Onan MARINE

Standard Repair Times

MGKBC, MGKBD

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Cummins Power Generation

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Foreword

The Standard Repair Times (SRTs) 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 (SRTs) 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 SRTs that a particular mechanic performs more frequently will often require less time than the standard. Conversely, those SRTs 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 SRTs. Most often at least one of each type is necessary to accurately depict the repair. The three types are:

- Administrative
- Troubleshooting
- Repair

Administrative SRTs

Administrative SRTs 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 SRTs found in this manual in Group 00 – Complete Engine. One 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 SRTs

Troubleshooting SRTs are found only in Group 00 – Complete Engine. These SRTs are intended to be used when diagnosing and analyzing engine, generator set or component failures. Troubleshooting SRTs are broken down into logical numbered steps. The time for each step is cumulative with successive steps, including the time for the appropriate preceding step(s). Some troubleshooting SRTs 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 installation 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 Includes:	
	–01	– Check: – Oil consumption report – For external oil leaks – For overfilled oil pan – Oil specifications – For fuel contamination – Oil change interval – For engine oil in torque converter	0.4
	–02	– Perform checks in Step 01 – Check: – Oil temperature – Air compressor oil consumption – Turbocharger seal – 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 SRTs

Repair SRTs make up the majority of this manual. These are the SRTs 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 (SRCTs) provide for the combining of the three types of SRTs under one code so that, if appropriate, the user can identify the work performed with fewer SRT codes.

Manual Organization

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 following list 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/ Sleeve
09	Drive Units		
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
21	Generator Equipment		
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.

General

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.

How Standard Repair Times are Developed

Cummins/Onan SRT Objectives and Philosophy

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

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

An 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 SRTs with sufficient flexibility to account for differences in complaints, failures, progressive damage, customer desires, etc., SRTs 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 Cummins Power Generation (CPG) Warranty System, it is CPG's intent that the SRTs be applicable to repairs conducted for any customer.

As SRTs are developed, it is assumed:

- That all the required tools, equipment, and supplies are available in sufficient quantity and in operating condition.
- That required CPG Service Manuals are available to the mechanic are being used.

– That the correct parts are available when the mechanic needs them.

How 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 An 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 (SRCTs)

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

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

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

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

Cummins Power Generation makes every effort to be sure the SRTs 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 SRTs 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 SRTs, including supplemental SRTs, 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 SRTs 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 or Generator Set

Contents

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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) *Includes:* – Clock on and off the job – Move equipment to and from work area – Clean work area – Record the following: – Genset model number – Genset serial number – Customer name and address – Genset date in service – Hours of operation – Write repair procedures	0.4	-	-	-	-	-
00–902 Administrative Time – Open/Close Repair Order (Road) *Includes:* – Clock on and off the job – Move equipment to and from work area – Clean work area – Record the following: – Genset model number – Genset serial number – Customer name and address – Genset date in service – Hours of operation – Write repair procedures	0.7	-	-	-	-	-
00–0AA Troubleshoot – Engine Will Not Crank *Includes:*	-	-	-	-	-	-
–01 – Check: – Battery condition – Battery voltage – Battery connections – Evaluate fault codes	-	-	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)						
00–0AA Troubleshoot – Engine Will Not Crank	-	-	-	-	-	-
–02 – Perform checks in step 01	-	-	0.7	-	-	-
– Check:						
– Manual engine rotation						
– Wiring connections to and from control, relay, switch, and starter						
– Start relay operation						
– Start/Stop switch						
– Starter						
00–0AB Troubleshoot – Genset Starts But Stops After Switch Releases	-	-	1.0	-	-	-
Includes:						
– Check:						
– Control plugs fully seated						
– Field sense, quad leads fully seated in connector to control						
– AC output						
– Field voltage						
– Broken or loose wires						
– Field windings						
– Proper field resistance reading, open to ground						
– Brush condition and contact						
– Proper quadrature resistance reading, open to ground and main windings						
00–0AD Troubleshoot – High/Low AC Output	-	-	0.5	-	-	-
Includes:						
– Check:						
– Control plugs fully seated						
– Sense leads fully seated in connector to control						
– Load balance						
– Broken or loose wires						
– Output lead configuration						
– Evaluate fault codes						

