VOLVO STANDARD TIME GUIDE
FOREWORD AND INTRODUCTION
FOREWORD

Volvo Standard Time Guides (VSTG) are based on Volvo dealerships production technology systems under workshop conditions.

Volvo Standard Time Guides currently cover the most common work out in the field.

Times can be adjusted when required due to changing methods, techniques, equipment or other developments within the automotive industry.

The times are continuously updated, which guarantees high quality and timeliness of Volvo Standard Time Guides.

VOLVO CAR CORPORATION
What is VSTG?

- VSTG is an application containing operation numbers and standard times for the most frequently occurring repair work at a workshop.
- The times for the different work operations are the basic times that a mechanic with the proper training needs to perform the work. This is on the condition that all the prescribed equipment, hand tools as well as special tools as well as the Volvo Car Corporation's distributed technical information are available within the work area.
- The standard times are subject to change due to changes in methods, techniques and equipment or other developments within the automotive industry.
- The times are continuously updated. This is to guarantee high quality and to ensure that VSTG remains current.
- VSTG covers all existing models, from and including the 200 series onwards.
- The works have been performed and the times have been studied within Volvo Car Customer Services method workshop.

Time units

- The job value (JV) is specified in the form of 1/10 hour. The job value (JV) 1 is equivalent to six minutes.
  JV 10 is equivalent to one hour.
WHAT IS THE PURPOSE OF VSTG?

Planning
• VSTG is a tool that can be used for planning work in the workshop. Once you know how long a job takes, you can use the workshop more effectively.

Salary and bonus system
• Since all jobs in VSTG have fixed JVs, the system can be used as a basis for different salary and bonus systems.

Budgeting
• VSTG is ideal for following up operations at the workshop, for example: sales hours, billing per hour, service costs per car etc.

Billing and package pricing
• With VSTG it is possible to provide the customer with fixed price labour costs.

Introduction of VSTG
• The works have been performed and the times have been studied within Volvo Car Customer Services Method workshop
• With the introduction of the times in VSTG, methods are followed in service literature and/or VIDA (Vehicle Information & Diagnostics for Aftersales).
CONTENTS LIST

A contents list heads each Volvo Standard Time Guide (VSTG) chapter, which indicates on which page the different subgroups are found.

Job scope

The main text gives a brief description of the overall scope. In unclear cases, additional text may occur.

Work on the body

The times for work on the body, for example, BONNET REPLACEMENT, FRONT WING REPLACEMENT etc. are not intended to be used in the event of collision damage.

Accessories

New installation of accessories is found in chapter X. Replacement of accessories is found in chapters 2-8.

CSC; Customer Symptom Codes

Customer Symptom Codes are used to describe how the customer/user experiences a problem/fault, i.e. how it manifests itself.

Software

Software downloads are included in all operations in chapter X where downloading is required. For other chapters, 2-8 replacement parts, software downloads are not included, except where specifically stated by the job scope.

Diagnostic trouble codes (DTCs)

DTCs are used to show that one/several of the car control modules has/have detected a fault. To determine which DTC(s) is/are to be analysed, a CSC must always be allocated before taking read outs from the car. The DTCs are then fault traced according to standard practice for fault tracing.
Cause codes

