | 1 |
| 22   | 252893      | Pipe, cooling water                           | 1                | 1 |
| 23   | 225315      | Joint                                         | 1                | 1 |
| 24   | 249845      | Joint                                         |                  | 1 |
| 25   | 249838      | Hose, rubber                                  |                  | 1 |
| 26   | 249846      | Clamp, wire harness                           |                  | 2 |
| 27   | 249843      | Clamp                                         |                  | 2 |
| 28   | 249839      | Clamp                                         |                  | 2 |
| 29   | 229492      | Clamp                                         | 6                | 6 |
| 30   | 252701      | Bolt, M8 x 35 plated                          | 1                | 1 |
| 31   | —           | See Group 105                                 | 1                | 1 |

## Group 14: Cooling Freshwater Pump, continued

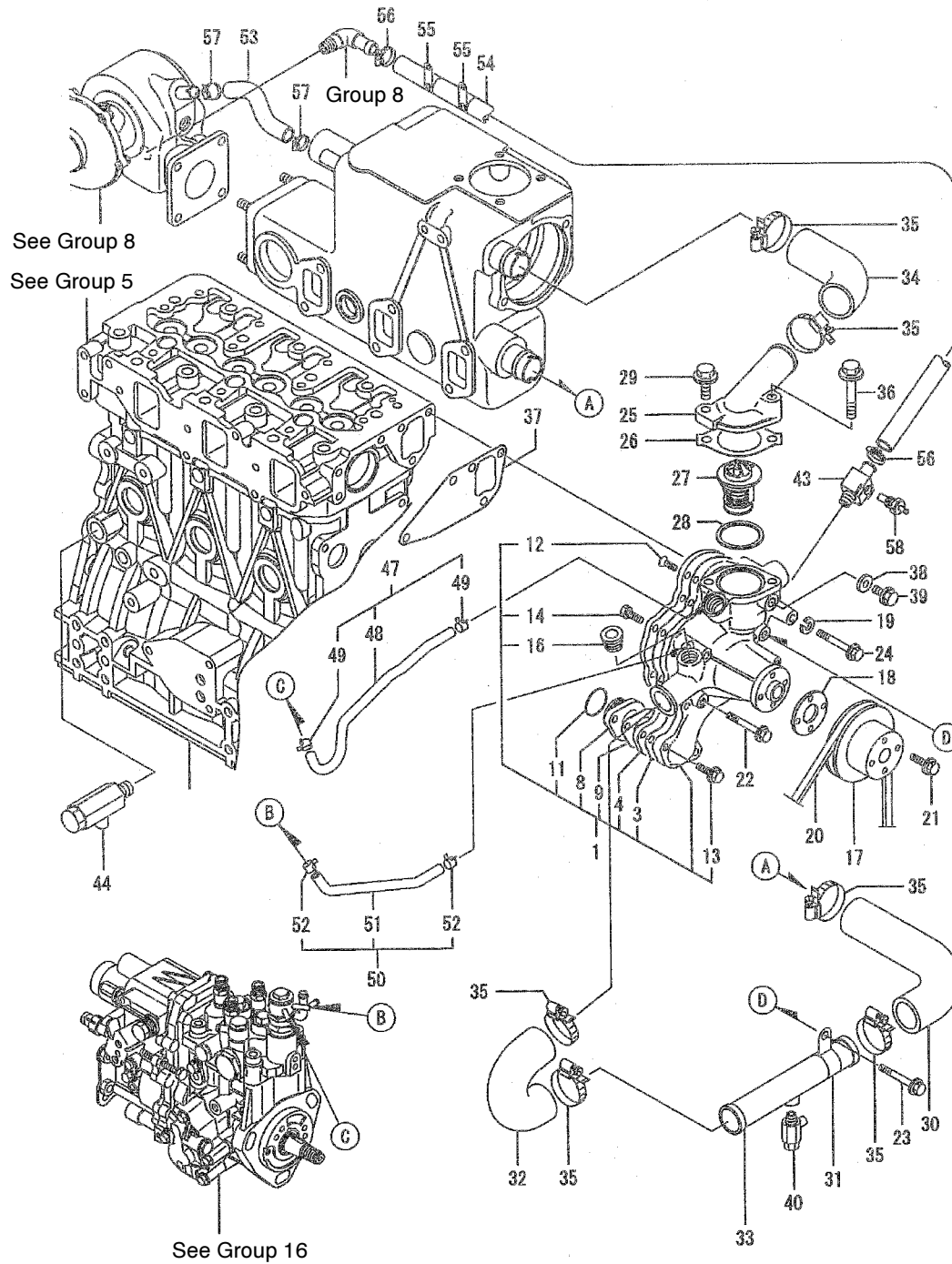


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## Group 14: Cooling Freshwater Pump, continued

| Item | Part Number | Description           | Quantity  |        |
|------|-------------|-----------------------|-----------|--------|
|      |             |                       | Variation | Number |
| 5    | 6           |                       |           |        |
| 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   | 276141      | V-belt, (24 V 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 28              | 1         | 1      |
| 33   | 252893      | Pipe                  | 1         | 1      |
| 34   | 225315      | 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   | GM13333     | Washer 8, polished    | 1         | 1      |
| 44   | 252394      | Valve                 | 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   | 252095      | Switch                | 1         | 1      |

## Group 14: Cooling Freshwater Pump, continued

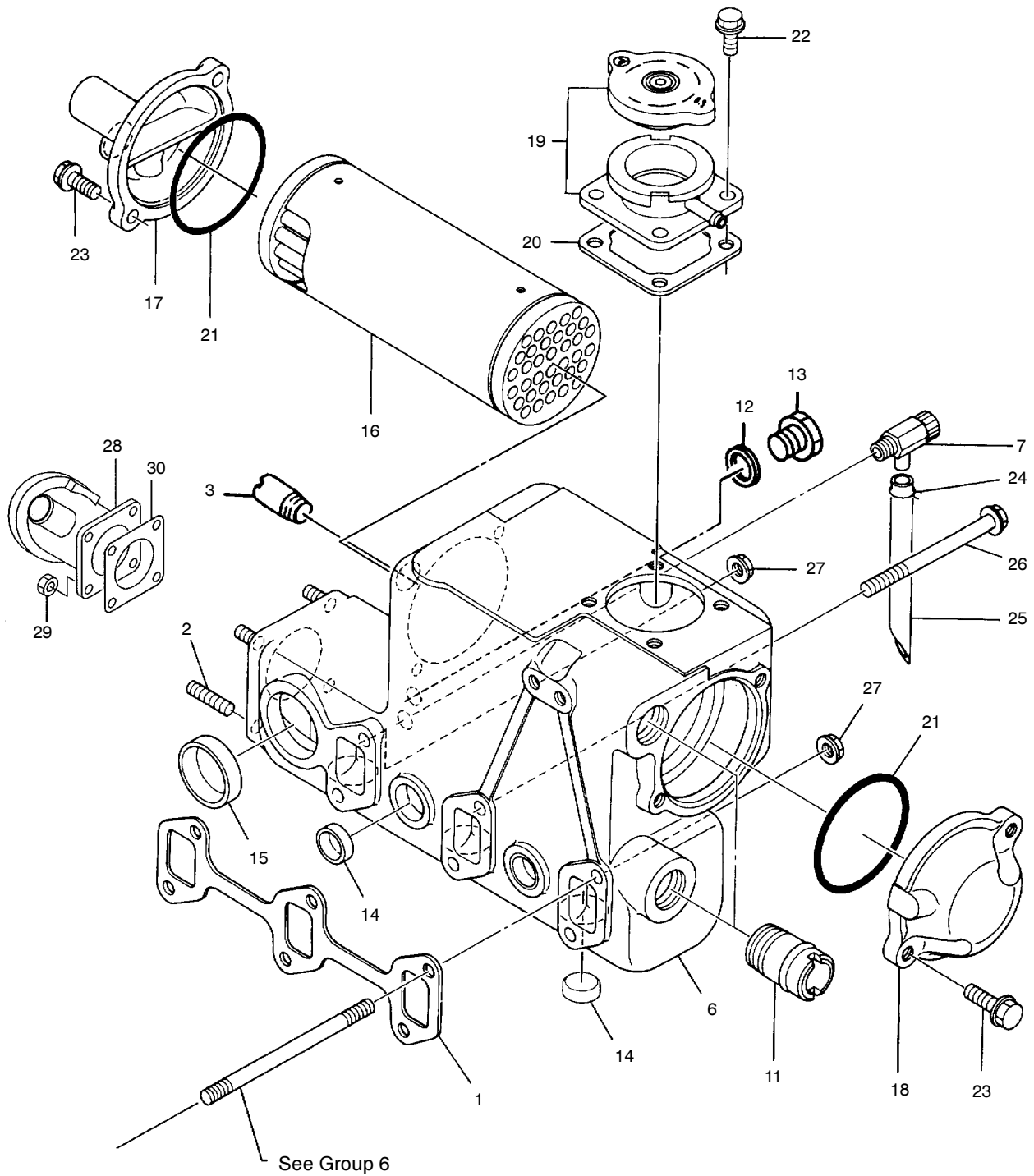


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## Group 14: Cooling Freshwater Pump, continued

| Item | Part Number | Description          | Quantity  |        |
|------|-------------|----------------------|-----------|--------|
|      |             |                      | Variation | Number |
| 7    | 8           |                      |           |        |
| 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         | 1      |
| 20   | 276141      | V-belt (24 V models) |           |        |
| 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 28             | 1         | 1      |
| 33   | 252893      | Pipe                 | 1         | 1      |
| 34   | 225315      | 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                | 1         | 1      |
| 47   | GM35569     | Pipe, cooling water  | 1         | 1      |
| 46   | 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   | GM13313     | Pipe                 | 1         | 1      |
| 55   | 249846      | Strap, hose          | 2         | 2      |
| 56   | 249843      | Hose clamp           | 2         | 2      |
| 57   | 249839      | Clamp, hose          | 2         | 2      |
| 58   | 252095      | Switch               | 1         | 1      |

# Group 15: Cooling Freshwater Cooler



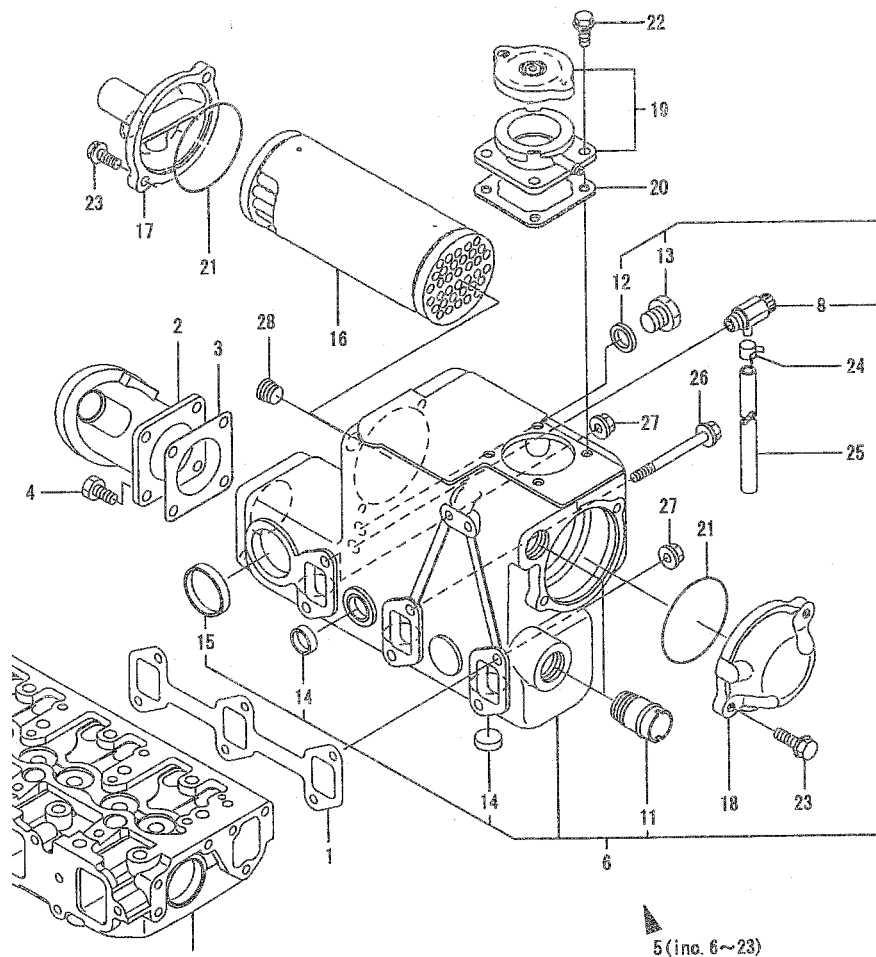
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## Group 15: Cooling Freshwater Cooler

| Item | Part Number | Description                                       | Quantity         |   |
|------|-------------|---------------------------------------------------|------------------|---|
|      |             |                                                   | Variation Number |   |
|      |             |                                                   | 2                | 3 |
| 1    | 256770      | Gasket, exhaust manifold                          | 1                | 1 |
| 2    | 256579      | Stud                                              | 4                | 4 |
| 3    | 229403      | Joint                                             |                  | 1 |
| 3    | 250975      | Plug PT3/8, screw                                 | 1                |   |
| 4    | 229733      | Cooler assembly, freshwater (includes items 5-23) | 1                | 1 |
| 5    | 229732      | Cooler, freshwater (includes items 6-15)          | 1                | 1 |
| 6    | X           | Body, cooler                                      | 1                | 1 |
| 7    | 252394      | Petcock (includes items 8-10)                     | 1                | 1 |
| 8    | X           | O-ring (not shown)                                | 1                | 1 |
| 9    | X           | Body, petcock (not shown)                         | 1                | 1 |
| 10   | X           | Valve (not shown)                                 | 1                | 1 |
| 11   | 252472      | Joint, pipe                                       | 2                | 2 |
| 12   | 229753      | Gasket 17, round                                  | 1                | 1 |
| 13   | 250877      | Plug PF 3/8                                       | 1                | 1 |
| 14   | 252730      | Plug 28                                           | 7                | 7 |
| 15   | 252732      | Plug 40                                           | 1                | 1 |
| 16   | 229725      | Core assembly                                     | 1                | 1 |
| 17   | 252887      | Cover                                             | 1                | 1 |
| 18   | 256544      | Cover                                             | 1                | 1 |
| 19   | 252748      | Filler assembly                                   | 1                | 1 |
| 20   | 252749      | Gasket, filler                                    | 1                | 1 |
| 21   | 252685      | O-ring                                            | 2                | 2 |
| 22   | 252696      | Bolt, M8 x 16 plated                              | 4                | 4 |
| 23   | 252699      | Bolt, M8 x 25 plated                              | 4                | 4 |
| 24   | 229714      | Retainer                                          | 1                | 1 |
| 25   | 252350      | Pipe                                              | 1                | 1 |
| 26   | 252708      | Bolt, M8 x100 plated                              | 4                | 4 |
| 27   | 252723      | Nut, M8                                           | 2                | 2 |
| 28   | GM13328     | Elbow, water mixing                               | 1                |   |
| 29   | 229509      | Nut, M8                                           | 4                |   |
| 30   | 252929      | Gasket                                            | 1                |   |

X Item not sold separately

## Group 15: Cooling Freshwater Cooler, continued



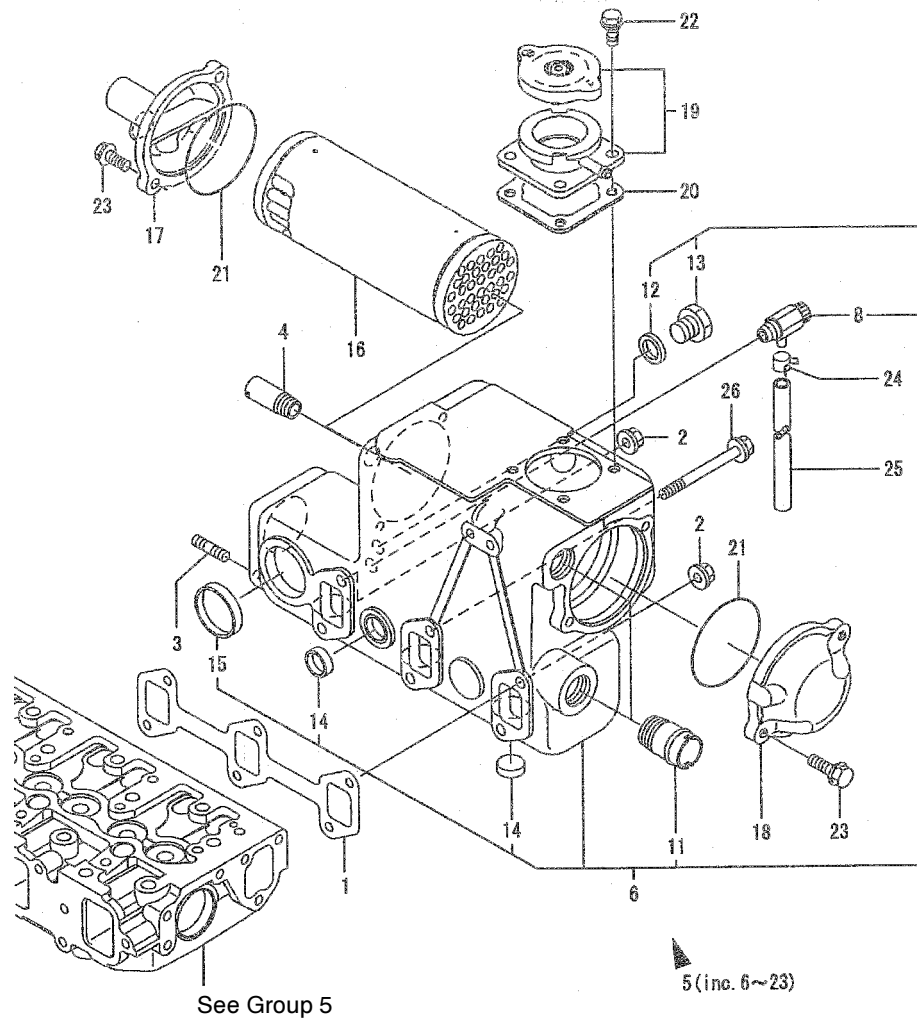
See Group 5

5 (ino. 6~23)

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| Item | Part Number | Description          | Quantity                |
|------|-------------|----------------------|-------------------------|
|      |             |                      | <b>Variation Number</b> |
|      |             |                      | <b>4</b>                |
| 1    | 256770      | Gasket, manifold     | 1                       |
| 2    | GM13328     | Elbow, water mixing  | 1                       |
| 3    | 252929      | Gasket, square       | 1                       |
| 4    | GM35727     | Bolt, M8 x 20        | 4                       |
| 5    | 229733      | Heat exchanger       | 1                       |
| 6    | 229732      | Cooler, fresh water  | 1                       |
| 8    | 252394      | Valve                | 1                       |
| 11   | 252472      | Pipe joint           | 2                       |
| 12   | 229753      | Gasket 17, round     | 1                       |
| 13   | GM35722     | Plug, hex.           | 1                       |
| 14   | 252730      | Plug 28              | 7                       |
| 15   | 252732      | Plug 40              | 1                       |
| 16   | 229725      | Core assembly        | 1                       |
| 17   | 252887      | Cover                | 1                       |
| 18   | 256544      | Cover                | 1                       |
| 19   | 252748      | Filler assembly      | 1                       |
| 20   | 252749      | Gasket               | 1                       |
| 21   | 252685      | O-ring               | 2                       |
| 22   | 252696      | Bolt, M8 x 16        | 4                       |
| 23   | 252699      | Bolt, M8 x 25 plated | 4                       |
| 24   | 229409      | Retainer             | 1                       |
| 25   | 252350      | Pipe                 | 1                       |
| 26   | 252708      | Bolt                 | 4                       |
| 27   | GM35732     | Nut                  | 2                       |
| 28   | GM35720     | Plug, screw          | 1                       |

