

Driver's Handbook

I-START System

B13R, 9700/USCAN



C0080351

VOLVO

Foreword

This manual contains information concerning the operation and function of the Volvo 9700 US/CAN bus I-Start System. Please keep this manual in the vehicle at all times.

Technical data, construction information, descriptions and illustrations in this driver's handbook, that were current when the book was published, can have been changed. The Volvo company reserve the right to make changes without prior notice.

The National Highway Traffic Safety Administration (NHTSA) and Prevost should be informed immediately if you believe that the vehicle has a defect that could cause a crash, injury or death.

Contact NHTSA by calling the Auto Safety Hotline at 1 (888) 327-4236, by writing to NHTSA, U.S. Department of Transportation, Washington, DC 20590, by TTY at 1 (800) 424-9153, or visit their website at: www.nhtsa.dot.gov.

Please keep this manual in the vehicle at all times.

Note: Illustrations in this manual are used for reference only and may differ slightly from the actual vehicle. However, key components addressed in this document are represented as accurately as possible.

Note: It is important that this manual stays with the vehicle when it is sold. Important safety information must be passed on to the new owner.

All information, illustrations and specifications contained in this manual are based upon the latest product information available at the time of publication. VOLVO Bus reserves the right to make changes at any time or to change specifications or design without notice and without incurring obligation.

Volvo Bus Corporation

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Contents

Introduction	1
Driver's responsibility	1
Overview	2
General Information	3
Labels	3
Power relays labels	4
Schematics	5
Battery charger	6
Batteries charger electrical outlet	6
Batteries charger specification	6
Charging mode	7
Battery charging time	8
ARMS (Automatic Reset Main Switch)	9
Starter batteries compartment	10
The battery main switch	10
A chassis fuse box	10
Consumer batteries compartment	11
A body fuse box	11
12 V Fuse holder	11
Vehicle messages and symbols	12
For I-start	12
For Starter Batteries/ARMS	13
If something happens	14
Service Switch	14
Jump start ground connection	15
Jump start procedure	16
Index	17

Safety Information

IMPORTANT: Before driving this vehicle, be certain that you have read and that you fully understand each and every step of the driving and handling information in this manual. Be certain that you fully understand and follow all safety warnings.

IT IS IMPORTANT THAT THE FOLLOWING INFORMATION BE READ, UNDERSTOOD AND ALWAYS FOLLOWED.

The following types of advisories are used throughout this manual:



DANGER

Danger indicates an unsafe practice that could result in serious personal injury or death. A danger advisory banner is in **white** type on a **black** background with a **black** border.



WARNING

Warning indicates an unsafe practice that could result in personal injury. A warning advisory banner is in **black** type on a **gray** background with a **black** border.



CAUTION

Caution indicates an unsafe practice that could result in damage to the product. A caution advisory is in **black** type on a **white** background with a **black** border.

Note: Note indicates a procedure, practice, or condition that must be followed in order for the vehicle or component to function in the manner intended.

Driver's responsibility

- As the driver, you are responsible for the safety and comfort of the passengers during the journey. Therefore, do not drive the bus before you have read this driver's manual. You must be familiar with all the indicators and warning lights and know what to do if something unexpected happens.
- As the driver of the vehicle, it is your responsibility to foresee any hazards that could threaten your passengers.
- It is also your responsibility to ensure that all the safety equipment of the bus is in place. Therefore check regularly the working order of safety belts, emergency door and window opening, door sensitive edges, fire extinguishers and first aid equipment.
- Follow the recommended service and maintenance program to maintain the bus's condition and safety.

2 Overview

I-Start is a dual battery system designed to secure cranking and provide a longer service life for the batteries

In order to achieve this, vehicle loads are split in two systems:

- Chassis electronics (connected to Starter Batteries)
- Body electronics (connected to Consumer Batteries)

All the electric devices are connected to the consumer batteries (Coffee makers, Lamps, Power outlets, etc).



