Onan

# RV GenSet

## Standard Repair Times

# HDKAJ, HDKAK

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Cummins Power Generation

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# FOREWORD

The Standard Repair Times (SRT) in this manual represent the time required to perform service repairs on Onan Engine and Generator Sets. These times are representative of an average mechanic in a typical dealer or distributorship using the prescribed hand tools, equipment, and all available service tools and equipment required to perform quality repairs and do all necessary testing.

The use of this manual will:

- Encourage uniform terminology throughout the Cummins/Onan organization
- Standardize Repair Order job description write-ups
- Provide shop managers with a guide for establishing flat rate quotations
- Serve as a basis for Onan Corporation, Inc. to establish its warranty labor obligations

Reporting of errors, omissions, and recommendations for improving this publication is encouraged. Send your suggestions or comments to:

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# GENERAL INFORMATION

Standard Repair Times (SRT) are lists of work tasks (procedures) and the time required to perform those tasks. The procedures list the work tasks required to be sure an engine or generator set is ready to return to service at the lowest possible cost to the customer. A Standard Repair Time is equitable when the repair described in the procedure can be performed in a period of time less than or equal to the standard by a journeyman mechanic after he/she has performed that repair on the same model, in the same application at least once. Those SRT that a particular mechanic performs more frequently will often require less time than the standard. Conversely, those SRT that a particular mechanic does not frequently perform may require more time than the standard. Several of the procedures may be required to accurately depict all the work actually performed to return a particular engine or generator set to service because the repair of a particular engine or generator set is often unique in light of the complaint, failure model, progressive damage, condition of the parts and customer desires. To allow for differences in the time required to perform a repair because of interference by the application, a Service Accessibility Code Scheme has been created.

## Types of Standard Repair Times

There are three types of SRT. Most often at least one of each type is necessary to accurately depict the repair. The three types are:

- Administrative
- Troubleshooting
- Repair

## Administrative SRT

Administrative SRT are intended to provide time to move the vehicle engine or generator set to and from the work area, fill out the repair order, record SRT used, etc. It is intended that an administrative SRT be used only once for each repair order. There are two administrative SRT found in this manual in Group 00 – Complete Engine. One of the administrative SRT is to be used when the repair takes place in a shop operated by the repairing location. The other administrative SRT is to be used when the repair takes place away from the shop operated by the repairing location (road repairs). The time for the road repair administrative SRT is greater to allow for loading and unloading tools, equipment, parts, etc. from the service truck.

## Troubleshooting SRT

Troubleshooting SRT are found only in Group 00 – Complete Engine. These SRT are intended to be used when diagnosing and analyzing engine, generator set or component failures. Troubleshooting SRT are broken down in to logical numbered steps. The time for each step is cumulative with successive steps, including the time for the appropriate preceding step(s). Some troubleshooting SRT contain time to remove and install components to perform the check(s) listed. Most do not. If a troubleshooting SRT does **NOT** include required component removal and installation, it is intended that the SRT for the removal and installa-

tion of that component be in addition to the troubleshooting SRT. Refer to the following example:

| Procedure Number | | Procedure Description | SRT Hours |
|---|---|---|---|
| 00–055 | | Troubleshoot – Lubricating Oil Consumption Excessive<br>Includes: | |
| | –01 | – Check:<br>– Oil consumption report<br>– For external oil leaks<br>– For overfilled oil pan<br>– Oil specifications<br>– For fuel contamination<br>– Oil change interval<br>– For engine oil in torque converter | 0.4 |
| | –02 | – Perform checks in Step 01<br>– Check:<br>– Oil temperature<br>– Air compressor oil consumption<br>– Turbocharger seal<br>– Crankcase blowby | 1.0 |

In the above example, the time required to perform the checks in Step 01 is 0.4 hour. If the problem is not located while performing the checks in Step 01, an additional 0.6 hour is allowed to perform the checks in Step 02 for a total of 1.0 hour. The total troubleshooting time appropriate is the time indicated in the column directly in line with the final step required to locate the problem. The step required to locate the problem may or may not be the last step shown in the troubleshooting SRT. Each step contains information as to which steps are included.

## Repair SRT

Repair SRT make up the majority of this manual. These are the SRT that cover the actual repair work. The time shown on the same line as the SRT code and title is the total time for that SRT.

## Standard Repair Combined Times

Standard Repair Combined Times (SRCT) provide for the combining of the three types of SRT under one code so that, if appropriate, the user can identify the work performed with fewer SRT codes.

# SRT CODING SYSTEM

Each SRT has a unique code so that SRT data can be computerized. The numbering system used is common to all the SRT manuals for all Onan engines and generator sets. The portion of the system shown in the manual contains three segments:

| "Group Number" | "Procedure Number" | "Step Number" |
|---|---|---|
| XX | XXX | XX |

**Group Numbers**

Group numbers (the first two digits in the SRT code) are used to identify major engine components. The list below explains the group numbers used in SRT manuals.

**Procedure Numbers**

The procedure number consists of three digits. The first digit provides guidance as to the category of the repair. The second and third digits, shown as XX in the following list, are sequential numbers or alpha within the category.

| Group Number | Contents of Group | Specific Repair Number | Description of Category |
|---|---|---|---|
| 00 | Complete Engine or Generator Set | | |
| 01 | Cylinder Block | 0XX | Troubleshooting |
| 02 | Cylinder Head | | ONLY in Group 00 |
| 03 | Rocker Levers | 1XX | Remove and Install |
| 04 | Cam Followers/Tappets | 2XX | Rebuild |
| 05 | Fuel System | 3XX | Replace |
| 06 | Injectors and Fuel Lines | 4XX | Clean and Visually Check or Inspect for Reuse |
| 07 | Lubricating Oil System | | |
| 08 | Cooling System | 5XX | Machine/Ream/Dowel/ |
| 09 | Drive Units | | Sleeve |
| 10 | Intake Air System | | Modify/Cut/Lap |
| 11 | Exhaust System | 6XX | Adjust/Calibrate |
| 12 | Air (Compressed) System | | |
| 13 | Electrical Equipment | 7XX | Test |
| 14 | Engine or Generator Set Testing | | |
| 15 | Instruments and Controls | | |
| 16 | Mounting Adaptations | | |
| 17 | Miscellaneous | 9XX | (SRCT in Group 99) General/Miscellaneous |
| 22 | Hardware | | |
| 25 | Generator Components | | |
| 26 | Generator Control Components | | |
| 27 | Transfer Switches | | |
| 99 | SRCT | | |

### Step Numbers

While all SRT codes will contain a Group and Procedure number, only those procedures that are broken down into steps have step numbers. The step numbers are sequential within a SRT.

# MANUAL ORGANIZATION

There is an alphabetic index in the back of the manual. Within a particular group the procedures are arranged in alphabetical order by title, thus are not in code numeric order.

There is also a numerical index in which the procedures are arranged in numeric order and not in alphabetical order.

Within a procedure, the user will note that some lines are indented. This indentation is intended to indicate that the sub–tasks are part of the task under which they are indented.

## Cummins/Onan SRT Objectives and Philosophy

The objective of Cummins/Onan SRT program is to provide credible and equitable labor time standards and procedures to the worldwide Cummins/Onan service network.

A SRT is credible when the procedure accurately depicts the work that **must** be performed to accomplish a quality engine or generator set repair.

A SRT is equitable when it can be performed in a period of time less than or equal to the standard by a journeyman mechanic after he/she has performed that repair at least once.

To establish credible and equitable SRT with sufficient flexibility to account for differences in complaints, failures, progressive damage, customer desires, etc., SRT have been structured using the following considerations:

- What must ALWAYS be done to the engine or generator set to perform the work.
- What MAY have to be done to the engine or generator set parts dependent on their condition.
- What MAY have to be removed to access the engine or generator set.
- How difficult it is for the mechanic to reach the engine or generator set even after interfering application hardware has been removed.

