resistive temperature sensor

sensor connector (plug)

−

+

black   yellow

resistive sensor simulation

potentiometric sensor

sensor connector (plug)

+

output

−

yellow

black   red

potentiometric sensor simulation

DTE DeltaTech Electronics ®

Resistive and Potentiometric Sensor Simulator

SCR-3V

User manual

Read before use

DeltaTech Electronics company is not responsible for any damage and consequences of misuse of the SCR-3V Simulator. Please always refer to service manual supplied by the car manufacturer.
In case of any questions or troubles please contact:

Modern engines rely on many different sensors. Some are very important and has great impact on engine performance. Measuring the sensor resistance is not always sufficient, as sometimes problem comes from faulty wiring or engine controller itself.

SCR-3V Simulator is very useful in diagnosing problems with coolant, oil, air temperature sensor and other resistive and potentiometric sensors.

SCR-3V Simulator may be used to simulate sensors with resistance in range of 200 to 10 000 Ohm.
Please be aware that some systems use semiconductor sensor and then SCR-3V is inappropriate.
If the sensor is not driven constant current by ECU, please take it into account while observing voltage output.

To make simulation of e.g. temperature sensor perform the following steps:
1. Localize temperature sensor and disconnect wires (disabled ignition).
2. Connect (according to diagram) simulator cables to sensor wires coming from the ECU. Pay attention to polarity, the user may consider checking it by multimeter. The device is protected against polarity reversal and the only result will be no operation.
3. Set value corresponding to cold engine (according to service manual)
4. Start the engine. The engine should operate on increased idle speed as in case of cold engine. If the engine is preheated, resistance can be changed in range from cold engine, for instance 6000 Ohm (4..4,5V) to hot engine, for instance 300 Ohm (1...1,5V). The engine should respond by increasing idling speed for 'cold engine' and decreasing speed to normal idling speed for 'hot engine'.
5. Stop engine, disconnect simulator cables and connect temperature sensor as normal.

If the engine fails to respond to temperature sensor simulator, this may indicate faulty wiring or problems with engine controller.
The most common response to cold engine simulation is increasing idling speed and enrichment of fuel-air mixture. The heated engine will result in factory set idling speed and default fuel-air mixture ratio (if the engine has operational temperature).

The table below provides most common resistance and voltage outputs of most common temperature sensors.

Temperature [°C]	Resistance [Ohm]	Voltage [Volt]
0	4600 - 6600	4 – 4.5
10	4000	3.75 – 4
20	2200 - 2800	3 – 3.5
30	1300	3.25
40	1000 - 1200	2.5 – 3.0
50	1000	2.5
60	800	2 – 2.5
80	270 - 380	1 – 1.3
110	180 - 200	0.5
Open circuit		5.0
Short circuit to ground		0

SCR-3V Simulator can be used similar way to simulate potentiometric sensors, for example throttle position sensor. To do this disconnect sensor from ECU and connect to sensor wires as shown in diagram. Always observe polarity when connecting to sensor cable.

WARNING

Improper usage of SCR-3V may result in generating fault codes. This may occur when:
- unreliable connection that may result in momentary opening of the circuit;
- setting the value outside of allowable range for specific sensor. Always refer to service manual or technical specification of sensor for details.