WARNING

On vehicles with I-Start there is voltage in the starter batteries even if the battery main switch is disengaged. In order to fully de-energize the vehicle, the cables on the battery terminals must be disconnected from both the starter batteries and the consumer batteries.

Labels

Danger, Warning and Caution labels are placed in various locations on the vehicle to alert drivers and service technicians about situations that may lead to personal injury or equipment damage. In the event that a label is damaged or missing the **label must be replaced**. Contact your authorized VOLVO Bus dealer for assistance regarding labels.

Decal is placed in the chassis fuse box in the starter batteries compartment.

<h3>WARNING</h3> <h4>STARTER BATTERIES</h4> <p>Do not stock anything in this compartment Starter motor is always connected to 24V Starter batteries</p> <p>Ne pas ranger quoi que ce soit dans ce compartiment Le démarreur est toujours sous tension 24-volt Batteries de démarrage</p> <p>No almacenar nada en este compartimento El motor de arranque está siempre conectado a 24V Baterías de arranque</p>	<p>VOLVO</p>
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Decal is placed in the body fuse box in the consumer batteries compartment.

<h3>WARNING</h3> <h4>CONSUMER BATTERIES</h4> <p>Do not stock anything in this compartment Consumer batteries Do not jump start here</p> <p>Ne pas ranger quoi que ce soit dans ce compartiment Batteries de consommation Ne pas connecter une batterie d'appoint pour démarrage de secours ici</p> <p>No almacenar nada en este compartimento Baterías de Consumo No pasar corriente</p>	<p>VOLVO</p>
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Decal with the system description is placed on the hatch of the right side battery compartment.