3 INTERRUPTED DOWNLOAD SERVICE 2.0
10 DEFECT COMPONENT
11 WRONG COMPONENT FITTED
12 COMPONENT MISSING
13 INSUFFICIENT AMOUNT
14 OVERFULL
15 WRONGLY FITTED, WRONGLY CONNECTED
16 WRONG SETTING
20 LOOSE
21 SCREW JOINT LOOSE
22 POOR ADHESION
23 DEFORMED
24 BURNT
25 JAMMED
26 BLOCKED
27 POOR SEAL, LEAKAGE
28 MOISTURE
40 WORN
41 RUBBED
42 SEIZED UP
43 BROKEN
44 STICKS
45 OUT OF ROUND
50 OPEN CIRCUIT
51 SHORT-CIRCUIT
60 CASTING FAULT
61 WELDING FAULT
62 SEALANT FAULT
63 SURFACE CORROSION
64 CORRODED THROUGH
80 COLOUR DEVIATION
81 PAINT RUN
82 DIRT IN PAINT
83 ORANGE PEEL SURFACE
84 PAINT COAT TOO THIN
85 TOUCH-UP VISIBLE
86 GRINDING SCRATCHES
87 SCRATCHES IN PAINT
88 CRACKED SURFACE
89 BLISTERING
90 PAINT SCRAPED
91 CHIPPED PAINT
92 AIRBORNE CONTAMINATION
93 MECHANICAL IMPACT ON PAINTWORK
97 INTERRUPTED DOWNLOAD
98 VOLVO PROGRAM
99 CAUSE UNKNOWN
**TIME TABLE DIVISION**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>General</td>
</tr>
<tr>
<td>1</td>
<td>Service and maintenance</td>
</tr>
<tr>
<td>2</td>
<td>Engine with mounting and equipment</td>
</tr>
<tr>
<td>3</td>
<td>Electrical system and instrumentation</td>
</tr>
<tr>
<td>4</td>
<td>Power transmission</td>
</tr>
<tr>
<td>5</td>
<td>Brakes</td>
</tr>
<tr>
<td>6</td>
<td>Suspension/steering</td>
</tr>
<tr>
<td>7</td>
<td>Springs, shock absorbers and wheels</td>
</tr>
<tr>
<td>8</td>
<td>Body and interior</td>
</tr>
<tr>
<td>X</td>
<td>Accessories</td>
</tr>
</tbody>
</table>

**NOTE!**

*Software downloads are included in all jobs within chapter X where downloading is required. For other chapters, 2-8 replacement parts, software downloads are not included, except where specifically stated by the job scope.*
OPERATION NUMBERS

The operation number consists of five digits and a type code

E.g.:

2 3 4 2 8 - 2

Chapter

Group

Section Serial number Type code

Chapter:
1 = Service and maintenance
2 = Engine with mounting and equipment
3 = Electrical system and instrumentation
4 = Power transmission
5 = Brakes
6 = Suspension and steering
7 = Springs, shock absorbers and wheels
8 = Body and interior

Group:
Example: 23 = Fuel system

Section:
Example: 234 = Fuel tank, fuel lines, evaporative system

Serial number:
Serial number for registering the jobs within each subgroup

Operation numbers:
23428-2 Fuel tank install-remove/replace
TYPE CODE

Example: when replacing a clutch assembly, we use operation number 41110-0 (package work), which consists of the following jobs:
- 41112-2 Clutch driven plate/pressure plate remove-install/replace (incl. removal/installation of gearbox)
- 41221-3 Throwout bearing replace (gearbox removed)

Example: When performing a maintenance service, where it is found that the brake pads need replacing, use operation number 51125-2, as the brakes were already checked during the maintenance service. This means that we do not charge the customer twice to check the brakes.

Example: When replacing both horns, without radar, the following operation number is used:
- 36202-2 Horn (without radar) replace (incl. all necessary removal/installation for 1st)
- 36203-3 Horn following replacement (additional work for 2nd)

The following type codes are used:

-0 = Package work. Type -0 jobs are defined as complete jobs and include everything, such as preparation time, repair time and other additional jobs needed to do the job from start to finish. It contains one or several types of -2 jobs in combination with one or more type -3 jobs.
-1 = Preparatory work, e.g. checking components.
-2 = Normal work. Complete job, i.e. all procedures included from the start of work to finish. (For some -2 jobs, several operation numbers can be added, for example, when downloading software, emptying-filling the AC-system, checking wheel alignments etc.)
-3 = Additional work. Used in connection with type -2.

NOTE!

Operation number with type code -3 never used separately.
STANDARD FOR MECHANIC SKILLS

Job overview (skill element) related to each level

Note: The following listed jobs are only examples.

Volvo mechanic level 1

- Basic fault tracing
- Replacing basic components on vehicles - i.e. exhaust system, brake pads, rear shock absorbers etc. Measurement of power supply
- Material handling ("environment").

