

RelaySim Pro

12V / 24V Relay Bypass Test Kit



ET0124
Users' Manual



Car Scope RelaySim Pro

The perfect electrical circuit test assistant! Get the job done with ease!

What is the RelaySim Pro?

RelaySim Pro is a handy tool that allows easy access to test automotive electrical circuit through a relay socket and fuse. Eliminates relay control circuits and provides manual control of the relay circuit.

Why use the RelaySim Pro?

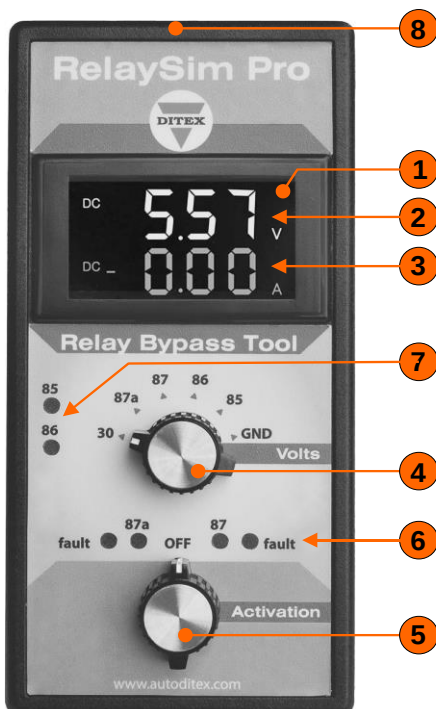
Most actuators on a car are controlled by computer and not directly. The computer uses relays to do the "dirty" work. Relays are used where it is necessary to control a circuit by a low-power signal (with complete electrical isolation between the control and the controlled circuits), or where several circuits must be controlled by one signal. So, if there is a problem with the primary component (fuel pump, a/c compressor clutch, cooling fan, etc.), you first have to figure out which of the two circuits has a problem: the one that uses the relay as the switch (power circuit) or the one (control circuit) that actually turns the relay ON or OFF.

What are the capabilities of the RelaySim Pro?

The RelaySim Pro is a device that can manually activate a circuit instead of using a relay. The RelaySim Pro tester is put in the circuit being tested in place of the relay and allows easy access to both sides (power side and control side) of the circuit. Use the tool to measure voltages and current flow when an automotive actuator is manually activated. It is compatible with standard 4 and 5 terminal relay circuits and can be used with most car makes and models.

The RelaySim Pro can energize any relay that powers DC electric motors, headlights, and other car lighting applications or almost all electrical actuators, such as electromagnetic, electromechanical, and electrohydraulic. Additionally, it can be used in series (in place of a fuse) with most other circuits rated for 25A or less. The device is suitable for both 12-volt and 24-volt systems. The operating range for continuous usage is up to 21 amps with a maximum surge of 27 amps, regardless of whether the voltage is 12V or 24V.

RelaySim Pro control panel



- 1 Built-in dual high-definition LCD digital display.
- 2 Measures the DC voltage of the circuit selected by the "Voltage selector knob".

- ③ Measures the DC current in the activated circuit.
- ④ Voltage selector knob.
- ⑤ Outputs manual activation knob. Manually controlled rotary switch that acts as the relay contacts.
- ⑥ Outputs activation/fault status. For details, see the table below.
- ⑦ Relay control circuit status. Note that these LEDs will only glow when the vehicle's computer intends to activate the relay.
- ⑧ Cable connector.

Output Fault Truth Table

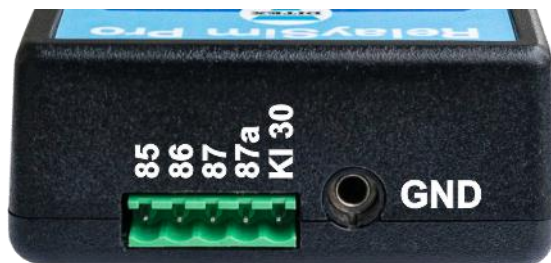
Only one of the two outputs 87 or 87a can be activated at the same time! Fault LEDs on each channel (87 and 87a) will light up when NO load is connected to the corresponding output and the output is not activated. NO load means that the output is left open. Also, the fault LED(s) will light up if any of following fault conditions occurs: Short circuit to positive supply (KL30; +12V; +24V), short circuit to GND or overload. For details, see the table below.