<h3>I-START SYSTEM OVERVIEW</h3> <p>When battery charged is plugged in power grid, consumer batteries are always charged Por chargez la batterie, elle sera toujours chargée en réseau électrique Wenn die Batterie geladen ist, werden die Verbraucherbatterien immer geladen Cuando el cargador de batería está conectado a la red eléctrica, las baterías de consumo siempre se cargan. Vista cargada del sistema de arranque por cable por la base de ganchos a la posición 1. Bateria de arranque en modo de arranque por cable está conectada a la red eléctrica.</p> <p>L'unique et l'unique chargeur de batteries est installé. Les batteries de Consommation seront maintenues pleines charge. Das einzige Ladegerät für Batterien ist installiert. Alle Batterien der Verbraucher werden immer geladen. No pueden desconectar el motor con el cargador de baterías instalado.</p> <p>For more information see electrical service manual. Para más información véase el manual eléctrico de servicio. Für alle Informationen siehe die Manual de servicio elektrisch.</p>	<h3>CAUTION</h3> <p>Start components:</p> <ol style="list-style-type: none"> 1. Starter motor 2. Control relay (CR) 3. Battery fuse (BF) 4. Chassis fuse box 5. Battery fuse (BF) 6. Battery fuse (BF) 7. Battery fuse (BF) 8. Battery fuse (BF) 9. Battery fuse (BF) 10. Battery fuse (BF) 11. Battery fuse (BF) 12. Battery fuse (BF) 13. Battery fuse (BF) 14. Battery fuse (BF) 15. Battery fuse (BF) 16. Battery fuse (BF) 17. Battery fuse (BF) 18. Battery fuse (BF) 19. Battery fuse (BF) 20. Battery fuse (BF) 21. Battery fuse (BF) 22. Battery fuse (BF) 23. Battery fuse (BF) 24. Battery fuse (BF) 25. Battery fuse (BF) 26. Battery fuse (BF) 27. Battery fuse (BF) 28. Battery fuse (BF) 29. Battery fuse (BF) 30. Battery fuse (BF) 31. Battery fuse (BF) 32. Battery fuse (BF) 33. Battery fuse (BF) 34. Battery fuse (BF) 35. Battery fuse (BF) 36. Battery fuse (BF) 37. Battery fuse (BF) 38. Battery fuse (BF) 39. Battery fuse (BF) 40. 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Battery fuse (BF) 29. Battery fuse (BF) 30. Battery fuse (BF) 31. Battery fuse (BF) 32. Battery fuse (BF) 33. Battery fuse (BF) 34. Battery fuse (BF) 35. Battery fuse (BF) 36. Battery fuse (BF) 37. Battery fuse (BF) 38. Battery fuse (BF) 39. Battery fuse (BF) 40. Battery fuse (BF) 41. Battery fuse (BF) 42. Battery fuse (BF) 43. Battery fuse (BF) 44. Battery fuse (BF) 45. Battery fuse (BF) 46. Battery fuse (BF) 47. Battery fuse (BF) 48. Battery fuse (BF) 49. Battery fuse (BF) 50. Battery fuse (BF) 51. Battery fuse (BF) 52. Battery fuse (BF) 53. Battery fuse (BF) 54. Battery fuse (BF) 55. Battery fuse (BF) 56. Battery fuse (BF) 57. Battery fuse (BF) 58. Battery fuse (BF) 59. Battery fuse (BF) 60. Battery fuse (BF) 61. Battery fuse (BF) 62. Battery fuse (BF) 63. Battery fuse (BF) 64. Battery fuse (BF) 65. Battery fuse (BF) 66. Battery fuse (BF) 67. Battery fuse (BF) 68. Battery fuse (BF) 69. Battery fuse (BF) 70. Battery fuse (BF) 71. Battery fuse (BF) 72. Battery fuse (BF) 73. Battery fuse (BF) 74. Battery fuse (BF) 75. Battery fuse (BF) 76. Battery fuse (BF) 77. Battery fuse (BF) 78. Battery fuse (BF) 79. Battery fuse (BF) 80. Battery fuse (BF) 81. Battery fuse (BF) 82. Battery fuse (BF) 83. Battery fuse (BF) 84. Battery fuse (BF) 85. Battery fuse (BF) 86. Battery fuse (BF) 87. Battery fuse (BF) 88. Battery fuse (BF) 89. Battery fuse (BF) 90. Battery fuse (BF) 91. Battery fuse (BF) 92. Battery fuse (BF) 93. Battery fuse (BF) 94. Battery fuse (BF) 95. Battery fuse (BF) 96. Battery fuse (BF) 97. Battery fuse (BF) 98. Battery fuse (BF) 99. Battery fuse (BF) 100. Battery fuse (BF) <p>VOLVO PH 1271463</p>
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4 General Information

Power relays labels

The I-Start system have two power relays:

- **K400** relay is identified with a label placed on the left side battery compartment near to the Consumer Batteries.
- **K300** relay is identified with a label placed on the right side battery compartment near to the Starter Batteries.

Note: Both power relays have a decal in three languages for a better identification.



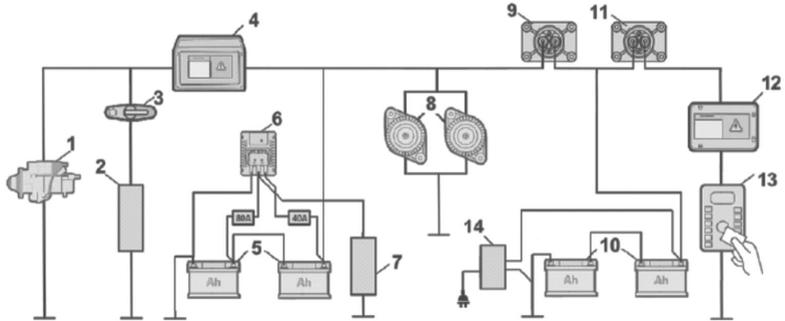
W0111072



W0111071

Schematics

I-Start system has the next Schematics distribution.