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)						
00–0AG Troubleshoot – No AC Output Voltage *Includes:* – Check: – Load breaker closed – Broken or loose wires – Control plugs fully seated – Evaluate fault codes	-	-	0.3	-	-	-
00–0AH Troubleshoot – Unstable Voltage with Stable Engine *Includes:* – Check: – Evaluate fault codes – Proper output lead connection – Genset output voltage – Voltage at line side of genset breaker – Voltage at load side of genset breaker – Sense leads fully seated in connector to control – Control plugs fully seated	-	-	0.3	-	-	-
00–0AZ Troubleshoot – Unblanced Output Voltage *Includes:* – Check: – Evaluate fault codes – Proper output lead connection – Genset output voltage – Voltage at line side of genset breaker – Voltage at load side of genset breaker – Load at genset breaker – Output lead configuration – Control plugs fully seated – Sense leads fully seated in connector to 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)						
00–0CM Troubleshoot – Engine Oil Leak	-	-	-	-	-	-
Includes:						
–01 – Clean contaminated area	-	-	0.4	-	-	-
– Check:						
– Oil level						
– Loose hose or drain fittings						
– Oil filter seal						
–02 – Perform checks in step 01	-	-	1.0	-	-	-
– Check:						
– Leaks while running with dye in oil						
– Evaluate fault codes						
00–010 Troubleshoot – Coolant Loss	-	-	-	-	-	-
Includes:						
–01 – Check:	-	-	0.5	-	-	-
– Evaluate fault codes						
– Coolant level						
– Cracked or leaking hoses						
– Loose hose clamps						
– Coolant in oil						
–02 – Perform checks in step 01	-	-	1.0	-	-	-
– Pressure test cooling system (cold)						
– Pressure test cooling system (hot)						
00–022 Troubleshoot – Genset Cranks But Will Not Start	-	-	-	-	-	-
Includes:						
–01 – Check:	-	-	0.5	-	-	-
– Evaluate fault codes						
– Battery voltage						
– Fuel supply						
– Fuel from fuel pump						
– Choke						
– Choke relay						
– Governor actuator operation						

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)						
00–022 Troubleshoot – Genset Cranks But Will Not Start	-	-	-	-	-	-
–02 – Perform checks in step 01 – Check: – Ignition spark – Cylinder compression	-	-	1.0	-	-	-
00–041 Troubleshoot – Genset Unstable (Hunts) *Includes:* – Check: – Evaluate fault codes – Fuel supply – Loose wire connections – Governor actuator operation – Choke function – Spark quality	-	-	0.7	-	-	-
00–046 Troubleshoot – Excessive Smoke Under Load (Overload Condition) *Includes:*	-	-	-	-	-	-
–01 – Check: – Evaluate fault codes – Fuel supply – Fuel filters	-	-	0.5	-	-	-
–02 – Perform checks in step 01 – Check: – Intake restriction – Fuel flow – Governor actuator operation	-	-	0.7	-	-	-
00–047 Troubleshoot – Excess White Smoke at Start-Up (Warm) *Includes:*	-	-	-	-	-	-
–01 – Check: – Low engine temperature – Low raw water flow (steam)	-	-	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)						
00–047 Troubleshoot – Excess White Smoke at Start-Up (Warm)	-	-	-	-	-	-
–02 – Perform checks in step 01 – Check: – Engine compression	-	-	1.0	-	-	-
00–048 Troubleshoot – Excess White Smoke at Start-Up (Cold) *Includes:* – Check – Choke operation	-	-	0.3	-	-	-
00–0CV Troubleshoot – Fault Code 1 (High Engine Temperature) *Includes:*	-	-	-	-	-	-
–01 – Check: – Coolant level – Grounded or shorted sender lead – Temperature sender resistance – Coolant temperature	-	-	0.5	-	-	-
–02 – Perform checks in step 01 – Check: – Raw water flow – Raw water impeller – Heat exchange blockage – Pressure cap	-	-	1.0	-	-	-
00–0CF Troubleshoot – Fault Code 2 (Low Oil Pressure) *Includes:*	-	-	-	-	-	-
–01 – Check: – Oil level – Broken or loose sender lead – Pressure sender open	-	-	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)						
00–0CF Troubleshoot – Fault Code 2 (Low Oil Pressure)	-	-	-	-	-	-
–02 – Perform checks in step 01	-	-	1.0	-	-	-
– Check:						
– Oil pressure (mechanical)						
00–0CG Troubleshoot – Fault Code 4 (Overcrank)	-	-	-	-	-	-
Includes:						
–01 – Check:	-	-	0.5	-	-	-
– Battery voltage						
– Fuel supply						
– Choke						
– Governor actuator operation						
– Control plugs fully seated						
– Field sense, quad leads fully seated in connector to control						
–02 – Perform checks in step 01	-	-	1.2	-	-	-
– Check:						
– AC output						
– Field voltage						
– Broken or loose wires						
– Field windings						
– Proper field resistance reading, open to ground						
– Brush condition and contact						
– Proper quadrature resistance reading, open to ground and main windings						
– Cylinder compression						
00–0CW Troubleshoot – Fault Code 7 (Loss of Raw Water Flow)	-	-	-	-	-	-
Includes:						
–01 – Check:	-	-	0.5	-	-	-
– Raw water supply						
– Raw water flow						
– Grounded or shorted S6 switch leads						

