Onan RV GenSet

Standard Repair Times

HDCAA, HDCAB, HDCAC

Printed in U.S.A.

900–0618B
9–2004

Cummins Power Generation

Table of Contents

Contents Page

Contents Page

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:

Onan Corporation
1400 73rd Avenue NE
Minneapolis, MN 55432

Attn: Service Department

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 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:	0.4
	– 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	
–02	– Perform checks in Step 01	1.0
	– Check:	
	– Oil temperature	
	– Air compressor oil consumption	
	– Turbocharger seal	
	– Crankcase blowby	

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

Group Numbers

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

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 letters within the category.

Group Number	Contents of Group	Specific Repair Number	Description of Category
00	Complete Engine or Genset		
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		

Group Number	Contents of Group	Specific Repair Number	Description of Category
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 the 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's 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

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

Use of SRCT’s 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’s are intended to supplement, NOT replace, SRT’s. 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

Contents Page

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 *Includes:* – Clock on and off the job – Move equipment to and from work area – Clean work area and write repair at the end of each shift and when job has been completed – Record the following: – Generator Set Model Number – Generator Set Serial Number – Customer name and address – Original date of purchase – Hours of operation	0.4	-	-	-	-	-
00–1AA Generator Set, Mobile – Remove and Install *Includes:* – Disconnect and Connect – Battery cables – Main leads and assciated wiring – Fuel lines – Exhaust systems – Remove and Install – Generator set from mounting location – Test run for proper operation	-	-	2.0	-	-	-
00–0BA Troubleshoot – Status Indicator Light Dead						
–01 – Check – Battery condition and polarity – Battery connections – loose, dirty – Problem same at remote console and set switch? – F1 fuse	-	-	0.2	-	-	-
–02 – Perform checks in step 01	-	-	0.8	-	-	-

(continued on next page)