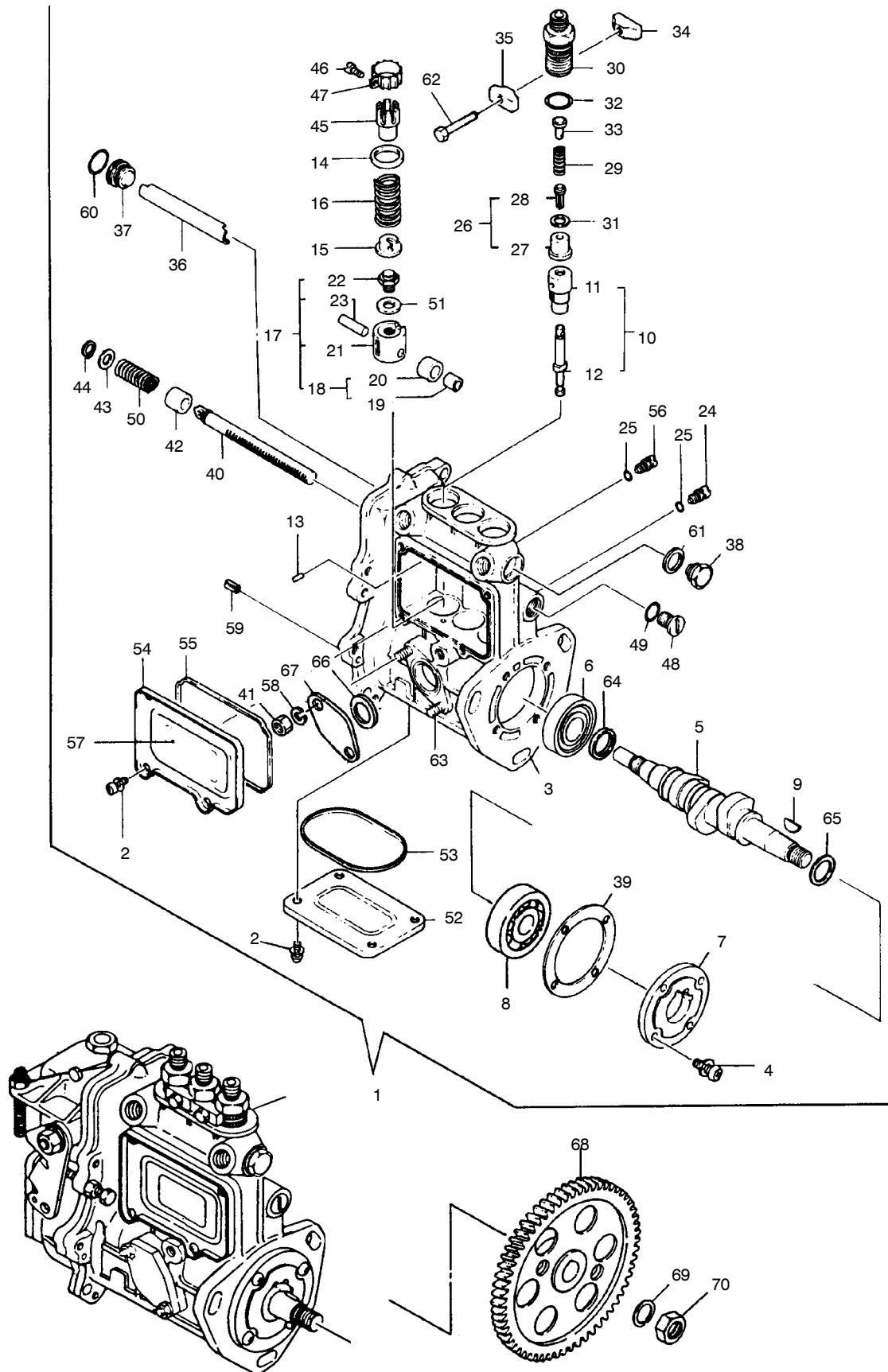
## Group 15: Cooling Freshwater Cooler, continued



6271\_15\_3

| Item | Part Number | Description          | Quantity         |
|------|-------------|----------------------|------------------|
|      |             |                      | Variation Number |
| 1    | 256770      | Gasket, manifold     | 1                |
| 2    | GM35732     | Nut                  | 2                |
| 3    | 256579      | Stud                 | 4                |
| 4    | 229403      | Joint                | 1                |
| 5    | 229733      | Heat exchanger       | 1                |
| 6    | 229732      | Cooler, fresh water  | 1                |
| 8    | 252394      | Valve                | 1                |
| 11   | 252472      | Pipe joint           | 2                |
| 12   | 229753      | Gasket 17, round     | 1                |
| 13   | GM35722     | Plug, hex.           | 1                |
| 14   | GM35735     | Plug 28              | 7                |
| 15   | 252732      | Plug 40              | 1                |
| 16   | 229725      | Core assembly        | 1                |
| 17   | 252887      | Cover                | 1                |
| 18   | 256544      | Cover                | 1                |
| 19   | 252748      | Filler assembly      | 1                |
| 20   | 252749      | Gasket               | 1                |
| 21   | 252685      | O-ring               | 2                |
| 22   | 252696      | Bolt, M8 x 16        | 4                |
| 23   | GM35726     | Bolt, M8 x 25 plated | 4                |
| 24   | 229409      | Retainer             | 1                |
| 25   | 252350      | Pipe                 | 1                |
| 26   | 252708      | Bolt                 | 4                |

# Group 16: Fuel Injection Pump



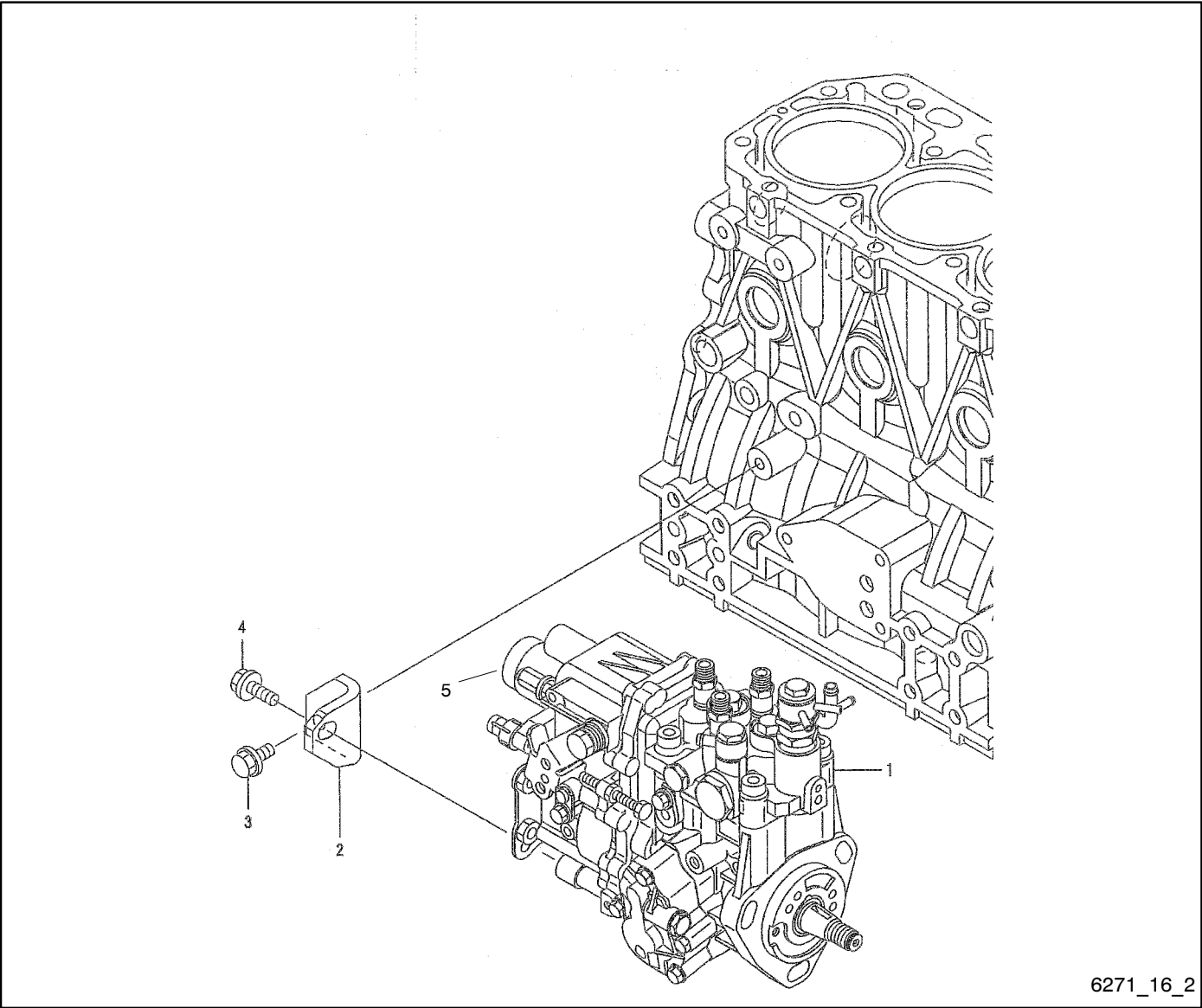
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## Group 16: Fuel Injection Pump

| Item | Part Number | Description                                       | Quantity    |          |
|------|-------------|---------------------------------------------------|-------------|----------|
|      |             |                                                   | Variation 2 | Number 3 |
| 1    | GM13336     | Pump, injector (includes items 2-67)              | 1           |          |
| 1    | GM13339     | Pump, injector (includes items 2-67)              |             | 1        |
| 2    | 225814      | Screw, M5 x 10                                    | 8           | 8        |
| 3    | X           | Body, fuel injector pump                          | 1           | 1        |
| 4    | 225815      | Screw, M6 x 16                                    | 4           | 4        |
| 5    | 256734      | Camshaft                                          | 1           | 1        |
| 6    | 256543      | Ball bearing, thrust                              | 1           | 1        |
| 7    | 256535      | Retainer, bearing                                 | 1           | 1        |
| 8    | 256556      | Ball bearing                                      | 1           | 1        |
| 9    | 256528      | Key                                               | 1           | 1        |
| 10   | 256608      | Plunger w/barrel (includes items 11 and 12)       |             | 3        |
| 10   | GM13322     | Plunger w/barrel (includes items 11 and 12)       | 3           |          |
| 11   | X           | Barrel                                            | 3           | 3        |
| 12   | X           | Plunger                                           | 3           | 3        |
| 13   | 256721      | Pin, barrel locking                               | 3           | 3        |
| 14   | 252589      | Retainer                                          | 3           | 3        |
| 15   | 256536      | Spring shoe, plunger                              | 3           | 3        |
| 16   | 252490      | Spring, plunger                                   | 3           | 3        |
| 17   | 252848      | Tappet assembly (includes item 18-23)             | 3           | 3        |
| 18   | X           | Roller assembly (includes items 19 and 20)        | 3           | 3        |
| 19   | X           | Roller, inner                                     | 3           | 3        |
| 20   | X           | Roller, outer                                     | 3           | 3        |
| 21   | X           | Guide, roller                                     | 3           | 3        |
| 22   | X           | Bolt, adjusting                                   | 3           | 3        |
| 23   | X           | Pin, roller                                       | 3           | 3        |
| 24   | 256537      | Locking, tappet                                   | 3           | 3        |
| 25   | 252849      | O-ring                                            | 3           | 3        |
| 26   | 256583      | Valve w/seat, delivery (includes items 27 and 28) | 3           | 3        |
| 27   | X           | Seat                                              | 3           | 3        |
| 28   | X           | Valve, delivery                                   | 3           | 3        |
| 29   | 256777      | Spring, valve                                     | 3           | 3        |
| 30   | 256724      | Valve guard, delivery                             | 3           | 3        |
| 31   | 250839      | Gasket, delivery                                  | 3           | 3        |
| 32   | 250840      | O-ring                                            | 3           | 3        |
| 33   | 256725      | Stopper, valve                                    | 3           | 3        |
| 34   | 256726      | Locking                                           | 2           | 2        |
| 35   | 256727      | Locking                                           | 2           | 2        |
| 36   | 225779      | Deflector                                         | 1           | 1        |
| 37   | 256778      | Check bolt, deflector                             | 1           | 1        |
| 38   | 256779      | Plug                                              | 1           | 1        |
| 39   | 256729      | Shim set, adjusting                               | 1           | 1        |
| 40   | 225780      | Rack, control                                     | 1           | 1        |
| 41   | 225824      | Nut, 6                                            | 2           | 2        |
| 42   | 256780      | Bush, rack                                        | 1           | 1        |
| 43   | 256694      | Spacer, aux. spring                               | 1           | 1        |
| 44   | 256695      | Circlip                                           | 1           | 1        |
| 45   | 256696      | Pinion, control                                   | 3           | 3        |
| 46   | 256697      | Screw, pinion                                     | 3           | 3        |
| 47   | 256698      | Pinion                                            | 3           | 3        |
| 48   | 256781      | Plug                                              | 1           | 1        |
| 49   | 252850      | O-ring                                            | 1           | 1        |
| 50   | 256699      | Spring, rack                                      | 1           | 1        |
| 51   | 256700      | Shim pack                                         | 3           | 3        |
| 52   | 256782      | Cover                                             | 1           | 1        |
| 53   | 256783      | Gasket                                            | 1           | 1        |
| 54   | 256784      | Cover, side                                       | 1           | 1        |
| 55   | 256785      | Gasket                                            | 1           | 1        |
| 56   | 256701      | Locking, rack                                     | 1           | 1        |
| 57   | 225791      | Label, caution                                    | 1           | 1        |
| 58   | 225804      | Spring washer                                     | 2           | 2        |
| 59   | 225808      | Spring pin                                        | 2           | 2        |
| 60   | 252686      | O-ring                                            | 1           | 1        |
| 61   | 363448      | Seal washer                                       | 1           | 1        |
| 62   | 225821      | Bolt, M5 x 30 plated                              | 2           | 2        |
| 62   | 229741      | Spring washer                                     | 2           | 2        |
| 63   | 256776      | Stud, feed pump                                   | 2           | 2        |
| 64   | 256702      | Spacer 3.25 mm                                    | 1           | 1        |
| 65   | 256703      | Spacer 1.5 mm                                     | 1           | 1        |
| 66   | 252851      | Gasket                                            | 1           | 1        |
| 67   | 256755      | Cover, blind                                      | 1           | 1        |
| 68   | 252827      | Gear                                              | 1           | 1        |
| 69   | 252666      | Washer 12, spring                                 | 1           | 1        |
| 70   | 252725      | Nut, M12                                          | 1           | 1        |

X Item not sold separately

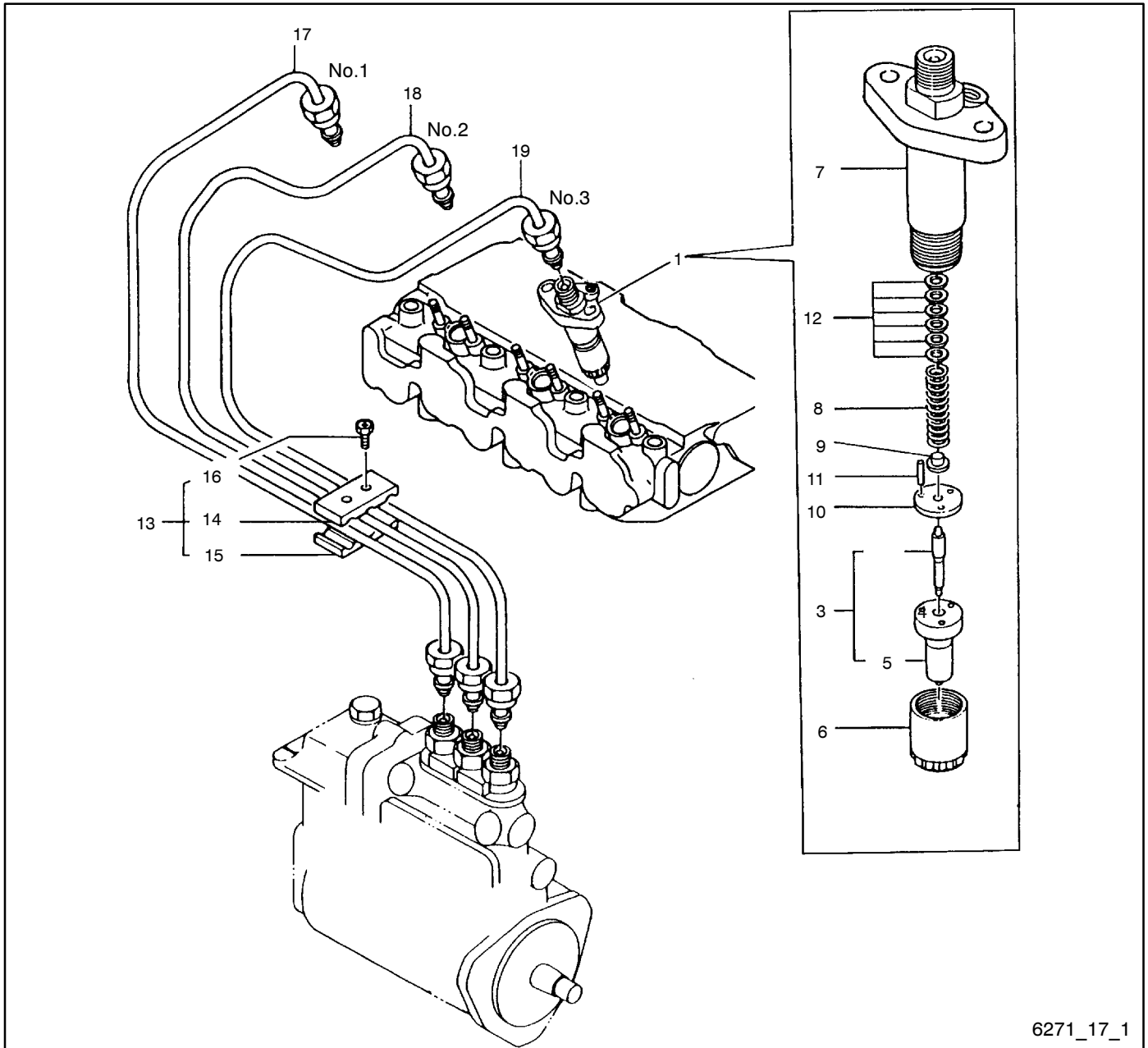
Group 16: Fuel Injection Pump, continued



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| Item | Part Number       | Description             | Quantity         |   |   |   |
|------|-------------------|-------------------------|------------------|---|---|---|
|      |                   |                         | Variation Number |   |   |   |
|      |                   |                         | 4                | 5 | 6 | 7 |
| 1    | GM35751           | Injection pump assembly | 1                | 1 |   |   |
| 1    | GM35747           | Injection pump assembly |                  |   | 1 | 1 |
| 2    | GM35478           | Bracket, pump           | 1                | 1 | 1 | 1 |
| 3    | 252696            | Bolt, M8 x 16           | 1                | 1 | 1 | 1 |
| 4    | 252697            | Bolt                    | 1                | 1 | 1 | 1 |
| 5    | <del>344764</del> | Solenoid (24 V models)  |                  | 1 |   | 1 |
|      | 344746            |                         |                  |   |   |   |

## Group 17: Fuel Injection Lines



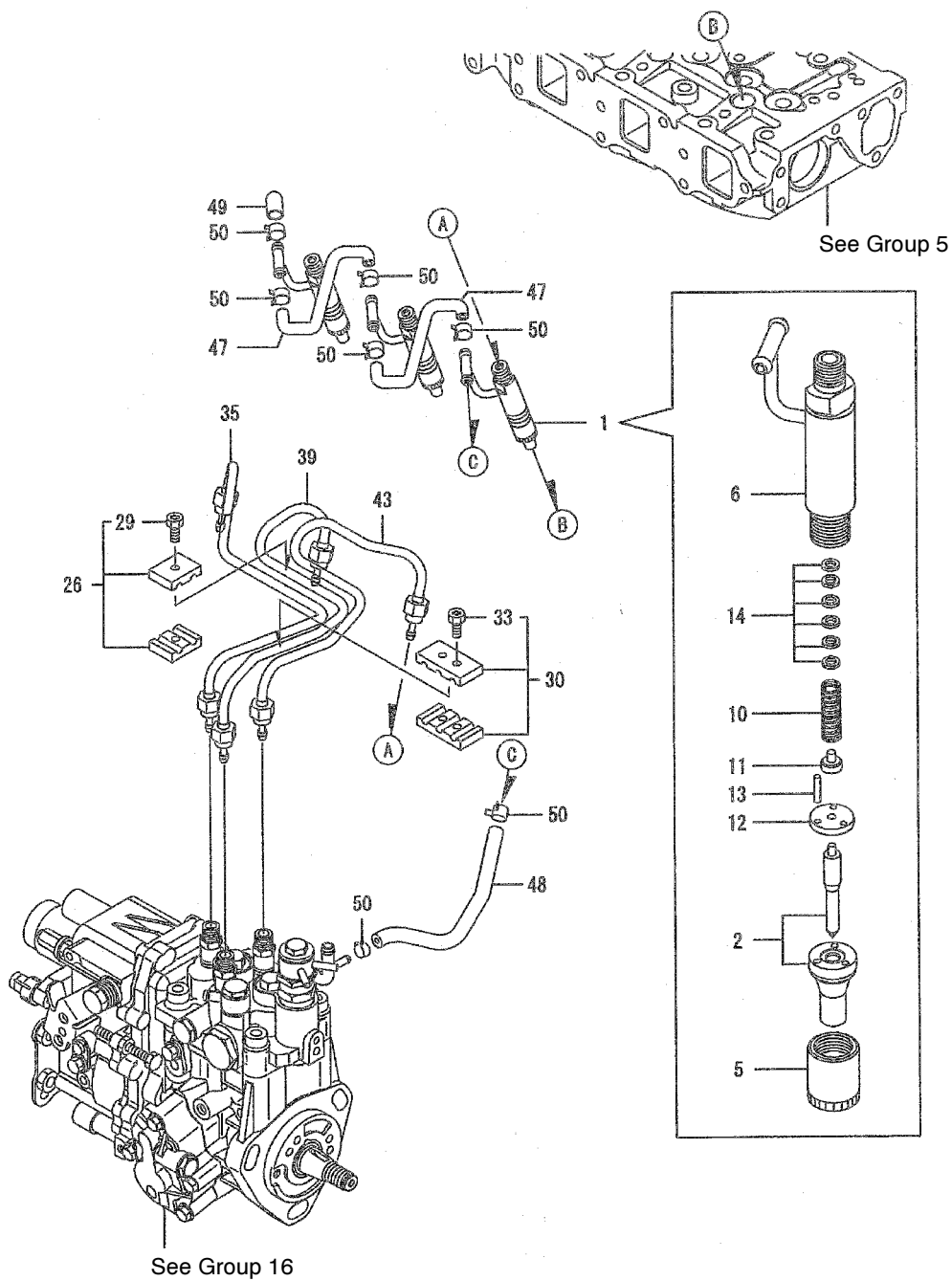
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| Item | Part Number | Description                                              | Quantity  |     |
|------|-------------|----------------------------------------------------------|-----------|-----|
|      |             |                                                          | Variation | No. |
| 1    | 224360      | Valve assembly, fuel injection (includes items 2-5)      | 3         |     |
| 1    | 229872      | Valve assembly, fuel injection (includes items 2-5)      |           | 3   |
| 3    | 225004      | Nozzle assembly, fuel injection (includes items 4 and 5) | 3         |     |
| 3    | 229873      | Nozzle assembly, fuel injection (includes items 4 and 5) |           | 3   |
| 4    | X           | Valve                                                    | 3         | 3   |
| 5    | X           | Body                                                     | 3         | 3   |
| 6    | 256520      | Nut, nozzle case                                         | 3         | 3   |
| 7    | 256706      | Holder                                                   | 3         | 3   |
| 8    | 256521      | Spring, nozzle                                           | 3         | 3   |

| Item | Part Number | Description                       | Quantity  |     |
|------|-------------|-----------------------------------|-----------|-----|
|      |             |                                   | Variation | No. |
| 9    | 256522      | Seat, nozzle spring               | 3         | 3   |
| 10   | 256523      | Plate, stop                       | 3         | 3   |
| 11   | 256707      | Pin                               | 6         | 6   |
| 12   | 256524      | Shim pack                         | 3         | 3   |
| 13   | 256774      | Retainer (includes items 14 - 16) | 1         | 1   |
| 14   | X           | Clamp, upper                      | 1         | 1   |
| 15   | X           | Clamp, lower                      | 1         | 1   |
| 16   | 225777      | Bolt, M4 x 12                     | 1         | 1   |
| 16   | 225418      | Bolt, M4 x 12 hex socket          | 2         | 2   |
| 17   | GM13308     | Pipe, fuel injection              | 1         | 1   |
| 18   | GM11309     | Pipe, fuel injection              | 1         | 1   |
| 19   | GM13310     | Pipe, fuel injection              | 1         | 1   |

