

Volvo_CEM_HC12_manual

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Volvo CEM manual

01 / Volvo CEM

User manual • UHDS / EcuX • HCS12 and HCS12X

Reading and writing EEPROM and FLASH, CEM type identification and **Decode PIN**. This manual covers five variants of modules with two processors.

Reading the PIN via OBD:

CEM DT256 + DT256
 CEM XDT256 + XDT256
 CEM XDT256 + XDT384
 CEM XDT384 + XDT384
 CEM DT256 + DT128 (not supported)

PIN requirements for reading MCU1 / MCU2

PIN reading is available via OBD or a bench connection for four of the five CEM models listed above.

Reading **MCU1 (HS)** requires a PIN. You can obtain it using **Decode PIN**, but first you must read MCU1 FLASH with an **external programmer** and open the file in the decoder. An exception may be CEM **384 + 384 from 2009 onwards**: first try PIN **FFFFFFFFFFFF** (12 characters). If it is accepted, reading the module with a programmer to obtain the PIN is unnecessary. Reading **MCU2 (LS): FLASH 2 and EEPROM 2 does not require a PIN**.

Quick start

- 1. Prepare the connection** Use the current version of the application. Connect the interface and CEM power supply according to the wiring diagram for that module.
- 2. Make a backup** Read EEPROM and FLASH from the relevant side. Keep the original BIN files before making any changes.
- 3. Check identification** Check the HW number and CEM type, including the HS and LS processors, in the main message window. If the selected option does not match, the program blocks further operation.
- 4. Wait for full completion** When writing, wait for verification and the final message. Do not disconnect the power supply or interface during erasing or programming.

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Version 1.12 • 9 October 2026. Connection image and HTML source added. Functional content based on version 1.11.

02 / Selecting the correct CEM

The HW number identifies the variant. The words “left” and “right” in a file name do not reliably identify the CAN side.

CEM variant	HS processor	LS processor
HCS12 (256 + 256)	MC9S12DT256	MC9S12DG256
HCS12X (384 + 384)	MC9S12XDT384	MC9S12XDT384
HCS12X (256 + 384)	MC9S12XDT256	MC9S12XDT384
HCS12X (256 + 256)	MC9S12XDT256	MC9S12XDT256
HCS12 (256 + 128)	MC9S12DT256	MC9S12DG128

Selecting the side for an operation

Dialog choice	Side	Interface CAN channels
Yes	HS, processor 1	OBD pins 6 / 14
No	LS, processor 2	OBD pins 3 / 11

Cancel

Cancel selection

The operation is not
started

Numbers 6/14 and 3/11 refer to the interface CAN channels, **not the numbering of pins on the CEM connector**. Use the appropriate wiring diagram for the module power supply, ground and connections.

The program selects the appropriate CAN channel. HS and LS do not operate simultaneously on this interface. Complete the current operation before switching sides.

03 / Reading EEPROM and FLASH

Each read operation applies to one selected side: HS or LS.

1. Select the operation Click **Read EE** or **Read FLASH**, then select HS or LS.

2. Enter PIN for HS For HS, the program asks for a **6 byte PIN: 12 hexadecimal characters**. **Reading FLASH 2 and EEPROM 2 (EE2), i.e. the side LS, does not require a PIN.** The PIN entry dialog is not displayed for LS. If you use Decode PIN, copy the result from the "CEM PIN" line.

Some CEM modules from after 2009 may accept a PIN consisting entirely of **FF**, so it is worth trying this first. Enter **FFFFFFFFFFFF** (12 characters) in the six-byte PIN dialog.

3. Check the messages The program checks the license, communicates with the CEM and identifies the module type. Once the bootloader starts successfully, "CEM HC12 SBL ready" appears.

4. Save the result The BIN save dialog opens. The suggested file name includes the variant, HS/LS, memory type, date and time. Keep these identifiers.

BIN file sizes

Variant	FLASH HS / LS	EEPROM HS / LS
DT256 + DG256	256 / 256 KB	4096 / 4096 B
XDT384 + XDT384	384 / 384 KB	4096 / 4096 B
XDT256 + XDT384	256 / 384 KB	4096 / 4096 B

XDT256 + XDT256	256 / 256 KB	4096 / 4096 B
DT256 + DG128	256 / 128 KB	4096 / 2048 B

In the table, 1 KB = 1024 bytes. FLASH: 128 KB = 131,072 B; 256 KB = 262,144 B; 384 KB = 393,216 B.