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
00–0BA Troubleshoot – Status Indicator Light Dead – Check – Connections and supply voltage at engine harness connector – All ground connections						
00–0AS Troubleshoot – Battery Not Charging – Check – Battery connections – Battery condition	-	-	0.2	-	-	-
00–022 Troubleshoot – Engine Cranks but will not Start (Genset) *Includes:*						
–01 – Check: – Fuel level – Prime fuel system – Fuel and air leaks at each fitting in the supply line – Air filter restriction – Glow plug fuse	-	-	0.5	-	-	-
–02 Perform checks in step 1 – Check: – Connections at glow plug bus bar – Connections and resistance of each glow plug – Fuel pump	-	-	0.7	-	-	-
00–0BB Troubleshoot – Starter Engages And Disengages – Check – Battery connections – Battery condition	-	-	0.2	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
00–0AG Troubleshoot – No Output Voltage–The Run Light is On – Check – Circuit breaker – Voltage output	-	-	0.2	-	-	-
00–045 Troubleshoot – Engine will not Shut Off when the Run Light is Off – Check – Binding in the governor linkage	-	-	0.4	-	-	-
00–0BD Troubleshoot – Fault Code 12 (Over Voltage–controller can not regulate to rated voltage) Check: – Output voltage – Binding in the governor linkage	-	-	0.2	-	-	-
00–0BE Troubleshoot – Fault Code 13 (Under Voltage–controller can not regulate to rated voltage) – Check – Circuit breaker – Loads – Control – Stator and rotor for opens and/or shorts	-	-	0.8	-	-	-
00–0BF Troubleshoot – Fault Code 14 (Over Frequency–controller can not regulate to rated frequency) – Check – Control	-	-	0.2	-	-	-
00–0BG Troubleshoot – Fault Code 15 (Under Frequency–controller can not regulate to rated frequency – Check – Control	-	-	0.2	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
00–0BK Troubleshoot – Fault Code 21 (Starter Solenoid Circuit–controller senses a short circuit)	-	-	0.2	-	-	-
– Check						
– Connections at starter motor						
– Shorts and/or grounds at solenoid						
00–0BL Troubleshoot – Fault Code 22 (Governor Actuator Overload–duration of operation at or near full-duty cycle is beyond the design limit)						
–01 – Check	-	-	0.5	-	-	-
– Load						
– Air intake restriction						
– Exhaust restriction						
– Air leak in fuel system						
–02 – Perform checks in step 01	-	-	1.0	-	-	-
– Check						
– Perform fuel flow test						
– Governor linkage for binding						
– High idle adjustment						
– Injectors						
– Injection pump timing						
– Compression						
00–0BM Troubleshoot – Fault Code 23 (Low Oil Pressure Cutoff Switch fault)	-	-	0.5	-	-	-
– Check						
– Connections in wiring harness						
– Switch continunity						
00–0BN Troubleshoot – Fault Code 24 (Temperature Sending Unit fault)	-	-	0.5	-	-	-
– 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
00–0BU Troubleshoot – Fault Code 27 (AC Output Sense Fault) – Check – Wiring harness connections	-	-	0.5	-	-	-
00–0CN Troubleshoot – Fault Code 28 (Quadrature Sense Fault) – Check – Wiring harness connections – Stator resistance for opens/shorts/grounds	-	-	0.5	-	-	-
00–0BR Troubleshoot – Fault Code 29 (High Battery Voltage) – Check – Battery connections – Battery charge rate	-	-	0.2	-	-	-
00–0CP Troubleshoot – Fault Code 35 (Control Card) – Check – Control	-	-	0.2	-	-	-
00–0BW Troubleshoot – Fault Code 36 (Engine Stopped Fault) – Check: – Fuel delivery system for air leaks – Fuel flow rate – Engine air intake blockage – Mechanical damage	-	-	0.5	-	-	-
00–0CQ Troubleshoot – Fault Code 37 (Invalid Genset Configuration) – Check – Control	-	-	0.2	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
00–0BX Troubleshoot – Fault Code 38 (Field Overload) – Check – Excessive load – Loads for proper operation – Control	-	-	0.5	-	-	-
00–0BY Troubleshoot – Fault Code 45 (Speed Sense Fault–controller does not sense quadrature frequency and voltage) – Check – F2 Fuse – Starter circuits – K2 relay and connections – Rotor/stator windings for opens/shorts/ grounds	-	-	0.6	-	-	-
00–010 Troubleshoot – External Coolant Loss *Includes:*						
–01 Visually check for: – Coolant level is OK – Cracked or leaking hoses – Loose clamps – Leaks or defects in radiator – Coolant in oil	-	-	0.4	-	-	-
–02 Perform checks in step 01 and Inspect: – Pressure test coolant system – Operate and check for leaks	-	-	1.0	-	-	-
00–041 Troubleshoot – Engine Unstable (Genset Hunts or Surges) *Includes:*						
–01 Check: – Fuel supply – Fuel lines leaking – Loose wiring connections	-	-	0.5	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
00–041 Troubleshoot – Engine Unstable (Genset Hunts or Surges) *(continued on next page)*						
–02 Perform checks in step 01 – Check: – Governor linkage for binding – Stator resistance for open/shorts/grounds	-	-	1.0	-	-	-
00–046 Troubleshoot – Excessive Exhaust Smoke Under Load *Includes:*						
–01 Check: – Intake air restrictions – Fuel filter restrictions – Valve settings	-	-	0.8	-	-	-
–02 Perform checks in step 01 – Inspect: – Injection pump timing	-	-	1.5	-	-	-
00–047 Troubleshoot – Excessive White Exhaust Smoke at Start-up (Warm Engine) *Includes:*						
–01 Check: – Glow plug operation – Low engine operating temperature – Valve settings – Air leaks in fuel system	-	-	0.8	-	-	-
–02 Perform checks in step 01 – Check: – Compression – Injection pump timing	-	-	1.8	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
00–048 Troubleshoot – Excessive White Exhaust Smoke at Start-up (Cold Engine)						
Includes:						
–01 Check:	-	-	0.5	-	-	-
– Glow plug operation						
– Air leak in fuel system						
– Valve settings						
–02 Perform checks in step 01	-	-	1.5	-	-	-
– Check:						
– Compression						
– Injection pump timing						
00–201 Engine – Remove and Install	-	-	7.0	-	-	-
Includes:						
– Drain and refill cooling system						
– Drain and refill lubricating oil						
– Disconnect and Connect:						
– Battery cables						
– Wiring harnesses						
– Fuel lines						
– Coolant hoses						
– Remove and install:						
– Cover and panels						
– Air cleaner assembly and hoses						
– Exhaust muffler and flanges						
– Fan scroll						
– Fan assembly						
– Fan back plate assembly						
– Generator end						
– Engine and generator mounts						
– Engine						
– Test run genset						