X Item not sold separately

## Group 17: Fuel Injection Lines, continued

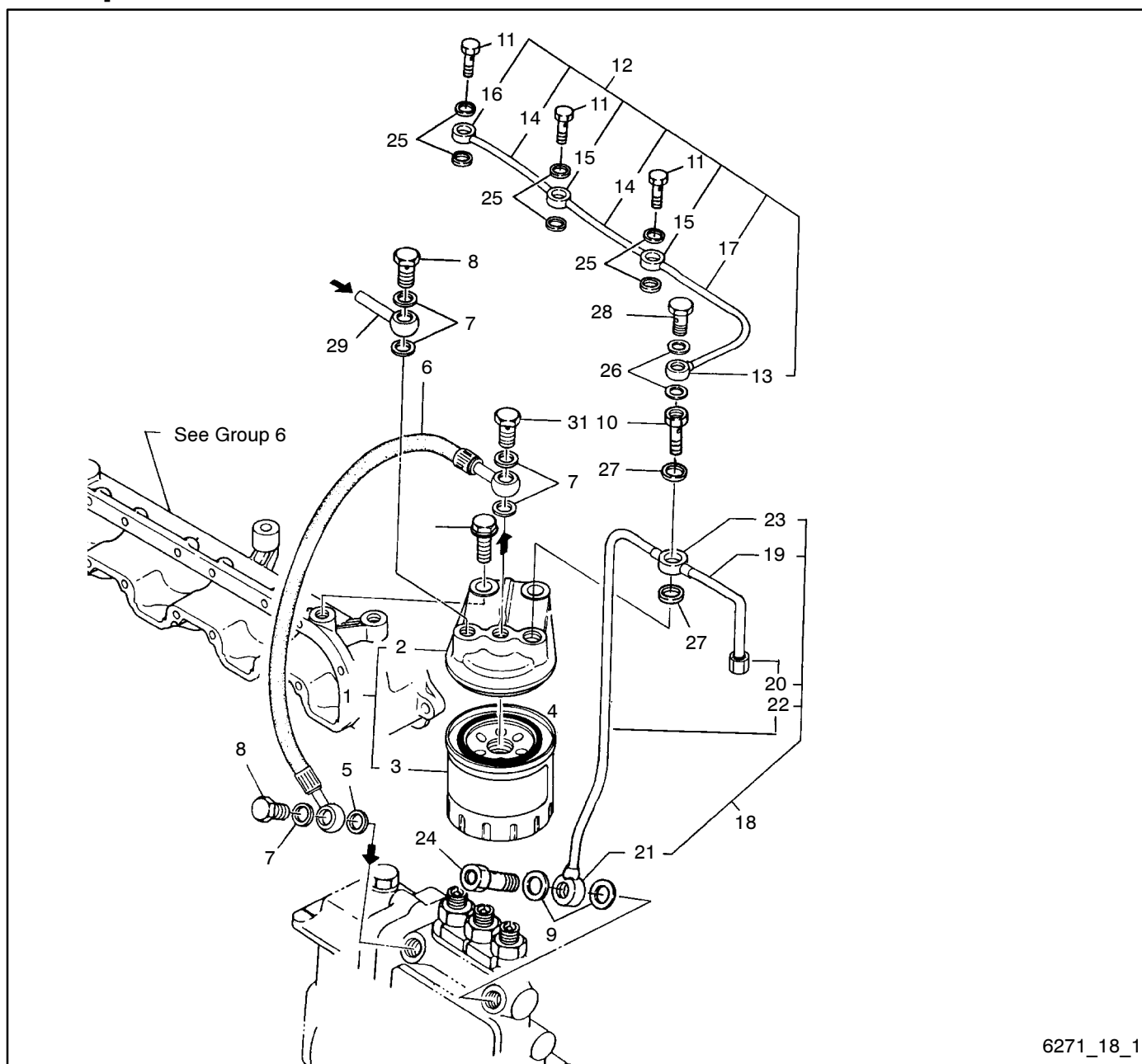


6271\_17\_2

## Group 17: Fuel Injection Lines, continued

| Item | Part Number | Description               | Quantity  |        |
|------|-------------|---------------------------|-----------|--------|
|      |             |                           | Variation | Number |
| 4    | 5           |                           |           |        |
| 1    | GM35749     | Valve assembly, injector  | 3         |        |
| 1    | GM35748     | Valve assembly, injector  |           | 3      |
| 2    | GM35567     | Nozzle                    | 3         |        |
| 2    | GM35560     | Nozzle                    |           | 3      |
| 5    | 256520      | Nut, nozzle case          | 3         | 3      |
| 6    | GM35479     | Holder assembly, nozzle   | 3         | 3      |
| 10   | 256521      | Spring nozzle             | 3         | 3      |
| 11   | 256522      | Seat, nozzle spring       | 3         | 3      |
| 12   | 256523      | Plate, stop               | 3         | 3      |
| 13   | 256707      | Pin                       | 6         | 6      |
| 14   | 256524      | Shim set                  | 3         | 3      |
| 26   | 225374      | Retainer                  | 1         | 1      |
| 29   | 225418      | Bolt, M4 x 14 hex. socket | 1         | 1      |
| 30   | 256774      | Clamp assembly, line      | 1         | 1      |
| 33   | 225418      | Bolt, M4 x 14 hex. socket | 2         | 2      |
| 35   | GM35542     | Pipe assembly, injection  | 1         | 1      |
| 39   | GM35543     | Pipe assembly, injection  | 1         | 1      |
| 43   | GM35544     | Pipe assembly, injection  | 1         | 1      |
| 47   | GM35573     | Pipe, fuel oil            | 2         | 2      |
| 48   | GM35483     | Pipe, fuel oil            | 1         | 1      |
| 49   | GM35574     | Cap                       | 1         | 1      |
| 50   | 249843      | Hose clamp                | 7         | 7      |

## Group 18: Fuel Line and Filter



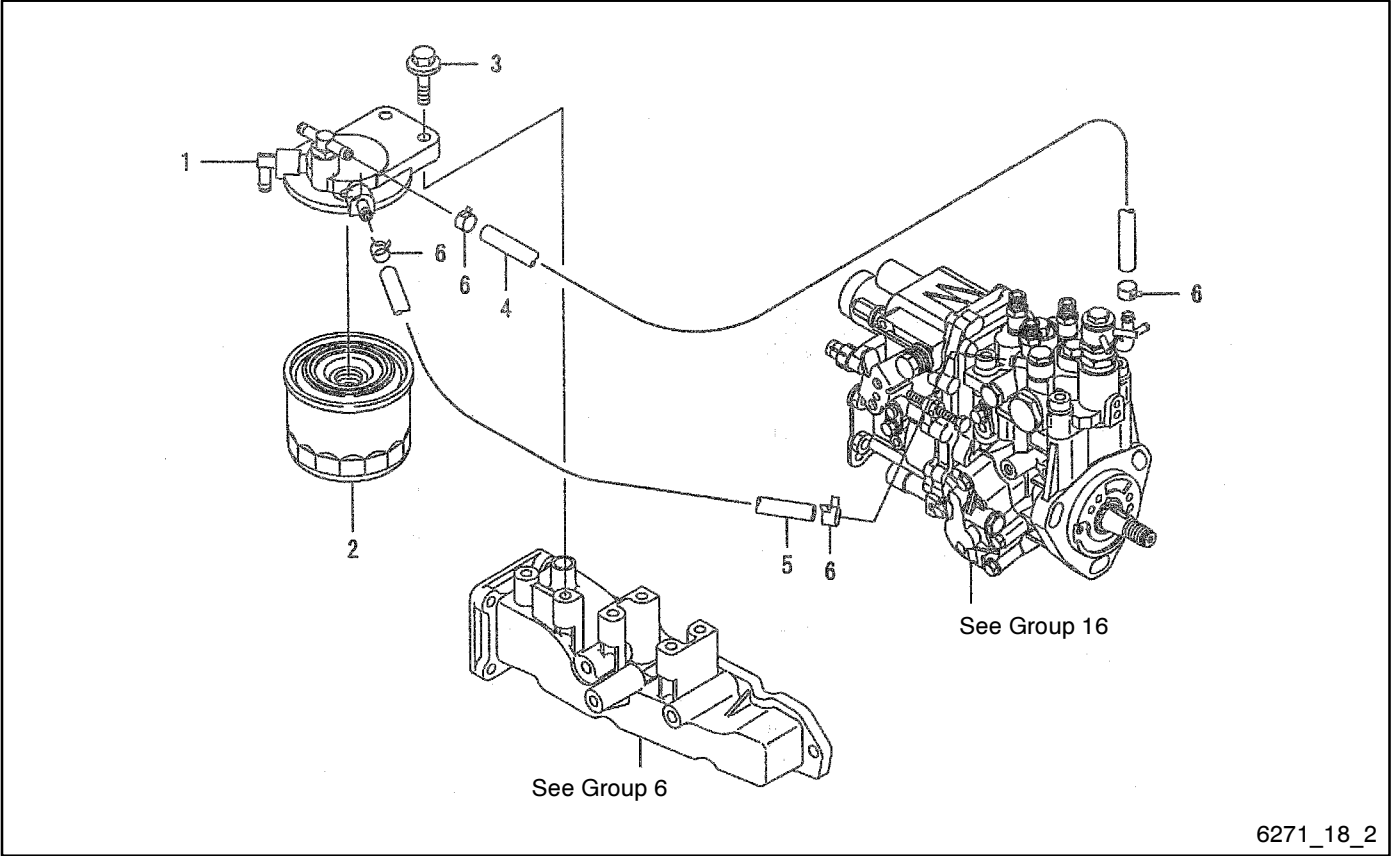
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| Item | Part Number | Description                                      | Quantity<br>Var. No. |
|------|-------------|--------------------------------------------------|----------------------|
| 1    | 256609      | Filter assembly, fuel<br>(includes item 2 and 3) | 1                    |
| 2    | X           | Body, fuel filter                                | 1                    |
| 3    | 252898      | Filter, fuel                                     | 1                    |
| 4    | 229768      | Bolt, M10 x 30 plated                            | 2                    |
| 5    | 225424      | Gasket                                           | 1                    |
| 6    | 229842      | Pipe, fuel                                       | 1                    |
| 7    | 250969      | Gasket 12, round                                 | 5                    |
| 8    | 250972      | Bolt, M6, joint                                  | 2                    |
| 9    | 252739      | Gasket                                           | 2                    |
| 10   | 225796      | Bolt, pipe joint                                 | 1                    |
| 11   | 256713      | Bolt, pipe joint                                 | 3                    |
| 12   | GM13315     | Pipe, fuel return<br>(includes item 13-17)       | 1                    |
| 13   | X           | Joint                                            | 1                    |
| 14   | X           | Pipe                                             | 3                    |
| 15   | X           | Joint, pipe                                      | 3                    |

| Item | Part Number | Description                            | Quantity<br>Var. No. |
|------|-------------|----------------------------------------|----------------------|
| 16   | X           | Joint, pipe                            | 1                    |
| 17   | X           | Pipe, return                           | 1                    |
| 18   | GM13314     | Pipe, return<br>(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                        | 6                    |
| 26   | 250967      | Gasket 8, round                        | 2                    |
| 27   | 252675      | Gasket 14, round                       | 2                    |
| 28   | 252677      | Bolt, pipe joint                       | 1                    |
| 29   | 256567      | Joint 12, pipe                         | 1                    |
| 31   | 229552      | Bolt, pipe joint                       | 1                    |

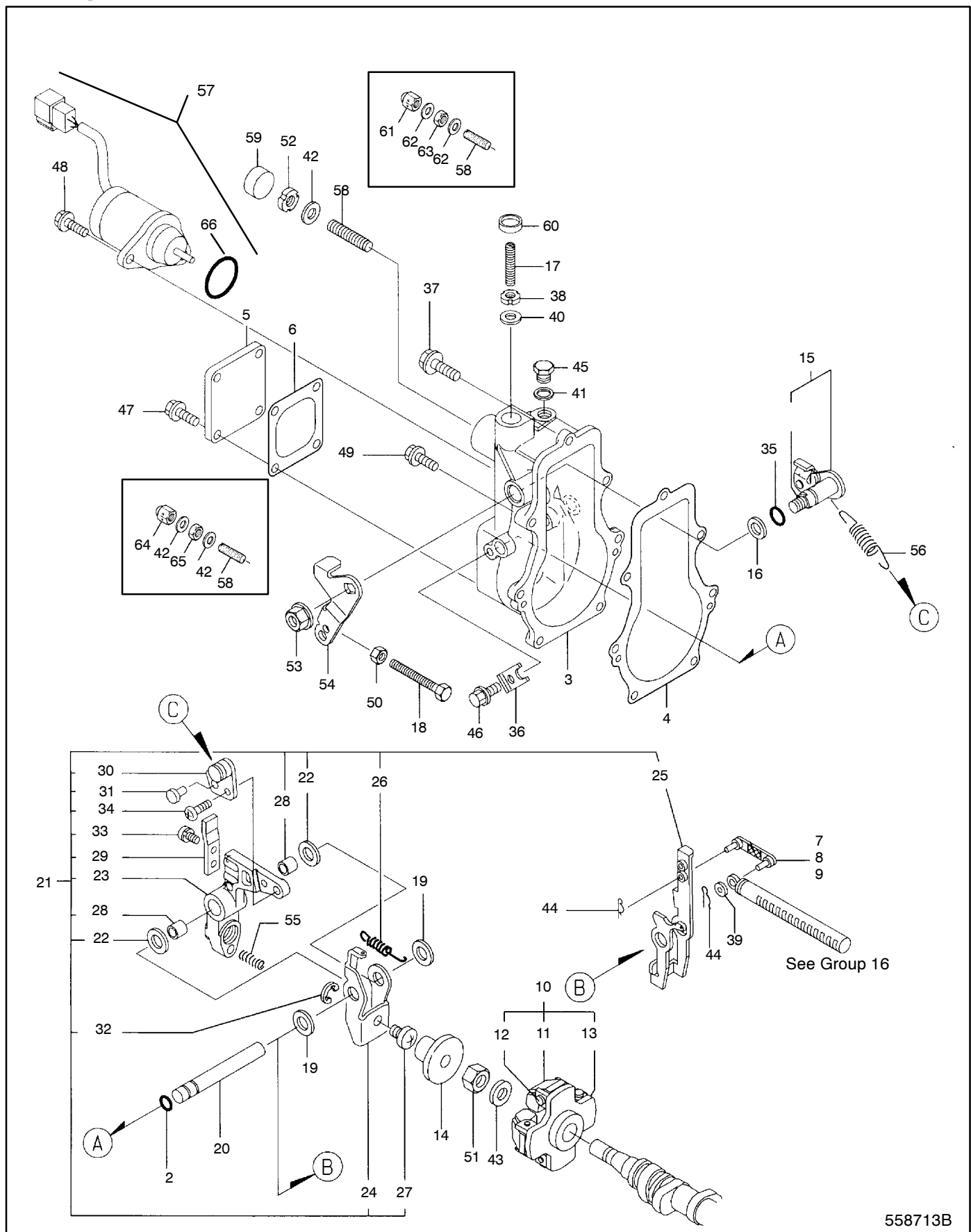
X Item not sold separately

# Group 18: Fuel Line and Filter



| Item | Part Number | Description          | Quantity         |
|------|-------------|----------------------|------------------|
|      |             |                      | Variation Number |
| 1    | GM35541     | Bracket, filter      | 1                |
| 2    | GM32359     | Filter, fuel         | 1                |
| 3    | 225819      | Bolt m 8 x 30 plated | 2                |
| 4    | GM35480     | Pipe, fuel oil       | 1                |
| 5    | GM35481     | Pipe, fuel oil       | 1                |
| 6    | 252670      | Clamp                | 4                |