Volvo mechanic level 2

- Adjustment of components/systems – i.e. gear box linkage system, throttle linkage system
- Scheduled service maintenance. DTC based fault tracing. Download software.
- Test, repair and replace electrical base circuits and components (– i.e. control modules, sensors.)
- Configure and program systems/functions
- Test and repair charging system. Repair lines and connectors.
- 2-Wheel alignment

Volvo mechanic level 3 (specialised)

Three different job areas – Mechanic / hydraulic (M/H), Electronic (E) and Air conditioning (AC).
The mechanic can choose to specialise in one, two or all three job areas.
- Inspection of components, systems and functions (M/H, E, AC). Symptom based fault tracing (M/H, E, AC). Non DTC based fault tracing
- Replacement of complex vehicle components:
  - i.e. brake discs front, viscous coupling (M/H).
  - i.e. evaporator, thermostatic expansion valve (AC).
- Replacement and repair of larger units – i.e. engine, gearbox etc. (M/H).
- 4-wheel alignment (M/H).
- Measurement signal values (E).
- Test and fill the AC-system according to legal requirements and Volvo norms (AC).

3E+

NICA is the only person in the workshop who may assess whether an electric vehicle's high voltage system requires de-electrifying or not. It is also only NICA who may perform electrifying off/on of the high voltage system.

3EB

Work with internal components in high voltage battery

Volvo mechanic level 4

Necessary = level 3 M/H + E, and when the market also requires AC.
Set diagnostics, based on information from customer and vehicle/system, on any component/system/function in the car.
Internal/external relations (conduct and communication skills).
THE LEVELS IN THE STANDARD

Volvo mechanic level 1

Volvo mechanic level 2

Volvo mechanic level 3 (specialised)

<table>
<thead>
<tr>
<th>Mechanic/hydraulic</th>
<th>Electronics</th>
<th>Air conditioning</th>
</tr>
</thead>
</table>

Volvo manager mechanic level 4
INTRODUCTION OF VSTG - TIMES

- The method technician creates a method by verifying the work in the car.
- The time setter verifies the method in time and records all stages of the work, as well as verifying that the method corresponds to the variant and is optimised from a time perspective.
- Sub work is created for each stage, sub work includes all screws, nuts, lubrication etc. The time is then built up of all sub work and is generated as an end time.
- With the introduction of the times in VSTG, methods are followed in VIDA (Vehicle Information & Diagnostics for Aftersales).
- Sub work is created for each sub stage in a job. Sub work includes all screws, nuts, lubrication, tools etc that are needed for each sub stage of the job. The complete time is then built up by all the sub work and generates an end time. Here is an example of a standard time, 33118-2 Starter motor remove-install/replace, where all the sub stages/sub work can be seen:

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>900-00-B</td>
<td>Bonnet open and close</td>
</tr>
<tr>
<td>863-01-G4</td>
<td>Cover over engine remove-install</td>
</tr>
<tr>
<td>311-01-F2</td>
<td>Covers 2x battery remove-install</td>
</tr>
<tr>
<td>311-01-D9</td>
<td>Battery remove-install</td>
</tr>
<tr>
<td>311-01-DI</td>
<td>Battery tray remove-install</td>
</tr>
<tr>
<td>311-01-DK</td>
<td>End battery tray remove-install</td>
</tr>
<tr>
<td>863-05-K5</td>
<td>Splash guard under engine remove-install</td>
</tr>
<tr>
<td>900-30-A</td>
<td>UNPACKING MATERIAL</td>
</tr>
<tr>
<td>254-97-F</td>
<td>Vacuum reservoir remove-install</td>
</tr>
<tr>
<td>331-01-P</td>
<td>Starter motor remove-install</td>
</tr>
</tbody>
</table>

**S04B03** Starter motor remove-install (SCREW/NUT<16MM, TX>50,IN<)
**S04B02** Cables remove-install (SCREW/NUT<16MM, TX>50,IN<)
**O05B02** Starter motor remove-install (OBJECT-TIME)

900-10-B CHECK FUNCTION

- = OP no 33118-2 Starter motor remove-install/replace
EXAMPLE OF TYPE DESIGNATIONS USED FOR COMBINATIONS.