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
00–201 Engine – Rebuild *Includes:* – Drain and refill cooling system – Drain and refill lubricating oil – Disconnect and Connect: – Battery cables – Wiring harnesses – Fuel lines – Coolant hoses – Remove and install: – Cover and panels – Engine – Belt & pulleys – Water pump assembly – Rear bearing plate assemby – Fuel lines – Speed control assembly – Starter – Flywheel – Intake manifold – Oil pan assembly – Exhaust manifold assembly – Injection pump – Valve cover and rocker arm assembly – Tappets – Cylinder head – Governor actuator – Control – Generator End – Fuel pump – Injection pump cover – Governor spring – Fuel lines *(continued on next page)*	-	-	13.0	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
00–201 Engine – Rebuild – Gear gase cover – Oil filter assembly – Idler gear – Camshaft lock – Pistons and connecting rods – Fork lever assembly – Fuel camshaft – Crankshaft – Camshaft – Bearings – Oil seals – Oil pump – Hone or bore cylinder – Adjust valve lash – Test run genset	-	-	13.0	-	-	-

Group 01 – Cylinder Block

Contents

Page

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
01–112 Crankshaft – Remove and Install *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and Connect: – Battery cables – Wiring harnesses – Fuel lines – Coolant hoses – Remove and install: – Panels and cover – Generator end – Engine – Belt and pulleys – Water pump assembly – Engine alternator – Oil pan assembly – Gear case cover and oil filter assembly – Idler gear – Connecting rod bearings – Main bearing carriers – Crankshaft – Oil seals – Oil pump – Clean and inspect cylinder bores – Adjust valve lash Test run genset	-	-	8.0	-	-	-
01–1AA Connecting Rod – Remove and Install *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect *(continued on next page)*	-	-	7.4	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
01–1AA Connecting Rod – Remove and Install – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Generator end – Engine – Valve cover and rocker assy – Injection lines – Rocker arm assembly – Cylinder head – Drip pan assembly – Oil pan assembly – Connecting rod and piston assembly – Piston rings – Wrist pin and keeper – Connecting rod bearings – Clean and visually inspect crankshaft – Adjust valve lash – Test run unit	-	-	7.4	-	-	-
01–1AC Fuel Camshaft & Gear – Remove and Install *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install *(continued on next page)*	-	-	6.7	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
01–1AC Fuel Camshaft & Gear – Remove and Install – Cover and panels – Engine – Belt – Crankshaft pulley – Injection pump cover – Governor actuator – Governor spring – Speed control plate – Injection pump – Gear case cover assembly – Idler gear – Fork lever assembly – Fuel camshaft stopper – Fuel camshaft – Prime and bleed fuel system – Test run unit	-	-	6.7	-	-	-
01–3AB Gear Case Cover Gasket – Replace *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Coolant hoses – Fuel lines – Remove and install – Cover and panels – Belt and pulley – Injection pump cover – Governor spring – Speed control plate *(continued on next page)*	-	-	2.9	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
01–3AB Gear Case Cover Gasket – Replace – Crankshaft pulley – Governor spring – Gear case cover assembly – Gear case cover gasket – Adjust governor – Test run unit	-	-	2.9	-	-	-
01–3AC Piston Rings – Replace *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Engine – Valve cover assembly – Injection lines – Rocker arm assembly – Cylinder head – Oil pan assembly – Connecting rod and piston assembly – Piston rings – Connecting rod bearings – Clean and visually inspect crankshaft – Hone or bore cylinders – Adjust valve lash – Test run unit	-	-	7.5	-	-	-