# Group 19: Governor



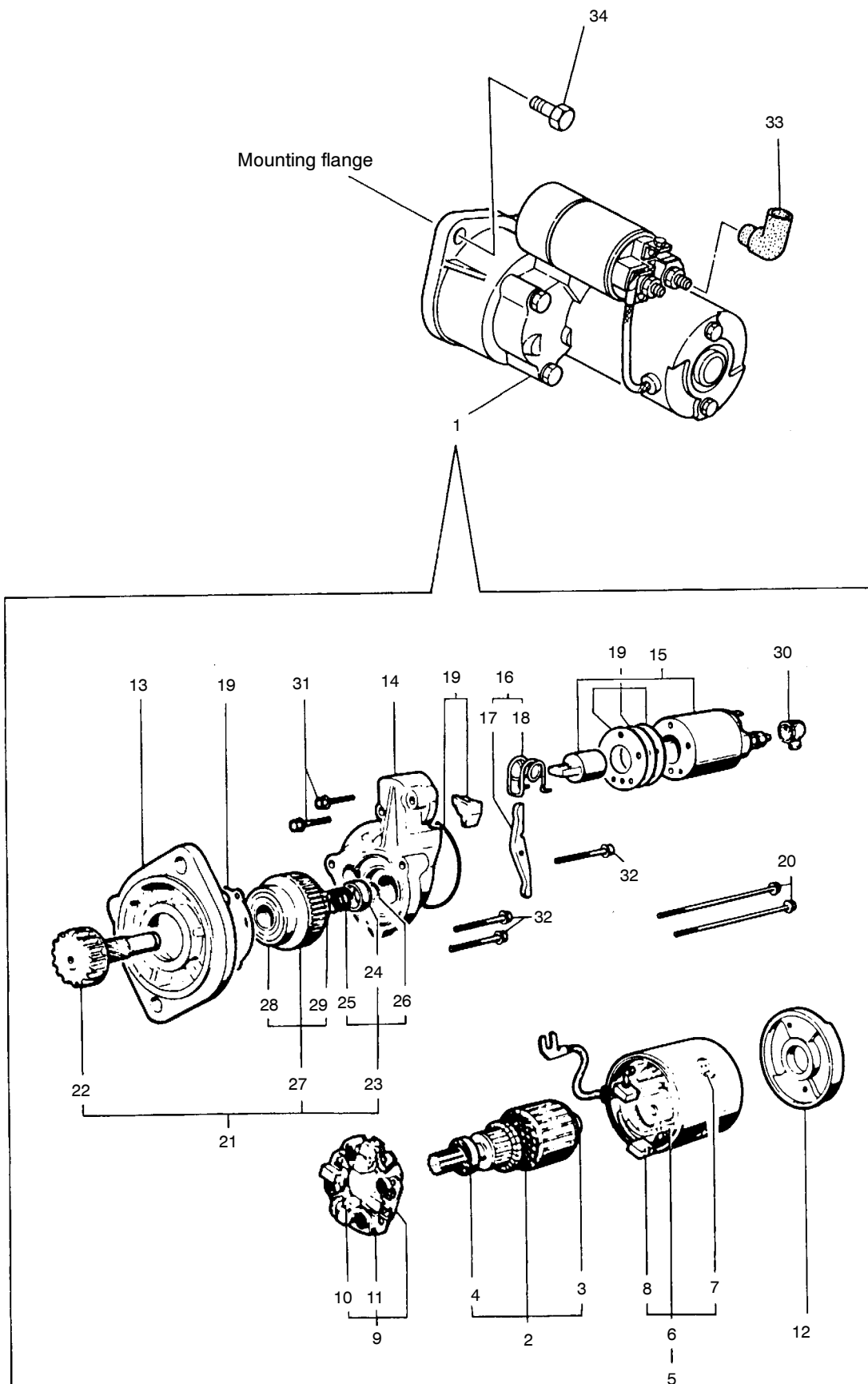
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## Group 19: Governor

| Item | Part Number | Description                                     | Quantity         |   |
|------|-------------|-------------------------------------------------|------------------|---|
|      |             |                                                 | Variation Number | 2 |
| 1    | X           | Governor assembly (includes items 2-52)         | 1                | 1 |
| 2    | 252849      | O-ring                                          | 2                | 2 |
| 3    | X           | Case, governor                                  | 1                | 1 |
| 4    | 225417      | Gasket, spacer                                  | 1                |   |
| 4    | 363449      | Gasket, spacer                                  |                  | 1 |
| 5    | 225414      | Cover                                           | 1                | 1 |
| 6    | 225408      | Packing                                         | 1                |   |
| 6    | 363450      | Packing                                         |                  | 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, gov. (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   | 225409      | Shaft assy., control                            | 1                |   |
| 15   | 252794      | Shaft assy., control                            |                  | 1 |
| 16   | 225782      | Spacer, shaft                                   | 1                | 1 |
| 17   | GM13294     | Bolt, revol. limit                              | 1                |   |
| 17   | 225784      | Bolt, revol. limit                              |                  | 1 |
| 18   | 225784      | Bolt, idle limit                                | 1                | 1 |
| 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                                          | 2                | 2 |
| 36   | 229692      | Retainer, shaft                                 | 1                | 1 |
| 37   | 225790      | Bolt, washer based                              | 1                |   |
| 38   | 225391      | Carb nut, high idle                             | 1                |   |
| 38   | 225767      | Nut, lock                                       |                  | 1 |
| 39   | 225803      | Washer 4                                        | 1                | 1 |
| 40   | 363451      | Seal washer 6                                   | 1                | 1 |
| 41   | 363452      | Seal washer 10                                  | 2                | 2 |
| 42   | 225424      | Seal washer 12                                  | 2                | 2 |
| 43   | 256704      | Washer 12                                       | 1                | 1 |
| 44   | 225809      | Snap pin 4                                      | 2                |   |
| 44   | 225803      | Washer 4 (not shown)                            |                  | 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                            | 1                | 1 |
| 52   | 225390      | Carb nut, flow limit                            | 1                | 1 |
| 53   | 252723      | Nut, M8                                         | 1                | 1 |
| 54   | 225800      | Lever, control                                  | 1                | 1 |
| 55   | GM13320     | Spring, fuel control                            | 1                | 1 |
| 56   | 225795      | Spring governor                                 | 1                | 1 |
| 57   | 225461      | Kit, fuel solenoid (includes item 66)           | 1                | 1 |
| 58   | 225785      | Bolt, fuel control                              | 1                | 1 |
| 59   | 225381      | Plug 22                                         | 1                | 1 |
| 60   | 225382      | Plug 14                                         | 1                | 1 |
| 61   | 225702      | Nut, cap                                        |                  | 1 |
| 62   | 225423      | Seal washer 6                                   |                  | 1 |
| 63   | 225825      | Nut, lock 6                                     |                  | 1 |
| 64   | 225770      | Nut, cap                                        |                  | 1 |
| 65   | 225826      | Nut, lock M2 plated                             |                  | 1 |
| 66   | 225427      | O-ring                                          | 1                | 1 |

X Item not sold separately

## Group 20: Starting Motor

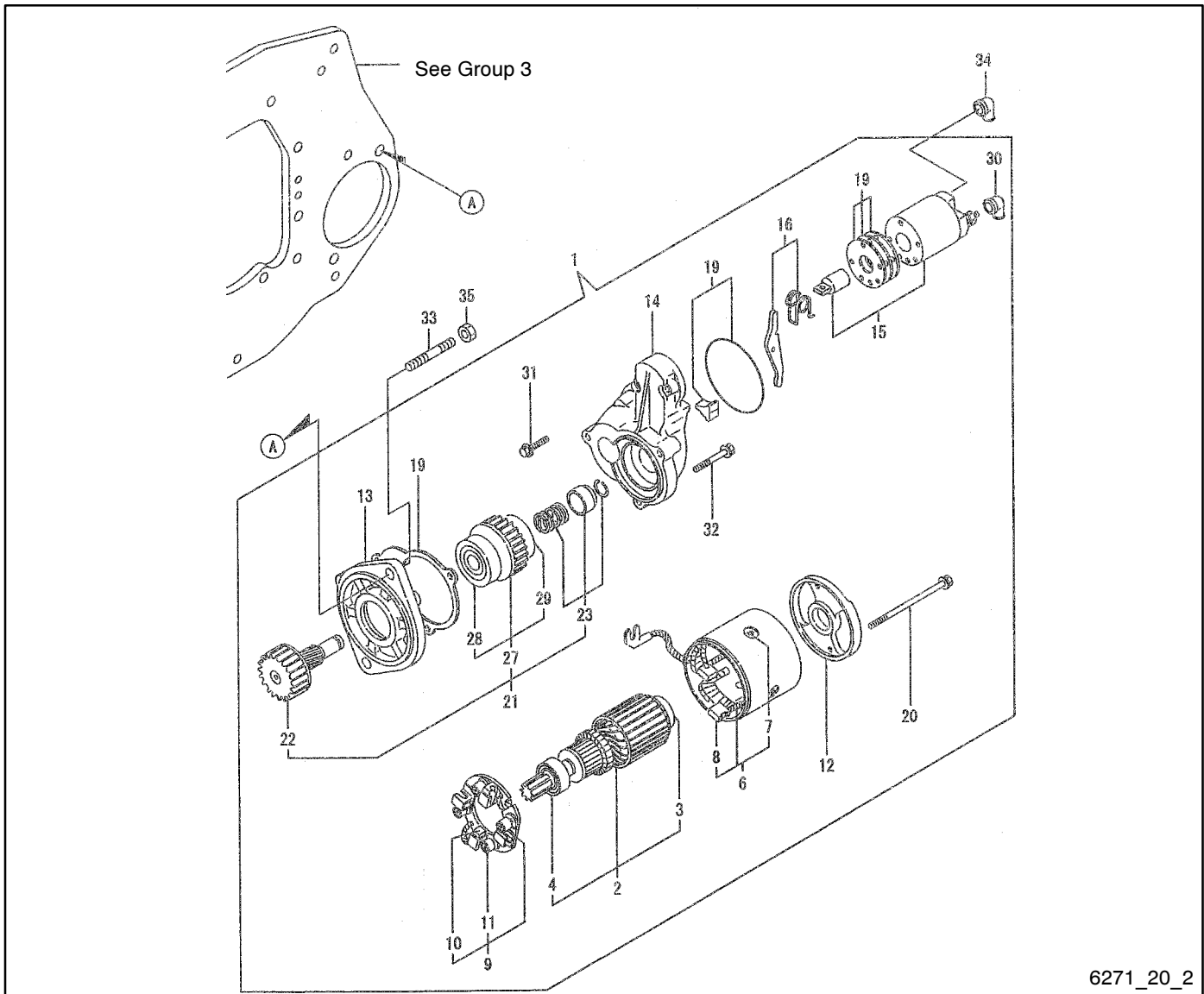


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## Group 20: Starting Motor

| Item | Part Number | Description                                       | Quantity           |
|------|-------------|---------------------------------------------------|--------------------|
|      |             |                                                   | Variation Number 1 |
| 1    | 225013      | Starter (includes items 2- 32)                    | 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 assy., gear                               | 1                  |
| 14   | 225906      | Housing, center                                   | 1                  |
| 15   | 225907      | Switch, magnetic                                  | 1                  |
| 16   | 225908      | Lever set, shift (includes items 17 and 18)       | 4                  |
| 17   | 229478      | Lever                                             | 1                  |
| 18   | 229479      | Spring                                            | 1                  |
| 19   | 225909      | Dust cover                                        | 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      | Ball bearing                                      | 1                  |
| 29   | 225916      | Ball bearing                                      | 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                  |

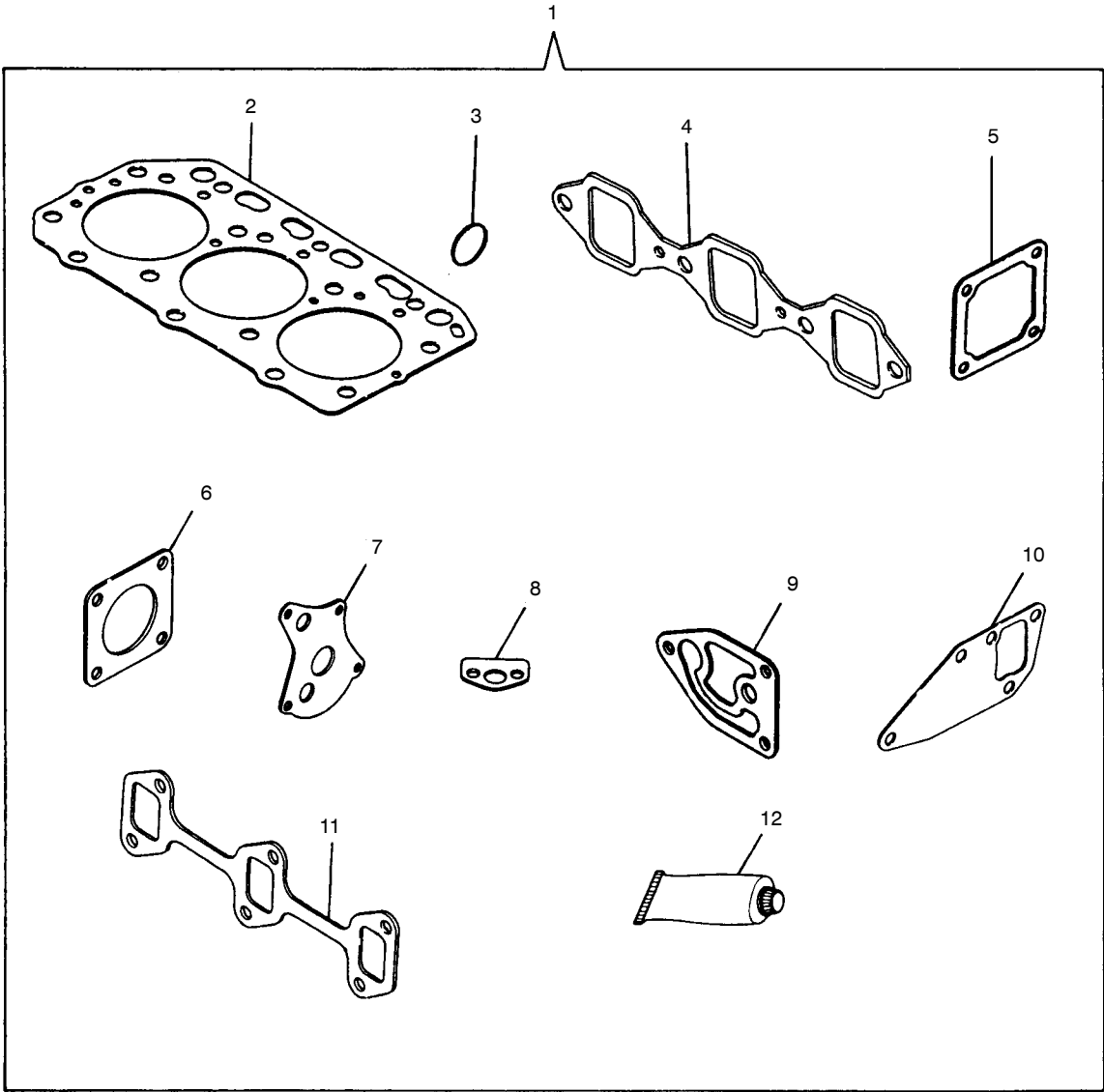
## Group 20: Starting Motor, continued



6271\_20\_2

| Item | Part Number | Description           | Quantity         |   | Item | Part Number | Description        | Quantity         |   |
|------|-------------|-----------------------|------------------|---|------|-------------|--------------------|------------------|---|
|      |             |                       | Variation Number |   |      |             |                    | Variation Number |   |
|      |             |                       | 2                | 3 |      |             |                    | 2                | 3 |
| 1    | 344743-P    | Starter               | 1                |   | 16   | 225908      | Shift lever set    | 1                |   |
| 1    | 344743      | Starter (24 V models) |                  | 1 | 19   | 225909      | Dust cover         | 1                |   |
| 2    | 225895      | Armature assembly     | 1                |   | 20   | 225910      | Through bolt       | 2                |   |
| 3    | GM35772     | Ball bearing          | 1                |   | 21   | 225911      | Pinion assembly    | 1                |   |
| 4    | GM35769     | Ball bearing          | 1                |   | 22   | 225912      | Pinion shaft       | 1                |   |
| 6    | 225898      | Field coil assembly   | 1                |   | 23   | 225913      | Pinion stopper set | 1                |   |
| 7    | 225899      | Screw                 | 4                |   | 27   | GM35770     | Clutch assembly    | 1                |   |
| 8    | 225900      | Brush (+)             | 2                |   | 28   | GM35771     | Ball bearing       | 1                |   |
| 9    | 225901      | Holder assembly       | 1                |   | 29   | GM35774     | Ball bearing       | 1                |   |
| 10   | 225902      | Brush(-)              | 2                |   | 30   | 225917      | Cover              | 1                |   |
| 11   | 225903      | Brush spring          | 4                |   | 31   | 225920      | Bolt               | 2                |   |
| 12   | 225904      | Rear cover            | 1                |   | 32   | 225921      | Bolt               | 3                |   |
| 13   | 225905      | Gear housing assembly | 1                |   | 33   | GM35516     | Stud, starter      | 2                |   |
| 14   | 225906      | Center housing        | 1                |   | 34   | 252481      | Cover              | 1                |   |
| 15   | 225907      | Switch, magnetic      | 1                |   | 35   | 252725      | Nut                | 2                |   |

Group 21: Gasket Set

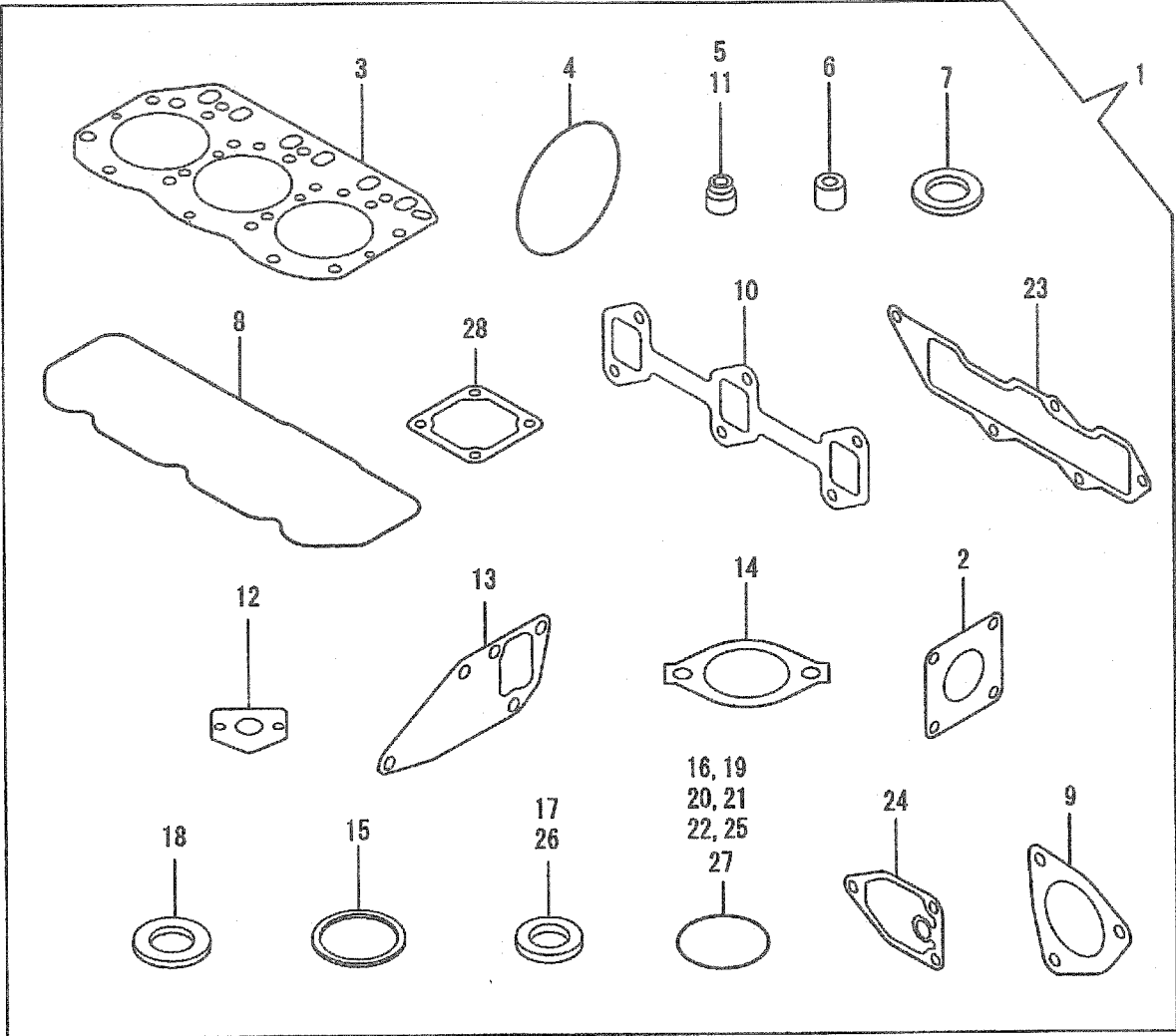


6271\_21\_1

| Item | Part Number | Description         | Quantity         |   |
|------|-------------|---------------------|------------------|---|
|      |             |                     | Variation Number |   |
|      |             |                     | 2                | 3 |
| 1    | GM13335     | Gasket set (3TNE88) | 1                |   |
| 1    | GM13340     | Gasket set (3TNE84) |                  | 1 |

Gasket set includes items 2-12 shown in the illustration.