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)						
00–0CW	**Troubleshoot – Fault Code 7 (Loss of Raw Water Flow)**	-	-	-	-	-	-
–02	– Perform checks in step 01 – Check: – Raw water impeller – Blocked heat exchanger	-	-	1.0	-	-	-
00–0BD	**Troubleshoot – Fault Code 12 (Overvoltage)**	-	-	-	-	-	-
	Includes:						
–01	– Check: – Output voltage – Loads – Fuel supply – Sense lead connections – Control plugs fully seated – Sense leads fully seated in connector to control	-	-	0.5	-	-	-
–02	– Perform checks in step 01 – Check: – Field windings – Proper field resistance reading, open to ground – Brush condition and contact – Grounded or shorted main windings	-	-	1.0	-	-	-
00–0BE	**Troubleshoot – Fault Code 13 (Undervoltage)**	-	-	-	-	-	-
	Includes:						
–01	– Check: – Output voltage – Loads – Fuel supply – Sense lead connections – Control plugs fully seated – Sense leads fully seated in connector to 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)						
00–0BE Troubleshoot – Fault Code 13 (Undervoltage)	-	-	-	-	-	-
–02 – Perform checks in step 01	-	-	1.0	-	-	-
– Check:						
– Field windings						
– Proper field resistance reading, open to ground						
– Brush condition and contact						
– Grounded or shorted main windings						
00–0BF Troubleshoot – Fault Code 14 (Overfrequency)	-	-	0.7	-	-	-
Includes:						
– Check						
– Engine speed						
– Loads						
– Governor actuator operation						
– Fuel supply						
– Control plugs fully seated						
– Quad leads fully seated in connector to control						
– Quad winding resistance						
00–0BG Troubleshoot – Fault Code 15 (Underfrequency)	-	-	0.7	-	-	-
Includes:						
– Check						
– Engine speed						
– Loads						
– Governor actuator operation						
– Fuel supply						
– Control plugs fully seated						
– Quad leads fully seated in connector to control						
– Quad winding resistance						

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)						
00–0BH Troubleshoot – Fault Code 17 (Overprime) *Includes:* – Check – Battery voltage – Fuel supply – Start/stop switch (local and remote) – Shorted wiring	-	-	0.4	-	-	-
00–0BL Troubleshoot – Fault Code 22 (Actuator Overload) *Includes:*	-	-	-	-	-	-
–01 – Check: – Load – Fuel supply – Intake restriction – Governor actuator operation	-	-	0.5	-	-	-
–02 – Perform checks in step 01 – Check: – Exhaust back pressure	-	-	0.7	-	-	-
–03 – Perform checks in step 02 – Check: – Field windings – Proper field resistance reading, open to ground – Brush condition and contact	-	-	1.0	-	-	-
00–0BM Troubleshoot – Fault Code 23 (Faulty Oil Pressure Sender) *Includes:*	-	-	-	-	-	-
–01 – Check: – Oil level – Grounded or shorted sender lead – Sender resistance (low)	-	-	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)						
00–0BM Troubleshoot – Fault Code 23 (Faulty Oil Pressure Sender)	-	-	-	-	-	-
–02 – Perform checks in step 01 – Check: – Oil pressure (mechanical)	-	-	1.0	-	-	-
00–0BN Troubleshoot – Fault Code 24 (Faulty Temperature Sender)	-	-	-	-	-	-
Includes:						
–01 – Check: – Coolant level – Open or loose sender lead – Sender resistance (high)	-	-	0.5	-	-	-
–02 – Perform checks in step 01 – Check: – Coolant temperature	-	-	1.0	-	-	-
00–0BU Troubleshoot – Fault Code 27 (Loss of Voltage Sense)	-	-	1.0	-	-	-
Includes: – Check – AC output – Sense lead connections – Control plugs fully seated – Sense leads fully seated in connector to control – Field windings – Proper field resistance reading, open to ground – Brush condition and contact – Grounded or shorted main windings						

