# Volvo FH/FM 4 series and RENAULT K,T,C EURO5 / EURO6

AdBlue emulator installation guide

ENTERING SERVICE MODE

Entering service mode is a necessary procedure that should not be disregarded. Even when the ignition is turned off, control units keep working and send data via the BackBone1 CAN bus. However, in the installation process, various connectors need to be plugged in and out. Before the work, pay attention to the Adblue pump. Usually, the system drainage starts in 15 minutes after the engine shutdown. Adblue fluid from the section between the pump and the nozzle drained to the muffler. Also, drained from the section between the pump and tank - to the tank. That is how the system is drained. Thus to keep the SCR system in working order, it is recommended to wait until the pump stops (it should stop buzzing).
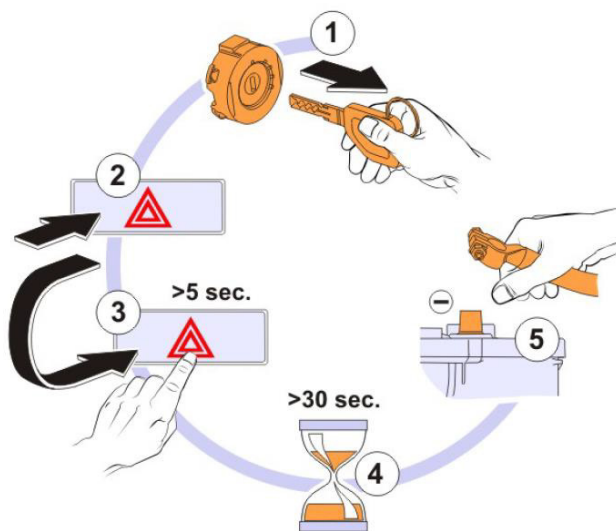
After removing the key from the ignition switch, press and release the hazard lights button, press the button again, and hold it for at least 5 seconds. A relay will click, and the parking brake icon on the dashboard will go out to confirm the activation of the service mode.
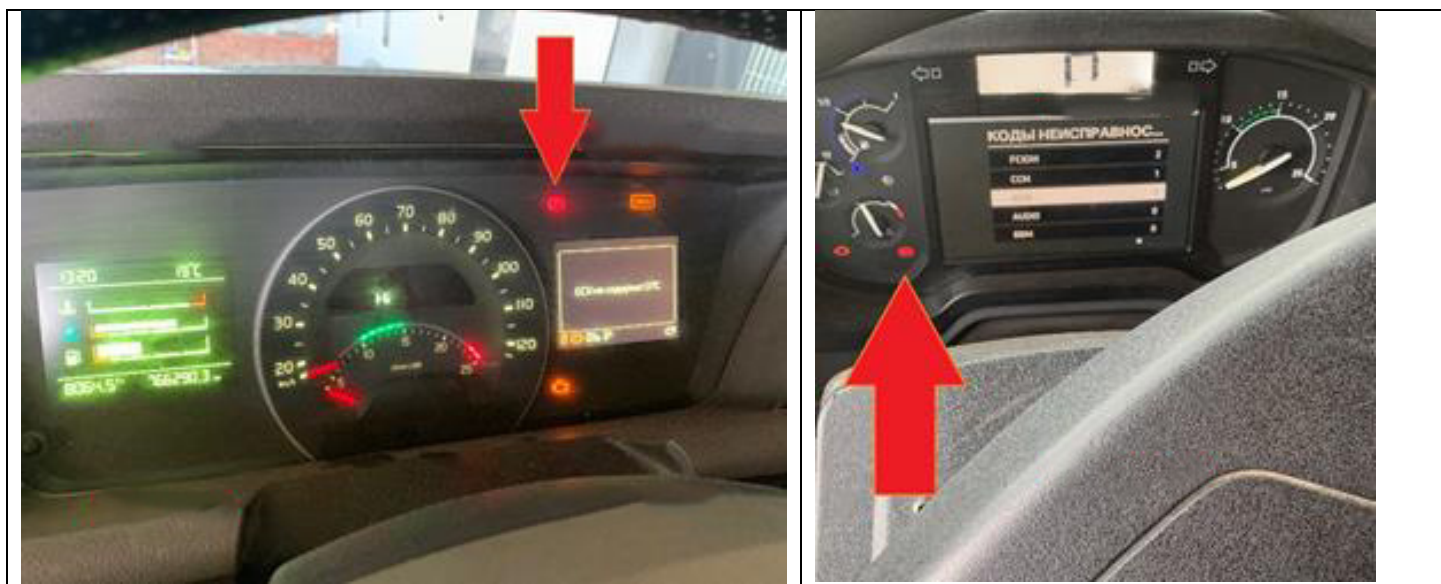
VOLVO FH/FM(4) AND RENAULT K,T,C EURO5