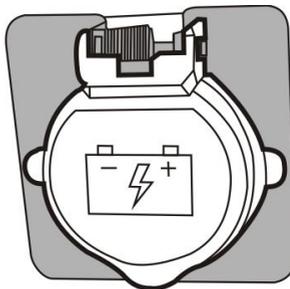
T3113041

- | | |
|-----------------------|--|
| 1 Starter Motor | 9 Split relay (Ignition controlled) |
| 2 Chassis Loads | 10 Consumer batteries |
| 3 Battery Main Switch | 11 Body relay (MCM controlled) |
| 4 Chassis fuse box | 12 Body fuse box |
| 5 Starter batteries | 13 Consumer loads (Video Equipment,
Coffee maker, Lamps, Power outlets, etc.) |
| 6 Battery equalizer | 14 Battery Charger |
| 7 12 V Chassis loads | |
| 8 24 V Alternators | |

6 Battery charger

Batteries charger electrical outlet

In the right hand side batteries compartment hatch there is installed an electrical outlet for connecting the charger to the power grid.



W0111074

Batteries charger specification

The current consumption is 15A connected to 120VAC +/- 10% 60Hz +/- 10.

Charging mode

The batteries charger has the following charging modes:

- If ignition key is on position **0** or **I + click**, only the consumer batteries are charged.
- If Ignition key is on position **II**, starter and consumer batteries are charged.

If Ignition key is on position I + click, bus accessories can be used (like the radio).



WARNING

Never crank engine with battery charger plugged on the power grid.

8 Battery charger

Battery charging time

Consumer batteries (ignition key on position 0 or position I + click):

- State of charge from **50% to 80%**:
Around **45 minutes**.*
- State of charge from **60% to 80%**:
Around **30 minutes**.*
- State of charge from **70% to 80%**:
Around **15 minutes**.*
- Starter and Consumer Batteries with state of charge from **50% to 80%**: Around **6 hours**.*
- Starter and Consumer Batteries with state of charge from **60% to 80%**: Around **4 hours**.*
- Starter and Consumer Batteries with state of charge from **70% to 80%**: Around **2 hours**.*

* Considering SOH (State Of Health) **100%** and **25 °C**.

The values were estimated and may vary according to specific conditions.



T0014333

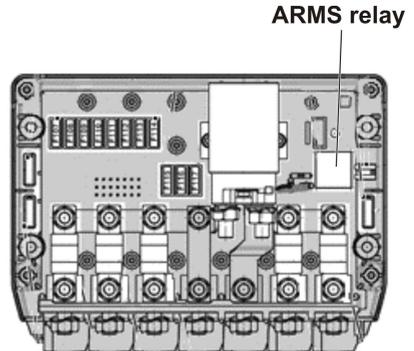
ARMS (Automatic Reset Main Switch) 9

The function of the ARMS (Automatic Reset of Main Switch) relay is to secure energy for cranking.

The ARMS relay is responsible for shutting down +30 power source to prevent starter batteries from getting drained when **23,5 V** are detected for more than **120 seconds**.

ARMS relay is located in the fuse box..

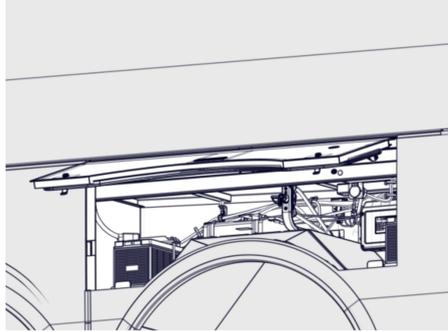
This function will only work if the ignition key is on position **I + a click**, refer to the ignition key positions on the Driver's manual.