Knob ⑤	Output status	Protection status	87 or 87a Green LED	Fault Red LED
OFF	Without load	No load detection		
OFF	Normal operation	Not activated		
OFF	Short to +BAT	Overload protection		
ON	Without load	Not activated		
ON	Normal operation	Not activated		
ON	Short to +BAT	Not activated		
ON	Short circuit to GND	Thermal shutdown		

Relay coil polarity LEDs

Two LEDs (85 and 86) indicate the status and polarity of the relay coil. Neither of the two LEDs will shine if the ECU has not energized the relay control circuit. If the corresponding ECU output is activated, only one of the two LEDs will light up depending on the polarity of terminals 85 and 86. The Green LED will shine when terminal 86 is +bat and 85 is switched to GND. The Red LED will shine when terminal 85 is +bat and 86 is switched to GND. Usually, the battery plus is connected to terminal 86, and terminal 85 is grounded when the ECU switches it.

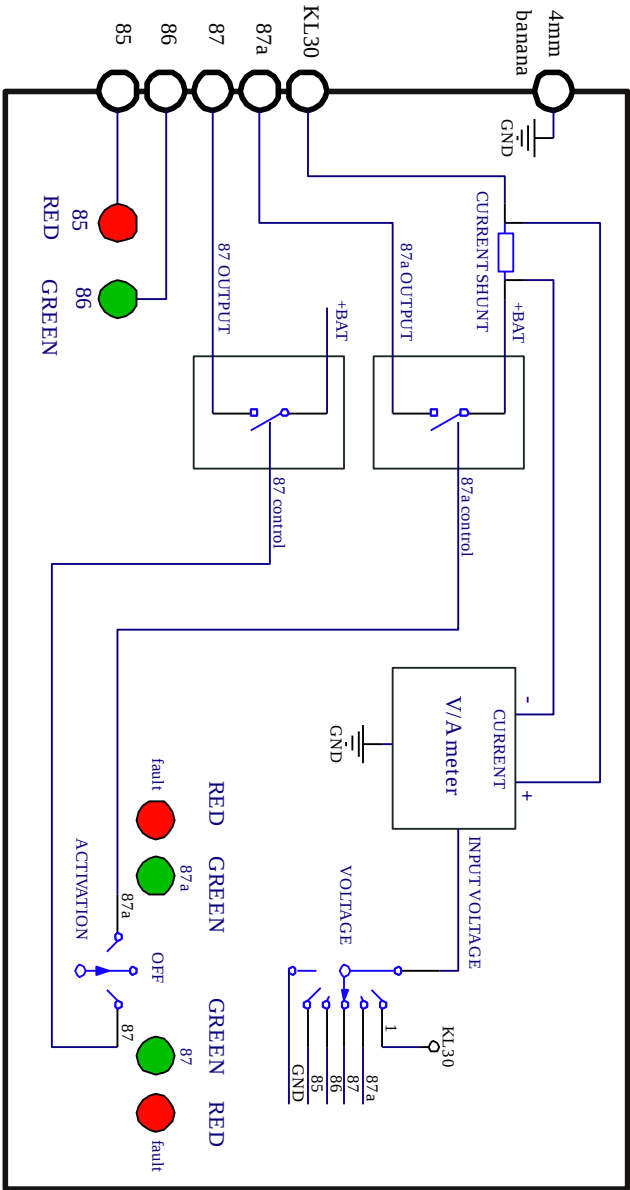
Connectors Pinout



Built in protections

- Overload protection;
- Current limitation;
- Short circuit protection;
- Thermal shutdown with restart;
- Overvoltage protection;
- Fast demagnetization of inductive loads;
- Reverse battery protection;
- Loss of ground and loss of positive supply voltage protection;
- Electrostatic discharge (ESD) protection.