Emulator must be installed under the hood inside the distribution box cover. The device board is coated with electrical insulating varnish and is protected from the moisture that can appear because of heating and cooling of the cabin.
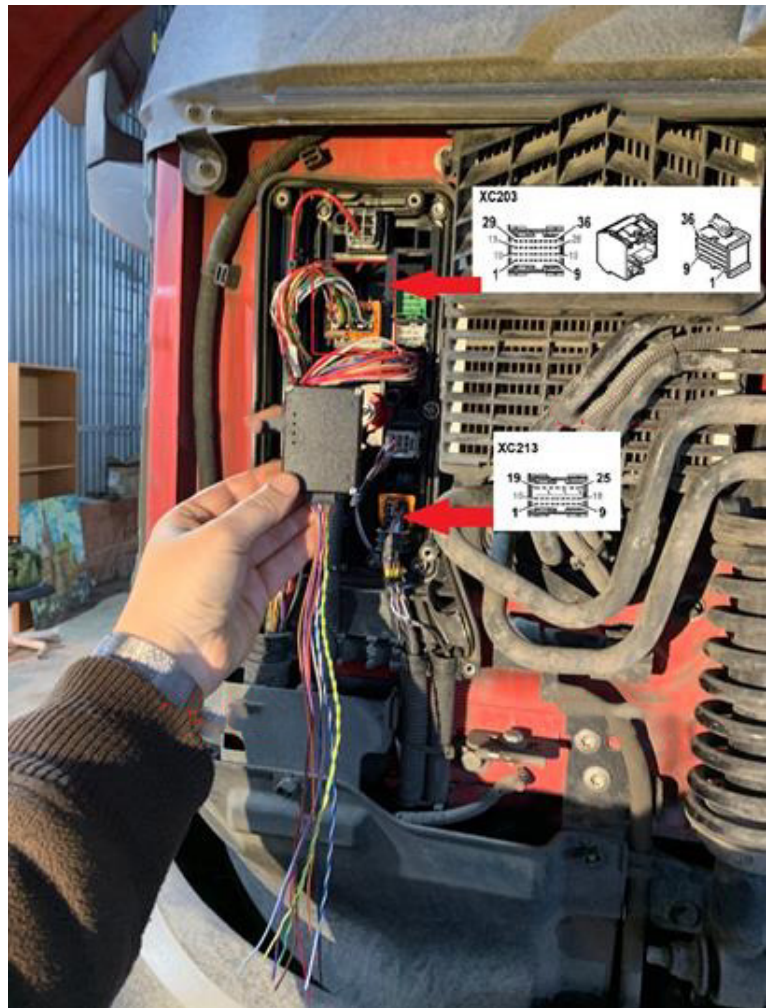
Product page:
https://www.cardiag.com/product/scr-emulator-volvo-euro-6-v3/

Find the XC203 connector in the distribution box and connect CAN1 and power. Connect the ground to the XC213 connector.