# Group 21: Gasket Set, continued



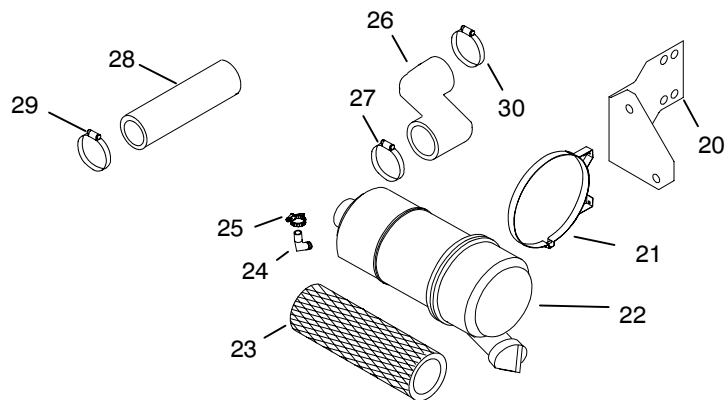
6271\_21\_2

Gasket set includes items 2-27 shown in the illustration.

| Item | Part Number | Description          | Quantity         |   |
|------|-------------|----------------------|------------------|---|
|      |             |                      | Variation Number |   |
|      |             |                      | 4                | 5 |
| 1    | GM35744     | Gasket set (3TNV88)  | 1                |   |
| 1    | GM35750     | Gasket set (3TNV84T) |                  | 1 |

# Group 101: Air Intake

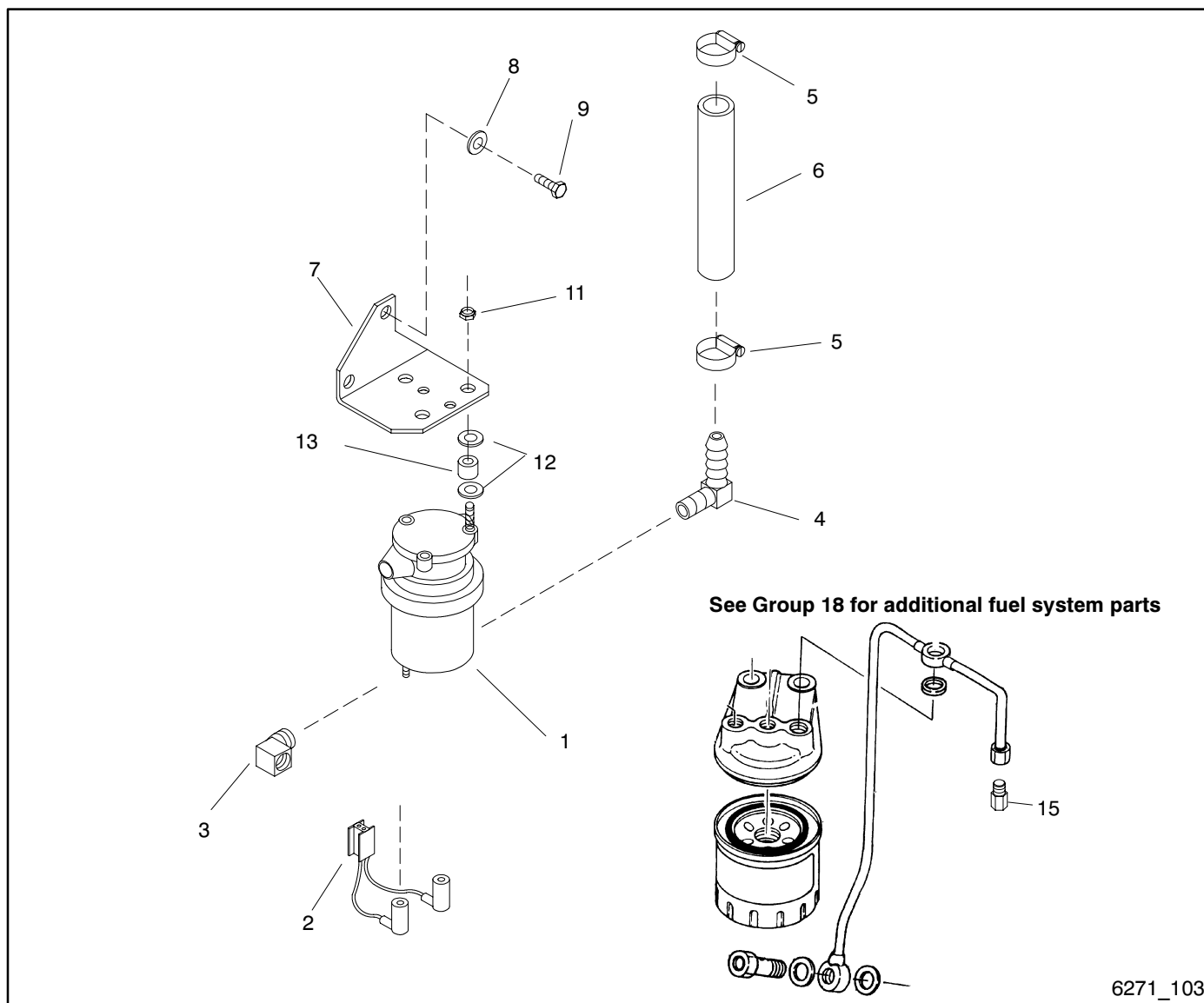
See Group 6 for 15.5EOZD/13EFOZD air cleaner



6271\_101

| Item | Part Number | Description                     | Quantity         |      |
|------|-------------|---------------------------------|------------------|------|
|      |             |                                 | Variation Number |      |
|      |             |                                 | 35-1             | 64-1 |
| 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   | GM22514     | Hose, molded, air cleaner       | 1                |      |
| 26   | GM32662     | Hose, air intake                |                  | 1    |
| 27   | X-426-6     | Clamp, hose, 1.56/2.5 in.       | 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    |
| 30   | X-426-6     | Clamp, hose, 1.56/2.5 in.       | 1                | 1    |

# Group 103: Fuel System

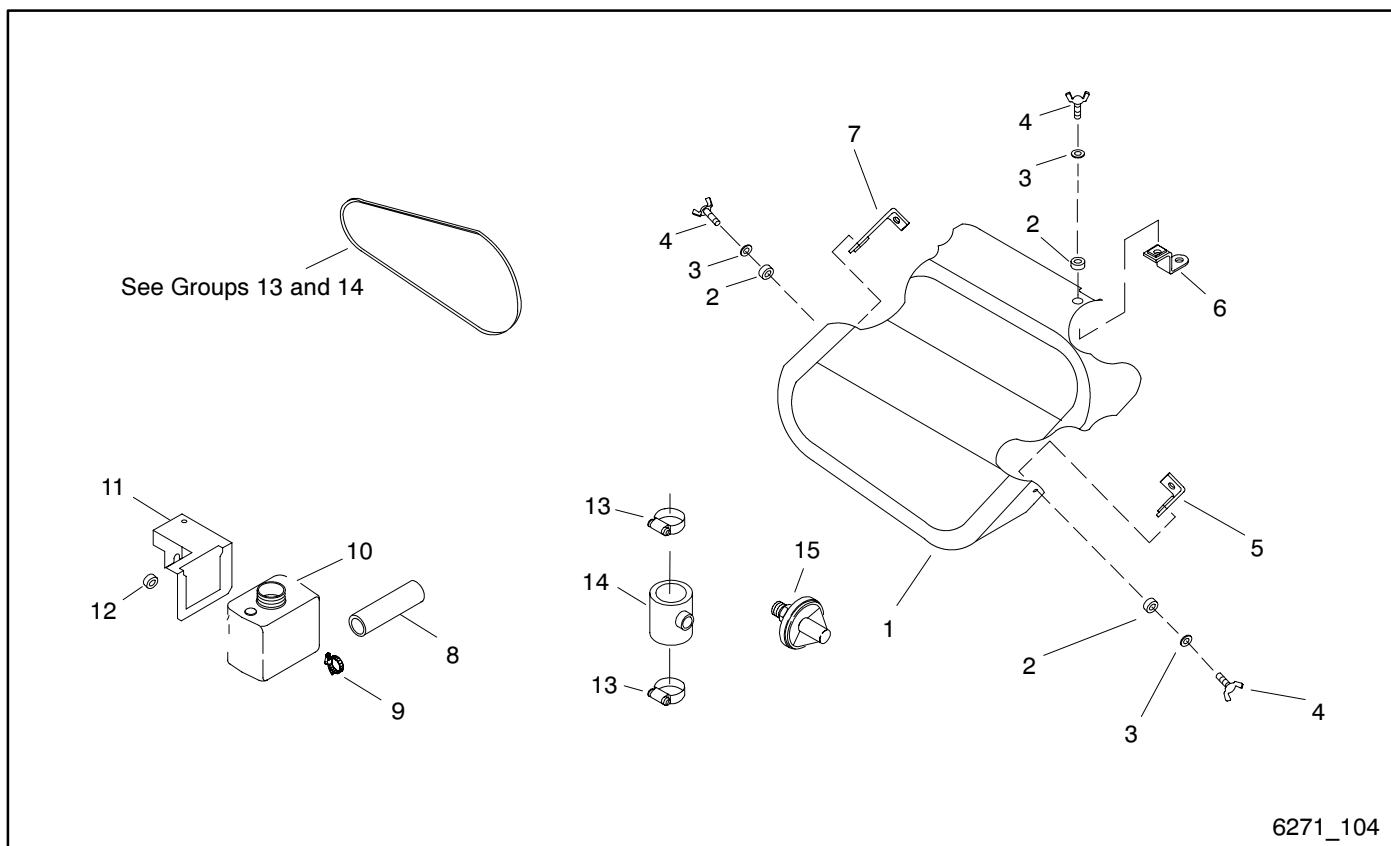


6271\_103

| Item | Part Number   | Description             | Quantity         |      |       |
|------|---------------|-------------------------|------------------|------|-------|
|      |               |                         | Variation Number |      |       |
|      |               |                         | 35-2             | 64-2 | 64-11 |
| 1    | 229051        | Pump, fuel              | 1                | 1    |       |
| 1    | 344740        | Pump, fuel              |                  |      | 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, hose elbow   | 1                |      |       |
| 4    | X-391-25      | Connector, 90 deg.      |                  | 1    | 1     |
| 5    | X-426-9       | Clamp, hose             | 2                | 2    | 2     |
| 6    | X-386-48      | Line, fuel              | 1                |      |       |
| 6    | X-386-93      | 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                | 2    | 2     |
| 15   | 229331        | Adapter, pipe           | 1                |      |       |

# Common hardware; procure locally

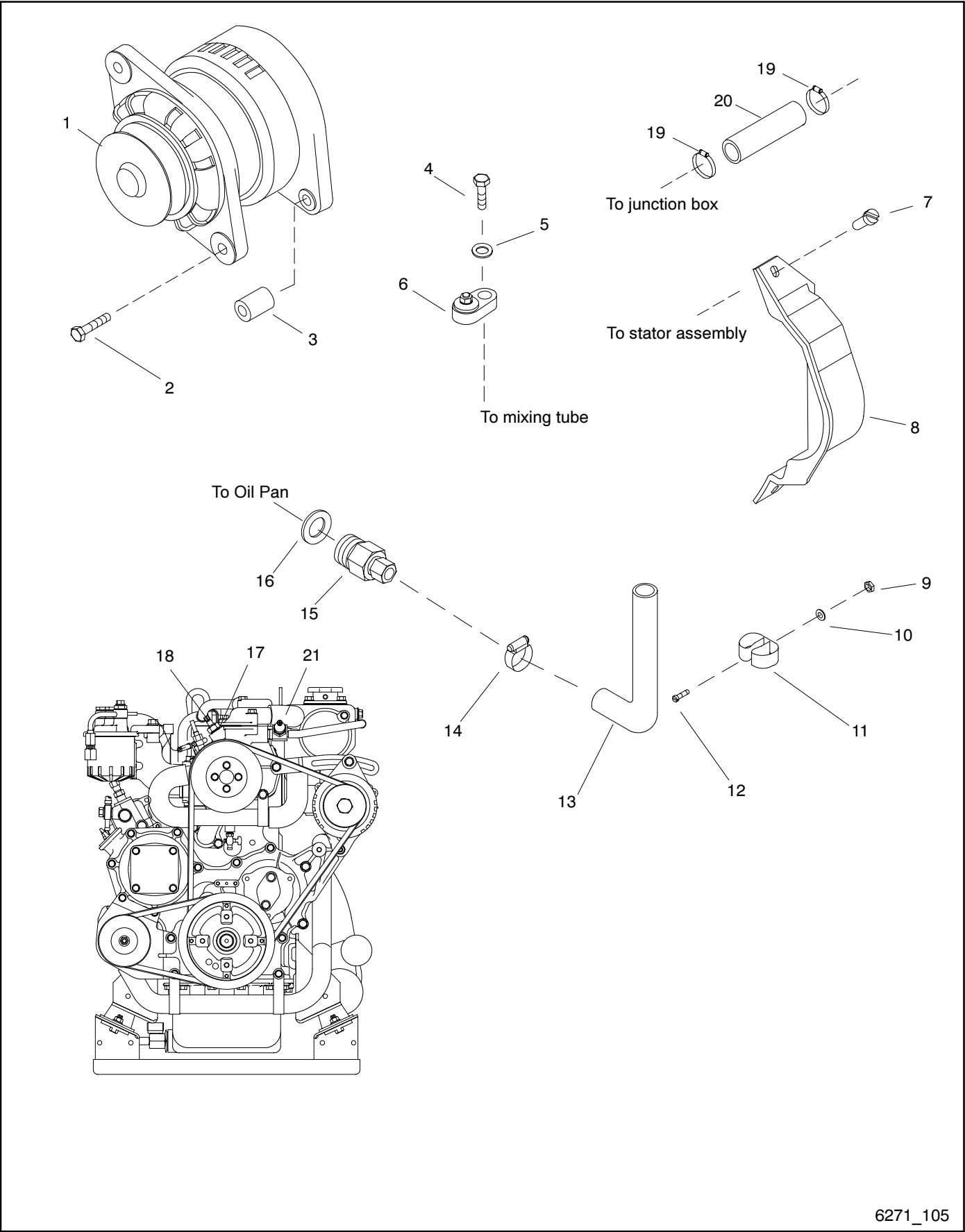
## Group 104: Cooling System



| Item | Part Number | Description                       | Quantity         |      |       |
|------|-------------|-----------------------------------|------------------|------|-------|
|      |             |                                   | Variation Number |      |       |
|      |             |                                   | 35-3             | 64-3 | 64-12 |
| 1    | 344320      | Guard, belt                       | 1                |      |       |
| 2    | X-284-39    | Grommet                           | 3                | 3    | 3     |
| 3    | X-25-40     | Washer, plain                     | 3                | 3    | 3     |
| 4    | 229330      | Screw, wing                       | 3                | 1    | 1     |
| 5    | 229201      | Bracket, belt guard               | 1                |      |       |
| 5    | GM35368     | Bracket, belt guard               |                  | 1    |       |
| 5    | GM35369     | Bracket, belt guard (24 V models) |                  |      | 1     |
| 6    | 229199      | Bracket, belt guard               | 1                |      |       |
| 6    | GM35366     | Bracket, belt guard               |                  | 1    |       |
| 6    | GM35367     | Bracket, belt guard (24 V models) |                  |      | 1     |
| 7    | 229286      | Bracket, belt guard               | 1                |      |       |
| 7    | GM35372     | Bracket, belt guard               |                  | 1    |       |
| 7    | 344820      | Bracket, belt guard (24 V models) |                  |      | 1     |
| 8    | X-386-34    | Line, flex. fuel, 5/16 x 28       | 1                | 1    | 1     |
| 9    | X-426-9     | Clamp, hose, .25/.70 in.          | 2                | 2    | 2     |
| 10   | 359037      | Bottle, overflow                  | 1                | 1    | 1     |
| 11   | 359039      | Bracket, water bottle             | 1                |      |       |
| 11   | GM32749     | Bracket, water bottle             |                  | 1    | 1     |
| 12   | X-400-104   | Spacer, .344 x .750 x .500        | 1                |      |       |
| 13   | X-426-20    | Clamp, hose, .63/1.5 in.          | 2                | 2    | 2     |
| 14   | GM30882     | Tube, seawater                    | 1                | 1    | 1     |
| 15   | GM30263     | Switch, pressure                  | 1                | 1    | 1     |

**Note:** Items 1-7, 51 are removed when an optional sound shield is installed.

# Group 105: Engine



6271\_105

## Group 105: Engine

| Item | Part Number   | Description                                                  | Quantity         |      |      |      |       |       |
|------|---------------|--------------------------------------------------------------|------------------|------|------|------|-------|-------|
|      |               |                                                              | Variation Number |      |      |      |       |       |
|      |               |                                                              | 35-4             | 35-5 | 64-4 | 64-5 | 64-13 | 64-15 |
| 1    | 256924        | Alternator, 12 V (see Group 13 for alternator adjusting arm) | 1                | 1    | 1    | 1    |       |       |
| 1    | 344742        | Alternator, 24 V                                             |                  |      |      |      | 1     | 1     |
| 1    | 344815        | Guard, alternator fan (not shown)                            |                  |      |      |      | 1     | 1     |
| 2    | X-125-22      | Bolt, hex cap                                                | 1                | 1    | 1    | 1    | 1     | 1     |
| 3    | X-400-184     | Spacer                                                       | 1                | 1    |      |      |       |       |
| 3    | X-400-258     | Spacer                                                       |                  |      | 1    | 1    |       |       |
| 3    | X-400-260     | Spacer                                                       |                  |      |      |      | 1     | 1     |
| 4    | M933-08016-60 | Screw, hex cap                                               | 1                | 1    | 1    | 1    | 1     | 1     |
| 5    | X-25-44       | Washer, .562 x .328 x .062                                   | 1                | 1    | 1    | 1    | 1     | 1     |
| 6    | 249872        | Switch, high temp. cutout                                    | 1                | 1    | 1    | 1    | 1     | 1     |
| 7    | X-67-113      | Screw, self tapping                                          | 2                | 2    | 2    | 2    | 2     | 2     |
| 8    | 229113        | Guard, generator fan                                         | 1                | 1    | 1    | 1    | 1     | 1     |
| 9    | X-101-11      | Nut, elastic stop 8-32                                       | 1                | 1    | 1    | 1    | 1     | 1     |
| 10   | X-25-48       | Washer, plain                                                | 1                | 1    | 1    | 1    | 1     | 1     |
| 11   | 276959        | Clip, hose                                                   | 1                | 1    | 1    | 1    | 1     | 1     |
| 12   | X-51-15       | Screw, RHM 8-32 x 1/2                                        | 1                | 1    | 1    | 1    | 1     | 1     |
| 13   | X-651-34      | Hose                                                         | 1                | 1    | 1    | 1    | 1     | 1     |
| 14   | X-426-18      | Clamp, hose, .38/.88 in.                                     | 1                | 1    |      |      |       |       |
| 14   | X-426-9       | Clamp, hose, .25/.70 in.                                     |                  |      | 1    | 1    | 1     | 1     |
| 15   | 344828        | Valve, drain                                                 | 1                | 1    | 1    | 1    | 1     | 1     |
| 16   | X-25-145      | Washer, 1.25 x .875 x .062                                   | 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     |
| 18   | GM28823       | Sensor, temperature                                          | 1                | 1    | 1    | 1    | 1     | 1     |
| 19   | X-426-4       | Clamp, hose, 1.31/2.25 in.                                   |                  |      |      | 1    |       | 1     |
| 20   | X-6292-2      | Hose, flexible air                                           |                  |      |      | 1    |       | 1     |
| 21   | A-359582      | Engine assembly (3TNE88)                                     | 1                |      |      |      |       |       |
| 21   | A-359583      | Engine assembly (3TNE84T)                                    |                  | 1    |      |      |       |       |
| 21   | GM29460       | Engine assembly (3TNV88)                                     |                  |      | 1    |      | 1     |       |
| 21   | GM29462       | Engine assembly (3TNV84T)                                    |                  |      |      | 1    |       | 1     |

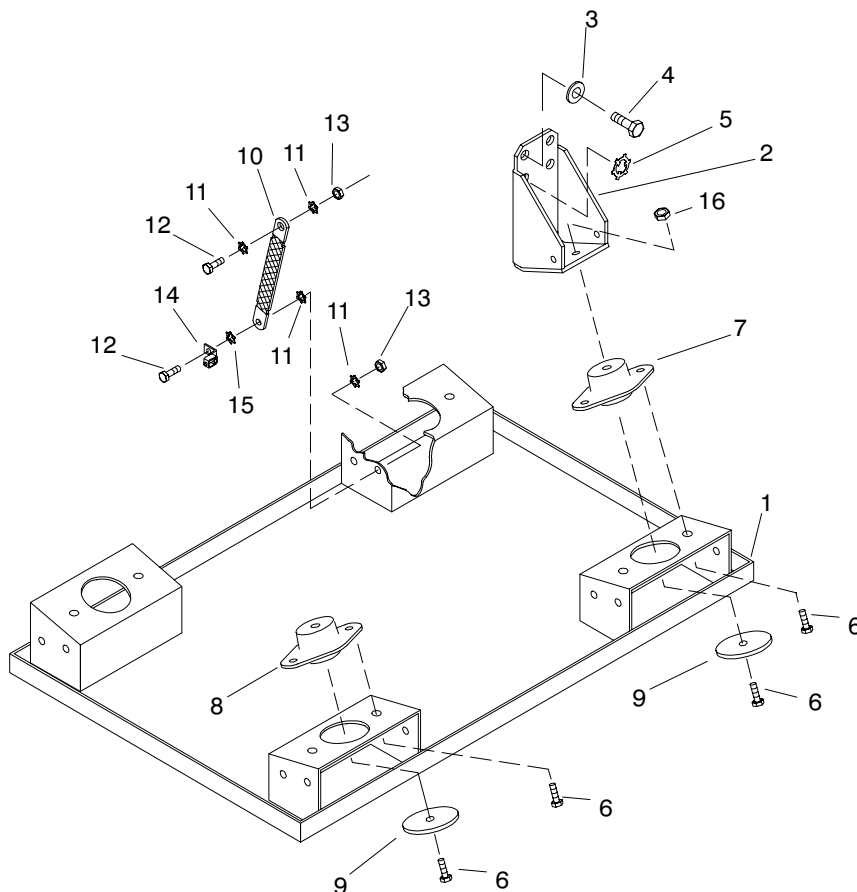
**Note:** Item 13 is removed when an optional sound shield is installed. The sound shield parts are listed in the Accessory section of this manual.

## Group 107: Nameplate and Decals

| Item | Part Number | Description                                            | Quantity         |      |       |
|------|-------------|--------------------------------------------------------|------------------|------|-------|
|      |             |                                                        | Variation Number |      |       |
|      |             |                                                        | 35-6             | 64-6 | 64-16 |
| 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                                           | 2                | 2    | 2     |
| 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-6348-5    | Decal, Kohler Logo                                     | 1                |      | 1     |
| 8    | X-6348-6    | Decal, Kohler Logo                                     |                  | 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 "This generator set has been rewired..." | 1                | 1    | 1     |

Nameplate and decals are not illustrated.