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 *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Engine – Belt and pulley – Crankshaft pulley – Injection pump cover – Governor spring – Speed control plate – Gear case cover assembly – Idler gear – Camshaft lock – Valve cover assembly – Injection lines – Rocker arm assembly – Cylinder head assembly – Camshaft and gear assembly – Adjust valve lash – Test run unit	-	-	7.9	-	-	-
01–3AF Connecting Rod Bearings – Remove and Install *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect *(continued on next page)*	-	-	7.4	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
01–3AF Connecting Rod Bearings – Remove and Install – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Engine – Oil pan assembly – Connecting rod bearings – Clean and visually inspect crankshaft – Test run unit	-	-	7.4	-	-	-
01–114 Gear, Crankshaft – Remove and Install *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Belt and pulley – Injection pump cover – Governor spring – Speed control plate – Crankshaft pulley – Gearcase cover – Idler gear – Oil pump – Crankshaft gear – Test run unit	-	-	2.5	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
01–121 Gear Cover – Remove and Install *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Belt and pulley – Injection pump cover – Governor spring – Speed control plate – Crankshaft pulley – Gear case cover assembly – Test run unit	-	-	2.4	-	-	-
01–140 Piston – Remove and Install, All *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Engine – Valve cover assembly – Injection lines *(continued on next page)*	-	-	8.0	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
01–140 Piston – Remove and Install, All – Rocker arm assembly – Cylinder head – Drip pan assembly – Oil pan assembly – Piston and connecting rods – Piston rings – Wrist pin and keeper – Connecting rod bearings – Clean and visually inspect crankshaft – Hone or bore cylinders – Adjust valve lash – Test run unit	-	-	8.0	-	-	-
01–304 Crankshaft Seal, Front – Replace *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Crankshaft pulley and belt – Oil seal – Test run unit	-	-	2.8	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
01–308 Crankshaft Seal, Rear – Replace (Horizontal) *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Inverter control – Fan – Rotor – Stator – Engine – Flywheel assembly – Rear bearing plate – Oil seal – Test run unit	-	-	5.3	-	-	-

Group 02 – Cylinder Head

Contents

Page

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:* Drain and refill engine coolant – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Drain and refill engine fluids – Remove and install – Cover and panels – Valve cover assembly – Injection lines – Rocker arm assembly – Cylinder head assembly – Replace head gasket – Clean and inspect: – Cylinder head – Tops of pistons – Around valves and ports – Adjust valve lash – Torque cylinder head – Test run unit	-	-	1.5	-	-	-
02–104 Cylinder Head – Remove and Install *Includes:* Drain and refill engine coolant – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install	-	-	2.5	-	-	-

(continued on next page)

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 – Cover and panels – Valve cover assembly – Injection lines – Rocker arm assembly – Cylinder head assembly – Replace head gasket – Clean and inspect: – Cylinder head – Tops of pistons – Around valves and ports – Adjust valve lash – Torque cylinder head – Test run unit	-	-	2.5	-	-	-
02–302 Valve Guides – Replace *Includes:* Drain and refill engine coolant Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Remove and install – Cover and panels – Coolant hoses – Valve cover assembly – Injection lines – Injectors – Rocker arm assembly – Cylinder head assembly and gasket – Exhaust manifold and gaskets – Intake manifold and gaskets *(continued on next page)*	-	-	6.7	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
02–302 Valve Guides – Replace – Remove valves from head – Caps – Valve keepers – Spring retainer and spring – Stem seal – Valve – Remove and install valve guides 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	-	-	6.7	-	-	-
02–513 Valves – Grind *Includes:* Drain and refill engine coolant – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Valve cover assembly and gaskets – Injection lines – Injectors – Rocker arm assembly – Cylinder head assembly and gaskets – Exhaust manifold and gaskets *(continued on next page)*	-	-	5.1	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
02–513 Valves – Grind – Intake manifold and gaskets – Remove valves from head – Caps – Spring keepers – Spring retainer and spring – Stem seal – Valve – Clean and inspect – Cylinder head – Tops of pistons – Around valves and ports – Refinish valve seats – Reface valves – Grind valves – Adjust valve lash – Torque cylinder head – Prime fuel system – Test run unit	-	-	5.1	-	-	-

Group 03 – Rocker Levers

Contents

Page

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 *Includes:* – Disconnect and connect – Battery cables – Remove and install – Cover and panels – Valve cover assembly and gasket – Adjust valve lash – Test run unit	-	-	1.4	-	-	-

Group 04 – Cam Follower

Contents

Page

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:* Drain and refill engine coolant – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Valve cover assembly and gasket – Injection lines – Rocker arm assembly – Cylinder head assembly and gasket – Tappets – Clean and inspect: – Cylinder head – Tops of pistons – Around valves and ports – Adjust valve lash – Torque cylinder head – Test run unit	-	-	4.1	-	-	-