900 Regards 940 = 944, 945. 960 = 964, 965
X40 Regards S40, V40
V70 Regards V70 2000-2008, XC70 2001-2008
C30, S40, V50, C70 Regards C30, S40, V50, C70
V70 Regards V70, XC70 2008-

B6254 Regards all B6254
B6304 Regards all B6304
B41X4S Regards B4164S, B4184S
B5204 Regards all B5204
B5244 Regards all B5244
B52X4T Regards B5204T, B5234T, B5244T, B5254T
B6294S Regards all B6294S
B5244s Regards all B5244sx
B52X4X Regards all B5244sx, B5244T and B5254T

D24 Regards all D24
D4192 Regards all D4192
D4204T Regards all D4204T
D5244TX Regards all D5244TX

The above variant groups are considered as general, if there is a specific variant group for an operation, it must used.

EXAMPLE OF ABBREVIATIONS USED FOR TYPE DESIGNATIONS

LHD Regards left-hand drive car
RHD Regards right-hand drive car
-10 Regards vehicles of model year 2010 or earlier
11- Regards vehicles of model year 2011 or later
B5254T Regards 5 cylinder, 2.5 litre, 4 valve turbo
B6294T Regards 6 cylinder, 2.9 litre, 4 valve turbo
B8444S Regards 8 cylinder, 4.4 litre, 4 valves
AWD Regards 4-wheel drive
FWD Regards 2-wheel drive
MAN Regards manual gearbox
AUT Regards automatic gearbox
AW50-42 Regards 4-speed automatic gearbox
AW55-50 Regards 5-speed automatic gearbox
4T65E Regards 4-speed automatic gearbox
AW30-43 Regards 4-speed automatic gearbox
M90 Regards 5-speed manual gearbox
AC, MCC Regards manual air conditioning
ACC, ECC Regards electronic air conditioning
GA1 Regards guard alarm 1
GA2 Regards guard alarm 2
DPF Regards Diesel Particulate Filter
CNG Compressed Natural Gas
LPG Liquefied Petroleum Gas
Standard Time Guides
The individual times indicated in Volvo standard time guides consist of the following parts:

**WORK TIME 1 = WT 1**

**WORK TIME 2 = WT 2**

**DISTRIBUTION OF TIME = UT**

**TOTAL = WORK TIME WT 1 + WORK TIME WT 2 + DISTRIBUTION OF TIME UT**

Internal bi-time is added to this total, depending on the type and scope of the work.

**INTERNAL BI-TIME = ST**

**TOTAL TIME**

The final times consist of **WT 1 + WT 2 + UT + ST** and are indicated in Volvo standard time guides.

**Volvo standard time guides do not include:**

- Removing and installing auxiliary equipment that obstructs the work

**Test driving**

- Test driving when fault tracing CSC (more information in the next section) is included in the time for mechanical CSC which requires it. Note that the time for test driving is based on the average time it takes to detect the problem.
- Test driving is included in the time for ordinary repair work if the service solution in VIDA requires it.
- All other test drives are included in the distribution of time and must not be allocated via foreman operations.
WORK TIME 1 (WT 1)

- The time required for execution of the work, including collection and return of hand tools during the work.
WORK TIME 2 (WT 2)

- The time needed for the introduction of standard equipment and tools from the tool cabinet and returning them at each start and end of a job.
- This time only applies to the mechanic’s own equipment and tools, as recommended for the job.
Distribution of time or necessary unproductive time includes among other things:

- Conversation with foreman
- Helping colleagues
- Administrative work
- Conversation with colleague (job related)
- Looking for/waiting for foreman
- Washing hands
- Reading technical information
- Organising tools
- Looking for/waiting for tools
- Conversation with customer
- Personal needs
- The distribution of time is calculated as the total of WT 1 + WT 2 (work time). Currently, the distribution of time is 12 % for chapter 1, and 18 % for chapters 2-8.
**Bi-times (ST)**

- Bi-times vary from time to time depending on the type of work. The bi-time consists of the following:

  **BI-TIME 1 = ST 1**  Introducing and removing special tools.
  **BI-TIME 2 = ST 2**  Transport parts to and from washing area.
  **BI-TIME 3 = ST 3**  Introduce and transport away portable, general workshop equipment.
  **BI-TIME 4 = ST 4**  Introduce and transport away rolling, general workshop equipment, e.g. vacuum cleaners, garage jacks, transmission jacks etc.
  **BI-TIME 5 = ST 5**  Transport parts to and from unit area.
• The total time consists of \((WT_1 + WT_2 + UT + ST) \times 15\%\)
CSC- Codes

CSC codes are a collection of codes that are designed to facilitate the dialogue with customers. CSC codes run like a thread through all of Volvo's aftermarket systems and considerably facilitates the work of, for example, searching for Technical Journals. CSC codes are chosen according to the customer described symptoms and are found in the relevant group (e.g. noise), find correct CSC and include in the work order.