Confirming completion

Look for the final message identifying the side and memory, such as “**CEM HS FLASH read OK**”, and the reset result. If the reset is not acknowledged, the program retains the data read and asks you to cycle the CEM power supply.

04 / Writing EEPROM and FLASH

Back up the original contents before writing. Do not interchange HS and LS files.

- 1. Select the memory and side** Click **Write EE** or **Write FLASH**, select HS/LS and enter the PIN if requested.
- 2. Select the BIN file** EEPROM and LS FLASH require the exact size listed in the table on page 3. For HS FLASH, select the correct 256/384 KB BIN file.
- 3. Check identification of the file and module** For HS FLASH, the program reads the HW from the file and compares its variant with the selected option. When communicating with the module, it also checks the actual HW number. A mismatch blocks the operation.
- 4. Wait for writing and verification** The program reads the original memory, checks sector protection, then erases and writes the changed sectors. After writing, it reads back the entire written memory and compares it with the input data.
- 5. Check the result** Success is confirmed by “write and full verification OK”, followed by the reset result. Progress bar movement or completion of data transfer alone does not replace verification.

FLASH 1 / HS safeguards

Check	Action
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HW and CEM variant	The file must match the selected processor variant. The SW number is not used to authorize writing.
HS / LS layout	Recognized FLASH 2 / LS files are rejected when writing HS, even if they have the same HW and size.
Unrecognized file	Writing is blocked if the HW or memory layout is not recognized. Do not change numbers in the file to bypass the check.

The file HW and FLASH 1/2 layout checks described above apply to **writing HS FLASH**. They do not check the content type of EEPROM or LS files. Matching HW does not guarantee that the file configuration is compatible with a particular vehicle.

05 / Decode PIN

The “CEM PIN” result is intended for the six-byte PIN dialog used in HS operations.

- 1. Connect the interface** Decode PIN checks authorization through MCU1, so a connected interface and the appropriate license are required even when analyzing a file offline.
- 2. Open the FLASH HS file** Select one of the supported CEM options and click **Decode PIN**. Once the license is accepted, select the **FLASH HS (FLASH 1)** file. The function identifies the supported layout from the file; the selected menu option is not used to calculate the PIN.
- 3. Read the result in the main window** The program displays the file name, size, identification, CEM type and PIN. The result is not shown in a separate dialog.
- 4. Use the correct value** In the PIN dialog for Read/Write HS, enter **12 characters** from the “**CEM PIN**” line. Do not enter the value labelled “SecurityAccess 27 secret (not boot PIN)”.

Current PIN decoder coverage

Recognized SW	Variant / supported file
31327320	XDT384 + XDT384 / BIN 384 KB

31314854	XDT256 + XDT384 / BIN 256 KB
31254750	XDT256 + XDT256 / BIN 256 KB
31254047	DT256 + DG128 / BIN 256 KB

Decode PIN coverage is narrower than CEM read/write coverage. Other SW versions or file layouts may not yet be supported. Variant identification for FLASH writing is based on HW and is independent of this table.

06 / Messages and troubleshooting

Read the entire session log in the main message window, including identification and the final result.

Message	Meaning and action
License Accepted	The license has been accepted. If authorization is denied, check the active license, application version and interface firmware version.
CEM type: HS ... + LS ...	The identified type and processors on both sides. Compare them with the selected option. If the option is incorrect, the program displays the identified variant before rejecting the operation.
Wrong PIN	The CEM rejected the boot PIN. Check the 12 characters from Decode PIN and confirm that the analyzed file comes from this module. Do not use the SecurityAccess 27 secret as the boot PIN.
Wrong FLASH type	The HW/type or file layout does not match the selected operation, or the identification is not recognized. Check the variant, HS/LS side and correct file. Writing is blocked.
Wrong ... file size Error file size	The file size is incorrect. Use a complete BIN file in the correct format. Do not add or remove bytes solely to obtain the required size.

does not match selected ... no SBL uploaded	The selected option does not match the connected CEM. Select the variant matching the HW and processor pair read from the module. The bootloader has not been loaded.
Error (timeout)	No response was received in time. Check the power supply, connections and CAN side. After a write error, keep the log and determine the module state before starting another operation.
write not completed. No automatic reset.	Writing did not complete successfully. The program does not reset the module automatically. Do not assume the module has been programmed correctly; keep the backup and full log.
write and full verification OK CEM reset acknowledged	Verification completed successfully and the reset was acknowledged. Also check the final session message.