Group 05 – Fuel System

Contents

Page

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 *Includes:* – Disconnect and connect – Wiring – Fuel lines – Remove and install – Fuel pump – Check – Fuel lines for leaks – Bleed fuel system – Test run unit	-	-	1.0	-	-	-
05–102 Pump, Injection – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Fuel lines – Remove and install – Cover and panels – Injection lines – Intake manifold – Governor actuator assembly – Injection pump cover – Injection pump mounting nuts – Injection pump – Bleed fuel system – Check and adjust timing – Test run unit	-	-	1.8	-	-	-
05–1AB Governor Actuator – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Remove and install – Cover and panels	-	-	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)						
05–1AB Governor Actuator – Remove and Install – Shaft, spring and bearing assy – Bearing carrier – Rotor – Stator – Reset high engine idle – Test run unit	-	-	2.0	-	-	-

Group 06 – Injectors

Contents

Page

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 *Includes:* – Remove and install – Fuel lines – Fuel filter – Bleed and prime fuel system – Check for leaks – Test run unit	-	-	0.3	-	-	-
06–149 Injectors – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Remove and install – Cover and panels – Injection lines – Over flow rail – Injector – Bleed fuel system – Test run unit	-	-	0.8	-	-	-

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 Base – Remove and Install *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Engine – Dip stick – Oil drain assembly – Oil base and gasket – Check for oil leaks – Test run unit	-	-	4.9	-	-	-
07–113 Oil Pump – Remove and Install *Includes:* Drain and refill cooling system – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Pulley and belt – Speed control cover and gaskets – Governor spring – Crankshaft pulley – Gear case cover assembly and gasket	-	-	2.5	-	-	-

(continued on next page)

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
07–113 Oil Pump – Remove and Install – Oil pump drive gear – Oil pump – Check for oil leaks – Test run unit	-	-	2.5	-	-	-
07–114 Oil Pickup Cup and Tube – Remove and Install *Includes:* Drain and refill cooling system Drain and refill lubricating oil – Disconnect and connect – Battery cables – Wiring harness – Fuel lines – Coolant hoses – Remove and install – Cover and panels – Engine – Dip stick – Oil pan assembly and gasket – Oil pickup cup – O-ring – Check for oil leaks – Test run unit	-	-	5.0	-	-	-
07–301 Oil Filter, Full Flow – Replace *Includes:* – Remove and install – Oil filter – Rubber filter gasket – Fill oil pan – Check oil level – Check for oil leaks – Test run unit	-	-	0.4	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
07–410 Oil By-Pass – Inspect and Reuse or Replace *Includes:* Drain and refill cooling system – Disconnect and connect – Wiring harness – Coolant hoses – Remove and install – Cover and panels – Belt and pulley – O-ring – Clean and visually inspect – Bore – O-ring – Valve assembly – Test run unit	-	-	1.5	-	-	-
07–801 Lubricating Oil and Filter – Change *Includes:* Drain and refill lubricating oil – Remove and install oil filter – Check for oil leaks – Test run unit	-	-	0.5	-	-	-

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 *Includes:* – Disconnect and connect – Battery cables – Remove and install – Cover and panels – Belt – Adjust to proper tension – Test run unit	-	-	1.0	-	-	-
08–107 Cooling System – Drain and Refill *Includes:* – Drain and refill cooling system – Visually check radiator cap	-	-	0.3	-	-	-
08–104 Coolant Thermostat – Remove and Install *Includes:* Drain and refill cooling system – Disconnect and connect – Coolant hoses – Remove and install – Cover and panels – Thermostat cover – Thermostat and gasket – Check for leaks – Test run unit	-	-	1.0	-	-	-
08–130 Water Pump – Remove and Install *Includes:* Drain and refill cooling system – Disconnect and connect – Battery cables – Coolant hoses – Remove and install *(continued on next page)*	-	-	2.4	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
08–130 Water Pump – Remove and Install – Cover and panels – Belt – Pulley – Water pump assembly – Check for leaks – Test run unit	-	-	2.4	-	-	-
08–209 Water Pump – Rebuild *Includes:* – Remove, clean and reassemble – Pump housing – Pump shaft flange – Hose adapter – Replace – Shaft and bearing – Seal – Impeller – Pump gasket – Check for water leaks – Test run unit	-	-	1.4	-	-	-
08–1AB Coolant Radiator – Remove and Install *Includes:* Drain and refill cooling system – Disconnect and connect – Battery cables – Remove and install – Cover and panels – Coolant hoses – Radiator – Test run unit	-	-	0.4	-	-	-