- From the tree structure that now appears select the function group in which the symptom is found (e.g. brakes).
- Then from the customer's description select where within the function group the symptom is (e.g. wheel brakes).
- Next to the far right is the CSC code to be inserted in the work order.
Upon the launch of VSTG 12/1 new operation numbers for fault tracing were introduced. These are based on what the customer experiences as problems with the car. At present there are about 500 operation numbers of this kind, and they cover all the currently active CSCs that might be fault traceable; the exception is appearance related.

As what the customer experiences is highly subjective, the nature of the fault can vary from one time to another. This means that a single CSC can be traced to several different types of problems with the car. The time needed for fault tracing may therefore differ, which is also reflected in the time that is an average time for all possible fault tracing on the CSC. This section is based on the fact-based studies conducted at VCCS in connection with the production of the new time work, based on the most frequent faults that the fleet suffers from today. All operation numbers for fault tracing CSCs are running numbers under the 96XXX number series in no particular order. Searches can be made on operation title on the VSTG CD as follows:

1. Click on the SEARCH tab
2. Click on CSC
3. Enter the CSC code

**NOTE!**

The search function searches for ANYTHING to do with CSCs, even combinations found in the title for example, and is why several hits may appear in the results!
USING CSC FAULT TRACING OPERATION NUMBER

As CSC fault tracing operations are introduced to increase customer satisfaction, it is of the utmost importance that these are not used incorrectly. It is therefore very important that the correct CSC is used for the customer experienced problem. If the fault on the vehicle is established without the need for significant fault tracing, above and beyond what is included within the specific VST for repair, the VST for CSC fault tracing should not be invoiced regardless of the end customer (retail job or Warranty repair).

When using CSC fault tracing for Warranty it is NOT permitted to allocate more than one fault tracing VST per job. The CSC on the repair order must match the CSC fault tracing VST that is claimed and jobs submitted incorrectly will be amended in analysis.

Example of incorrect warranty order:
CSC PE is stated on the warranty order, but the stated operation number for the fault tracing is 96002-2 Fault tracing instrumentation: 7G, and the replacement part is fuel pump. In this example it is perceived that the customer indicated a problem with the wheel brakes, but the instrumentation has been fault traced and the fuel pump replaced. This is an example that would be amended in analysis.

Example of correct warranty order:
CSC PE is stated on the warranty order, the stated operation number for fault tracing is 96377-2 Fault tracing wheel brakes: PE, and corrective action part is suspension adjustment. In this example there is an obvious logic that can be followed systematically.
VOLVO'S STANDARD TIME GUIDE, MECHANICAL WORK

(Under section 0 General/Index/i VSTG there is a contents list of all time set operation numbers in alphabetic and numerical order)
### Car type (A)

### Group (B)

### Section (C)

### Operation number (D)

The operation number for the specific work is given here. The operation number includes:
- Chapter
- Group
- Section
- Serial number
- Type code

### Operation's main text (E)

A short descriptive text that clarifies the scope of the work. However, the text should not be construed as a detailed method description for each individual model.

### Variant designation (F)

Variant designations are used to specify car or engine type.

### Operation time (G)

These are the assigned operation times for the specific operation number and are given as 1/10 hour.
• There is usually an image for the sections (camera symbol) to help the user find the correct part/operation number. The images are general and may differ from specific car variants.
OPERATION NUMBER FOR NON TIME SET WORK

Non time set work

Non time set work is always designated by the number 9 as the fifth digit in the operation number. Non time set work is found at the end of each section.

- A non time set operation number, so-called foreman arrangement, is usually used when a suitable operation number is not available.
- When using a non time set operation number, it is important to specify the work as accurately as possible so the customer knows what is done.
- It is important to know that the use of general operation numbers may only occur when ordinary operation numbers are not available, or when difficult problems arise during the work.