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)						
00–0BR Troubleshoot – Fault Code 29 (High Battery Voltage) *Includes:* – Check – Battery voltage – Battery connections – Battery charge rate	-	-	0.3	-	-	-
00–0CA Troubleshoot – Fault Code 35 (Control Card EE Checksum) *Includes:* – Check – Verify fault	-	-	0.3	-	-	-
00–0BW Troubleshoot – Fault Code 36 (Engine Stopped) *Includes:*	-	-	-	-	-	-
–01 – Check: – Fuel supply – Mechanical engine damage – Output voltage – Loads – Quad leads fully seated in connector to control – Control plugs fully seated	-	-	0.5	-	-	-
–02 – Perform checks in step 01 – Check: – Governor actuator operation – Field windings – Proper field resistance reading, open to ground – Brush condition and contact – Grounded or shorted quad windings	-	-	1.0	-	-	-
00–0CH Troubleshoot – Fault Code 37 (Invalid Set Configuration) *Includes:* – Check: – Configuration number	-	-	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)						
00–0BX Troubleshoot – Fault Code 38 (Field Overflow)	-	-	-	-	-	-
Includes:						
–01 – Check:	-	-	0.5	-	-	-
– Output voltage						
– Frequency						
– Loads						
– Air inlet						
–02 – Perform checks in step 01	-	-	1.0	-	-	-
– Field windings						
– Proper field resistance reading, open to ground						
– Brush condition and contact						
– Main stator resistance						
00–0CI Troubleshoot – Fault Code 41 (Grounded Rotor)	-	-	0.5	-	-	-
Includes:						
– Check:						
– Fuel supply						
– Field windings						
– Proper field resistance reading, open to ground						
– Brush condition and contact						
00–0CB Troubleshoot – Fault Code 42 (Control Card ROM)	-	-	0.3	-	-	-
Includes:						
– Check:						
– Verify fault						
00–0CC Troubleshoot – Fault Code 43 (Control Card RAM)	-	-	0.3	-	-	-
Includes:						
– Check:						
– Verify fault						

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)						
00–0BY Troubleshoot – Fault Code 45 (Speed Sense Loss) *Includes:* – Check: – Quad leads fully seated in connector to control – Control plugs fully seated – Field windings – Proper field resistance reading, open to ground – Brush condition and contact – Grounded or shorted quad windings	-	-	0.7	-	-	-
00–0CD Troubleshoot – Fault Code 48 (Control Card Field Voltage Sense) *Includes:* – Check: – Verify fault	-	-	0.3	-	-	-
00–0AN Troubleshoot – Fault Code 58 (High Exhaust Temp) *Includes:* – Check: – Broken or loose switch leads – Exhaust temperature switch S5 – Raw water flow	-	-	0.7	-	-	-
00–0CX Troubleshoot – Fault Code 61 (Emergency Shutdown) *Includes:* – Check – Customer input connections – K5 relay operation (if equipped)	-	-	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)						
00–1AB Genset (Above Deck) – Remove And Install *Includes:* – Disconnect and connect – Battery cables – Output leads – Fuel lines – Exhaust system – Raw water supply – Remove and install – Genset – Test run unit	-	-	4.0	-	-	-
00–1AC Genset (Below Deck) – Remove And Install *Includes:* – Disconnect and connect – Battery cables – Output leads – Fuel lines – Exhaust system – Raw water supply – Remove and install – Genset – Test run unit	-	-	8.0	-	-	-
00–201 Engine – Rebuild *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids	-	-	12.0	-	-	-

