Catalyst operation emulator SK-07

SK-07 emulator is compatible with any vehicle. If necessary, superstructures may be modified directly on the vehicle.

Installation

It is carried out as presented in the picture scheme. The emulator is connected to the second lambda located behind the catalyst. Emulator supply is provided by the lambda sensor heat circuit or spark coil through a red wire (supply should be applied only when the ignition is on).

The yellow and blue wires are connected to the lambda signal wire break. The voltage of this wire ranges from 0,1 to 1 V. For some original American vehicles the voltage may range within 2.5…3.5 V (estimated relatively to the chassis).

In case the second lambda sensor (next to the catalyst) is broken, a signal for the emulator may be taken from the first lambda sensor provided that the voltage of this lambda sensor ranges within 0…1 volts. To do this, the blue emulator wire should be connected to the signal wire of the first lambda sensor.

For Audi, Chrysler, Dodge vehicles the supply +12V should be taken from other place.
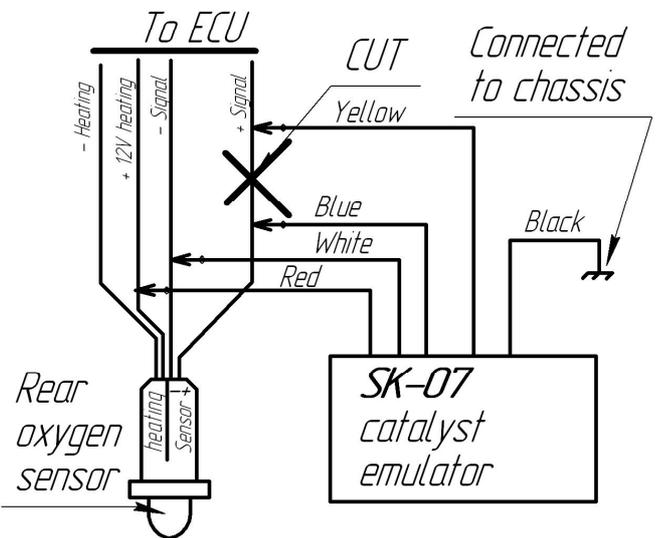
Connection for the majority of vehicles
(the lambda signal has continuity with the chassis)
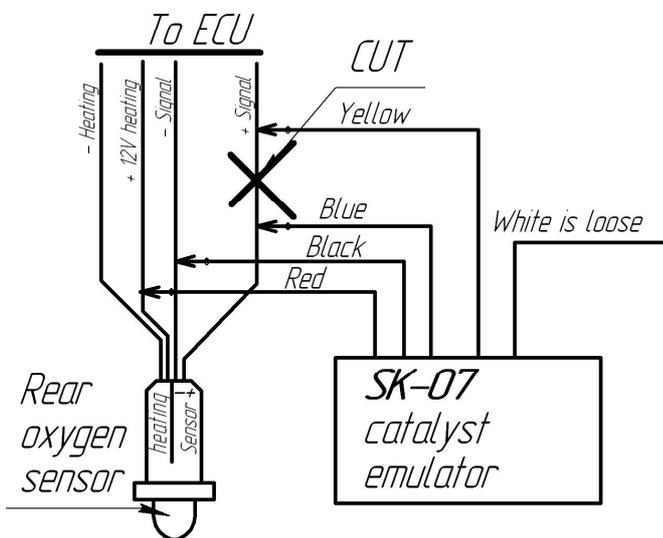
Connection for Chrysler, Dodge Cadillac, Jeep, Mitsubishi
(the lambda signal HAS NOT continuity with the chassis)

It is required for correct device operation that the lambda sensors be sound as the emulator is based upon its values.
The lambda sensor should be directly accessible for the exhaust gases with no obstacles.

Emulator operation

At normal operation of the emulator, its output voltage would predominantly range within 0,6 … 0,8 volts at idle. In modern vehicles the emulator output voltage is determined by the vehicle control unit to maintain the prescribed mix.   Fuel consumption may be affected by the emulator due to this reason. Therefore, checking the emulator, make a test run for as long as 5km and consider the fuel adjustments for the black lambda sensors. Fuel adjustments should range within -4 … 4 %.

Sporadic voltage falls to 0,15 volts with an interval of 2 sec may take place. At normal operation one may see flashes of the blue indicator located on the emulator's edge. Indicator's glow means that the voltage from the lambda sensor is greater than 0,42V (rich mixture). Absence of glow means poor mix (less than 0,42 V).

Problem identification (if present).

All measurements should be carried with the operating warmed up engine. Measurements are carried relatively to the signal minus of the lambda.