## Group 109: Skid and Plant Mounting

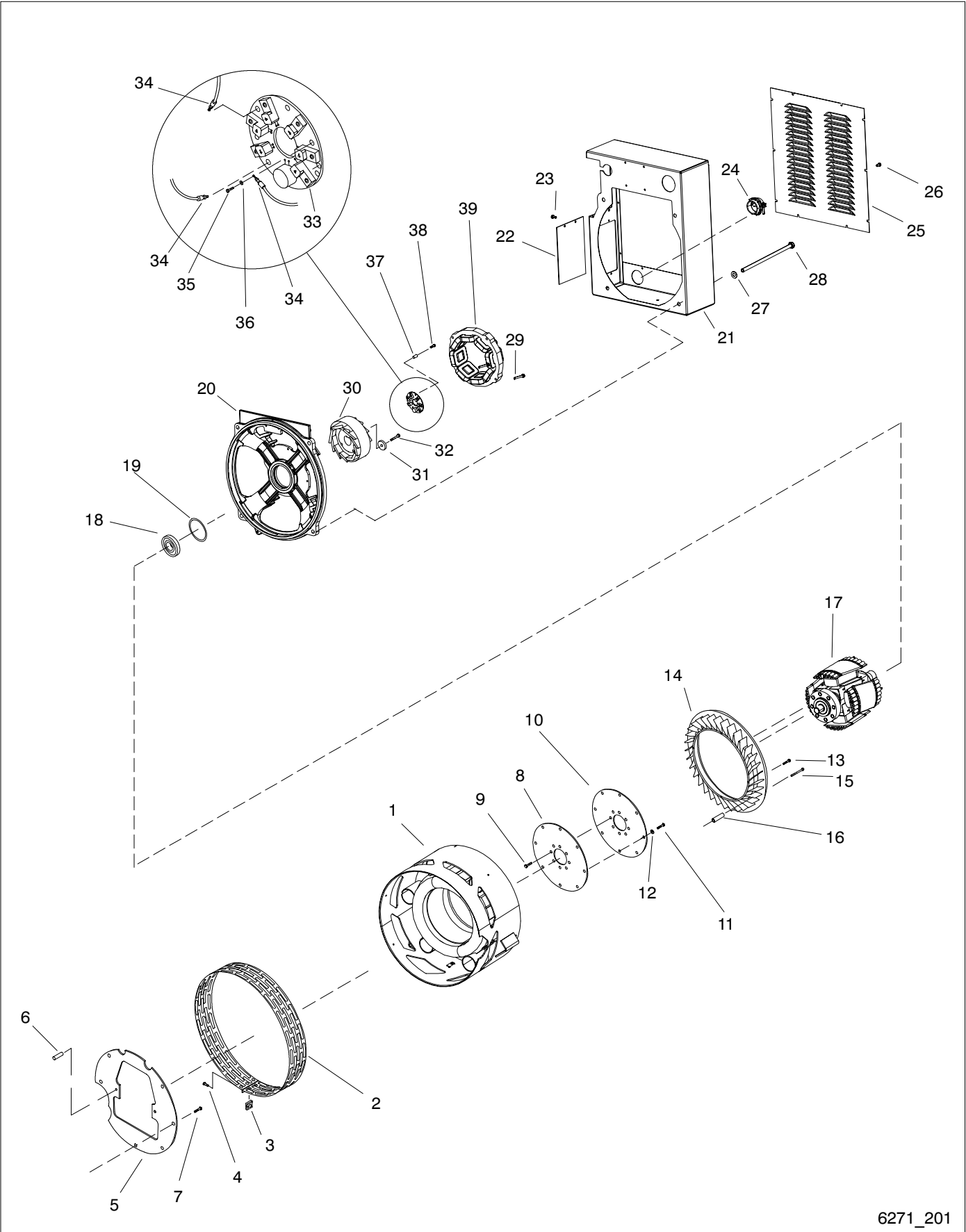


6271\_109

| Item | Part Number   | Description                  | Quantity              |                       |
|------|---------------|------------------------------|-----------------------|-----------------------|
|      |               |                              | Variation Number 35-7 | Variation Number 64-7 |
| 1    | GM31908       | 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    | 229127        | Mount, vibro (engine end)    | 2                     | 2                     |
| 8    | 278322        | Mount, vibro (generator end) | 2                     | 2                     |
| 9    | X-25-96       | Washer, plain                | 4                     | 4                     |
| 10   | 245297        | Strap, ground                | 1                     | 1                     |
| 11   | X-22-12       | Washer, shakeproof           | 4                     | 4                     |
| 12   | #             | Hardware, M6-1.00            | 2                     | 2                     |
| 13   | #             | Hardware, M6-1.00            | 2                     | 2                     |
| 14   | X-377-12      | Connector, cable             | 1                     | 1                     |
| 15   | X-22-11       | Washer, lock 1/4             | 1                     | 1                     |
| 16   | M982-08-80    | Nut, hex elastic stop        | 4                     | 4                     |

# Common hardware; procure locally

# Group 201: Generator and Mounting



6271\_201

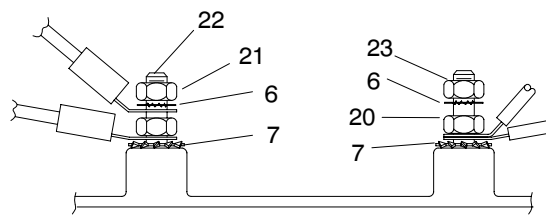
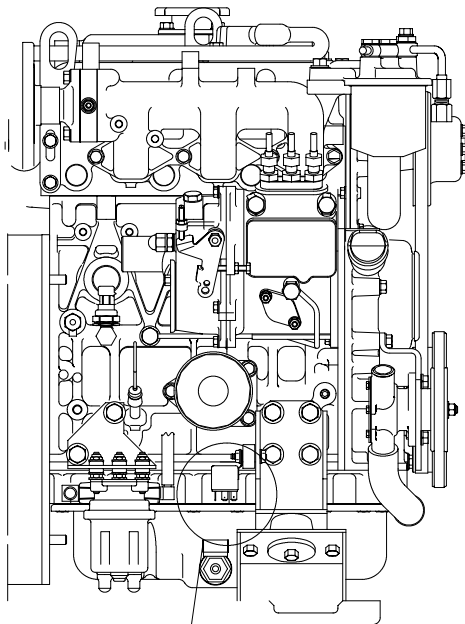
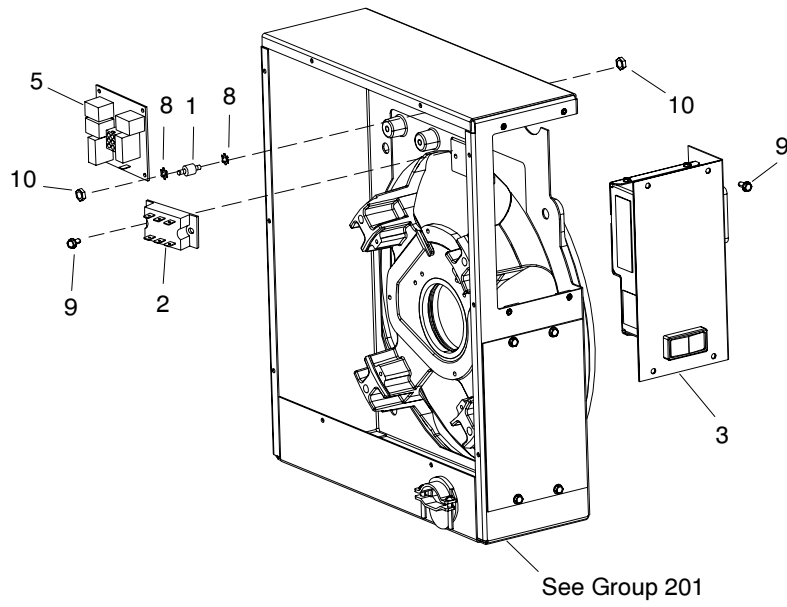
## Group 201: Generator and Mounting

| Item | Part Number   | Description                       | Quantity         |      |      |      |       |
|------|---------------|-----------------------------------|------------------|------|------|------|-------|
|      |               |                                   | Variation Number |      |      |      |       |
|      |               |                                   | 35-8             | 64-8 | 35-9 | 64-9 | 64-17 |
| 1    | GM29283       | Stator assembly                   | 1                | 1    | 1    | 1    |       |
| 1    | GM29788       | Stator assembly                   |                  |      |      |      | 1     |
| 2    | 229109        | Guard, generator fan              | 1                | 1    | 1    | 1    | 1     |
| 3    | 257442        | Clip, speed                       | 1                | 1    | 1    | 1    | 1     |
| 4    | X-67-125      | Screw, tapping, 10-24             | 1                | 1    | 1    | 1    | 1     |
| 5    | 229097        | Plate, locator                    | 1                | 1    | 1    | 1    | 1     |
| 6    | 229356        | Pin, knurled                      | 2                | 2    | 2    | 2    | 2     |
| 7    | M933-10012-60 | Screw, M10-1.50                   | 6                | 6    | 6    | 6    | 6     |
| 8    | 257017        | Disc, drive                       | 1                | 1    | 1    | 1    | 1     |
| 9    | X-6238-3      | Screw, 3/8-16 x .875              | 8                | 8    | 8    | 8    | 8     |
| 10   | 257017        | Disc, drive                       | 1                | 1    | 1    | 1    | 1     |
| 11   | M933-08016-60 | Screw, HC M8-1.25                 | 8                | 8    | 8    | 8    | 8     |
| 12   | M125A-08-80   | Washer                            | 8                | 8    | 8    | 8    | 8     |
| 13   | X-6284-1      | Screw, M5 x .8 x 10 mm            | 4                | 4    | 4    | 4    | 4     |
| 14   | 225215        | Fan, generator                    | 1                | 1    | 1    | 1    | 1     |
| 15   | X-6284-2      | Screw, M5 x .8 x 45 mm            | 4                | 4    | 4    | 4    | 4     |
| 16   | X-400-189     | Spacer                            | 4                | 4    | 4    | 4    | 4     |
| 17   | GM29683       | Rotor assembly (includes item 18) | 1                | 1    |      |      |       |
| 17   | GM29684       | Rotor assembly (includes item 18) |                  |      | 1    | 1    | 1     |
| 18   | X-758-15      | Bearing, ball                     | 1                | 1    | 1    | 1    | 1     |
| 19   | 229110        | O-ring                            | 1                | 1    | 1    | 1    | 1     |
| 20   | GM24810       | Bracket, end                      | 1                | 1    | 1    | 1    | 1     |
| 21   | GM29688       | Box, junction                     | 1                | 1    | 1    | 1    | 1     |
| 22   | GM30021       | Plate, circuit breaker            | 1                | 1    | 1    | 1    | 1     |
| 23   | X-67-64       | Screw, self-tapping               | 4                | 4    | 4    | 4    | 4     |
| 24   | X-6266-1      | Connector, cable                  | 1                | 1    | 1    | 1    | 1     |
| 25   | GM29690       | Panel, junction box louver        | 1                | 1    | 1    | 1    | 1     |
| 26   | X-67-64       | Screw, self-tapping               | 10               | 10   | 10   | 10   | 10    |
| 27   | X-801-3       | Washer, hardened                  | 4                | 4    | 4    | 4    | 4     |
| 28   | X-6051-16     | Screw, hex head                   | 4                | 4    | 4    | 4    | 4     |
| 29   | X-97-14       | Screw, hex, 10-24                 | 4                | 4    | 4    | 4    | 4     |
| 30   | 344568        | Exciter, armature                 | 1                | 1    | 1    | 1    | 1     |
| 31   | X-25-129      | Washer, plain                     | 1                | 1    | 1    | 1    | 1     |
| 32   | X-6238-3      | Screw, 3/8-16 x .875              | 1                | 1    | 1    | 1    | 1     |
| 32   | X-22-1        | Washer, lock                      | 1                | 1    | 1    | 1    | 1     |
| 33   | A-229152      | Circuit Board, diode board        | 1                | 1    | 1    | 1    | 1     |
| 34   | X-283-3       | Terminal                          | 3                | 3    | 3    | 3    | 3     |
| 35   | X-51-8        | Screw, 8-32 x .75                 | 5                | 5    | 5    | 5    | 5     |
| 36   | X-22-7        | Washers, #8                       | 5                | 5    | 5    | 5    | 5     |
| 37   | X-712-17      | Spacer                            | 3                | 3    | 3    | 3    | 3     |
| 38   | X-67-135      | Screw, tapping, 10-24             | 3                | 3    | 3    | 3    | 3     |
| 39   | GM31594       | Exciter assembly, field           | 1                | 1    | 1    | 1    | 1     |

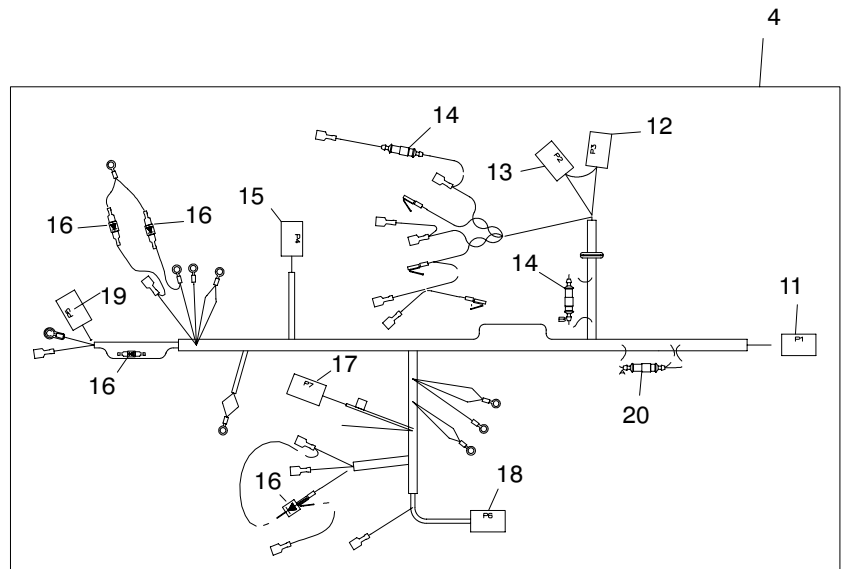
**Note:** Item 25 is replaced with a different part when an optional sound shield is installed. The sound shield parts are listed in the Accessory section of this manual.

# Group 301: Controller and Mounting

See Group 201



LO & GRD Lead Connection



6271\_301

## Group 301: Controller and Mounting

| Item | Part Number | Description                                               | Quantity         |       |       |
|------|-------------|-----------------------------------------------------------|------------------|-------|-------|
|      |             |                                                           | Variation Number |       |       |
|      |             |                                                           | 35-10            | 64-10 | 64-14 |
| 1    | 282829      | Vibromount                                                | 5                | 5     | 5     |
| 2    | GM28483     | SCR module                                                | 1                | 1     | 1     |
| 3    | GM34969     | Controller assembly, ADC 2100 (kit includes instructions) | 1                | 1     | 1     |
| 4    | GM29566     | Harness, engine, Yanmar 13-32EOZD                         | 1                | 1     | 1     |
| 5    | GM29671     | PCB assembly, relay board, 12V                            | 1                | 1     |       |
| 5    | GM29778     | PCB assembly, relay board, 24V                            |                  |       | 1     |
| 6    | X-22-11     | Washer, lock, .262 ID x .469 in. OD                       | 2                | 2     | 2     |
| 7    | X-22-12     | Washer, lock, .262 ID .743 in. OD                         | 2                | 2     | 2     |
| 8    | X-22-20     | Washer, lock, .172 ID x .373 in. OD                       | 10               | 10    | 10    |
| 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                | 3     | 3     |
| 22   | X-6054-22   | Stud, metric                                              | 2                | 2     | 2     |
| 23   | M934-06-64  | Nut, hex, 6mm                                             | 1                | 1     | 1     |
| 24   | 259391      | Relay, 12 V                                               | 1                | 1     |       |
| 24   | 272684      | Relay                                                     |                  |       | 1     |

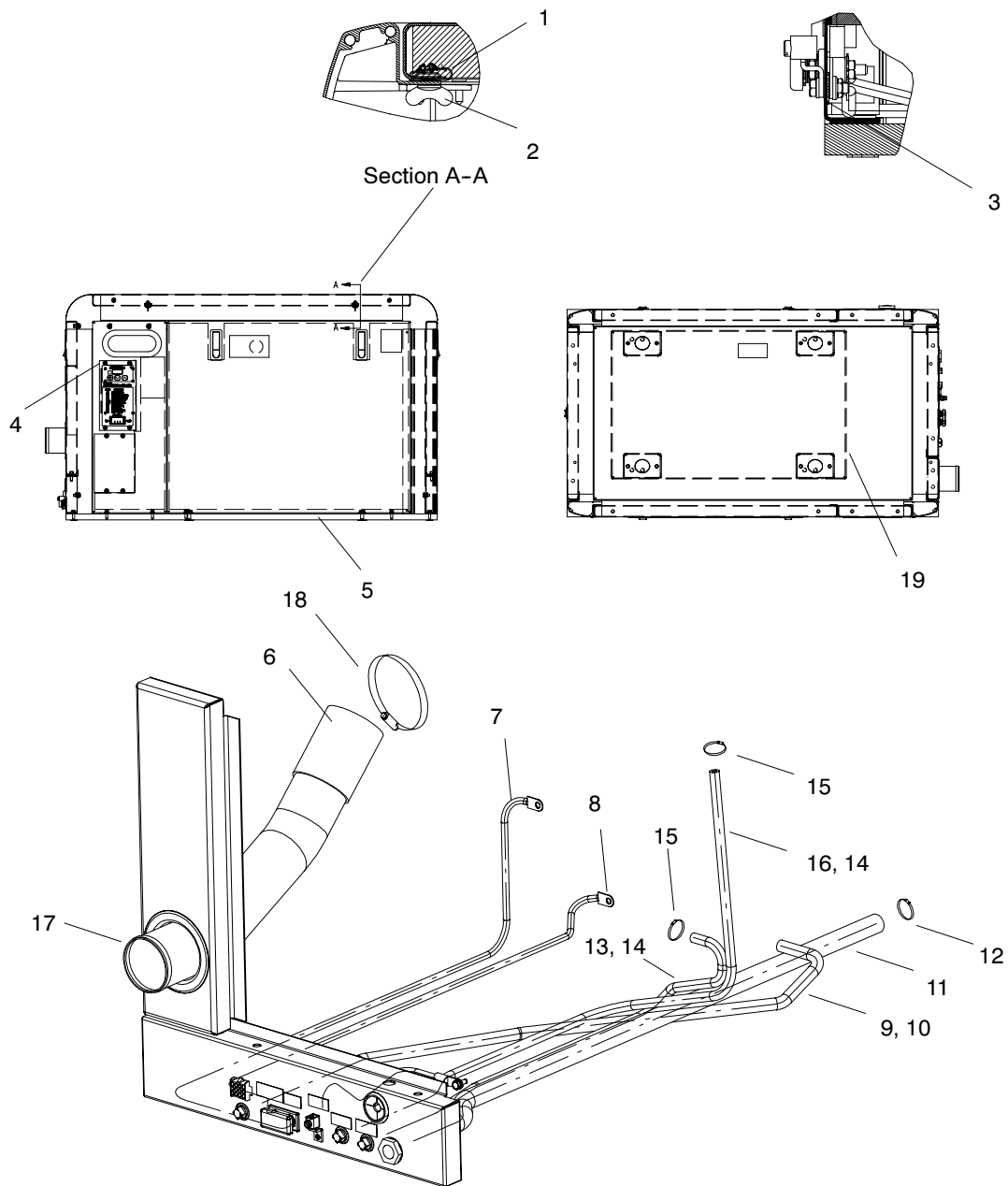
## Group 701: Literature

| Item | Part Number | Description                | Quantity         |    |    |    |    |
|------|-------------|----------------------------|------------------|----|----|----|----|
|      |             |                            | Variation Number |    |    |    |    |
|      |             |                            | 45               | 46 | 47 | 56 | 57 |
| 1    | TP-5375     | Warranty, Marine           | 1                | 1  | 1  | 1  | 1  |
| 2    | TP-5620     | Safety Precautions, Marine | 1                | 1  | 1  | 1  | 1  |
| 3    | TP-6252     | O/M 8-32EOZD/6.5-27EFOZD   | 1                | 1  | 1  | 1  | 1  |
| 4    | TP-6253     | I/M EOZ/EFOZ/EOZD/EFOZD    | 1                | 1  | 1  | 1  | 1  |
| 5    | TP-6255     | S/M 8-15.5EOZD/6.5-13EFOZD | 1                | 1  | 1  | 1  | 1  |
| 6    | TP-6271     | P/C 13-15.5EOZD/11-13EFOZD | 1                | 1  | 1  | 1  | 1  |
| 7    | TP-6292     | O/M Yanmar TNV Series      | 1                | 1  | 1  |    |    |
| 7    | TP-6067     | O/M Yanmar TNE Series      |                  |    |    | 1  | 1  |
| 8    | TP-6293     | S/M Yanmar TNV Series      | 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