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)						
00–201 Engine – Rebuild	-	-	12.0	-	-	-
– Remove and install						
– Soundshield (as needed)						
– Starter						
– Generator drive belt						
– Engine coupling assembly, drive belt						
– Flywheel						
– Intake resonator / flame arrestor						
– Ignition coil						
– Governor actuator						
– Engine assembly						
– Coolant pump belt drive						
– Coolant pumps						
– Coolant hoses						
– Exhaust manifold						
– Carburetor						
– Valve cover rocker assembly and pushrods						
– Spark plugs and leads						
– Ignition distributor assembly						
– Cylinder head and gasket						
– Lifters						
– Crankshaft pulley						
– Gearcase cover and gasket						
– Oil pan and gasket						
– Piston and connecting rod						
– Rod bearings						
– Oil pump drive gear						
– Oil pump and gasket						
– Rear main seal carrier						
– Crankshaft						
– Main bearing carrier and bearings						
– Oil seals						
– Clean and visually inspect						
– Crankshaft						
– Camshafts						

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 – Cylinder block – Hone cylinder (as needed) – Torque cylinder head – Adjust valve lash – Test run unit	-	-	12.0	-	-	-
00–3AB Genset Engine Assembly – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Engine assembly – Transfer parts to new engine – Intake manifold – Exhaust manifold – Switches and senders – Raw water pump – Test run unit	-	-	6.0	-	-	-

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, Valve – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant pumps – Coolant hoses – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Valve cover rocker assembly and pushrods – Exhaust manifold – Cylinder head and gasket – Lifters – Crankshaft pulley – Gearcase cover and gasket – Idler gear – Camshaft stopper – Camshaft and gear – Torque cylinder head – Adjust valve lash – Test run unit	-	-	8.0	-	-	-

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)						
01–1AC Camshaft, Fuel – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Engine assembly – Distributor assembly – Coolant pump drive belt – Coolant pumps – Coolant hoses – Governor actuator stator – Valve cover rocker assembly and pushrods – Exhaust manifold – Cylinder head and gasket – Lifters – Crankshaft pulley – Gearcase cover and gasket – Idler gear – Camshaft, fuel stopper – Camshaft assembly – Torque cylinder head – Adjust valve lash – Test run unit	-	-	10.0	-	-	-

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)						
01–1AA Connecting Rod – Remove And Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Engine assembly – Exhaust manifold – Valve cover and rocker assembly – Cylinder head and gasket – Oil pan and gasket – Piston and connection rod – Rod bearings – Clean and visually inspect crankshaft – Hone cylinder (as needed) – Torque cylinder head – Adjust valve lash – Test run unit	-	-	10.0	-	-	-

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)						
01–3AF Connecting Rod Bearings – Replace *Includes:* – Disconnect and Connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Engine assembly – Exhaust manifold – Valve cover and rocker assembly – Cylinder head and gasket – Oil pan and gasket – Piston and connection rod – Rod bearings – Clean and visually inspect crankshaft – Hone cylinder (as needed) – Torque cylinder head – Adjust valve lash – Test run unit	-	-	10.0	-	-	-
01–112 Crankshaft – Remove And Install *Includes:* – Disconnect and connect – Battery cables	-	-	11.0	-	-	-

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)						
01–112 Crankshaft – Remove And Install – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Engine assembly – Exhaust manifold – Valve cover and rocker assembly – Cylinder head and gasket – Oil pan and gasket – Piston and connection rod – Rod bearings – Crankshaft pulley – Gearcase cover and gasket – Idler gear – Oil pump and gasket – Rear main seal carrier – Crankshaft – Main bearing carrier and bearings – Oil seals – Clean and visually inspect crankshaft – Hone cylinder (as needed) – Torque cylinder head – Adjust valve lash – Test run unit	-	-	11.0	-	-	-

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)						
01–114 Gear, Crankshaft – Remove And Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant pumps – Coolant hoses – Crankshaft pulley – Gearcase cover and gasket – Idler gear – Crankshaft collet and o-ring – Crankshaft gear – Test run unit	-	-	4.5	-	-	-
01–121 Gear Case Cover – Remove And Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant pumps – Coolant hoses	-	-	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)						
01–121 Gear Case Cover – Remove And Install – Crankshaft pulley – Gearcase cover and gasket – Test run unit	-	-	4.0	-	-	-
01–140 Piston – Remove And Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Engine assembly – Exhaust manifold – Valve cover and rocker assembly – Cylinder head and gasket – Oil pan and gasket – Pistons and connection rods – Rod bearings – Clean and visually inspect crankshaft – Hone cylinder (as needed) – Torque cylinder head – Adjust valve lash – Test run unit	-	-	10.0	-	-	-