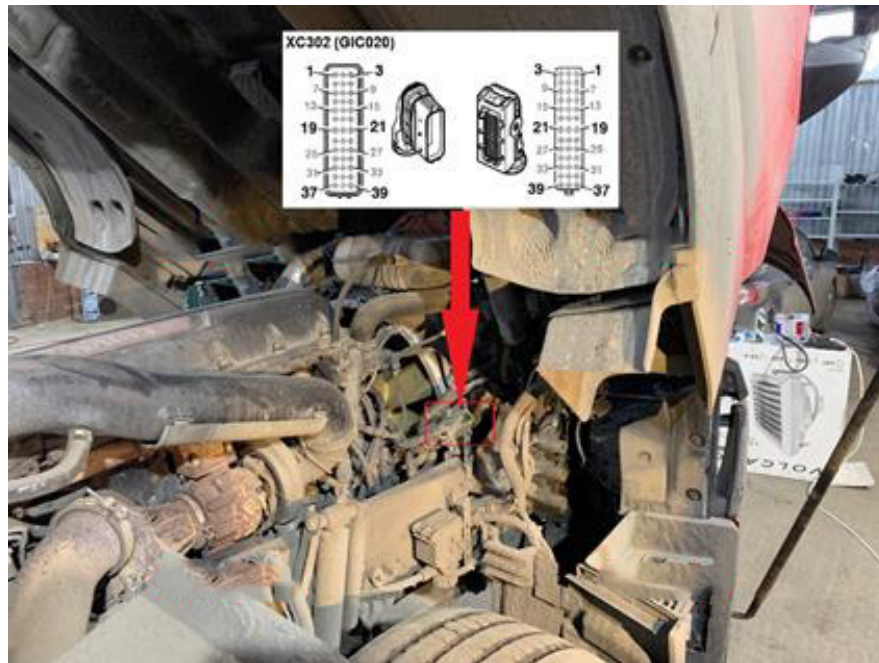| XC203 PINOUT		
PIN NO.	TRUCK	EMU
1	7004	YELLOW
2	7005	GREEN
26	2020	WHITE
XC213 PINOUT		
7	1	BROWN

ATTENTION! DO NOT disconnect XC203 without entering service mode!

ATTENTION! Tachograph battery life is TWO (2) years. Find out when the tachograph was calibrated the last time. If it was almost two years ago or more, change the battery. Disconnecting the XC203 connector with a discharged tachograph battery shall result in replacing the tachograph at your expense!

After installing the emulator in the distribution box, connect the CAN2 to the XC302 connector under the cab with a separate wire.

ENGINE
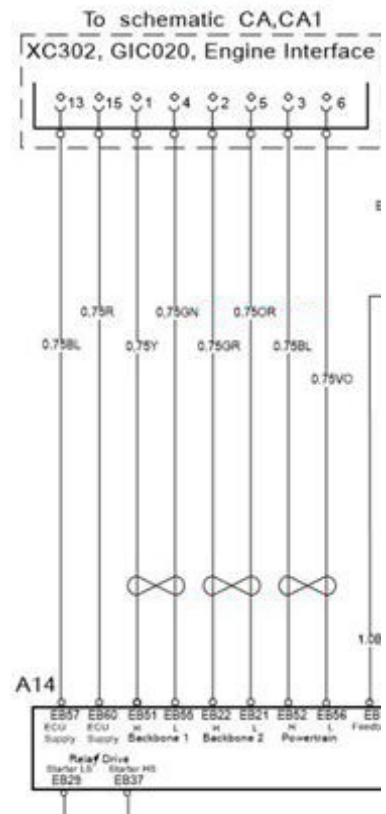
To schematic CA,CA1
XC302, GIC020, Engine Interface

The table has double entries for pins 3 and 6 because wires of different colors are connected to them in the XC302 connector. Pin 3 is connected to yellow wire 7036 from the frame and blue wire 7128 from the engine. Pin 6 is connected to green wire 7037 from the frame and purple wire 7129 from the engine.