While the most frequent use of SRT information is the Onan Warranty System, it is Onan's intent that the SRT be applicable to repairs conducted for any customer.

As SRT are developed, it is assumed:

- That all the required tools, equipment, and supplies are available in sufficient quantity and in operating condition.
- That required Onan Service Manuals are available to the mechanic are being used.
- That the correct parts are available when the mechanic needs them.

# How Standard Repair Times are Developed

SRTs are developed from time studies conducted in the field and Onan Technical Service Personnel. Technical Service Representatives create a comprehensive list of all the work elements or tasks required to perform specific repairs. Field studies are analyzed to find these same work elements or tasks and determine the time required for each. The time for work elements or tasks that are not included in the field time studies is determined by conducting free engine or generator set studies or by estimation using similar elements from existing time studies. A time is determined for each element of the procedure. The time for all elements is then totaled to establish the total productive repair time.

## Productive Repair Time

Productive Repair Time is described as the actual time involved doing productive work, such as removing, disassembling, cleaning, inspecting, machining, installing and adjusting parts or components. In addition, the following operations are considered to be productive work for inclusion in an SRT:

- Clock on and off the job or repair order, including shift changes.
- Move vehicle, engine or generator set to and from the work area.
- Move tool box to the work area.
- Obtain tools from tool box, wipe and put away after use.
- Refer to service manuals.
- Obtain, unpack and clean replacement parts as necessary.
- Package and mark parts removed as necessary for warranty or local consumer laws.
- Operate engine or generator set to check for proper operation.
- Clean work area at completion of shift or repair.
- Properly dispose of used engine fluids such as oil and coolant.
- Write summary of work performed at completion of repair or work shift.
- Help from another mechanic (time for one man to complete the task times two).

## Time Allowances

After the total productive time is established, an additional allowance of 15 percent is added to cover the following:

- Personal time of 5 percent for:
  - Scheduled rest breaks
  - Personal phone calls
  - Restroom breaks
  - Shift changes
- Supplementary time of 10 percent to cover normal work interruptions:
  - Seized or hard turning fasteners
  - Extra time for extremely dirty equipment
  - Excessive waiting time for replacement parts
  - Brief assistance to other mechanics (less than 5 minutes)
  - Routine maintenance (not repair) of shop equipment
  - Obtain consumable supplies
  - Technical consultation with shop supervision

The following is an example of how the allowances are calculated to establish the SRT for a procedure where the productive time is 208.7 minute (3.48 hr):

| Allowance Type | Allowance Percent (%) | Time (Minutes) |
|---|---|---|
| Productive Repair Time | 100 | 208.7 |
| Personal | 5 | 10.4 |
| Supplementary | 10 | 20.9 |
| TOTAL | 115 | 240.0 |

Published Standard Repair Time = 4.0 hours

## Work Not Included in A SRT

For almost every complete repair there will be one SRT that contains most of the work performed. This is sometimes called a base repair. For example, repairing an engine for high oil consumption often requires use of the SRT title Piston and Rings – Remove and Install. This SRT contains most of the time appropriate for the repair, so it is the base repair. There can be work required that is **not** part of this base SRT. This does not mean that the other work is non-productive, rather that other work is **NOT** required EVERY TIME the pistons and rings are removed and installed. More often than not, this other work is covered by another SRT. If the other work is **not** included in the base repair or in another SRT, the work is probably still productive work required for that particular repair.

## Non-Productive Work

Analysis of past SRT time studies reveals the following general types of work that were not considered to be productive:

– Waiting on camshaft gears to heat and cool
– Waiting on another mechanic to finish using special tools or shop equipment
– Hunting for misplaced parts
– Repairing shop equipment
– Sorting through capscrews, to find the correct length, that were all thrown together into one basket during disassembly
– Repairing customer supplied components
– Salvaging parts or tools that have been damaged from improper handling or lack of correct tools
– Clearing off tables, parts carts, parts racks etc. left dirty or loaded with parts from previous repairs on other equipment
– Rework caused by installation of incorrect parts or incorrect installation of correct parts
– Fabrication or modification of special tools or equipment because the correct tools or equipment are not available
– Visiting during non-break time
– Conducting business with tool vendors
– Waiting on other mechanics to provide required help

– Waiting on parts clerk to fill orders for other mechanics
– Unnecessary inspection of new parts
– “Hot Setting” valves and injectors when not required
– Repairs to application hardware
– Rework resulting from failure to follow recommended service practices
– Performing work that is **not** part of the repair order or helping another mechanic

## Service Accessibility Codes

Service repairs are affected by engine or generator set accessibility. The more difficult the accessibility, the longer it will take to complete the tasks given in the SRT procedure. Accessibility for a particular application is determined by reviewing the application and rating the degree of difficulty for performing the 20 most common repairs. Four codes (A, B, C and D) are used to classify the degree of difficulty for the service accessibility of a specific model or type of equipment. An “A” accessibility code indicates the engine or generator set is easily accessible. A “D” code indicates the application does not make the engine or generator set as easily accessible, thus the highest degree of difficulty relative to SRT standards. An “S” code is included for special or specific repairs not covered in the other four classifications. The “R” code indicates the repair is completed with the component, engine or generator set removed from the application.

## “A” Accessibility Rating

1. Engine or generator sets mounted in equipment where 90 percent of the work can be performed while standing on the ground, shop floor, or flat work deck.

2. Engine or generator set can be accessed without removing any doors or panels.

3. Interfering application hardware can all be removed.

4. Clearance is sufficient for hands, wrenches, and drain and fill operations, making visual checks and room to stand and work.

## “B” Accessibility Rating

1. Engine or generator set mounted in equipment where 70 percent of the work can be performed while standing on the ground, shop floor or flat work deck.

2. Access to the engine can be gained by removing access panels or doors.

3. On 80 percent of the operations, interfering application hardware can be removed.

4. On 80 percent of the operations, clearance is sufficient for hands, wrenches, service tools, drain and fill operations, making visual checks and room to stand and work.

## “C” Accessibility Rating

1. Engine or generator set  mounted in equipment where 50 percent of the work can be performed while standing on the ground, shop floor, or flat work deck.
2. Access to the engine or generator set can be gained by removing the hood, structural members (bolted in), or sheet metal panels.
3. On 60 percent of the operations, interfering application hardware can be removed.
4. On 60 percent of the operations, clearance is sufficient for hands, wrenches, service tools, drain and fill operations, making visual checks, and room to stand and work.

## “D” Accessibility Rating

1. Engine or generator set mounted in equipment where 25 percent of the work can be performed while standing on the ground, shop floor, or flat work deck.
2. Access to the engine or generator set is limited due to interference from permanently mounted structural members, sheet metal, or crossmembers.
3. On 40 percent of the operations, clearance is sufficient for hands, wrenches, service tools, drain and fill operations, making visual checks, and limited room to stand and work.

## Standard Repair Combined Times (SRCT)

SRCT are the combination of some of the SRT in the manual within a distinctive code. These SRCT are based on field input of SRT that are most frequently used in combination to describe the most common field repairs on this engine.

Use of SRCT can reduce the amount of time required to determine the labor standard for a specific complete engine or generator set repair.  The use of SRCT will also reduce the number of codes required when completing a warranty claim or customer invoice.

SRCT are intended to supplement, NOT replace, SRT.  One SRCT code can be used instead of several SRT codes.

It is intended that other appropriate SRT can be used to supplement a SRCT as long as the work does not overlap.  If there is overlapping work, do **not** use a SRCT.

## How To Use This Manual

1. **Determine the actual work performed:**

   – Obtain this information from the work description on the repair order.