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)						
01–304 Crankshaft Seal, Front – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Crankshaft pulley – Oil seal – Crankshaft collet and o-ring – Visually inspect for oil leaks – Test run unit	-	-	2.0	-	-	-
01–308 Crankshaft Seal, Rear – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Bearing case cover – Oil seal	-	-	3.0	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
						Special
Procedure Number and Description	R	A	B	C	D	S
(continued from previous page)						
01–308 Crankshaft Seal, Rear – Replace – Visually inspect for oil leaks – Test run unit	-	-	3.0	-	-	-

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
02–3AA Cylinder Head Gasket – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant pumps – Coolant hoses – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Carburetor – Valve cover rocker assembly and pushrods – Exhaust manifold – Intake manifold – Cylinder head and gasket – Clean carbon off – Cylinder head – Tops of pistons – Around valve ports – Torque cylinder head – Adjust valve lash – Test run unit	-	-	5.0	-	-	-

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)						
02–302 Valve Guides – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant pumps – Coolant hoses – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Carburetor – Valve cover rocker assembly and pushrods – Exhaust manifold – Intake manifold – Cylinder head and gasket – Remove and install from head – Caps – Spring collet, retainer, and spring – Stem seal – Valve – Valve guides – Clean carbon off – Cylinder head – Tops of piston – Around valve ports – Lap valves of valve seats – Torque cylinder head – Adjust valve lash – Test run unit	-	-	6.5	-	-	-

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)						
02–3AB Valves – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant pumps – Coolant hoses – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Carburetor – Valve cover rocker assembly and pushrods – Exhaust manifold – Intake manifold – Cylinder head and gasket – Remove and install from head – Caps – Spring collet, retainer, and spring – Stem seal – Valve – Clean carbon off – Cylinder head – Tops of pistons – Around valve ports – Lap valves of valve seats – Torque cylinder head – Adjust valve lash – Test run unit	-	-	5.5	-	-	-

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 *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Spark plugs and leads – Valve cover – Adjust valve lash – Test run unit	-	-	1.0	-	-	-
03–801 Breather – Service *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Breather cover – Breather gasket – Breather element – Test run unit	-	-	0.7	-	-	-

Group 04 – Cam Followers/Tappets

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 *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant pumps – Coolant hoses – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Carburetor – Valve cover rocker assembly and pushrods – Exhaust manifold – Intake manifold – Cylinder head and gasket – Tappets – Clean carbon off – Cylinder head – Tops of pistons – Around valve ports – Torque cylinder head – Adjust valve lash – Test run unit	-	-	5.2	-	-	-

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
05–1AB Governor Actuator – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Governor actuator – Shaft spring linkage – Test run unit	-	-	0.7	-	-	-
05–1AC Fuel Pump, Electrical – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Oil filter – Fuel cooler assembly – Fuel pump – Test run unit	-	-	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)						
05–115 Carburetor – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Governor actuator – Shaft spring linkage – Carburetor – Test run unit	-	-	2.0	-	-	-
05–1AH Fuel Cutoff Solenoid – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Governor actuator – Shaft spring linkage – Shutoff solenoid – Test run unit	-	-	1.0	-	-	-

Group 06 – Injectors and Fuel Lines

Contents

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
06–303 Fuel Filter – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Govenor actuator – Shaft spring linkage – Fuel filter – Test run unit	-	-	1.0	-	-	-

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
07–109 Oil Pan and Gasket – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Engine assembly – Oil pan and gasket – Test run unit	-	-	9.0	-	-	-
07–113 Oil Pump – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant pumps	-	-	5.0	-	-	-

