2014

Smart Voltmeter

User Manual

Multifunctional Digital Car Voltmeter with Protection Feature

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Functions and technical features of the device

Description

Spl-Lab Smart Voltmeter - is multifunctional digital car voltmeter. Although most of car electronics manufacturers state that their products have inbuilt protection from supply voltage sags or swells, in actual practice it turns out that not every, even expensive, amplifier is able to cope with this task. It means that another voltage overrun can end with expensive repairs or buying new unit. But if you add to your system an inexpensive device from Spl-Lab you can forget about such problems once for all. Main functions of the Smart Voltmeter are the following: measuring exact characteristics of a car electric network voltage, analysing voltage sags and swells that appear in car electronics operation process, protection of electrical equipment of a car from breakage, possibility of flexible setting and easy use. The voltmeter can easily change data refresh speed onscreen (from once a second to once per quarter second), which allows excluding the unnecessary details or to make measurements with maximum possible accuracy. The device has three working modes that are changed with just one button: voltmeter mode; voltmeter mode with sag and swell indication; voltmeter mode with sag and swell indication and protection feature. For indicating current mode there is a three-coloured LED. User can easily set permissible voltage range for setting the electrical equipment. In the

with sag and swell indication mode the car voltmeter displays current voltage and in case if the permitted range is overstepped, the voltmeter will inform the user about it by holding maximum or minimum value onscreen for evaluating the degree of sag or swell. In the protection mode in case if the permitted range is overstepped, the voltmeter will break the remote controlling circuit before user's interference, protecting electrical equipment from breakage in doing so. It stands to mention that Smart Voltmeter is able to commutate the Remote controlling circuit with current up to 3 ampere, thus in case of necessity replacing an additional relay.Smart Monitor form Spl-Lab will protect your car audio components from breakage, will help in tuning sound in the car, as well as will measure power of your sound system and acoustics characteristics. Actually the Smart Monitor replaces amp clamp, True RMS digital voltmeter, and oscilloscope, and in addition to this provides protecting functions.

Ergonomics

Spl-Lab car voltmeter has compact case, including a three-segment display, 4 control buttons, three-coloured LED for indicating active working mode and a slot for five contacts that has several variants of connection to the electric system of the car. The design of the device allows including it practically in any car interior.

Technical features

Measured value of direct current voltage	from 0 to 18 Volt
Measurement accuracy	0.1 Volt
Data refresh speed	one second, half second, quarter second
Commutated current of the Remote circuit	3 ampere
Algorithm of measuring direct voltage	Averaging by time
Display	Three-segment
Sockets/connectors:	five-contact slot
Supply voltage	from 6 to 18 Volt
Dimensions: (LBH)	69x50x21mm

Working with the device

Important safety information:

- ! The protection features of the device are intended solely for providing information and do not exempt from using safety fuses and other classical protection elements.
- ! The manufacturer does not bear responsibility for damage, caused directly or indirectly, as a result of improper device use.
- ! Before using the device, examine its case for cracks and splits, because any depressurization of the device will result in its breakage.
- ! To avoid the risk of electric shock all the connector cables should not have insulation defects.
- ! Avoid measuring load beyond the maximum limit.
- ! All operations of connecting and disconnecting cables should be performed with equipment switched off.
- ! Do not use or store the device in the areas with high humidity or heat, as well as, close to the devices, generating strong magnetic field.
- ! During the preventive maintenance of the device do not use the synthetic detergents, do not apply solvents. Using wet wipes is more preferable.
- ! Before starting the device and a system on the whole, ensure that all the connection cables are switched correctly.