It often happens that out of the box, wire colors are mixed up! Always connect by pin numbers! If CAN2 is not connected correctly, the red RUN LED will not light, but many errors will appear (NOx and others). Adblue level will be shown on the dashboard.

XC302 PINOUT		
PIN NO.	TRUCK	EMU CAN2
3	7036	GREY
3	7128	
6	7037	BLUE
6	7129	

As the next step, deactivate the ACM (A174) unit and the NOx sensor in the X1 connector of the CCIOM (A163) unit, as described at the end of section 2 (see p. 4 and 5).

When installing in trucks with retarders (see the next section), do not cut the power wire 2020. Instead, cut pin 2 and pin 6 that is CAN Powertrain (7036/7037).
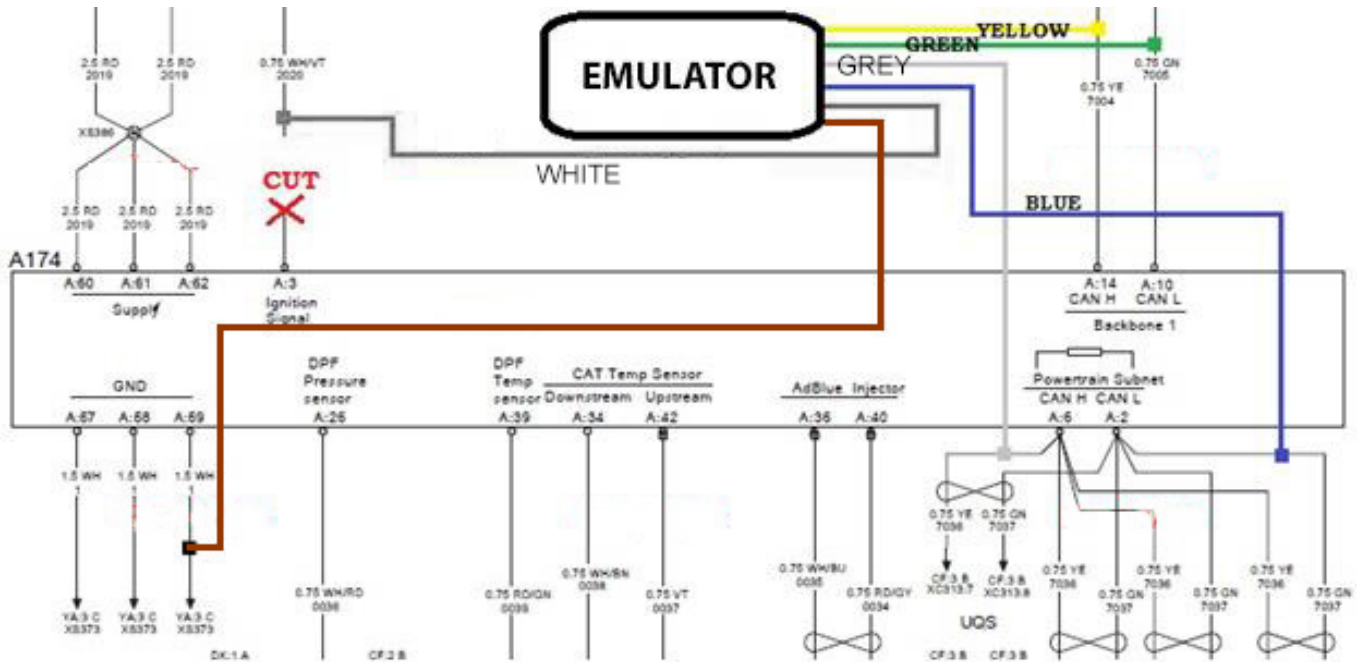
VOLVO FH/FM(4) AND RENAULT K,T,C EURO5 – WIRING WITH INSTALLED RETARDER

If the truck is equipped with a retarder, the emulator should be connected in a different way. The ACM post-processing control unit (A174) also controls the retarder, so it should not be de-energized.