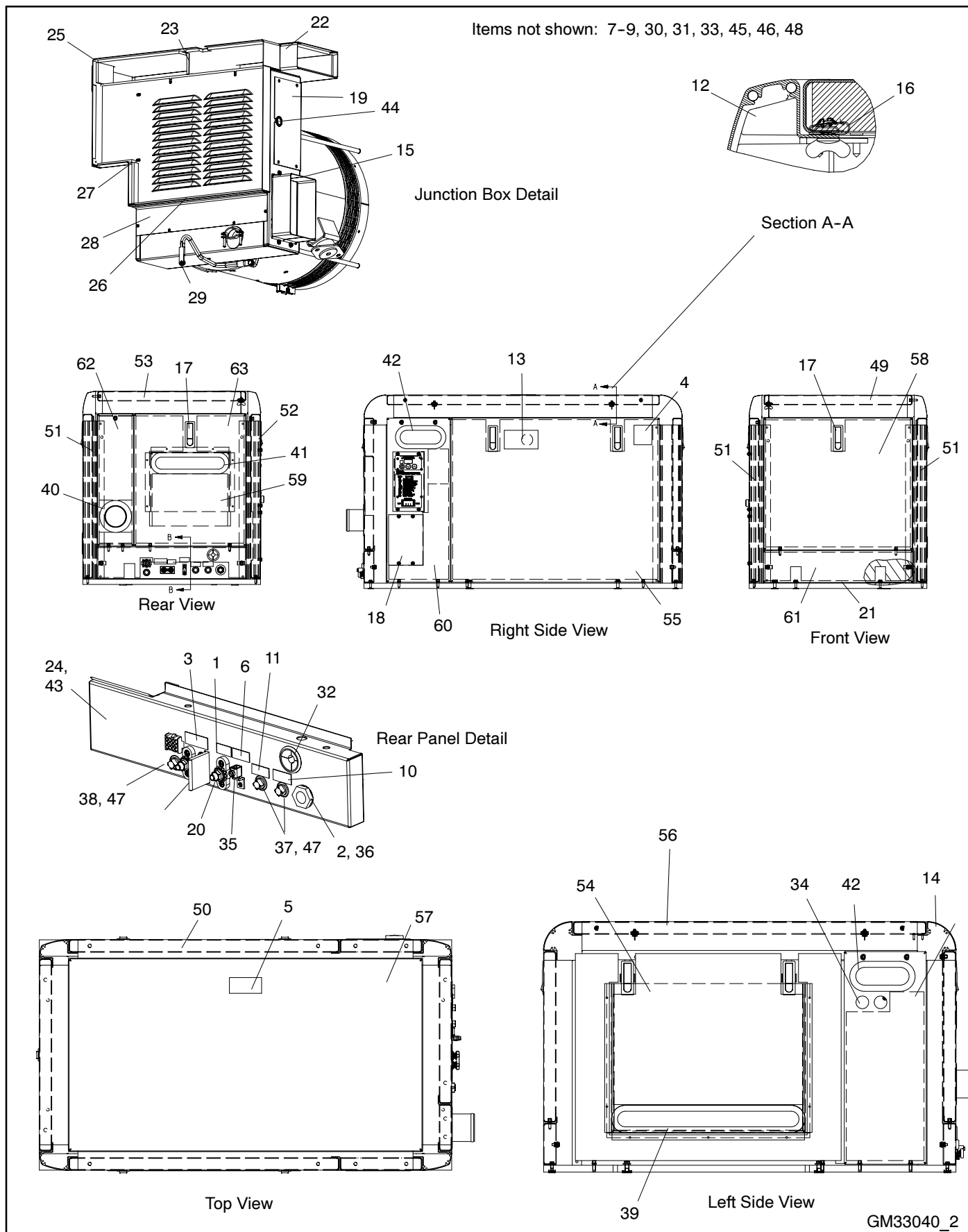


GM33040\_1

# Sound Shield

| Item | Part Number | Description                              | Quantity   |            |            |            |
|------|-------------|------------------------------------------|------------|------------|------------|------------|
|      |             |                                          | Kit Number |            |            |            |
|      |             |                                          | GM33040-K1 | GM32546-K1 | GM32546-K2 | GM33040-K2 |
| 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    | GM31926     | Base, sound shield                       | 1          | 1          | 1          | 1          |
| 6    | GM32638     | Hose, radiator                           | 1          | 1          | 1          | 1          |
| 7    | X-545-173   | Cable, battery                           | 1          |            |            | 1          |
| 7    | X-545-177   | Cable, battery                           |            | 1          | 1          |            |
| 8    | X-545-174   | Cable, battery                           | 1          | 1          | 1          | 1          |
| 9    | X-651-6     | Hose, rubber, straight, .375 in. ID      | 1          | 1          | 1          | 1          |
| 10   | X-426-18    | Clamp, hose, .38/.88 in.                 | 1          | 1          | 1          | 1          |
| 11   | X-6014-117  | Hose, wire inserted radiator             | 1          | 1          | 1          | 1          |
| 12   | X-426-8     | Clamp, hose, .81/1.75 in.                | 2          | 2          | 2          | 2          |
| 13   | X-386-75    | Fuel line, flexible                      | 1          |            |            | 1          |
| 13   | X-386-70    | Fuel line, flexible                      |            | 1          | 1          |            |
| 13   | X-380-4     | Connector, hose + vibra seal (not shown) |            | 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-386-103   | Hose                                     | 1          |            |            | 1          |
| 16   | X-386-90    | 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         |

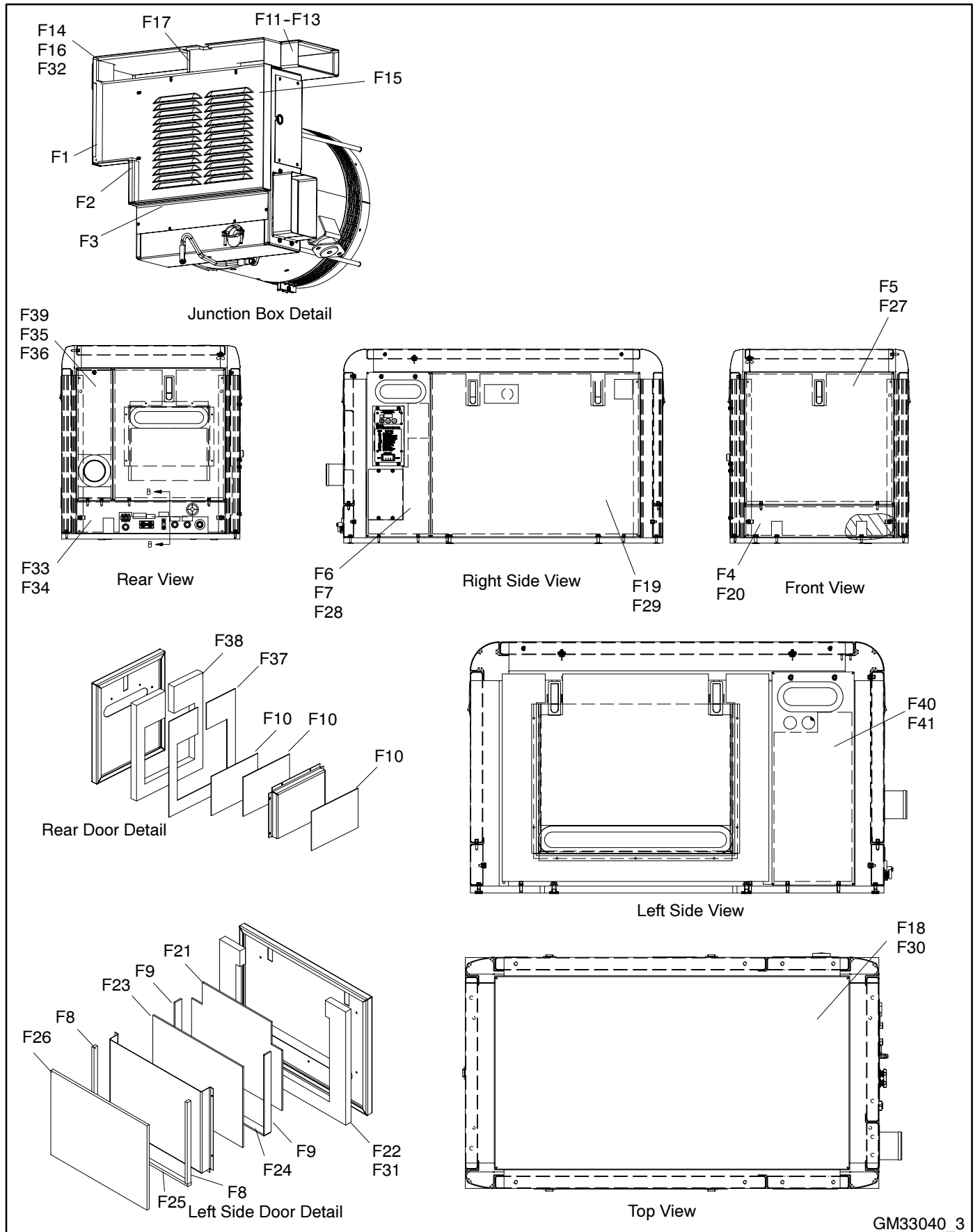
# Sound Shield, continued



## Sound Shield, continued

| Item | Part Number  | Description                         | Quantity   |            |            |            |
|------|--------------|-------------------------------------|------------|------------|------------|------------|
|      |              |                                     | Kit Number |            |            |            |
|      |              |                                     | GM33040-K1 | GM32546-K1 | GM33040-K2 | GM32546-K2 |
| 1    | 226917       | Decal, negative battery connect     | 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          |
| 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 in. 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          | 2          | 2          |
| 38   | X-582-39     | Connector, hose                     | 2          | 2          | 2          | 2          |
| 39   | X-582-9      | Connector, hose + vibra seal        | 1          | 1          | 1          | 1          |
| 40   | X-6047-3     | Channel, U                          | 1          | 1          | 1          | 1          |
| 41   | X-6047-33    | Channel, U                          | 1          | 1          | 1          | 1          |
| 42   | X-6047-44    | Channel, U                          | 1          | 1          | 1          | 1          |
| 43   | X-6047-7     | Channel, U                          | 2          | 2          | 2          | 2          |
| 44   | X-6220-3     | Clip, speed                         | 4          | 4          | 4          | 4          |
| 45   | X-634-25     | Bushing, .672 x .875 in. NPT        | 1          | 1          | 1          | 1          |
| 46   | X-67-64      | Screw, self-tapping                 | 11         | 11         | 11         | 11         |
| 47   | X-71-2       | Nut, hex machine screw, 6-32        | 1          | 1          | 1          | 1          |
| 48   | X-75-10      | Plug, pipe, 3/8 in. NPT             | 3          | 3          | 3          | 3          |
| 49   | X-781-14     | Rivet, pop, .187 in.                | 15         | 15         | 15         | 15         |
| 50   | 359044       | Rail, sound shield                  | 1          | 1          | 1          | 1          |
| 51   | GM29319      | Rail, sound shield                  | 2          | 2          | 2          | 2          |
| 52   | GM30642      | Rail, sound shield                  | 3          | 3          | 3          | 3          |
| 53   | GM30643      | Rail, sound shield                  | 1          | 1          | 1          | 1          |
| 54   | GM32568      | Rail, sound shield                  | 1          | 1          | 1          | 1          |
| 55   | GM25960      | Duct, air outlet                    | 1          | 1          | 1          | 1          |
| 56   | GM29392      | Door, sound shield (right side)     | 1          | 1          | 1          | 1          |
| 57   | GM29395      | Door, sound shield (left side)      | 1          | 1          | 1          | 1          |
| 58   | GM29397      | Roof, sound shield                  | 1          | 1          | 1          | 1          |
| 59   | GM29489      | Door, sound shield (front)          | 1          | 1          | 1          | 1          |
| 60   | GM30723      | Duct, air intake                    | 1          | 1          | 1          | 1          |
| 61   | GM31188      | Panel, sound shield (right side)    | 1          | 1          | 1          | 1          |
| 62   | GM32184      | Rail, sound shield (front)          | 1          | 1          | 1          | 1          |
| 63   | GM32553      | Panel, rear exhaust                 | 1          | 1          | 1          | 1          |
| 64   | GM32554      | Door, sound shield (rear)           | 1          | 1          | 1          | 1          |
| 65   | GM32635      | Panel, sound shield (left side)     | 1          | 1          | 1          | 1          |
| 66   | GM33828      | Barrier, battery terminal           | 1          | 1          | 1          | 1          |

# Sound Shield, continued



## Sound Shield, continued

| Item | Part Number | Description                         | Quantity   |            |            |            |
|------|-------------|-------------------------------------|------------|------------|------------|------------|
|      |             |                                     | Kit Number |            |            |            |
|      |             |                                     | GM33040-K1 | GM32546-K1 | GM33040-K2 | GM32546-K2 |
| 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  | GM30885     | Foam, acoustic insulation           | 1          | 1          | 1          | 1          |
| F19  | GM30886     | Foam, acoustic insulation           | 1          | 1          | 1          | 1          |
| F20  | GM30887     | Foam, acoustic insulation           | 1          | 1          | 1          | 1          |
| F21  | GM30898     | Foam, acoustic insulation           | 1          | 1          | 1          | 1          |
| F22  | GM30899     | Foam, acoustic insulation           | 1          | 1          | 1          | 1          |
| F23  | GM30900     | Foam, acoustic insulation           | 1          | 1          | 1          | 1          |
| F24  | GM30901     | Foam, acoustic insulation           | 1          | 1          | 1          | 1          |
| F25  | GM30902     | Foam, acoustic insulation           | 1          | 1          | 1          | 1          |
| F26  | GM30903     | 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  | GM30918     | Foam, acoustic insulation (barrier) | 1          | 1          | 1          | 1          |
| F30  | GM30919     | Foam, acoustic insulation (barrier) | 1          | 1          | 1          | 1          |
| F31  | GM30920     | 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  | GM32636     | Insulation, acoustic foam           | 1          | 1          | 1          | 1          |
| F41  | GM32637     | Insulation, acoustic foam (barrier) | 1          | 1          | 1          | 1          |

# Parts List: Accessories

| Qty. | Description | Part No. |
|------|-------------|----------|
|------|-------------|----------|

## Circuit Breakers

|                                    |                         |
|------------------------------------|-------------------------|
| <b>Circuit Breaker Kit</b>         | <b>GM30331-KA(KP)12</b> |
| 1 Plate, cover                     | 229208                  |
| 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, 50 A, 1 pole    | 229917                  |
| 2 Nut, flange whiz, 6-32           | X-6210-3                |

|                                    |                         |
|------------------------------------|-------------------------|
| <b>Circuit Breaker Kit</b>         | <b>GM30331-KA(KP)13</b> |
| 1 Plate, circuit breaker           | GM30023                 |
| 4 Screw, pan head, 6-32 x 3/16 in. | X-49-21                 |
| 1 Circuit breaker, 50 A, 2 pole    | 249479                  |

|                                    |                         |
|------------------------------------|-------------------------|
| <b>Circuit Breaker Kit</b>         | <b>GM30331-KA(KP)14</b> |
| 1 Plate, circuit breaker           | GM30023                 |
| 4 Screw, pan head, 6-32 x 3/16 in. | X-49-21                 |
| 1 Circuit breaker, 60 A, 2 pole    | 229205                  |

|                                    |                         |
|------------------------------------|-------------------------|
| <b>Circuit Breaker Kit</b>         | <b>GM30331-KA(KP)16</b> |
| 1 Boot                             | 238915                  |
| 1 Plate, circuit breaker           | GM30023                 |
| 4 Screw, pan head, 6-32 x 3/16 in. | X-49-21                 |
| 1 Circuit breaker, 70 A, 2 pole    | 229397                  |

|                                    |                         |
|------------------------------------|-------------------------|
| <b>Circuit Breaker Kit</b>         | <b>GM30331-KA(KP)17</b> |
| 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, 60 A, 1 pole    | 359367                  |
| 2 Nut, flange whiz, 6-32           | X-6210-3                |

|                                    |                         |
|------------------------------------|-------------------------|
| <b>Circuit Breaker Kit</b>         | <b>GM30331-KA(KP)25</b> |
| 3 Boot                             | 238915                  |
| 1 Plate, circuit breaker           | GM30024                 |
| 4 Screw, pan head, 6-32 x 3/16 in. | X-49-21                 |
| 1 Circuit breaker, 50 A, 3 pole    | 269249                  |

|                                    |                         |
|------------------------------------|-------------------------|
| <b>Circuit Breaker Kit</b>         | <b>GM30331-KA(KP)26</b> |
| 3 Boot                             | 238915                  |
| 1 Plate, circuit breaker           | GM30024                 |
| 4 Screw, pan head, 6-32 x 3/16 in. | X-49-21                 |
| 1 Circuit breaker, 40 A, 3 pole    | 269252                  |

## Electrical System

|                                     |                        |
|-------------------------------------|------------------------|
| <b>Isolated Ground System, 12 V</b> | <b>GM31865-KA(KP)1</b> |
| 1 Adapter, sender                   | 229323                 |
| 4 Insulator, panel                  | 233269                 |
| 1 Sensor, pressure                  | GM28822                |
| 1 Switch, high temp. cut-out        | GM29289                |
| 1 Solenoid                          | GM30412                |
| 1 Harness, engine                   | GM31764                |
| 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              |

|                                 |                    |
|---------------------------------|--------------------|
| <b>Harness, 12 in., Pigtail</b> | <b>GM32332-KP1</b> |
| 1 Harness, pigtail              | GM32324            |

| Qty. | Description | Part No. |
|------|-------------|----------|
|------|-------------|----------|

|                                      |                    |
|--------------------------------------|--------------------|
| <b>Harness, 15 ft., Remote Panel</b> | <b>GM32333-KP1</b> |
| 1 Harness, extension                 | GM30248            |

|                                      |                    |
|--------------------------------------|--------------------|
| <b>Harness, 25 ft., Remote Panel</b> | <b>GM32333-KP2</b> |
| 1 Harness, extension                 | GM32323            |

|                            |                        |
|----------------------------|------------------------|
| <b>Oil Pressure Sender</b> | <b>GM32112-KA(KP)1</b> |
| 1 Adapter, sender          | 229323                 |
| 1 Sensor, pressure         | GM28822                |

|                             |                    |
|-----------------------------|--------------------|
| <b>Preheat Kit, 12 Volt</b> | <b>(PA-)229240</b> |
| 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             |

|                                       |                        |
|---------------------------------------|------------------------|
| <b>Preheat Kit, 12 Volt</b>           | <b>GM32117-KA(KP)8</b> |
| 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               |

|                                       |                        |
|---------------------------------------|------------------------|
| <b>Preheat Kit, 24 Volt</b>           | <b>GM32117-KA(KP)9</b> |
| 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               |

|                             |                    |
|-----------------------------|--------------------|
| <b>Remote Digital Gauge</b> | <b>GM32337-KP1</b> |
| 1 Decal, waring             | 249494             |
| 1 Gauge, digital            | GM30565            |
| 1 Harness, remote           | GM32325            |

|                                        |                    |
|----------------------------------------|--------------------|
| <b>Remote Start Panel (12 V)</b>       | <b>GM32335-KP1</b> |
| 1 Decal, warning                       | 249494             |
| 1 Installation instructions            | TT-1245            |
| 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             |

# Parts List: Accessories

| Qty. | Description | Part No. |
|------|-------------|----------|
|------|-------------|----------|

|                                  |                                      |                    |
|----------------------------------|--------------------------------------|--------------------|
| <b>Remote Start Panel (24 V)</b> |                                      | <b>GM32335-KP2</b> |
| 1                                | Decal, warning                       | 249494             |
| 1                                | Installation instructions            | TT-1245            |
| 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             |

|                             |                           |                   |
|-----------------------------|---------------------------|-------------------|
| <b>Ship to Shore Switch</b> |                           | <b>PAA-246617</b> |
| 1                           | Switch, transfer, 3-pole  | A-246617          |
| 1                           | Installation Instructions | TT-535            |