2. **Determine the Accessibility Code:**

   – Determine the application from the repair order.

– Look in the “Accessibility Code Listing” on page to determine the accessibility code for the application involved in the repair. If the application is not shown, assume the accessibility code is “B.”

– Write down the code.

**3. Determine applicable SRCT:**

– Find the Contents Page for Group 99 – Standard Repair Combined Times.

– Compare the titles to the work performed to determine if a SRCT will apply.

– If there is a SRCT that seems to apply, find that SRCT and compare the SRT within the SRCT to the work performed. If you are not sure of the work included in the SRT, read that SRT and compare the procedure listing with the work performed.

– If a SRCT applies to all or part of the work performed, find the column that contains the same accessibility code determined in Step 2 above.

– Move down the column to the line containing the SRCT code and title and pick out the appropriate time.

– If all the work in the SRCT is performed and additional steps were taken, use the SRCT and continue to Step 4 to cover the additional work.

– If there is NOT an appropriate SRCT, move to Step 4.

**4. Determine the appropriate repair SRT:**

– Use the information from the repair order to identify the parts involved.

– Use the contents page at the front of the manual or the alphabetical index in the back of the manual to determine the appropriate SRT group for the parts and/or work involved.

– Find the contents page for that group.

– Read the contents page for procedure titles that seem to correspond to the work performed.

– Find the SRT within the group.

– Read the SRT procedure listing to determine the work included.

– If the work performed and the work included in the SRT are the same, all or in part, determine and record the time.

– Repeat the steps in this paragraph until you have determined a SRT for all the work performed.

5. **Determine the appropriate troubleshooting SRT:**

   – Read the repair order to determine what troubleshooting work was performed.

   – Find the contents page for Group 00.

   – Read the contents page for procedure to determine the work included in each step.

   – If the work performed and the work included in the troubleshooting SRT are the same, all or in part, determine and record the time of the SRT step. Remember that troubleshooting SRT are cumulative.

6. **Determine the appropriate miscellaneous SRT:**

   – Read the repair order to determine if any application hardware was removed and installed in order to access the engine or generator set.

   – Find the contents page for Group 17.

   – Read the contents page for procedure titles that seem to correspond to the work performed.

   – Find the SRT within the group.

   – Read the SRT procedure to determine the work included in the SRT.

   – If the work performed and the work included in the SRT are the same, all or in part, determine and record the time.

   – If the work required to application hardware is not given in the SRT manual, determine the time for ONLY this work from the repair order. Record the time for possible use as “99–999” or “Non-SRT Time”.

7. **Determine the appropriate administrative SRT:**

   – Both of the administrative SRT are shown at the beginning of Group 00.

   – Determine the appropriate SRT.

   – Record the time.

8. **Determine the total appropriate SRT time:**

   – Check to be sure that there is no duplication of tasks within the SRT procedures selected. If there is work duplicated by some of those selected, use other information contained in the manual to reduce the time of one of the SRT accordingly. If the information is not available, make an estimate.

   – Total all the times obtained during performance of Steps 2 through 7.

**Standard Repair Times Review Procedure**

Onan Corporation makes every effort to be sure the SRT published in this manual are credible and equitable. It will be necessary to review the published times when one or more of the following changes occur:

– Design changes to special service tools or equipment required to perform the repair

– Changes to the repair procedure

A formal SRT review procedure is available for any Cummins/Onan Authorized Repair Location that believes the SRT shown in this manual are incorrect.

To be sure prompt attention and an accurate appraisal is given to your request, the following guidelines must be met:

1. Be sure the technician has followed all the procedures and used all the service tools referred to in the appropriate service manuals.

2. Be sure a journeyman technician performed the repair, one who has completed the repair a sufficient number of times to become familiar with the procedure.

3. Be sure all the SRT, including supplemental SRT, appropriate for the repair are being used.

4. Include as much detail as possible about the specific repair.

**NOTE:** It is **NOT** the intent of this procedure to provide a forum for appealing or disputing the amount of time or the SRT judged appropriate on a particular warranty claim. Communication of this sort **must** follow the processes shown in the Onan Warranty Administration Manual.

5. Provide photographs of the installation.

6. Provide copies of all repair orders applicable to the SRT involved, the technicians time cards, and any other information related to the repair that will aid in the review process.

7. Be sure to provide the correct name of the repairing location, a phone number, and point of contact.

## Company Action

Upon receipt of the request for an SRT review, the following action will be taken:

1. The person signing the request will be contacted to acknowledge the receipt of the request.

2. All the information provided will be analyzed and compared with the history files of the specific operation.

3. All information will be analyzed to determine if an error has been made in the procedure, the operations description, or the published repair time.

4. If it is determined the published repair time is incorrect, additional studies/analysis will be performed to establish the correct time. The requester will be notified of the results, and the results will be published in the next SRT update.

5. If it is determined that the time and procedure is correct, recommendations and assistance will be offered as needed.

# Group 00 – Complete Engine

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# Group 00 – Complete Engine