The NOx sensor should be deactivated, as described in section 2 (see p. 4 and 5). Connect the CAN1 of the emulator to the Backbone1 bus, cut the Powertrain bus from the ACM unit, and connect the CAN2 of the emulator according to the diagram. If the emulator is installed under the hood as described in section 3 (see p.6), then the wiring does not change.

Check the resistance of the CAN Powertrain. It should be 60 Ohms. CAN disconnection will also cause a disconnection of the 120 Ohms terminal resistance (see the diagram above). It is recommended to connect a 120 Ohms resistance to ensure the bus resistance stays at 60 Ohms; otherwise, it may cause incorrect operation.

VOLVO FH/FM(4) AND RENAULT K,T,C EURO6 - EMULATOR INSTALLATION UNDER THE HOOD

Emulator must be installed under the hood inside the distribution box cover. The device board is coated with electrical insulating varnish and is protected from the moisture that can appear because of the heating and cooling of the cabin.
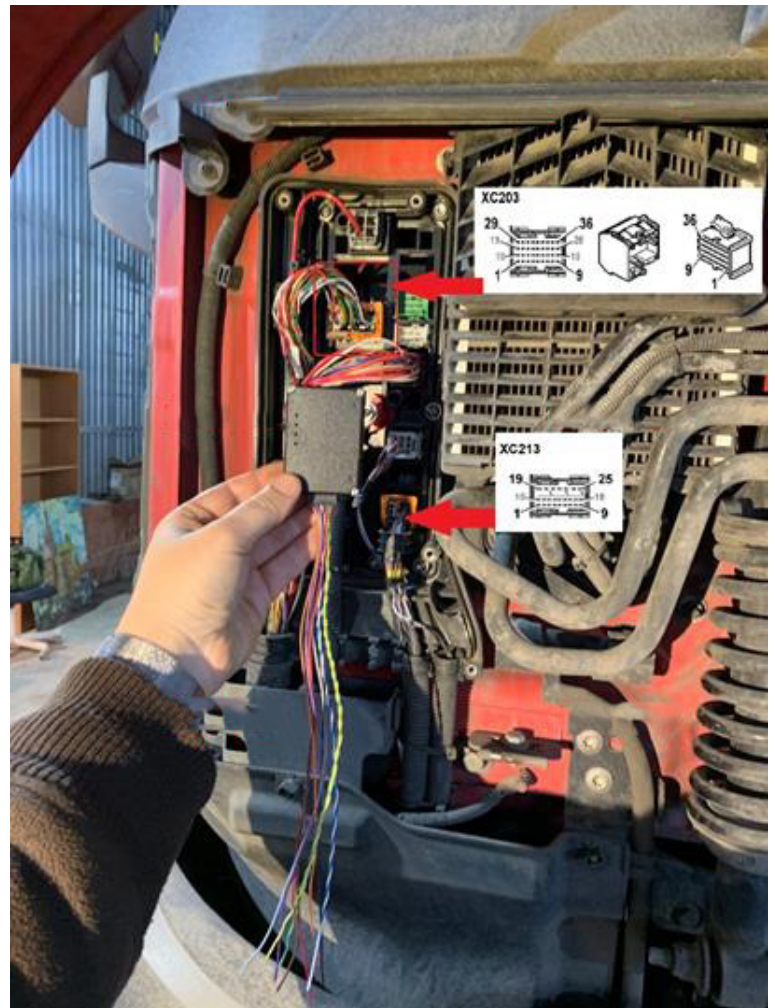
Product page:
https://www.cardiag.com/product/scr-emulator-volvo-euro-6-v3/

Find the XC203 connector in the distribution box and connect CAN1 and power. Connect the ground to the XC213 connector.

XC203 PINOUT		
PIN NO.	TRUCK	EMU
1	7004	YELLOW
2	7005	GREEN
26	2020	WHITE
XC213 PINOUT		
7	1	BROWN

ATTENTION! DO NOT disconnect XC203 without entering service mode!