W0111465

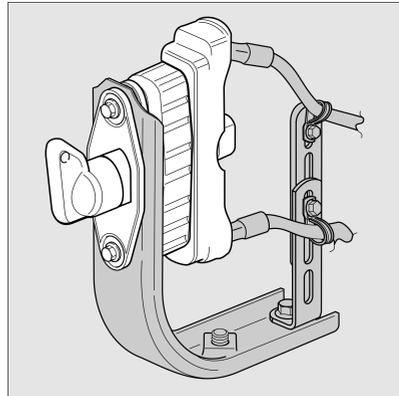
10 Starter batteries compartment

The starter batteries supply the necessary current to starter motor to work. These batteries are located in the left side of the bus, refer to the image.



The battery main switch

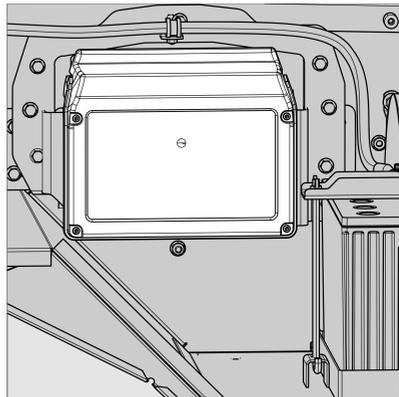
The battery main switch disconnects the current to the consumer batteries but NOT the starter batteries.



W0104281

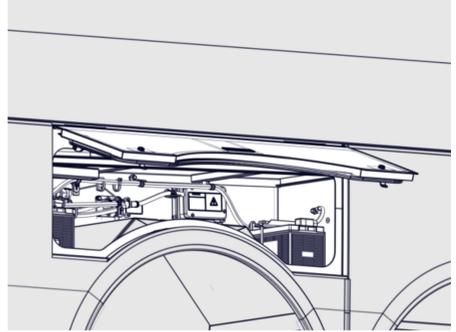
A chassis fuse box

This fuse box contains the fuses for the I-Start System. This fuse box is located in the starter batteries compartment.



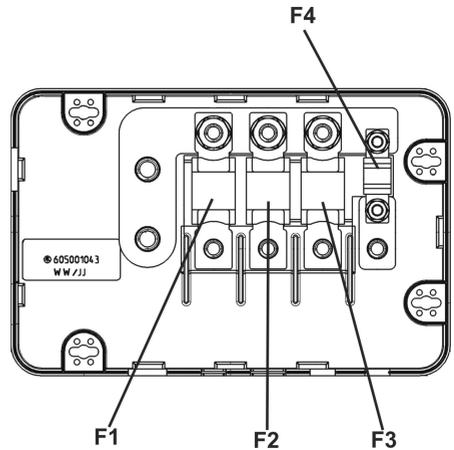
W0104280

The consumer batteries supply energy to all bus electrical devices and the vehicle's Control Units. These batteries are located in the right side of the bus, refer the image.



A body fuse box

This fuse box contains the fuses for the I-Start System. This fuse box is located in the consumer batteries compartment.



T3113651

12 V Fuse holder

12V supply from Equalizer

A decal was added to the fuse holder for a better identification of each fuse.



F958 10A (12V) OBD	F957 20A (12V)	F956 10A (12V)	F955 20A (12V)	F915 30A (12V)	F907 20A (12V)
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12 Vehicle messages and symbols

For I-start

High Voltage / Consumer Batteries and probable causes:

- Rapid charger or jump starting unit connected
- Faulty alternator
- Abnormally high voltage or short-circuit to higher voltage



T3113158

Low voltage / Consumer Batteries and probable causes:

- Faulty battery
- Abnormally low voltage or short-circuit to ground cable

I START fault and probable causes:

- Problem on K300 or K400 or K53 Relay

Note: If one of the mentioned messages appear, call to the service center at the next stop.

For Starter Batteries/ARMS

High Voltage / Starter Batteries and probable causes:

- Rapid charger or jump starting unit connected
- Faulty alternator
- Faulty battery
- Abnormally high voltage or short-circuit to higher voltage



T3113159

Supply voltage below 24 V and probable causes:

- Faulty battery
- Abnormally low voltage or short-circuit to ground cable



T3113158

Check BBM and probable causes:

- ARMS relay open circuit
- Faulty ARMS relay

Note: If one of the mentioned messages appears, stop the bus in the next station and call to the service center.