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| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **00–901 Administrative Time – Open/Close Repair Order (Shop)**<br>*Includes:*<br>– Clock on and off the job<br>– Move equipment to and from work area<br>– Clean work area and write repair at the end of each shift and when job has been completed<br>– Record the following:<br>Generator Set model number<br>Generator Set serial number<br>Customer name and address<br>Original date of purchase<br>Hours of operation | 0.4 | - | - | - | - | - |
| **00–3AB Engine Block – Remove And Install Short Block**<br>*Includes:*<br>– Drain and fill oil and coolant<br>– Connect and disconnect<br>Fuel lines<br>Battery connections<br>Harness assembly<br>– Remove and install<br>Air intake resonator<br>Flexible exhaust pipe<br>Stator and rotor and blower wheel<br>Flywheel<br>Generator adapter<br>Governor stator and related components<br>Fan belt and guard<br>Oil and coolant sensors or switches<br>Engine mounting hardware<br>Coolant hoses<br>Oil fill assembly<br>Starter assembly | - | - | 6.0 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–3AB Engine Block – Remove And Install Short Block** | - | - | 6.0 | - | - | - |
| Engine | | | | | | |
| Start and test genset | | | | | | |
| **00–201 Engine – Rebuild** | - | - | 9.4 | - | - | - |
| *Includes:* | | | | | | |
| – Cooling system, drain and refill | | | | | | |
| – Lube oil, drain and refill | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Engine | | | | | | |
| Inverter control | | | | | | |
| Generator end | | | | | | |
| Belt | | | | | | |
| Water pump | | | | | | |
| Rear bearing plate assy | | | | | | |
| Flywheel | | | | | | |
| Fuel lines | | | | | | |
| Fuel pump | | | | | | |
| Speed control assy | | | | | | |
| Governor actuator | | | | | | |
| Starter | | | | | | |
| Intake manifold | | | | | | |
| Oil pan | | | | | | |
| Exhaust manifold | | | | | | |
| Injection pump | | | | | | |
| Valve cover and rocker assy | | | | | | |
| Tappets | | | | | | |
| Cylinder head | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–201 Engine – Rebuild** | - | - | 9.4 | - | - | - |
| Injection pump cover | | | | | | |
| Governor spring | | | | | | |
| Gearcase cover | | | | | | |
| Oil filter | | | | | | |
| Idler gear | | | | | | |
| Camshaft lock | | | | | | |
| Piston and connecting rods | | | | | | |
| Fork lever assy | | | | | | |
| Fuel camshaft | | | | | | |
| Crankshaft | | | | | | |
| Camshaft | | | | | | |
| Bearings | | | | | | |
| Oil seals | | | | | | |
| Oil pump | | | | | | |
| – Hone or bore cylinders | | | | | | |
| – Adjust valve lash | | | | | | |
| – Test run unit | | | | | | |
| **00–1AA Generator Set, Mobile – Remove And Install** | - | - | 2.0 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Main leads and associated wiring | | | | | | |
| Fuel lines | | | | | | |
| Exhaust systems | | | | | | |
| – Remove and install | | | | | | |
| Generator set from mounting location | | | | | | |
| Test run for proper operation | | | | | | |
| **00–0AS Troubleshoot – Battery Not Charging** | - | - | - | - | - | - |
| –01 – Check | - | - | 0.2 | - | - | - |
| Battery connections | | | | | | |
| Battery condition | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–0AS Troubleshoot – Battery Not Charging** | - | - | - | - | - | - |
| –02 – Perform checks in step 01 | - | - | 0.8 | - | - | - |
| – Check | | | | | | |
| Circuit breaker | | | | | | |
| Wiring connections | | | | | | |
| Continunity of transformer | | | | | | |
| DC regulator | | | | | | |
| **00–010 Troubleshoot – Coolant Loss (External)** | - | - | - | - | - | - |
| –01 – Check: | - | - | 0.4 | - | - | - |
| Coolant level | | | | | | |
| Cracked or leaking hoses | | | | | | |
| Loose hose clamps | | | | | | |
| Radiator for leaks | | | | | | |
| Coolant in oil | | | | | | |
| –02 – Preform checks in step 01 | - | - | 1.0 | - | - | - |
| – Check: | | | | | | |
| Pressure test coolant system | | | | | | |
| Run generator set and check for leaks | | | | | | |
| **00–022 Troubleshoot – Engine Cranks But Will Not Start (Genset)** | - | - | - | - | - | - |
| –01 – Check: | - | - | 0.5 | - | - | - |
| Fuel level | | | | | | |
| Prime fuel system | | | | | | |
| Air in fuel system | | | | | | |
| Air filter restriction | | | | | | |
| Glow plug fuse | | | | | | |
| –02 – Perform checks in step 01 | - | - | 0.7 | - | - | - |
| – Check: | | | | | | |
| Connections at glow plug bus | | | | | | |
| Resistance of each glow plug | | | | | | |
| Fuel pump | | | | | | |
| B+ at glow plugs | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–041 Troubleshoot – Engine Unstable (Hunts) (Genset)** | - | - | - | - | - | - |
| –01 – Check:<br>Fuel supply<br>Fuel Lines for leakage<br>Loose wire connection | - | - | 0.5 | - | - | - |
| –02 – Perform checks in step 01<br>– Check:<br>Governor for binding<br>Governor adjustments | - | - | 1.0 | - | - | - |
| **00–045 Troubleshoot – Engine Will Not Shut Off**<br>*Includes:*<br>– Check<br>Binding in the governor<br>Actuator adjustment | - | - | 0.5 | - | - | - |
| **00–046 Troubleshoot – Excessive Exhaust Smoke Under Load** | - | - | - | - | - | - |
| –01 – Check:<br>Intake air restrictions<br>Overloaded generator<br>Valve settings | - | - | 0.8 | - | - | - |
| –02 – Perform checks in step 01<br>– Check:<br>Injection pump timing | - | - | 1.5 | - | - | - |
| **00–0BC Troubleshoot – Fault Code 11**<br>*Includes:*<br>– Check<br>Circuit breaker<br>Transformer<br>Wiring harness<br>Inverter control | - | - | 0.5 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–0BD Troubleshoot – Fault Code 12**<br>*Includes:*<br>– Check<br>Voltage output | - | - | 0.2 | - | - | - |
| **00–0BE Troubleshoot – Fault Code 13**<br>*Includes:*<br>– Check<br>Circuit breaker<br>Loads<br>Inverter control<br>Stator for opens/shorts | - | - | 0.5 | - | - | - |
| **00–0BF Troubleshoot – Fault Code 14**<br>*Includes:*<br>– Check<br>Inverter control | - | - | 0.2 | - | - | - |
| **00–0BG Troubleshoot – Fault Code 15**<br>*Includes:*<br>– Check<br>Inverter control | - | - | 0.2 | - | - | - |
| **00–0BH Troubleshoot – Fault Code 17**<br>*Includes:*<br>– Check<br>Connections at fuel pump<br>Testing pump on a separate voltage supply<br>Connections in wiring harness | - | - | 0.5 | - | - | - |
| **00–0BI Troubleshoot – Fault Code 18**<br>*Includes:*<br>– Check<br>Glow plug fuse<br>Connections in wiring harness<br>Inverter control | - | - | 0.5 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–0BJ Troubleshoot – Fault Code 19** | - | - | 0.6 | - | - | - |
| *Includes:* | | | | | | |
| – Check | | | | | | |
| Connections at actuator | | | | | | |
| Resistance of actuator coil | | | | | | |
| **00–0BK Troubleshoot – Fault Code 21** | - | - | 0.2 | - | - | - |
| *Includes:* | | | | | | |
| – Check | | | | | | |
| Connections at starter motor | | | | | | |
| **00–0BL Troubleshoot – Fault Code 22** | - | - | - | - | - | - |
| –01 – Check | - | - | 0.5 | - | - | - |
| Load | | | | | | |
| Air intake restriction | | | | | | |
| Exhaust restriction | | | | | | |
| Air leak in fuel system | | | | | | |
| Stator for opens/shorts | | | | | | |
| –02 – Perform checks in step 01 | - | - | 1.0 | - | - | - |
| – Check | | | | | | |
| Fuel flow test | | | | | | |
| Governor for binding | | | | | | |
| High idle adjustment | | | | | | |
| Injectors | | | | | | |
| Injection pump timing | | | | | | |
| Compression | | | | | | |
| **00–0BM Troubleshoot – Fault Code 23** | - | - | 0.5 | - | - | - |
| *Includes:* | | | | | | |
| – Check | | | | | | |
| Connections in wiring harness | | | | | | |
| Switch continunity | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–0BN Troubleshoot – Fault Code 24**<br>*Includes:*<br>– Check<br>Connections in wiring harness<br>Switch continunity | - | - | 0.5 | - | - | - |
| **00–0BP Troubleshoot – Fault Code 25**<br>*Includes:*<br>– Check<br>Fuel rack return spring<br>Binding of the governor<br>High idle speed | - | - | 0.5 | - | - | - |
| **00–0BQ Troubleshoot – Fault Code 26** | - | - | - | - | - | - |
| –01 – Check<br>Loads<br>Air in fuel system<br>Air intake restriction<br>Exhaust restriction | - | - | 0.5 | - | - | - |
| –02 – Perform checks in step 01<br>– Check<br>Binding in the governor<br>High idle speed<br>Injectors<br>Injection timing<br>Compression | - | - | 1.0 | - | - | - |
| **00–0BU Troubleshoot – Fault Code 27**<br>*Includes:*<br>– Check<br>Stator connections to control<br>Stator resistance | - | - | 0.2 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–0CN Troubleshoot – Fault Code 28** | - | - | 0.3 | - | - | - |
| *Includes:* | | | | | | |
| – Check | | | | | | |
| Excessive coach load | | | | | | |
| Stator connected to control | | | | | | |
| Stator resistance | | | | | | |
| **00–0BR Troubleshoot – Fault Code 29** | - | - | 0.2 | - | - | - |
| *Includes:* | | | | | | |
| – Check | | | | | | |
| Battery connections | | | | | | |
| Battery charge rate | | | | | | |
| **00–0BS Troubleshoot – Fault Code 31** | - | - | 0.5 | - | - | - |
| *Includes:* | | | | | | |
| – Check | | | | | | |
| Binding of the governor | | | | | | |
| High idle speed adjustment | | | | | | |
| **00–0BS Troubleshoot – Fault Code 32** | - | - | - | - | - | - |
| *Includes:* | | | | | | |
| –01 – Check | - | - | 0.3 | - | - | - |
| Fuse | | | | | | |
| Harness connections to starter | | | | | | |
| Battery connections at set and battery | | | | | | |
| Battery voltage at set | | | | | | |
| –02 – Perform checks in step 01 | - | - | 0.7 | - | - | - |
| – Check | | | | | | |
| Starter operation | | | | | | |
| Harness connection for opens/shorts | | | | | | |
| Stator resistance for opens/shorts | | | | | | |
| Rotor magnets for failure | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–0CS Troubleshoot – Fault Code 33** | - | - | - | - | - | - |
| *Includes:* | | | | | | |
| –01 – Check | - | - | 0.5 | - | - | - |
| Verify FC is actually a secondary code | | | | | | |
| Verify coolant level and fill if needed | | | | | | |
| Verify engine coolant temperature | | | | | | |
| Air inlet/outlet opening for blockage | | | | | | |
| Excessive coach loads | | | | | | |
| Coolant pump belt for wear | | | | | | |
| Cooling fan for damage | | | | | | |
| Housing air leaks | | | | | | |
| –02 – Perform checks in step 01 | - | - | 0.5 | - | - | - |
| – Check | | | | | | |
| Temperature sensor lead for opens/shorts | | | | | | |
| Radiator blockage and clean | | | | | | |
| –03 – Perform checks in step 02 | - | - | 2.0 | - | - | - |
| – Clean and flush coolant system | | | | | | |
| – Replace coolant thermostat | | | | | | |
| **00–0CT Troubleshoot – Fault Code 34** | - | - | 0.5 | - | - | - |
| *Includes:* | | | | | | |
| – Check | | | | | | |
| Air inlet for blockage | | | | | | |
| Clean inverter heat sink | | | | | | |
| Damaged cooling fan | | | | | | |
| Reduce coach loads | | | | | | |
| Cool heat sink with compressed air | | | | | | |
| **00–0CA Troubleshoot – Fault Code 35** | - | - | 0.2 | - | - | - |
| *Includes:* | | | | | | |
| Verify problem and report to factory | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–0BW Troubleshoot – Fault Code 36** | - | - | - | - | - | - |
| *Includes:* | | | | | | |
| –01 – Check | - | - | 0.3 | - | - | - |
| Fuel level in coach tanks | | | | | | |
| Prime genset fuel system | | | | | | |
| Air filter blockage | | | | | | |
| Mechanical damage | | | | | | |
| –02 – Perform checks in step 01 | - | - | 0.5 | - | - | - |
| – Check | | | | | | |
| Auxiliary fuel pump | | | | | | |
| Conduct fuel flow test | | | | | | |
| P1 and P2 connectors and wiring | | | | | | |
| **00–CHA Troubleshoot – Fault Code 37** | - | - | 0.2 | - | - | - |
| *Includes:* | | | | | | |
| Verify problem and report to factory | | | | | | |
| **00–0BX Troubleshoot – Fault Code 38** | - | - | - | - | - | - |
| *Includes:* | | | | | | |
| –01 – Check | - | - | 0.2 | - | - | - |
| Reduce coach loads | | | | | | |
| Cool inverter | | | | | | |
| –02 – Perform checks in step 01 | - | - | 1.0 | - | - | - |
| – Check if set has engine performance issue | | | | | | |
| Fuel supply for sucking air | | | | | | |
| Fuel flow test | | | | | | |
| Governor operates smoothly | | | | | | |
| High idle speed | | | | | | |
| Current transformer for shorts/opens | | | | | | |