ATTENTION! Tachograph battery life is TWO (2) years. Find out when the tachograph was calibrated the last time. If it was almost two years ago or more, change the battery. Disconnecting the XC203 connector with a discharged tachograph battery shall result in replacing the tachograph at your expense!

After installing the emulator in the distribution box, connect the CAN2 to the XC302 connector under the cab with a separate wire.

The table has double entries for pins 3 and 6 because wires of different colors are connected to them in the XC302 connector. Pin 3 is connected to yellow wire 7038 from the frame and blue wire 7128 from the engine. Pin 6 is connected to green wire 7039 from the frame and purple wire 7129 from the engine.

It often happens that out of the box, wire colors are mixed up! Always connect by pin numbers!

If CAN2 is not connected correctly, the red RUN LED will not light, but many errors will appear (NOx and others). Adblue level will be shown on the dashboard.

As the next step, deactivate the ACM (A174) unit and the NOx sensor in the X1 connector of the CCIOM (A163) unit, as described at the end of section 2 (see p. 4 and 5).

When installing in trucks with retarders (see the next section), do not cut the power wire 2020. Instead, cut pin 1 and pin 5 that is CAN Powertrain (7038/7039).
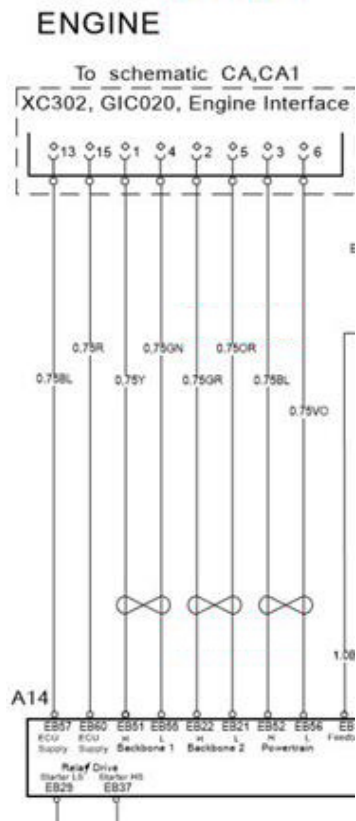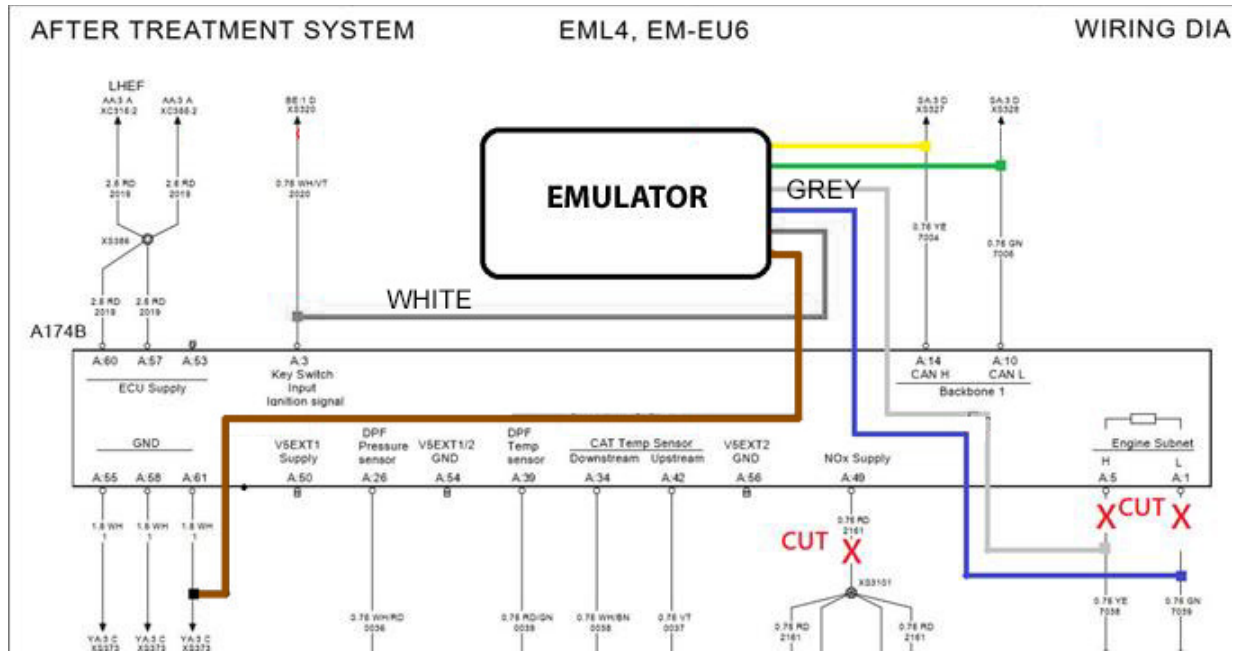