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)						
07–113 Oil Pump – Replace – Coolant hoses – Crankshaft pulley – Gearcase cover and gasket – Oil pump drive gear – Oil pump and gasket – Test run unit	-	-	5.0	-	-	-
07–114 Oil Pickup Tube and Strainer – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Engine assembly – Oil pan and gasket – Oil pickup tube and strainer – Test run unit	-	-	9.2	-	-	-
07–301 Oil Filter and Fluid – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed)	-	-	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)						
07–301 Oil Filter and Fluid – Replace – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Oil filter – Test run unit	-	-	0.5	-	-	-
07–410 Oil Pressure Relief Valve – Inspect and Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Oil filter – Valve assembly – Clean and visually inspect or replace – Bore, spring, ball, and seat – Test run unit	-	-	0.6	-	-	-
07–3AD Lubricating Oil Dipstick Tube – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses	-	-	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)						
07–3AD Lubricating Oil Dipstick Tube – Replace – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Governor actuator – Shaft spring linkage – Fuel filter – Dipstick / fill tube assembly – Test run unit	-	-	4.0	-	-	-
07–3AE Lubricating Oil Dipstick – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Dipstick – Test run unit	-	-	0.3	-	-	-

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
08–104 Thermostat – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant hoses – Thermostat cover and gasket – Thermostat – Test run unit	-	-	1.0	-	-	-
08–119 Heat Exchanger – Remove And Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant hoses – Raw water pump – Heat exchanger and gasket – Adjust belt tension – Test run unit	-	-	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)						
08–142 Belt Guard – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Belt guard – Test run unit	-	-	0.3	-	-	-
08–207 Raw Water Pump – Replace / Rebuild *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant hoses – Raw water pump – Clean and visually inspect or replace – Pump housing – Cover and gasket – Impeller – Seal – Adjust belt tension – Test run unit	-	-	0.8	-	-	-

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 Coolant Pump – Replace / Rebuild *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant hoses – Coolant pump – Clean and visually inspect or replace – Impeller – Seal assembly – Shaft assembly – Pulley flange – Pump gasket – Inspect pump housing – Adjust belt tension – Test run unit	-	-	2.0	-	-	-
08–302 Drive Belt, Water Pump – Adjust / Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids	-	-	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)						
08–302 Drive Belt, Water Pump – Adjust / Replace – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Adjust belt tension – Test run unit	-	-	0.5	-	-	-
08–1AE Cooler, Fuel – Remove And Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Oil filter – Fuel cooler assembly – Fuel pump – Test run unit	-	-	1.0	-	-	-

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
10–129 Intake Manifold – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Governor actuator – Shaft spring linkage – Intake manifold and gasket – Test run unit	-	-	2.5	-	-	-
10–1AA Air Intake Silencer – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Test run unit	-	-	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)						
10–3AB Flame Arrestor – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Test run unit	-	-	0.5	-	-	-

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
11–105 Exhaust Manifold – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant pump drive belt – Coolant hoses – Raw water pump – Exhaust manifold and gasket – Heat exchanger and gasket – Exhaust mixer and gasket – Adjust belt tension – Test run unit	-	-	3.0	-	-	-
11–110 Exhaust Mixer – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Coolant hoses – Exhaust mixer and gasket – Exhaust temperature switch – Adjust belt tension – Test run unit	-	-	1.5	-	-	-

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
13–104 Starter Motor – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Fuel cooler – Oil filter – Starter – Test run unit	-	-	1.5	-	-	-
13–109 Spark Plug – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Spark plugs – Test run unit	-	-	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)						
13–116 Ignition Coil – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Ignition coil – Test run unit	-	-	0.5	-	-	-
13–117 Ignition Module – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator – Engine assembly – Distributor cap and rotor – Igniton module – Test run unit	-	-	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)						
13–119 Spark Plug Wires – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Governor actuator – Shaft spring linkage – Carburetor – Spark plug wires – Test run unit	-	-	2.5	-	-	-
13–1AD Distributor, Ignition – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Intake resonator / flame arrestor – Ignition coil – Governor actuator	-	-	6.5	-	-	-

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)						
13–1AD Distributor, Ignition – Remove and Install – Engine assembly – Distributor cap and rotor – Distributor assembly – Test run unit	-	-	6.5	-	-	-
13–3AB Ignition Distributor Cap and Rotor – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Governor actuator – Shaft spring linkage – Carburetor – Spark plug wires – Distributor cap – Distributor rotor – Test run unit	-	-	2.5	-	-	-

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 – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Test run unit	-	-	1.5	-	-	-
16–1AB Belt Drive Pulley Coupling Assembly – Inspect and Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Test run unit	-	-	2.0	-	-	-