| Standard Repair Times | | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|---|
| | Procedure Number and Description | R | A | B | C | D | Special S |
| | **(continued from previous page)** | | | | | | |
| **00–0CU** | **Troubleshoot – Fault Code 39 (Prior to Spec F only)**<br>*Includes:*<br>– Check<br>Battery connections at set and battery<br>Battery condition | - | - | 0.2 | - | - | - |
| **00–0CB** | **Troubleshoot – Fault Code 42 (Beginning with Spec F and Replacement Inverters)**<br>*Includes:*<br>– Check<br>Verify fault code | - | - | 0.2 | - | - | - |
| **00–0CC** | **Troubleshoot – Fault Code 43 (Beginning with Spec F and Replacement Inverters)**<br>*Includes:*<br>– Check<br>Verify fault code | - | - | 0.2 | - | - | - |
| **00–0BZ** | **Troubleshoot – Fault Code 46 (Beginning with Spec F and Replacement Inverters)**<br>*Includes:*<br>– Check<br>Verify fault code<br>Voltage at set during cranking<br>Voltage at starter during cranking<br>Battery connections at set and battery<br>Battery condition<br>Set charging system, if equipped | - | - | 0.5 | - | - | - |
| **00–0BV** | **Troubleshoot – No Output Voltage (Avr) (Genset)**<br>– Incudes:<br>– Check<br>Circuit breaker<br>Voltage output | - | - | 0.2 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–0BB Troubleshoot – Starter Engages And Disengages** | - | - | - | - | - | - |
| –01 – Check<br>Battery connections<br>Battery condition | - | - | 0.2 | - | - | - |
| –02 – Perform checks in step 01<br>– Check<br>Circuit breaker<br>Wiring connections<br>Continuity of transformer<br>DC regulator | - | - | 0.8 | - | - | - |
| **00–0BA Troubleshoot – Status Indicator Light Dead** | - | - | - | - | - | - |
| –01 – Check<br>Battery condition<br>Battery connections<br>F1 fuse | - | - | 0.2 | - | - | - |
| –02 – Perform checks in step 01<br>– Check<br>Connections at the genset<br>Ground connections | - | - | 0.8 | - | - | - |
| **00–048 Troubleshoot – Excess White Smoke At Start – Up (Cold)** | - | - | - | - | - | - |
| –01 – Check:<br>Glow plugs<br>Air leak in fuel system<br>Valve settings | - | - | 0.5 | - | - | - |
| –02 – Perform checks in step 01<br>– Check:<br>Injection pump timing<br>Compression | - | - | 1.5 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **00–047 Troubleshoot – Excess White Smoke At Start – Up (Warm)** | - | - | - | - | - | - |
| –01 – Check:<br>Glow plugs<br>Valve settings<br>Low engine operating temp | - | - | 0.8 | - | - | - |
| –02 – Perform checks in step 01<br>– Check:<br>Injection pump timing<br>Compression | - | - | 1.8 | - | - | - |