ENGINE

To schematic CA,CA1
XC302, GIC020, Engine Interface

XC302 PINOUT		
PIN NO.	TRUCK	EMU CAN2
3	7036	GREY
3	7128	GREY
6	7037	BLUE
6	7129	BLUE

VOLVO FH/FM(4) AND RENAULT K,T,C EURO6 – WIRING IN CASE OF INSTALLED RETARDER

If the truck is equipped with a retarder, the emulator should be connected in a different way. The ACM post-processing control unit (A174) also controls the retarder, so it should not be de-energized.

Connect the CAN1 of the emulator to the Backbone1 bus, cut the Powertrain bus from the ACM unit, and connect the CAN2 of the emulator according to the diagram. If the emulator is installed under the hood as described in section 3 (see p.6), then the wiring does not change.

Check the resistance of the CAN Powertrain. It should be 60 Ohms. CAN disconnection will also cause a disconnection of the 120 Ohms terminal resistance (see the diagram above). It is recommended to connect a 120 Ohms resistance to make sure the bus resistance stays at 60 Ohms; otherwise, it may cause incorrect operation.

RATIONALE AND WIRING SPECIFICS OF EMULATOR WITH TEMPERATURE INPUT

Using the emulator with analog input from the exhaust gas temperature sensor has the following particularities:

1. There is no need to deactivate the "7 nozzle" on EURO6 trucks. Active regeneration operates as usual. At the same time, there are no DTCs related to the AEF system.
2. If the fuel system gets faulty, the calculation of the exhaust gases temperature works incorrectly. But with this emulator, the actual exhaust gases temperature will be displayed, and there will be no DTCs. I.e., the emulator processes the 5-volt analog signal from the first temperature sensor and sends correct signals of 3 temperature sensors in the catalyst to the CAN bus.
3. Correct temperature readings when the truck operates in highlands. A feature of VOLVO engines is the powerful and efficient VEB/VEB+ engine brake. From experience, we know that the highest temperature of exhaust gases is reached during long downhill runs when VEB is actively used, as the kinetic energy of the moving truck is converted into thermal energy due to the compression of gases in the combustion chamber. The temperature often rises above 550 Celsius in this case. A regular emulator will show the idle temperature in this case, as there is no engine load.
4. The only drawback of this method is that the exhaust gas temperature sensor must work correctly, so you need to connect a diagnostic scanner and start the monitoring process of the sensors.