## Miscellaneous Accessories

|                             |                                       |                    |
|-----------------------------|---------------------------------------|--------------------|
| <b>Fuel/Water Separator</b> |                                       | <b>GM31994-KP1</b> |
| 1                           | Filter assembly, fuel/water separator | GM32181            |
| 1                           | Element, water separator              | GM32182            |

|                                |                        |                        |
|--------------------------------|------------------------|------------------------|
| <b>Keel Cooling Conversion</b> |                        | <b>GM32201-KA(KP)3</b> |
| 1                              | O-ring                 | 252685                 |
| 1                              | Gasket                 | 252929                 |
| 1                              | Cover                  | 256544                 |
| 1                              | Flange, exhaust outlet | GM34471                |

|                                |                        |                        |
|--------------------------------|------------------------|------------------------|
| <b>Keel Cooling Conversion</b> |                        | <b>GM32201-KA(KP)4</b> |
| 1                              | O-ring                 | 252685                 |
| 1                              | Gasket                 | 256653                 |
| 1                              | Cover                  | 256544                 |
| 1                              | Flange, exhaust outlet | GM32186                |

|                     |                           |                  |
|---------------------|---------------------------|------------------|
| <b>Siphon Break</b> |                           | <b>PA-229928</b> |
| 1                   | Valve, siphon break       | GM32985          |
| 1                   | Installation Instructions | TT-1268          |

|                     |                           |                  |
|---------------------|---------------------------|------------------|
| <b>Siphon Break</b> |                           | <b>PA-229929</b> |
| 1                   | Valve, siphon break       | GM34688          |
| 1                   | Installation Instructions | TT-1268          |

|                              |                                       |                        |
|------------------------------|---------------------------------------|------------------------|
| <b>Fuel Attachment Block</b> |                                       | <b>GM33129-KA(KP)1</b> |
| 1                            | Fuel block                            | 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-386-101              |
| 1                            | Fuel line, flexible                   | X-386-113              |
| 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                |

| Qty. | Description | Part No. |
|------|-------------|----------|
|------|-------------|----------|

## Sound Shield

|                                     |                                 |                        |
|-------------------------------------|---------------------------------|------------------------|
| <b>Siphon Break Hose Connection</b> |                                 | <b>GM32719-KA(KP)1</b> |
| 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-284-43               |
| 2                                   | Clamp, hose, .75/1.5 in.        | X-426-15               |
| 1                                   | Clamp, hose, .25/.70 in.        | X-426-9                |

|                                     |                                 |                        |
|-------------------------------------|---------------------------------|------------------------|
| <b>Siphon Break Hose Connection</b> |                                 | <b>GM32719-KA(KP)2</b> |
| 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-284-43               |
| 2                                   | Clamp, hose, .75/1.5 in.        | X-426-15               |
| 1                                   | Clamp, hose, .25/.70 in.        | X-426-9                |

# Notes

# Appendix A Abbreviations

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

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

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

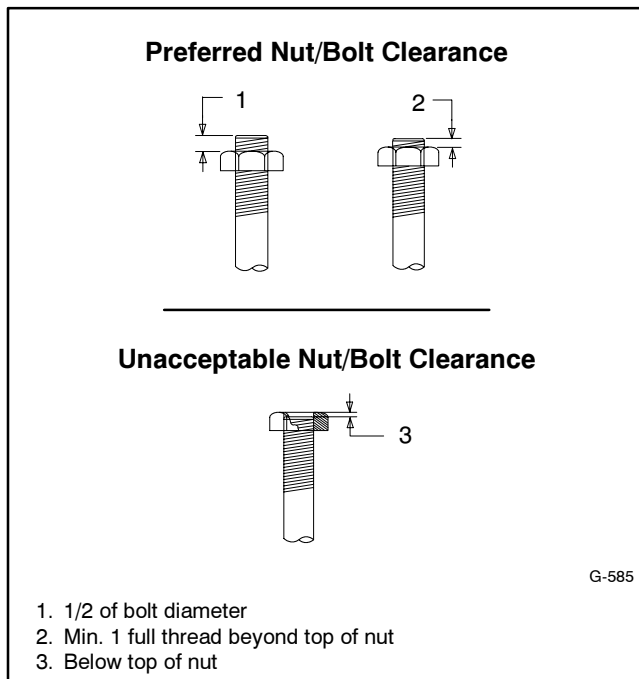
## Appendix B Common Hardware Application Guidelines

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

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

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

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



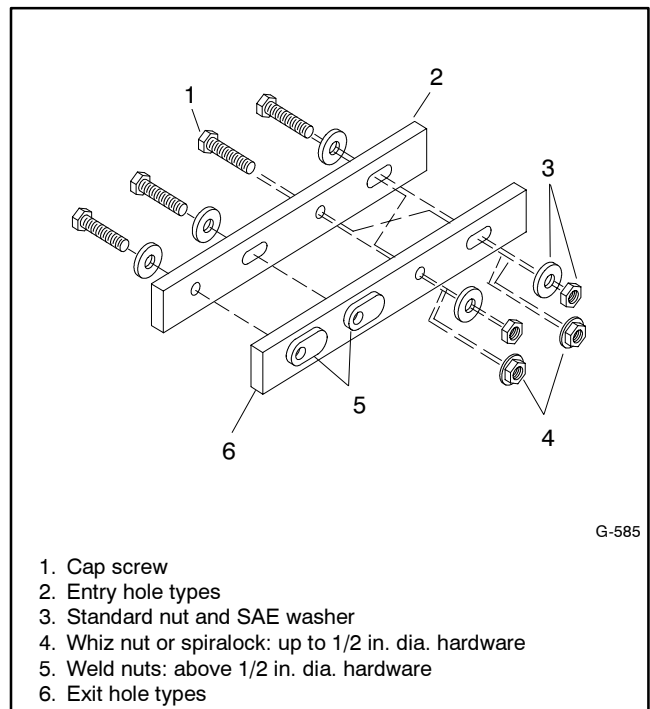
**Figure 1** Acceptable Bolt Lengths

Steps for common hardware application:

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

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

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



**Figure 2** Acceptable Hardware Combinations

## Appendix C General Torque Specifications

Use the following torque specifications when service literature instructions give no specific torque values. The charts list values for new plated, zinc phosphate, or

oiled threads. Increase values by 15% for nonplated threads. All torque values are +0%/-10%.

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

| Metric Fasteners Torque Specifications, Measured in Nm (ft. lb.) |                                   |             |             |                                          |
|------------------------------------------------------------------|-----------------------------------|-------------|-------------|------------------------------------------|
| Size (mm)                                                        | Assembled into Cast Iron or Steel |             |             | Assembled into Aluminum Grade 5.8 or 8.8 |
|                                                                  | Grade 5.8                         | Grade 8.8   | Grade 10.9  |                                          |
| M6 x 1.00                                                        | 5.6 (4)                           | 9.9 (7)     | 14.0 (10)   | 5.6 (4)                                  |
| M8 x 1.25                                                        | 13.6 (10)                         | 25.0 (18)   | 35.0 (26)   | 13.6 (10)                                |
| M8 x 1.00                                                        | 21.0 (16)                         | 25.0 (18)   | 35.0 (26)   | 21.0 (16)                                |
| M10 x 1.50                                                       | 27.0 (20)                         | 49.0 (35)   | 68.0 (50)   | 27.0 (20)                                |
| M10 x 1.25                                                       | 39.0 (29)                         | 49.0 (35)   | 68.0 (50)   | 39.0 (29)                                |
| M12 x 1.75                                                       | 47.0 (35)                         | 83.0 (61)   | 117.0 (86)  | —                                        |
| M12 x 1.50                                                       | 65.0 (48)                         | 88.0 (65)   | 125.0 (92)  | —                                        |
| M14 x 2.00                                                       | 74.0 (55)                         | 132.0 (97)  | 185.0 (136) | —                                        |
| M14 x 1.50                                                       | 100.0 (74)                        | 140.0 (103) | 192.0 (142) | —                                        |
| M16 x 2.00                                                       | 115.0 (85)                        | 200.0 (148) | 285.0 (210) | —                                        |
| M16 x 1.50                                                       | 141.0 (104)                       | 210.0 (155) | 295.0 (218) | —                                        |
| M18 x 2.50                                                       | 155.0 (114)                       | 275.0 (203) | 390.0 (288) | —                                        |
| M18 x 1.50                                                       | 196.0 (145)                       | 305.0 (225) | 425.0 (315) | —                                        |

# Appendix D Common Hardware Identification

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

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

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

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

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

## Sample Dimensions

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

1/4-20 x 1  
 ——— Length In Inches (Screws and Bolts)  
 ——— Threads Per Inch  
 ——— Major Thread Diameter In Fractional Inches Or Screw Number Size

### Metric (Screws, Bolts, Studs, and Nuts)

M8-1.25 x 20  
 ——— Length In Millimeters (Screws and Bolts)  
 ——— Distance Between Threads In Millimeters  
 ——— Major Thread Diameter In Millimeters

### Plain Washers

9/32 x 5/8 x 1/16  
 ——— Thickness  
 ——— External Dimension  
 ——— Internal Dimension

### Lock Washers

5/8  
 ——— Internal Dimension

# Appendix E Common Hardware List

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

## American Standard

### Part No. Dimensions Hex Head Bolts (Grade 5)

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

### Part No. Dimensions Hex Head Bolts, cont.

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

### Part No. Dimensions Type

#### Hex Nuts

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

#### Washers

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

## Metric

Hex head bolts are hardness grade 8.8 unless noted.

### Part No. Dimensions Hex Head Bolts (Partial Thread)

|               |                |
|---------------|----------------|
| M931-05055-60 | M5-0.80 x 55   |
| M931-06040-60 | M6-1.00 x 40   |
| M931-06055-60 | M6-1.00 x 55   |
| M931-06060-60 | M6-1.00 x 60   |
| M931-06060-SS | M6-1.00 x 60   |
| M931-06070-60 | M6-1.00 x 70   |
| M931-06070-SS | M6-1.00 x 70   |
| M931-06075-60 | M6-1.00 x 75   |
| M931-06090-60 | M6-1.00 x 90   |
| M931-06145-60 | M6-1.00 x 145  |
| M931-06150-60 | M6-1.00 x 150  |
| M931-08035-60 | M8-1.25 x 35   |
| M931-08040-60 | M8-1.25 x 40   |
| M931-08045-60 | M8-1.25 x 45   |
| M931-08050-60 | M8-1.25 x 50   |
| M931-08055-60 | M8-1.25 x 55   |
| M931-08055-82 | M8-1.25 x 55*  |
| M931-08060-60 | M8-1.25 x 60   |
| M931-08070-60 | M8-1.25 x 70   |
| M931-08070-82 | M8-1.25 x 70*  |
| M931-08075-60 | M8-1.25 x 75   |
| M931-08080-60 | M8-1.25 x 80   |
| M931-08090-60 | M8-1.25 x 90   |
| M931-08095-60 | M8-1.25 x 95   |
| M931-08100-60 | M8-1.25 x 100  |
| M931-08110-60 | M8-1.25 x 110  |
| M931-08120-60 | M8-1.25 x 120  |
| M931-08130-60 | M8-1.25 x 130  |
| M931-08140-60 | M8-1.25 x 140  |
| M931-08150-60 | M8-1.25 x 150  |
| M931-08200-60 | M8-1.25 x 200  |
| M931-10040-82 | M10-1.25 x 40* |
| M931-10040-60 | M10-1.50 x 40  |
| M931-10045-60 | M10-1.50 x 45  |
| M931-10050-60 | M10-1.50 x 50  |
| M931-10050-82 | M10-1.25 x 50* |
| M931-10055-60 | M10-1.50 x 55  |
| M931-10060-60 | M10-1.50 x 60  |
| M931-10065-60 | M10-1.50 x 65  |
| M931-10070-60 | M10-1.50 x 70  |
| M931-10080-60 | M10-1.50 x 80  |
| M931-10080-82 | M10-1.25 x 80* |
| M931-10090-60 | M10-1.50 x 90  |
| M931-10090-82 | M10-1.50 x 90* |
| M931-10100-60 | M10-1.50 x 100 |
| M931-10110-60 | M10-1.50 x 110 |
| M931-10120-60 | M10-1.50 x 120 |
| M931-10130-60 | M10-1.50 x 130 |
| M931-10140-60 | M10-1.50 x 140 |
| M931-10180-60 | M10-1.50 x 180 |
| M931-10235-60 | M10-1.50 x 235 |
| M931-10260-60 | M10-1.50 x 260 |
| M960-10330-60 | M10-1.25 x 330 |
| M931-12045-60 | M12-1.75 x 45  |
| M960-12050-60 | M12-1.25 x 50  |
| M960-12050-82 | M12-1.25 x 50* |
| M931-12050-60 | M12-1.75 x 50  |
| M931-12050-82 | M12-1.75 x 50* |
| M931-12055-60 | M12-1.75 x 55  |
| M931-12060-60 | M12-1.75 x 60  |
| M931-12060-82 | M12-1.75 x 60* |
| M931-12065-60 | M12-1.75 x 65  |
| M931-12075-60 | M12-1.75 x 75  |
| M931-12080-60 | M12-1.75 x 80  |
| M931-12090-60 | M12-1.75 x 90  |
| M931-12100-60 | M12-1.75 x 100 |
| M931-12110-60 | M12-1.75 x 110 |

### Part No. Dimensions Hex Head Bolts (Partial Thread), continued

|               |                 |
|---------------|-----------------|
| M960-16090-60 | M16-1.50 x 90   |
| M931-16090-60 | M16-2.00 x 90   |
| M931-16100-60 | M16-2.00 x 100  |
| M931-16100-82 | M16-2.00 x 100* |
| M931-16120-60 | M16-2.00 x 120  |
| M931-16150-60 | M16-2.00 x 150  |
| M931-20065-60 | M20-2.50 x 65   |
| M931-20090-60 | M20-2.50 x 90   |
| M931-20100-60 | M20-2.50 x 100  |
| M931-20120-60 | M20-2.50 x 120  |
| M931-20140-60 | M20-2.50 x 140  |
| M931-20160-60 | M20-2.50 x 160  |
| M931-22090-60 | M22-2.50 x 90   |
| M931-22120-60 | M22-2.50 x 120  |
| M931-22160-60 | M22-2.50 x 160  |
| M931-24090-60 | M24-3.00 x 90   |
| M931-24120-60 | M24-3.00 x 120  |
| M931-24160-60 | M24-3.00 x 160  |
| M931-24200-60 | M24-3.00 x 200  |

### Hex Head Bolts (Full Thread)

|               |                |
|---------------|----------------|
| M933-04006-60 | M4-0.70 x 6    |
| M933-05030-60 | M5-0.80 x 30   |
| M933-05035-60 | M5-0.80 x 35   |
| M933-05050-60 | M5-0.80 x 50   |
| M933-06010-60 | M6-1.00 x 10   |
| M933-06012-60 | M6-1.00 x 12   |
| M933-06014-60 | M6-1.00 x 14   |
| M933-06016-60 | M6-1.00 x 16   |
| M933-06020-60 | M6-1.00 x 20   |
| M933-06025-60 | M6-1.00 x 25   |
| M933-06030-60 | M6-1.00 x 30   |
| M933-06040-60 | M6-1.00 x 40   |
| M933-06050-60 | M6-1.00 x 50   |
| M933-07025-60 | M7-1.00 x 25   |
| M933-08010-60 | M8-1.25 x 10   |
| M933-08012-60 | M8-1.25 x 12   |
| M933-08016-60 | M8-1.25 x 16   |
| M933-08020-60 | M8-1.25 x 20   |
| M933-08025-60 | M8-1.25 x 25   |
| M933-08030-60 | M8-1.25 x 30   |
| M933-08030-82 | M8-1.25 x 30*  |
| M933-10012-60 | M10-1.50 x 12  |
| M961-10020-60 | M10-1.25 x 20  |
| M933-10020-60 | M10-1.50 x 20  |
| M933-10025-60 | M10-1.50 x 25  |
| M961-10025-60 | M10-1.25 x 25  |
| M933-10025-82 | M10-1.50 x 25* |
| M961-10030-60 | M10-1.25 x 30  |
| M933-10030-60 | M10-1.50 x 30  |
| M933-10030-82 | M10-1.50 x 30* |
| M961-10035-60 | M10-1.25 x 35  |
| M933-10035-60 | M10-1.50 x 35  |
| M933-10035-82 | M10-1.50 x 35* |
| M961-10040-60 | M10-1.25 x 40  |

### Part No. Dimensions Hex Head Bolts (Full Thread), continued

|                |                |
|----------------|----------------|
| M933-12016-60  | M12-1.75 x 16  |
| M933-12020-60  | M12-1.75 x 20  |
| M961-12020-60F | M12-1.50 x 20  |
| M933-12025-60  | M12-1.75 x 25  |
| M933-12025-82  | M12-1.75 x 25* |
| M961-12030-60  | M12-1.25 x 30  |
| M933-12030-82  | M12-1.75 x 30* |
| M961-12030-82F | M12-1.50 x 30* |
| M933-12030-60  | M12-1.75 x 30  |
| M933-12035-60  | M12-1.75 x 35  |
| M961-12040-82  | M12-1.25 x 40* |
| M933-12040-60  | M12-1.75 x 40  |
| M933-12040-82  | M12-1.75 x 40* |
| M961-14025-60  | M14-1.50 x 25  |
| M933-14025-60  | M14-2.00 x 25  |
| M961-14050-82  | M14-1.50 x 50* |
| M961-16025-60  | M16-1.50 x 25  |
| M933-16025-60  | M16-2.00 x 25  |
| M961-16030-82  | M16-1.50 x 30* |
| M933-16030-82  | M16-2.00 x 30* |
| M933-16035-60  | M16-2.00 x 35  |
| M961-16040-60  | M16-1.50 x 40  |
| M933-16040-60  | M16-2.00 x 40  |
| M961-16045-82  | M16-1.50 x 45* |
| M933-16045-82  | M16-2.00 x 45* |
| M933-16050-60  | M16-2.00 x 50  |
| M933-16050-82  | M16-2.00 x 50* |
| M933-16060-60  | M16-2.00 x 60  |
| M933-16070-60  | M16-2.00 x 70  |
| M933-18035-60  | M18-2.50 x 35  |
| M933-18050-60  | M18-2.50 x 50  |
| M933-18060-60  | M18-2.50 x 60  |
| M933-20050-60  | M20-2.50 x 50  |
| M933-20055-60  | M20-2.50 x 55  |
| M933-24060-60  | M24-3.00 x 60  |
| M933-24065-60  | M24-3.00 x 65  |
| M933-24070-60  | M24-3.00 x 70  |

### Pan Head Machine Screws

|                 |               |
|-----------------|---------------|
| M7985A-03010-20 | M3-0.50 x 10  |
| M7985A-03012-20 | M3-0.50 x 12  |
| M7985A-04010-20 | M4-0.70 x 10  |
| M7985A-04016-20 | M4-0.70 x 16  |
| M7985A-04020-20 | M4-0.70 x 20  |
| M7985A-04050-20 | M4-0.70 x 50  |
| M7985A-04100-20 | M4-0.70 x 100 |
| M7985A-05010-20 | M5-0.80 x 10  |
| M7985A-05012-20 | M5-0.80 x 12  |
| M7985A-05016-20 | M5-0.80 x 16  |
| M7985A-05020-20 | M5-0.80 x 20  |
| M7985A-05025-20 | M5-0.80 x 25  |
| M7985A-05030-20 | M5-0.80 x 30  |
| M7985A-05080-20 | M5-0.80 x 80  |
| M7985A-05100-20 | M5-0.80 x 100 |
| M7985A-06100-20 | M6-1.00 x 100 |

### Flat Head Machine Screws

|                |              |
|----------------|--------------|
| M965A-04012-SS | M4-0.70 x 12 |
| M965A-05012-SS | M5-0.80 x 12 |
| M965A-05016-20 | M5-0.80 x 16 |
| M965A-06012-20 | M6-1.00 x 12 |

\* This metric hex bolt's hardness is grade 10.9.

## Metric, continued

| Part No.        | Dimensions | Type         |
|-----------------|------------|--------------|
| <b>Hex Nuts</b> |            |              |
| M934-03-50      | M3-0.50    | Standard     |
| M934-04-50      | M4-0.70    | Standard     |
| M934-04-B       | M4-0.70    | Brass        |
| M934-05-50      | M5-0.80    | Standard     |
| M934-06-60      | M6-1.00    | Standard     |
| M934-06-64      | M6-1.00    | Std. (green) |
| M6923-06-80     | M6-1.00    | Spiralock    |
| M982-06-80      | M6-1.00    | Elastic Stop |
| M934-08-60      | M8-1.25    | Standard     |
| M6923-08-80     | M8-1.25    | Spiralock    |
| M982-08-80      | M8-1.25    | Elastic Stop |
| M934-10-60      | M10-1.50   | Standard     |
| M934-10-60F     | M10-1.25   | Standard     |
| M6923-10-80     | M10-1.50   | Spiralock    |
| M6923-10-62     | M10-1.50   | Spiralock†   |
| M982-10-80      | M10-1.50   | Elastic Stop |
| M934-12-60      | M12-1.75   | Standard     |
| M934-12-60F     | M12-1.25   | Standard     |
| M6923-12-80     | M12-1.75   | Spiralock    |
| M982-12-80      | M12-1.75   | Elastic Stop |
| M982-14-60      | M14-2.00   | Elastic Stop |
| M6923-16-80     | M16-2.00   | Spiralock    |
| M982-16-80      | M16-2.00   | Elastic Stop |
| M934-18-80      | M18-2.5    | Standard     |
| M982-18-60      | M18-2.50   | Elastic Stop |
| M934-20-80      | M20-2.50   | Standard     |
| M982-20-80      | M20-2.50   | Elastic Stop |
| M934-22-60      | M22-2.50   | Standard     |
| M934-24-80      | M24-3.00   | Standard     |
| M982-24-60      | M24-3.00   | Elastic Stop |
| M934-30-80      | M30-3.50   | Standard     |

## Washers

| Part No.    | ID   | OD   | Thick. | Bolt/<br>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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