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)						
16–1AE Engine / Generator Adapter Plate – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Generator pulley – Intake resonator / flame arrestor – Generator air inlet duct – Brush block assembly – Cooling fan – End bell / bearing carrier – Main stator – Main rotor assembly – Engine / generator mounts – Engine / generator adapter plate – Check brush alignment – Test run unit	-	-	6.0	-	-	-
16–1AF Drive Belt (Generator) – Inspect and Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses	-	-	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)						
16–1AF Drive Belt (Generator) – Inspect and Replace – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Generator drive belt – Test run unit	-	-	1.2	-	-	-
16–1AG Self Tensioner, Drive Belt (Generator) – Inspect and Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Generator drive belt – Self tensioner – Test run unit	-	-	1.3	-	-	-

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, Aqualift – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Muffler – Test run unit	-	-	0.5	-	-	-
17–1AB Vibration Isolators – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Engine / generator mounts – Drip tray – Vibration isolators – Test run unit	-	-	2.3	-	-	-
17–1AC Sound Shield – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines	-	-	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)						
17–1AC Sound Shield – Replace – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield – Test run unit	-	-	1.5	-	-	-
17–1AL Drip Tray – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Fuel cooler – Engine / generator mounts – Drip tray – Vibration isolators – Bulkhead fittings – Test run unit	-	-	3.0	-	-	-

Group 21 – Generator Equipment

Contents

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
21–102 Main Circuit Breaker (AC) – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Circuit breaker – Test run unit	-	-	0.7	-	-	-
21–105 Oil Pressure Sender – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Oil filter – Sender – Test run unit	-	-	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)						
21–315 Temperature Sender – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Sender – Test run unit	-	-	0.3	-	-	-
21–701 Genset – Test with Load Bank *Includes:* – Disconnect and connect – Engine wiring harness (as needed) – Load bank	-	-	1.0	-	-	-

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 – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Engine coupling assembly, drive belt – Flywheel – Generator pulley – Generator air inlet duct – Brush block assembly – Cooling fan – End bell / bearing carrier – Main stator – Main rotor assembly – Check brush alignment – Test run unit	-	-	4.0	-	-	-
25–1AB Main Stator – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids	-	-	3.0	-	-	-

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)						
25–1AB Main Stator – Replace – Remove and install – Soundshield (as needed) – Starter – Generator drive belt – Brush block assembly – Cooling fan – End bell / bearing carrier – Main stator – Main rotor assembly – Check brush alignment – Test run unit	-	-	3.0	-	-	-
25–3AB Brushes – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Brush block assembly – Check brush alignment – Test run unit	-	-	0.5	-	-	-

Group 26 – Generator Control Components

Contents

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
26–1AB DC Wire Harness – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Intake resonator / flame arrestor – Exhaust manifold and gasket – Electrical wiring – Adjust belt tension – Test run unit	-	-	4.0	-	-	-
26–1AC AC Control Box – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Control box cover – Control box – Ground strap – Isolator – Circuit breaker – Test run unit	-	-	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)						
26–1AH Digital Display (Start/Stop) – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Digital display – Test run unit	-	-	0.3	-	-	-
26–3AB PCB Control Board – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Control – Test run unit	-	-	1.5	-	-	-
26–3AE Circuit Breaker (DC) – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose	-	-	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)						
26–3AE Circuit Breaker (DC) – Replace – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Circuit breaker – Test run unit	-	-	0.3	-	-	-
26–3AJ Start / Stop Switch – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Start / stop switch – Test run unit	-	-	0.3	-	-	-
26–3AK Hourmeter – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Hourmeter – Test run unit	-	-	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)						
26–3AL Relay – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Relay – Test run unit	-	-	0.3	-	-	-
26–3AQ Battery Charger Regulator – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Regulator assembly – Heat sink cooling fins – Test run unit	-	-	0.7	-	-	-

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)						
26–668 PCB Network Interface Module (NIM) – Replace *Includes:* – Disconnect and connect – Battery cables – Engine wiring harness (as needed) – Fuel lines – Exhaust hose – Coolant hoses – Drain and refill engine fluids – Remove and install – Soundshield (as needed) – Network interface module – Test run unit	-	-	0.5	-	-	-

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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

Power Generation

Onan

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

Power Generation