On EURO5, deactivate the NOx sensor
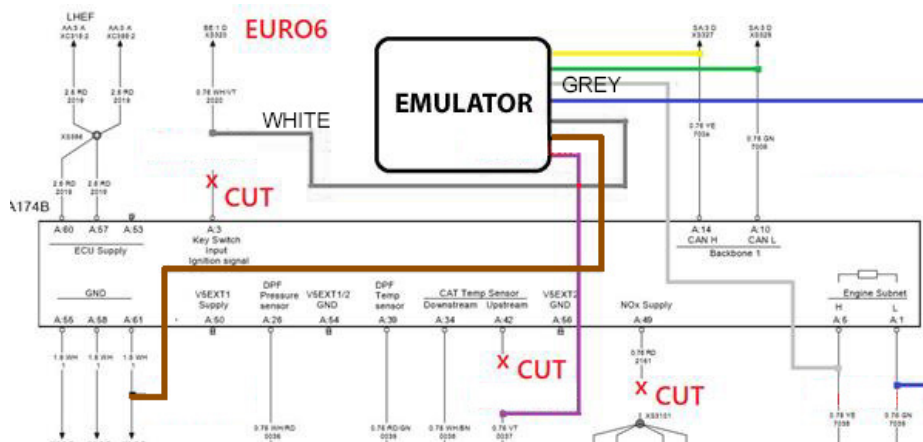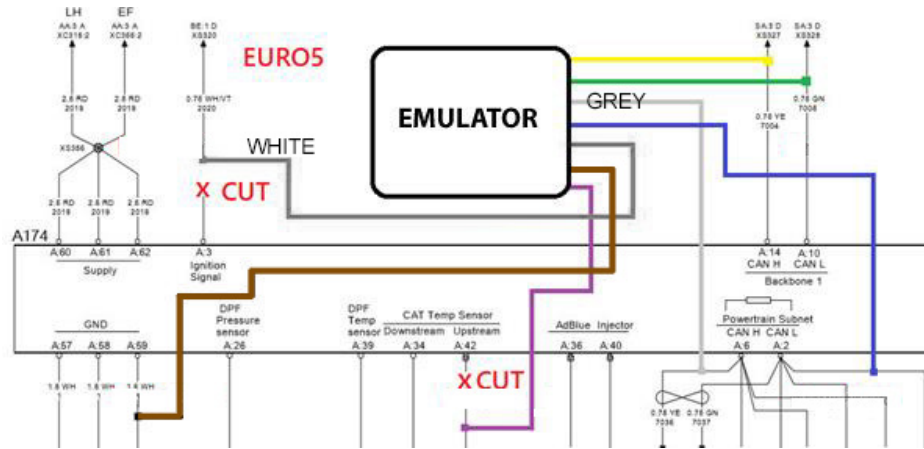
PARTICULATE FILTER CONDITION CHECK

A clogged particulate filter is the most common reason for the post-processing system failures. Note that after disabling the post-processing system, no power and speed limits will be applied when the particulate filter is clogged, which in turn could lead to engine failure and its costly repair or replacement.

The particulate filter should be either dismantled and cleaned on every oil change or totally removed.

However, the particulate filter is the second element of the catalyst, but there are also the third and fourth. Removing the third and fourth elements requires cutting and subsequent welding.

ERROR CODE ERASER USAGE

It's highly recommended to equip EURO6 trucks with an error code eraser, you can purchase it here - https://www.cardiag.com/product/euro-6-dtc-error-code-eraser-obd/

ATTENTION! DO NOT USE ERASERS THAT DOES NOT FIT THE PARTICULAR MODEL AND MARK OF THE TRUCK.

Procedure:

- Turn the ignition on (do not start the engine).
- Connect the eraser (red LED will light up for about a minute).
- Wait until either the LED or the CHECK mark on the dashboard goes out.
- Disconnect the eraser.

There are two connection options:

- Connect to the OBD II. The eraser is connected to the diagnostic block of the truck.
- The eraser is permanently connected to the harness of the diagnostic block through a separate switch (button). Press the button to use the eraser.
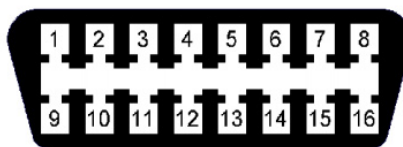
NO.	EMULATOR OUTPUTS	EMU WIRE COLORS	OBDII PINS
1	CAN 1 HIGH	YELLOW	6
2	CAN 1 LOW	GREEN	14
3	POWER	WHITE	16
4	GROUND	BROWN	4 OR 5