# Group 01 – Cylinder Block

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **01–3AE Camshaft – Replace**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>Fuel lines<br>Coolant hoses<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>Engine<br>Belt<br>Crankshaft pulley<br>Governor actuator<br>Injection pump cover<br>Governor spring<br>Speed control plate<br>Gearcase cover<br>Idler gear<br>Camshaft lock<br>Valve cover and rocker assembly<br>Injection lines<br>Cylinder head<br>Camshaft and gear<br>– Prime and bleed fuel system<br>– Test run unit | - | - | 7.5 | - | - | - |
| **01–1AC Camshaft, Fuel – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>Fuel lines<br>Coolant hoses | - | - | 6.2 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **01–1AC Camshaft, Fuel – Remove And Install** | - | - | 6.2 | - | - | - |
| – Drain and refill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Engine | | | | | | |
| Crankshaft pulley | | | | | | |
| Injection pump cover | | | | | | |
| Governor actuator | | | | | | |
| Governor spring | | | | | | |
| Speed control plate | | | | | | |
| Injection pump | | | | | | |
| Gearcase cover | | | | | | |
| Idler gear | | | | | | |
| Fork lever assembly | | | | | | |
| Fuel camshaft stopper | | | | | | |
| Fuel camshaft | | | | | | |
| – Prime and bleed fuel system | | | | | | |
| – Test run unit | | | | | | |
| **01–1AA Connecting Rod – Remove And Install** | - | - | 6.1 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Drain and refill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Engine | | | | | | |
| Oil pan | | | | | | |
| Valve cover and rocker assy | | | | | | |
| Injection lines | | | | | | |
| Cylinder head | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **01–1AA Connecting Rod – Remove And Install** | - | - | 6.1 | - | - | - |
| Piston and connecting rods | | | | | | |
| Piston rings | | | | | | |
| Wrist pin and keepers | | | | | | |
| Bearings | | | | | | |
| – Clean and visually inspect crankshaft | | | | | | |
| – Hone or bore cylinders | | | | | | |
| – Adjust valve lash | | | | | | |
| – Test run unit | | | | | | |
| **01–3AF Connecting Rod Bearings – Replace** | - | - | 7.0 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Drain and fill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Engine | | | | | | |
| Oil pan | | | | | | |
| Bearings | | | | | | |
| – Clean and visually inspect crankshaft | | | | | | |
| – Test run unit | | | | | | |
| **01–112 Crankshaft – Remove And Install** | - | - | 8.3 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant lines | | | | | | |
| – Drain and refill engine fluids | | | | | | |
| – Remove and install | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
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| **01–112 Crankshaft – Remove And Install** | - | - | 8.3 | - | - | - |
| Cover and panels | | | | | | |
| Engine | | | | | | |
| Inverter control | | | | | | |
| Generator end | | | | | | |
| Flywheel | | | | | | |
| Rear bearing plate assy | | | | | | |
| Water pump | | | | | | |
| Oil pan | | | | | | |
| Injection lines | | | | | | |
| Valve cover and rocker assy | | | | | | |
| Tappets | | | | | | |
| Cylinder head | | | | | | |
| Governor actuator | | | | | | |
| Injection pump cover | | | | | | |
| Governor spring | | | | | | |
| Speed control plate | | | | | | |
| Gearcase cover | | | | | | |
| Oil filter | | | | | | |
| Idle gear | | | | | | |
| Piston and connecting rod | | | | | | |
| Connecting rod bearings | | | | | | |
| Main bearings | | | | | | |
| Crankshaft | | | | | | |
| Oil seals | | | | | | |
| Oil pump | | | | | | |
| – Adjust valve lash | | | | | | |
| – Clean and inspect cylinder bores | | | | | | |
| – Test run unit | | | | | | |
| **01–304 Crankshaft Seal, Front – Replace** | - | - | 2.5 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
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| **01–304 Crankshaft Seal, Front – Replace** | - | - | 2.5 | - | - | - |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Drain and refill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Belt | | | | | | |
| Crankshaft pulley | | | | | | |
| Oil seal | | | | | | |
| – Test run unit | | | | | | |
| **01–308 Crankshaft Seal, Rear – Replace (Horizontal)** | - | - | 5.0 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Drain and fill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Inverter control | | | | | | |
| Fan | | | | | | |
| Rotor | | | | | | |
| Stator | | | | | | |
| Rear bearing plate assy | | | | | | |
| Flywheel | | | | | | |
| Oil seal | | | | | | |
| – Test run unit | | | | | | |
| **01–121 Gear Cover – Remove And Install** | - | - | 2.2 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
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| **01–121 Gear Cover – Remove And Install** | - | - | 2.2 | - | - | - |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Drain and refill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Belt | | | | | | |
| Crankshaft pulley | | | | | | |
| Governor actuator | | | | | | |
| Injection pump cover | | | | | | |
| Governor spring | | | | | | |
| Speed control plate | | | | | | |
| Gearcase cover | | | | | | |
| – Test run unit | | | | | | |
| **01–3AB Gear Cover Gasket – Replace** | - | - | 2.5 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Coolant hoses | | | | | | |
| Fuel lines | | | | | | |
| – Drain and refill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Belt | | | | | | |
| Governor actuator | | | | | | |
| Speed control assy | | | | | | |
| Injection pump cover | | | | | | |
| Governor spring | | | | | | |
| Gearcase cover | | | | | | |
| Gearcase cover gasket | | | | | | |
| Crankshaft pulley | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
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| **01–3AB Gear Cover Gasket – Replace** | - | - | 2.5 | - | - | - |
| – Adjust governor | | | | | | |
| – Test run unit | | | | | | |
| **01–114 Gear, Crankshaft – Remove And Install** | - | - | 2.2 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Belt | | | | | | |
| Crankshaft pulley | | | | | | |
| Governor actuator | | | | | | |
| Injection pump cover | | | | | | |
| Governor spring | | | | | | |
| Speed control plate | | | | | | |
| Gearcase cover | | | | | | |
| Idler gear | | | | | | |
| Oil pump | | | | | | |
| Crankshaft gear | | | | | | |
| – Test run unit | | | | | | |
| **01–140 Piston – Remove And Install, All** | - | - | 7.5 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Drain and fill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **01–140 Piston – Remove And Install, All** | - | - | 7.5 | - | - | - |
| Engine | | | | | | |
| Injection lines | | | | | | |
| Oil pan | | | | | | |
| Valve cover and rocker assy | | | | | | |
| Cylinder head | | | | | | |
| Piston and connecting rods | | | | | | |
| Piston rings | | | | | | |
| Bearings | | | | | | |
| – Clean and visually inspect crankshaft | | | | | | |
| – Hone or bore cylinders | | | | | | |
| – Adjust valve lash | | | | | | |
| – Test run unit | | | | | | |
| **01–3AC Piston Rings – Replace** | - | - | 7.0 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Drain and fill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Engine | | | | | | |
| Injection lines | | | | | | |
| Oil pan | | | | | | |
| Valve cover and rocker assy | | | | | | |
| Cylinder head | | | | | | |
| Piston and connecting rods | | | | | | |
| Piston rings | | | | | | |
| Bearings | | | | | | |
| – Hone or bore cylinders | | | | | | |
| – Adjust valve lash | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **01–3AC Piston Rings – Replace** | - | - | 7.0 | - | - | - |
| – Test run unit | | | | | | |

# Group 02 – Cylinder Head

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **02–104 Cylinder Head – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>Fuel lines<br>Coolant hoses<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>Valve cover and rocker assy<br>Injection lines<br>Exhaust and intake manifolds<br>Cylinder head<br>Cylinder head gasket<br>– Scraping carbon from<br>Cylinder head<br>Remove valves from old head, clean and install in new head<br>Tops of pistons<br>Around valves and ports<br>– Adjust valve lash<br>– Torque cylinder head<br>– Test run unit | - | - | 6.0 | - | - | - |
| **02–3AA Cylinder Head Gasket – Replace**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>Fuel lines<br>Coolant hoses<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels | - | - | 4.0 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **02–3AA Cylinder Head Gasket – Replace** | - | - | 4.0 | - | - | - |
| Valve cover and rocker assy | | | | | | |
| Injection lines | | | | | | |
| Cylinder head | | | | | | |
| Cylinder head gasket | | | | | | |
| – Scraping carbon from | | | | | | |
| Cylinder head | | | | | | |
| Tops of pistons | | | | | | |
| Around valves and ports | | | | | | |
| – Adjust valve lash | | | | | | |
| – Torque cylinder head | | | | | | |
| – Test run unit | | | | | | |
| **02–302 Valve Guides – Replace** | - | - | 6.5 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| – Drain and refill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Coolant hoses | | | | | | |
| Valve cover and rocker assy | | | | | | |
| Injection lines | | | | | | |
| Injectors | | | | | | |
| Cylinder head | | | | | | |
| Exhaust manifold | | | | | | |
| Intake manifold | | | | | | |
| Valve guides | | | | | | |
| – Remove valves from head | | | | | | |
| Caps | | | | | | |
| Spring collet | | | | | | |
| Spring retainer and spring | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **02–302 Valve Guides – Replace** | - | - | 6.5 | - | - | - |
| Stem seal | | | | | | |
| Valve | | | | | | |
| – Scrapping carbon from | | | | | | |
| Cylinder head | | | | | | |
| Tops of pistons | | | | | | |
| Around valves and ports | | | | | | |
| – Refinish valve seats | | | | | | |
| – Grind valves | | | | | | |
| – Adjust valve lash | | | | | | |
| – Torque cylinder head | | | | | | |
| – Test run unit | | | | | | |
| **02–513 Valves – Grind** | - | - | 4.8 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| – Drain and refill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Coolant hoses | | | | | | |
| Valve cover and rocker assy | | | | | | |
| Injection lines | | | | | | |
| Injectors | | | | | | |
| Cylinder head | | | | | | |
| Exhaust manifold | | | | | | |
| Intake manifold | | | | | | |
| – Remove valves from head | | | | | | |
| Caps | | | | | | |
| Spring collet | | | | | | |
| Spring retainer and spring | | | | | | |
| Stem seal | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **02–513 Valves – Grind** | - | - | 4.8 | - | - | - |
| Valve | | | | | | |
| – Scrapping carbon from | | | | | | |
| Cylinder head | | | | | | |
| Tops of pistons | | | | | | |
| Around valves and ports | | | | | | |
| – Refinish valve seats | | | | | | |
| – Grind valves | | | | | | |
| – Adjust valve lash | | | | | | |
| – Torque cylinder head | | | | | | |
| – Prime and bleed fuel system | | | | | | |
| – Test run unit | | | | | | |

