

Standard Repair Times

OHPC/CHPC

Transfer Switch

125 to 800 Amperes

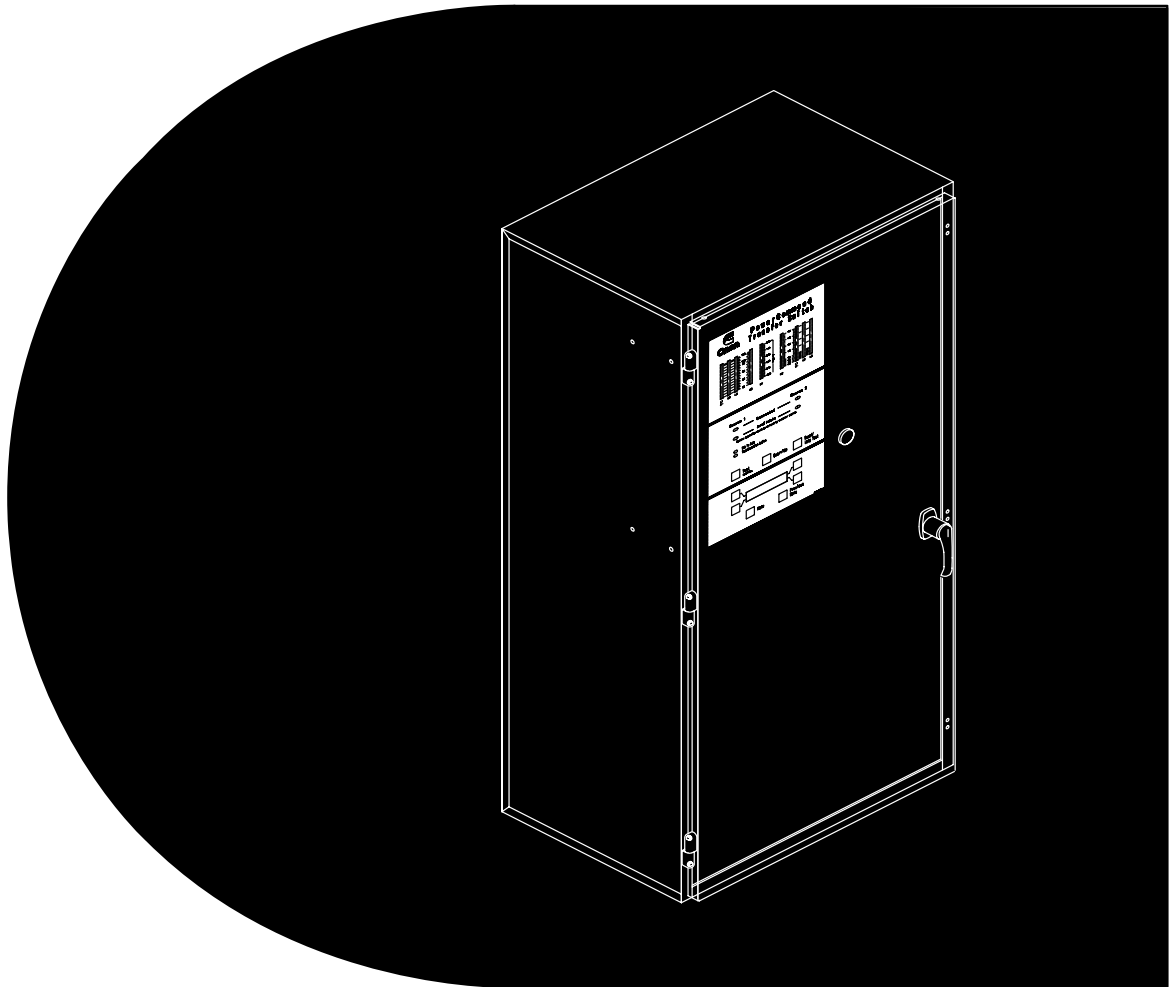


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Foreword

The Standard Repair Times (SRTs) in this manual represent the time required to perform service repairs on Onan Transfer Switches. 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

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Attn: Service Department

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 fill out the repair order, record SRTs used, etc. It is intended that an administrative SRT be used only once for each repair order. The time for the road repair administrative SRT allows for loading and unloading tools, equipment, parts, etc. from the service truck.