Fault	Possible reason	Way of elimination
Voltage from the emulator is more than 1 volt (at measurement between two signal wires of the lambda)	No contact with the chassis	The black emulator wire should be connected to the vehicle chassis (commonly through the lambda sensor wire). The continuity test between the black emulator wire and chassis should be successful.
	The signal minus of the lambda is not connected with the chassis	Connect the emulator as it is shown in the second scheme.
The voltage from the emulator consistently accounts for nearly 0 or 0,45 volts	No signal from the lambda	Make sure that the lambda is warmed up: The blue wire voltage should randomly change and respond as the gas pedal is pushed. Lambda warning up time should not exceed 2 minutes. There may be no signal from the lambda due to its moving off the exhaust gas stream or failure. If the second lambda is broken and the first has the signal of 0…1 volts – connect the blue emulator wire to the first lambda signal.
Voltage on the emulator output predominately accounts for 0 volts at idle (according to the diagnostics)	No supply	Check the supply in the red emulator wire
	The emulator is broken	Refer to the dealer to replace the emulator.
	Incorrectly configured gas equipment	Check the emulator operation basing on gasoline. If the emulator works properly basing on gasoline – perform the gas equipment configuration
	Problems with the engine management system	If the voltage from the front and rear lambda is nearly 0 volts – check the air suction in the inlet manifold, pressure in the fuel rail, nozzles, etc. Consider the ECU fuel adjustments.
At idle the voltage from the emulator is nearly 0,15 volts or 0,75 volts and neither it fluctuates, nor responds to heavy throttling.	The front lambda is broken	Check the front lambda.
	Other engine management systems are broken	Perform the diagnostics.
	Adaptation occurs	In some vehicles this may be normal soon after the emulator installation. Nearly after a ride of 5 km ECU adapts to new parameters and the values should normalize.

If all listed above is normal, then one should check the emulator. Measure the voltage between the black and yellow wires or observe according to the diagnostics. At idle operation of the engine, the voltage should range within 0,6…0,75V and occasionally may fall to 0 V. At sharp and heavy pressing and releasing the gas pedal, the voltage on the emulator output should fall to 0,15 volts after 1…3 sec after the cut-off.

Warranty liabilities

The manufacturer guarantees the operability of the product, unless the operating rules laid by the operation manual are met.

Product warranty period – 2 years since the day of realization.

The owner is entitled to free repair within the warranty period in case of the product failure.

The repair is performed at owner's account within the warranty period, whether he operates the optimizer in breach of the current operation manual or does not comply with the manufacturer's requirements.

The system looses its warranty in the following cases:

Existence of mechanical damages

Operation is performed in breach of the current user's manual

SK-07 Emulator is recognized as exploitable and meeting the technical specifications.

Date of _____ 2018.

Seller:_____   seal here

Brand of the vehicle (at which the equipment is installed): _____

Installed by: _____/_____/

Installation date:_____

SK-07 Emulator configuration

Emulator features an opportunity of switching the operating modes. Custom emulator settings fit the majority of vehicles.

1. touch the magnet emulator for a short time, the mix quality tables are switched. The higher the table number, the richer mix would be presented to the management unit (more effective catalyst operation) and the fuel adjustments would be decreased by that. Table №2 is set as custom (5 tables in total)

2. At connecting the white wire to the red one for 1…2 seconds, the lambda sensor response time switching occurs (the volume of stored oxygen in the catalyst). Mode №2 is set as custom (4 modes in total)
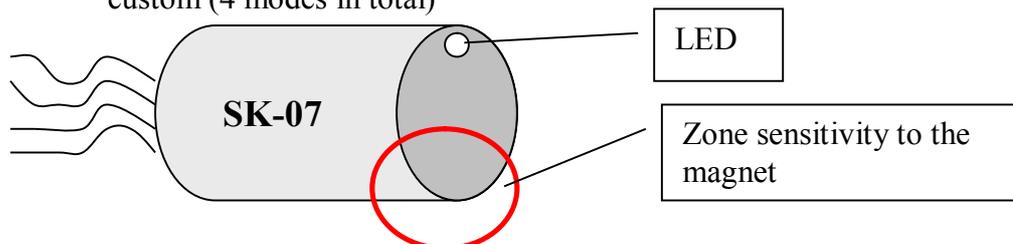
When touch the magnet emulator, the LED indicator converses into the displaying mode of the current settings for 40 seconds.

The number of indicator flashes corresponds to the table number. The number of "interruptive" indicator flashes corresponds to the lambda response delay time.

The catalyst efficiency is affected by the mix quality and response time. These parameters are interrelated. The richer the mix and the longer the response, the more effective catalyst is. Although too high values should not be set at once, as the parameters may not fit the range allowed and determined by the vehicle manufacturer.

In order to make sure that the configuration is correct – perform a test run of 5 km. Fuel adjustments for rear lambda sensors should tend to zero. If fuel adjustments are not available, then it is possible to estimate the emulator operation by the voltage. The voltage at idle operation should range predominately within 0,6 … 0,8 volts. Voltage falls below 0,6 V and not more frequent as once in a second are accepted. At heavy pressing and releasing the gas pedal the voltage may fall to 0,15 V with some latency (since the cut-off moment) .

All measurements should be carried out after the lambda sensor is warmed up. This is evidenced by the LED "flashing" on the emulator edge according to the lambda sensor operation. After enabling the LED indication, it is required 0,5 to 2 minutes for establishing the internal impedance and then the measurements may be performed.