Reference diagram of the RelaySim Pro internal circuit.





Quick Start Guide

- **Locate the Circuit to Test.** Find the desired circuit you will test, since you will activate it manually.
- **Remove the Relay.** Take note of the exact location of the relay and any its unique orientation! Remove the relay and store it in a safe place.
- **Select RelaySim Pro Cable.** Select the appropriate cable from the RelaySim Pro kit. Compare the relay base terminals to the RelaySim Pro cables. Use the universal cable if you can't find the correct cable in the kit. In some rare cases, you may have to create your own adapters.
- **Prepare the RelaySim Pro.** Ensure that the Activation rotary switch is in the OFF position. Set the Voltage selector knob in the desired position.
- **Connect to the chassis ground.** Connect the tester to the chassis (GND) of the vehicle using the black cable with the male banana and the alligator clip. This connection is mandatory!!! Without it, you will not be able to use the device and perform any tests!!!
- **Insert Cable.** Insert the suitable RelaySim Pro cable into the relay socket.
- **Test & Measurement.** You will first see the voltage in the circuit and you can manually activate it using the RelaySim Pro Activation rotary switch. The corresponding LED will light up, depending on which circuit you have activated: 87 or 87a. Monitor the current and voltage in the circuit simultaneously*. Current is directly



proportional to voltage and inversely proportional to resistance. No need to connect additional external current clamps and voltmeter to RelaySim Pro.

* The voltage measured on 87 and 87a can be up to 1.0 volts lower than the actual value. Therefore, these readings provided are intended for reference purposes only. That voltage drop depends on the current passing through the load.

- **How to use an Oscilloscope.** If you want to use an oscilloscope, hook the oscilloscope's input probe to the appropriate terminal on the instrument's input connector.

Kit Contents

- RelaySim Pro unit;
- 4-pin cable ISO Micro;
- 4-pin cable ISO Micro 280;
- 4-pin cable ISO Mini;
- 5-pin cable ISO Micro;
- 5-pin cable ISO Micro 280;
- 5-pin cable ISO Mini;
- Black Banana Plug to Black Alligator Clip Test Lead Wire Cable – 0.8 meter. This test lead for connection to the car chassis (GND) has a 4mm male banana on one end and a fully insulated alligator clip on the other.
- Hard Plastic Case;
- 2-year Warranty.



Optional 5-pin Universal cable. Use this cable to make your custom adapters to connect to different relay types and to connect into circuits through standard connectors. You can order it additionally.





Performance you can count on

Ditex has industry-leading service and support, and every RelaySim Pro tool is backed with a standard two-year warranty.

RelaySim Pro Specifications

Power supply operation range	10 to 30V DC from car battery
Output channels	2 (independent)
Number of simultaneously activated outputs	1 (87 or 87a)
Output supply current - nominal	21A (6 minutes min) each channel
Output supply current - surge	27A each channel
Output short circuit current limitation	65A each channel
Relay coil terminals 85/86 polarity status	Green and Red LEDs
Main display	Dual Voltage/Current digital LCD
Built-in voltage meter measurement range	0-199.9V DC
Built-in current meter measurement range	0-50A DC
Embedded protective functions	• Short circuit protection • Current limitation • Overload protection • Thermal Shutdown • Overvoltage protection • Reverse battery protection • Loss of GND and loss of positive supply voltage protection • Electrostatic discharge protection
Built-in fault indicator	Red LED indicates fault for each channel



Dimensions – main device RelaySim Pro	170 x 83 x 36 mm
Dimensions – hard plastic case	280 x 230 x 80 mm
Weight – main device RelaySim Pro	0.4 kg
Weight – complete set	1.5 kg