Troubleshooting SRTs

Troubleshooting SRTs are intended to be used when diagnosing the transfer switch. Troubleshooting SRTs are broken down in to logical numbered steps. Some troubleshooting SRTs contain time to remove and install components to perform the check(s) listed. 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
00-0XX	Troubleshoot – Generator Set Does not Exercise Includes:	
-01	- Check: - Exercise enabled - Exercise period - Exercise exceptions - Exercise with/wthout load - Real-Time clock - Transfer inhibit signal	0.2
-02	- Perform checks in Step 01 - Check: - Motor disconnect switch on transfer switch - Selector switch on genset - Genset fuel system - Start signal	0.7

In the above example, the time required to perform the checks in Step 01 is 0.2 hour. If the problem is not located while performing the checks in Step 01, an additional 0.5 hour is allowed to perform the checks in Step 02 for a total of 0.7 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.

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 transfer switch. The portion of the system shown in the manual contains three segments:

“Group Number”
XX

“Procedure Number”
XXX

“Step Number”
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 Transfer Switch		
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		Modify/Cut/Lap
10	Intake Air System		Adjust/Calibrate
11	Exhaust System	6XX	
12	Air (Compressed) System		
13	Electrical Equipment	7XX	Test
14	Engine or Generator Set Testing		
15	Instruments and Controls		
16	Mounting Adaptations		
17	Miscellaneous	9XX	(SRCT in Group 99) General/Miscellaneous
22	Hardware		
25	Generator Components		
26	Generator Control Components		
27	Transfer Switches		
99	SRCT		

Step Numbers

While all SRT codes will contain a Group and Procedure number, only those procedures that are broken down into steps have step numbers. The step numbers are sequential within an 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 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 transfer switch to perform the work.
- What MAY have to be done to the transfer switch parts dependent on their condition.
- What MAY have to be removed to access the transfer switch components.

While the most frequent use of SRT information is the Onan Warranty System, it is Onan'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 Onan 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

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 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 an SRT for all the work performed.

3. 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.

4. 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”.

4. 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.

5. 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

Onan Corporation 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, are 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 Transfer Switch

Contents	Page
Administrative Time	2
Open/Close Repair Order	2

Standard Repair Times	Removed From Cabinet	In-Cabinet Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	<u>Special</u> S
00-901 Administrative Time – Open/Close Repair Order <i>Includes:</i> Clock on and off the job Clean work area and write repair at end of each shift and when job has been completed Record the following: <ul style="list-style-type: none"> – Generator set model number – Generator set serial number – Transfer switch model number – Transfer switch serial number – Customer name and address 	0.4	-	-	-	-	-

Group 17 – Miscellaneous

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Troubleshoot, Self-Installation Application	4
Troubleshoot, LonMaker Installation Application	4

Standard Repair Times	Removed From Chassis	In-Chassis Service Accessibility Codes				
Procedure Number and Description	R	A	B	C	D	<u>Special</u> S
<p>17-7AA ATS Network Communications Module (FT-10 Network), P/N 327-1307 and Kit 541-0812 – Troubleshoot, Self-Installation Application</p> <p><i>Includes:</i></p> <ul style="list-style-type: none"> - System inspection - Inspect wire connections and LED indicators - Disconnect/reconnect batteries - Disconnect/reconnect switch and control power - Physical installation procedures, as outlined in Section 11 of the FT-10 Installation and Operation Manual (900-0529) - Remove binding procedures, as outlined in Section 11 of the FT-10 Installation and Operation Manual (900-0529) - Self-installation procedures, as outlined in Section 11 of the FT-10 Installation and Operation Manual (900-0529) - Test system for proper operation 	-	-	1.0	-	-	-
<p>17-7AB ATS Network Communications Module (FT-10 Network), P/N 327-1307 and Kit 541-0812 – Troubleshoot, LonMaker Installation Application</p> <p><i>Includes:</i></p> <ul style="list-style-type: none"> - System inspection - Inspect wire connections and LED indicators - Computer hook-up, database reference, and LonMaker troubleshooting - Disconnect/reconnect batteries - Disconnect/reconnect switch and control power - Physical installation procedures, as outlined in Section 11 of the FT-10 Installation and Operation Manual (900-0529) - Define, install, manage, and test LonMaker procedures, as outlined in the FT-10 Installation and Operation Manual (900-0529) - Test system for proper operation 	-	-	1.4	-	-	-

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- ATS Network Communications Module (FT-10 Network), Troubleshoot
 - LonMaker Installation Application, 4
 - Self-Installation Application, 4

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 _____

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