If you need assistance

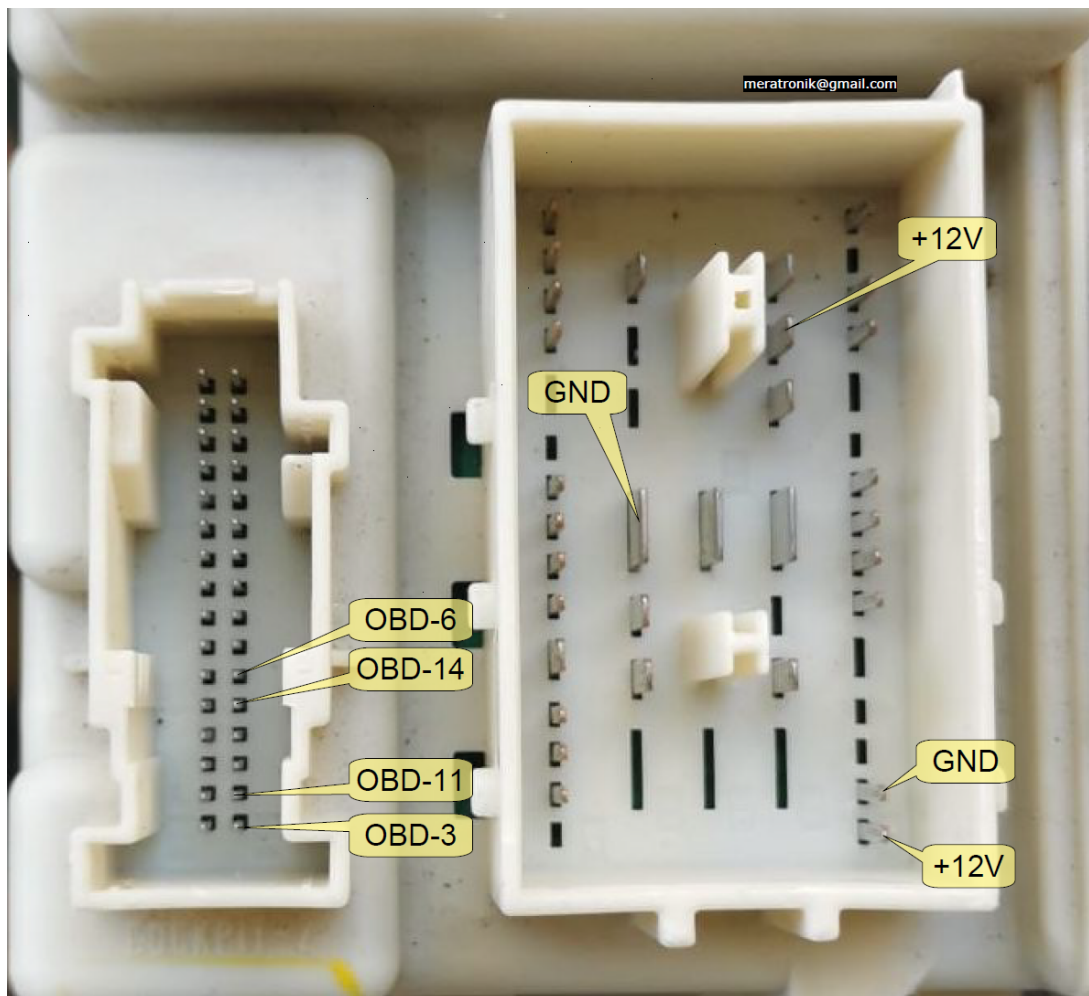
Provide the full session log, CEM HW number, selected option, HS/LS side, operation type and size of the file used. An "Error" message alone is not enough to determine the cause.

Do not overwrite your only copy of the original EEPROM/FLASH. Share files and PINs only with the person handling the job.

Bench Connection

CEM connection

Connector view with the connections marked in the image.



HS CAN: OBD 6 / 14 **LS CAN:** OBD 3 / 11

Power supply: +12 V and GND at the points marked in the image.

CEM connection - additional power supply

Additional connector view showing the +12 V connection point.