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
08–310 Lower Radiator Hose – Replace *Includes:* Drain and refill cooling system – Disconnect and connect – Battery cables – Remove and install – Cover and panels – Hose clamp – Hose – Check for water leaks – Test run unit	-	-	0.6	-	-	-
08–311 Upper Radiator Hose – Replace *Includes:* Drain and refill cooling system – Disconnect and connect – Battery cables – Remove and install – Cover and panels – Hose clamp – Hose – Check for water leaks – Test run unit	-	-	0.7	-	-	-

Group 10 – Intake Air System

Contents

Page

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 Filter – Remove and Install *Includes:* – Remove and install – Air filter cover – Filter element	-	-	0.5	-	-	-
10–129 Intake Manifold – Remove and Install *Includes:* – Remove and install – Cover and panel – Intake manifold and gaskets – ICheck for leaks – Test run unit	-	-	0.5	-	-	-

Group 11 – Exhaust System

Contents

Page

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 – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Remove and install – Cover and panels – Muffler bolts – Exhaust tube – Exhaust manifold – Exhaust manifold gasket – Check for exhaust leaks – Test run unit – Battery cables	-	-	0.7	-	-	-
11–304 Exhaust Manifold Gaskets – Replace *Includes:* – Disconnect and connect – Battery cables – Remove and install – Cover and panels – Muffler bolts – Exhaust tube – Exhaust manifold – Check for exhaust leaks – Test run unit	-	-	0.9	-	-	-

Group 13 – Electrical Equipment

Contents

Page

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
13–101 Alternater – Remove and Install *Includes:* – Remove and install – Electrical wiring – Muffler – Alternator – Test run unit	-	-	0.9	-	-	-
13–114 Glow Plugs – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Glow plug wires – Remove and install – Cover and panels – Glow plugs – Test run unit	-	-	0.6	-	-	-
13–104 Starter Motor – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Starter wiring – Remove and install – Starter – Test run unit	-	-	1.0	-	-	-

Group 16 – Mounting Adaptations

Contents

Page

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 *Includes:* – Disconnect and connect – Battery cables – Wiring harness – Cooling hoses – Remove and install – Cover and panels – Engine – Inverter control – Fan – Rotor – Stator – Flywheel and mounting bolts – Test run unit	-	-	4.2	-	-	-

Group 17 – Miscellaneous

Contents

Page

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	Special S
17–1AB Vibration Isolators – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Remove and install – Cover and panels – Lift set off of mounts – Engine mounts – Check for leaks – Test run unit	-	-	1.0	-	-	-
17–131 Muffler – Remove and Install *Includes:* – Remove and install – Cover and panels – Hanger bracket and clamps – Muffler – Check for exhaust leaks – Test run unit	-	-	0.5	-	-	-

Group 25 – Generator

Contents

Page

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 *Includes:* – Disconnect and connect – Battery cables – Wiring harness – Remove and install – Cover and panels – Stator – Rotor – Test run unit	-	-	4.0	-	-	-
25–1AB Main Stator – Remove and Install *Includes:* – Disconnect and connect – Battery cables – Wiring harness – Remove and install – Cover and panels – Stator – Test run unit	-	-	3.5	-	-	-

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
26–3AB–01 PCB Control Panel – Specs A and B – Replace *Includes:* – Disconnect and connect – Battery cables – Wiring harness to control – Remove and install – Top and side housing panels – Resonator intake air hoses – Intake resonator – Control – Test run unit	-	-	1.5	-	-	-
26–3AB–02 PCB Control Panel – Begin Spec C – Replace *Includes:* – Disconnect and connect – Battery cables – Wiring harness to control – Remove and install – Control – Test run unit	-	-	0.8	-	-	-
26–3AE Circuit Breaker – Replace *Includes:* – Remove and install – Access panel – Circuit breaker – Test run unit	-	-	0.5	-	-	-
26–3AJ Start Stop Switch – Replace *Includes:* – Remove and install – Access panel – Start stop switch – 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)						
26–3AK	**Hourmeter – Replace** *Includes:* – Remove and install – Access panel – Hourmeter – Test run unit	-	-	0.5	-	-	-
26–3AN	**Fuse – Replace** *Includes:* – Remove and install – Access panel – Fuse – Test run unit	-	-	0.3	-	-	-

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

Power Generation

Onan

Cummins Power Generation
1400 73rd Avenue N.E.
Minneapolis, MN 55432
763-574-5000
Fax: 763-574-8087

Cummins Power Generation