14 If something happens

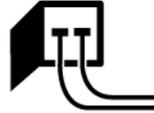
Service Switch

There is a switch in the Electrical Center compartment (with a lock symbol) that needs to be activated when the MCM is being programmed.



T1008543

If this switch is activated, the start is disable and an indicator is displayed in the cluster.

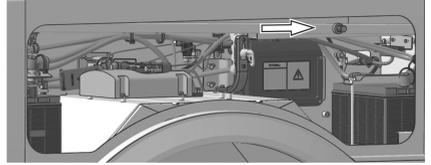


T0014716

Jump start ground connection

A stud for jump start was placed in the Starter Batteries compartment.

On the hatch of the compartment there is a decal with instructions for jump start in three languages.



T3113156

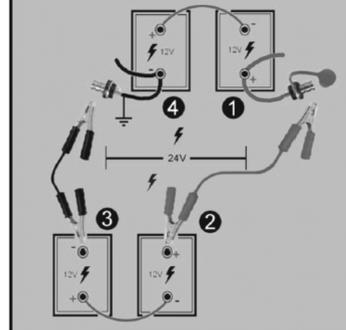
Ground connection

16 If something happens

Jump start procedure

For jump start batteries, proceed as follows:

- 1 Place the ignition switch in **0** position
- 2 Make sure the donor batteries have **24 V** total voltage or **24 V** voltage on the system
- 3 Turn **OFF** the engine on the assistance vehicle and make sure the vehicles do not touch each other
- 4 Open the consumer batteries compartment.
- 5 Connect one of the red cable end to the positive terminal of the donor battery. The positive terminal is marked in red, **P** or +
- 6 Connect the other red cable clamp to the positive terminal of the dead batteries. The positive terminal is marked in red, **P** or +
- 7 Connect one of the black cable end to the negative terminal of the donor battery marked in black, **N** or -
- 8 Connect the other black cable end to a ground stud
- 9 Start the engine of the assistance vehicle. Let the engine run, at approximately **1000 rpm**
- 10 Start engine of dead vehicle. Disconnect the black cable from the ground stud. Disconnect the other end of the black cable
- 11 Disconnect the clamp on the black cable from the ground terminal
- 12 Disconnect the cable end on the black cable from the negative terminal on the donor batteries.
- 13 Disconnect the red cable.



T3113157

- 1 Red on dead
- 2 Red on donor
- 3 Black on donor
- 4 Black on dead

12 V Fuse holders. 11

A

A chassis fuse box. 10
 ARMS (Automatic Reset
 Main Switch)..... 9
 ARMS (Automatic Reset
 Main Switch). 9

B

Batteries charger
 specification..... 6
 Battery charger 6
 Battery charger. 6
 Battery charging time. 8

C

Charging mode. 7
 Chassis fuse box front..... 11
 Check BBM 13
 Consumer batteries
 compartment..... 11
 Consumer batteries
 compartment..... 11

D

Driver's responsibility. 1

G

General Information..... 3

H

High Voltage / Consumer
 Batteries..... 12
 High Voltage / Starter
 Batteries..... 13

I

I START Fault..... 12

If something happens 14
 If something happens..... 14
 Introduction 1

J

Jump start batteries
 procedure..... 16
 Jump start procedure..... 15

L

Labels..... 3
 Low voltage / Consumer
 Batteries..... 12

O

Overview..... 2
 Overview..... 2

P

Power relays..... 4

S

Safety information. 5
 Schematics..... 5
 Service Switch. 14
 Starter batteries
 compartment..... 10
 Starter batteries
 compartment..... 10
 Supply voltage below 24
 V 13

T

The battery main switch. 10

V

Vehicle messages and
 symbols..... 12

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