# Group 03 – Rocker Levers

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **03–603 Valves – Adjust, All**<br>*Includes:*<br>– Remove and install<br>Cover and panels<br>Valve cover<br>– Adjust valve lash<br>– Test run unit | - | - | 1.2 | - | - | - |

# Group 04 – Cam Follower

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **04–118 Valve Tappets – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>Fuel lines<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>Coolant hoses<br>Valve cover and rocker assy<br>Injection lines<br>Cylinder head<br>Tappets<br>– Scrapping carbon from<br>Cylinder head<br>Tops of pistons<br>Around valves and ports<br>– Adjust valve lash<br>– Torque cylinder head<br>– Test run unit | - | - | 3.8 | - | - | - |

# Group 05 – Fuel System

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **05–1AC Fuel Pump, Electrical – Remove And Install** | - | - | 1.0 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Wiring | | | | | | |
| Fuel lines | | | | | | |
| – Remove and install | | | | | | |
| Fuel pump | | | | | | |
| – Check | | | | | | |
| Fuel lines for leaks | | | | | | |
| – Prime and bleed fuel system | | | | | | |
| – Test run unit | | | | | | |
| **05–1AB Governor Actuator Stator and Base Assembly – Remove And Install** | - | - | - | - | - | - |
| *Includes:* | | | | | | |
| –01 – Disconnect and connect | - | - | 0.5 | - | - | - |
| Battery cables | | | | | | |
| – Remove and install | | | | | | |
| Governor cover | | | | | | |
| Governor spring | | | | | | |
| Mounting screws | | | | | | |
| Bearing carrier assembly | | | | | | |
| Governor stator assembly | | | | | | |
| –02 – Perform steps in 01 | - | - | 1.0 | - | - | - |
| – Remove and install | | | | | | |
| O-ring | | | | | | |
| Governor rotor | | | | | | |
| Governor base mounting screws | | | | | | |
| Governor base and gasket | | | | | | |
| – Check/reset high speed idle | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **05–102 Pump, Injection – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Fuel lines<br>– Remove and install<br>Cover and panels<br>Governor actuator<br>Injection lines<br>Intake manifold<br>Injection pump cover<br>Injection pump<br>– Prime and bleed fuel system<br>– Check and adjust timing<br>– Adjust stop solenoid<br>– Test run unit | - | - | 1.6 | - | - | - |

# Group 06 – Injectors

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **06–301 Fuel Filter, Clip Type – Replace**<br>*Includes:*<br>– Remove and install<br>Fuel lines<br>Fuel filter<br>– Bleed and prime fuel system<br>– Check for leaks<br>– Test run unit | - | - | 0.3 | - | - | - |
| **06–149 Injectors – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>– Remove and install<br>Cover and panels<br>Injection lines<br>Over flow rail<br>Injector<br>– Bleed injection lines<br>– Test run unit | - | - | 0.6 | - | - | - |

# Group 07 – Lubricating Oil System

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **07–801 Lubricating Oil And Filter – Change**<br>*Includes:*<br>– Drain and fill oil base<br>– Remove and install filter<br>– Fill filter and engine with oil<br>– Check for oil leaks<br>– Test run unit | - | - | 0.5 | - | - | - |
| **07–109 Oil Base – Remove And Install (Horizontal)**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>Fuel lines<br>Coolant hoses<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>Engine<br>Dipstick<br>Oil drain assembly<br>Oil pan<br>Oil pan gasket<br>– Check for oil leaks<br>– Test run unit | - | - | 4.7 | - | - | - |
| **07–410 Oil By-Pass – Inspect And Reuse (Horizontal)**<br>*Includes:*<br>– Disconnect and connect<br>Wiring harness<br>Coolant hoses<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>OIl by–pass valve | - | - | 1.2 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **07–410 Oil By-Pass – Inspect And Reuse (Horizontal)** | - | - | 1.2 | - | - | - |
| O–ring | | | | | | |
| Belt and belt guards | | | | | | |
| – Clean and visually inspect | | | | | | |
| Bore | | | | | | |
| O–ring | | | | | | |
| Valve assy | | | | | | |
| – Test run unit | | | | | | |
| **07–301 Oil Filter, Full Flow – Replace** | - | - | 0.4 | - | - | - |
| *Includes:* | | | | | | |
| – Remove and install | | | | | | |
| Oil filter | | | | | | |
| Rubber filter gasket | | | | | | |
| – Fill oil pan | | | | | | |
| – Check for oil leaks | | | | | | |
| – Test run unit | | | | | | |
| **07–114 Oil Pickup Cup And Tube – Remove And Install (Hor)** | - | - | 4.5 | - | - | - |
| *Includes:* | | | | | | |
| – Disconnect and connect | | | | | | |
| Battery cables | | | | | | |
| Wiring harness | | | | | | |
| Fuel lines | | | | | | |
| Coolant hoses | | | | | | |
| – Drain and refill engine fluids | | | | | | |
| – Remove and install | | | | | | |
| Cover and panels | | | | | | |
| Engine | | | | | | |
| Dipstick | | | | | | |
| Oil drain assembly | | | | | | |
| Oil pan | | | | | | |
| Oil pan gasket | | | | | | |
| Oil puckup cup | | | | | | |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **07–114 Oil Pickup Cup And Tube – Remove And Install (Hor)**<br>O–ring<br>– Check for oil leaks<br>– Test run unit | - | - | 4.5 | - | - | - |
| **07–113 Oil Pump – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>Fuel lines<br>Coolant hoses<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>Belt<br>Governor actuator<br>Injection pump cover<br>Governor spring<br>Speed control assy<br>Crankshaft pulley<br>Gearcase cover<br>Idler gear<br>Oil pump drive gear<br>Oil pump<br>– Test run unit | - | - | 2.0 | - | - | - |

# Group 08 – Cooling System

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **08–302 Belt, Water Pump Drive – Replace**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>– Remove and install<br>Cover and panels<br>Belt<br>– Adjust to proper tension<br>– Test run unit | - | - | 0.8 | - | - | - |
| **08–1AB Coolant Radiator – Remove And Install**<br>*Includes:*<br>– Drain and refill engine fluids<br>– Disconnect and connect<br>Battery cables<br>– Remove and install<br>Cover and panels<br>Coolant hoses<br>Radiator<br>– Test run unit | - | - | 1.0 | - | - | - |
| **08–104 Coolant Thermostat – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>Coolant hoses<br>Thermostat cover<br>Thermostat cover gasket<br>– Test run unit | - | - | 0.8 | - | - | - |
| **08–107 Cooling System – Drain And Fill**<br>*Includes:* | - | - | 0.3 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **08–107 Cooling System – Drain And Fill**<br>– Drain and refill cooling system<br>– Visually check radiator cap<br>– Test run for proper operation | - | - | 0.3 | - | - | - |
| **08–310 Lower Radiator Hose – Replace**<br>*Includes:*<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>Hose clamps<br>Hose<br>– Check for water leaks<br>– Test run unit | - | - | 0.6 | - | - | - |
| **08–311 Upper Radiator Hose – Replace**<br>*Includes:*<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>Hose clamps<br>Hose<br>– Check for water leaks<br>– Test run unit | - | - | 0.7 | - | - | - |
| **08–209 Water Pump – Rebuild**<br>*Includes:*<br>– Clean and visually inspect<br>Pump housing<br>Pump shaft flange<br>Hose adapter<br>– Replace<br>Shaft and bearing<br>Seal<br>Impeller | - | - | 1.2 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **08–209 Water Pump – Rebuild**<br>Pump gasket<br>– Check for water leaks<br>– Test run unit | - | - | 1.2 | - | - | - |
| **08–130 Water Pump – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Coolant hoses<br>– Drain and refill engine fluids<br>– Remove and install<br>Cover and panels<br>Belt<br>Pulley<br>Water pump<br>– Test run unit | - | - | 2.0 | - | - | - |

# Group 10 – Intake Air System

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **10–301 Air Cleaner Element – Replace**<br>*Includes:*<br>– Remove and install<br>Air filter cover<br>Filter element<br>– Test run unit | - | - | 0.5 | - | - | - |
| **10–129 Intake Manifold – Remove And Install**<br>*Includes:*<br>– Remove and install<br>Cover and panel<br>Intake manifold<br>Intake manifold gaskets<br>– Test run unit | - | - | 0.3 | - | - | - |

# Group 11 – Exhaust System

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **11–3AA Exhaust Manifold – Replace**<br>*Includes:*<br>– Disconnect and connect<br>– Remove and install<br>Cover and panels<br>Exhaust pipe<br>Exhaust manifold<br>Exhaust manifold gasket<br>– Check to exhaust leaks<br>– Test run unit<br>Battery cables | - | - | 0.5 | - | - | - |
| **11–304 Exhaust Manifold Gaskets – Replace**<br>*Includes:*<br>– Remove and install<br>Cover and panels<br>Exhaust pipe<br>Exhaust manifold<br>Exhaust manifold gasket<br>– Check to exhaust leaks<br>– Test run unit | - | - | 0.7 | - | - | - |

# Group 13 – Electrical Equipment

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **13–114 Glow Plugs – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Electrical wiring<br>– Remove and install<br>Cover and panels<br>Glow plugs<br>– Test run unit | - | - | 0.4 | - | - | - |
| **13–104 Starter Motor – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>– Remove and install<br>Starter<br>– Test run unit | - | - | 0.8 | - | - | - |

# Group 16 – Mounting Adaptations

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **16–103 Flywheel – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>– Remove and install<br>Cover and panels<br>Inverter control<br>Fan<br>Rotor<br>Flywheel<br>– Test run unit<br>Stator | - | - | 3.6 | - | - | - |

# Group 17 – Miscellaneous

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **17–131 Muffler – Remove And Install**<br>*Includes:*<br>– Remove and install<br>Cover and panels<br>Hanger bracket and clamps<br>Muffler and pipes<br>Gaskets<br>– Check for exhaust leaks<br>– Test run unit | - | - | 0.3 | - | - | - |
| **17–1AB Vibration Isolators – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>– Remove and install<br>Cover and panels<br>Lift set off of mounts<br>Engine mounts<br>– Test run unit | - | - | 0.6 | - | - | - |
| **17–1AM Single Panel Assembly – Remove And Install**<br>*Includes:*<br>– Remove and install<br>Mounting screws<br>Panel assembly | - | - | 0.2 | - | - | - |

# Group 25 – Generator

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **25–1AA Main Rotor – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Electrical wiring<br>– Remove and install<br>Cover and panels<br>Inverter control<br>Air inlet assy<br>Fan<br>Stator<br>Rotor<br>– Test run unit | - | - | 3.6 | - | - | - |
| **25–1AB Main Stator – Remove And Install**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Electrical wiring<br>– Remove and install<br>Cover and panels<br>Inverter control<br>Air inlet assy<br>Fan<br>Stator<br>– Test run unit | - | - | 3.1 | - | - | - |

# Group 26 – Generator Control

## Contents

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **26–3AE AC Circuit Breaker – Replace**<br>*Includes:*<br>– Remove and install<br>Access panel<br>Circuit breaker<br>– Test run unit | - | - | 0.5 | - | - | - |
| **26–3AQ Battery Charge Regulator – Replace**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>– Remove and install<br>– Cover and panels<br>Regulator<br>– Test run unit | - | - | 0.3 | - | - | - |
| **26–3AR Battery Charge Transformer – Replace**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>– Remove and install<br>Cover and panels<br>Inverter control<br>Air inlet assy<br>– Test run unit | - | - | 1.5 | - | - | - |
| **26–1AE Control Inverter Converter – Replace**<br>*Includes:*<br>– Disconnect and connect<br>Battery cables<br>Wiring harness<br>– Remove and install<br>Cover and panels | - | - | 1.0 | - | - | - |

| Standard Repair Times | Removed From Chassis | In-Chassis Service Accessibility Codes | | | | |
|---|---|---|---|---|---|---|
| Procedure Number and Description | R | A | B | C | D | Special S |
| **(continued from previous page)** | | | | | | |
| **26–1AE Control Inverter Converter – Replace**<br>Inverter control<br>– Program new Inverter control<br>– Test run unit | - | - | 1.0 | - | - | - |
| **26–3AN Fuse – Replace**<br>*Includes:*<br>– Remove and install<br>Access panel<br>Fuse<br>– Test run unit | - | - | 0.3 | - | - | - |
| **26–3AK Hourmeter – Replace**<br>*Includes:*<br>– Remove and install<br>Access panel<br>Hourmeter<br>– Test run unit | - | - | 0.5 | - | - | - |
| **26–3AJ Start Stop Switch – Replace**<br>*Includes:*<br>– Remove and install<br>Access panel<br>Start stop switch<br>– Test run unit | - | - | 0.5 | - | - | - |

# INDEX

## P



## S



## T



## U



## V



## W

# Request for SRT Review

| Distributor/Dealer Data | | |
|---|---|---|
| **Distributor/Dealer** | | **Phone No.** |
| **Address** | | |
| **City** | **State** | **Zip Code** |
| **Country** | | |

**My experience has indicated the following repair procedures require more time:**

| Procedure Data | | | |
|---|---|---|---|
| **SRT Number** | **Procedure Discription** | **Published time Hrs.** | **Suggested time Hrs.** |
| | | | |
| | | | |
| | | | |
| | | **Total Hours** | |

| | |
|---|---|
| **Generator Set Model** | |
| **Transfer Switch Model** | |
| **Repair Date** | |
| **Technician Name** | |

**Describe how repair was performed:**

**Signature** _____ **Title** _____

**Mail to:** **Onan Corporation**
**Service Department**
**1400 73rd Avenue NE**
**Minneapolis, MN 55432**

Onan

Cummins Power Generation
1400 73rd Avenue N.E.
Minneapolis, MN  55432
763-574-5000
Fax: 763-528-7229



Power Generation