Identifying the functional parts of the device:

Number of the element	Description
1	Display
2	Work mode indicator
3	Functional button #1
4	Functional button #2
5	Functional button #3
6	Functional button #4
7	The five-contact slot (contact numeration goes from left to right)

Functional purpose of slot contacts

Number of the element	Description
1	Negative (common), should be connected to the negative contact of the car electric network.
2	+ 12 V for feeding the device, it is possible to connect to any supply line, for example to the ignition or to the Remote.
3	Output signal of the Remote controlling circuit should be connected to the amplifier or other controllable equipment.
4	Input signal of the Remote controlling circuit should be usually connected to the head unit.
5	Positive of the measured voltage should be connected to the amplifier feed point or other controllable equipment.

Typical device connection schemes

Simple voltmeter

Such scheme implies that the device works as a simple voltmeter. The two-contact connection provides device power supply directly from the measured line. Measures voltage range in this case is limited from 6 to 18 volts.

Contact	Description
1	Should be connected to the negative contact of the car electric network.
2	Should be connected to the measured network spot.
3	Not connected
4	Not connected
5	Connected with contact 2

Disconnectable voltmeter

Such voltmeter connection scheme allows to control switching the device on with or without measures voltage, thus eliminating a possibility of unnecessary operation.

Contact	Description
1	Should be connected to the negative contact of the car electric network.
2	+ 12 V for feeding the device, it is possible to connect to any supply line, for example to the ignition or to the Remote.
3	Not connected
4	Not connected
5	Should be connected to the measured network spot.

Voltmeter with protection feature without external control

This voltmeter connection scheme provides the use of external power amplifier protection feature through Remote circuit. In this case the external control from the head unit is not used.

Contact	Description
1	Should be connected to the negative contact of the car electric network.
2	+ 12 V for feeding the device, it is possible to connect to any supply line, for example to the ignition or to the Remote.
3	Output signal of the Remote controlling circuit should be connected to the amplifier or other controllable equipment.
4	Connected with contact 2
5	Should be connected to the measured network spot.

Voltmeter with protection feature with external control

Connection involving all the device features, such as protection, external power supply, and control. Allows determining the moment when to switch on the device and to use protection feature for external equipment, such as power amplifiers, applying Remote circuit control for the head unit.

Contact	Description
1	Negative (common), should be connected to the negative contact of the car electric network.
2	+ 12 V for feeding the device, it is possible to connect to any supply line, for example to the ignition or to the Remote.
3	Output signal of the Remote controlling circuit should be connected to the amplifier or other controllable equipment.
4	Remote is usually connected to the head unit.
5	Should be connected to the measured network spot.

Button assignment

Button	Assignment
Functional button #1	Selecting the work mode or exiting the configuration menu
Functional button #2	Decreasing the selected value in the configuration menu
Functional button #3	Entering the configuration menu or selecting next parameter in the configuration menu
Functional button #4	Resetting current values and restoring the remote circuit or increasing the selected value in the configuration menu

Setup mode

For entering the configuration menu press Functional button #3.

- Select necessary parameter by pressing Functional button #3.
- Set the necessary parameter value using Functional buttons #2 (decreasing value) and #4 (increasing value).
- After setting the last parameter and pressing Functional button #3 the device will save selected parameters and will change to measuring mode.
- To exit the configuration menu without saving press Functional button #1

Menu item	Assignment
LO	Setting the lower permissible voltage range value. from 0 to 17.9 Volt
HI	Setting the upper permissible voltage range value. from 0 to 17.9 Volt
SP	Setting data refresh speed onscreen. One dot means that data is refreshed once a second; two dots - two times a second, and three - four times a second. **Protection actuation speed depends on data refresh speed.**

Device work modes

The Smart Voltmeter has three work modes. Working mode is changed by pressing the Functional button #1. For indicating current working mode there is a three-coloured LED. Detailed description of working modes:

- **Voltmeter (green LED)** - the device displays present measured voltage value. The Remote controlling circuit is closed if the signal on contact #4 (Remote In) of the slot is present.
- **Voltmeter mode with sag and swell indication (yellow LED)** - the device displays and checks the value of measured voltage for correspondence with the range set in configuration menu. If the voltage oversteps the defined range, the device comes into the pick hold mode changing the value on-screen only in case if value overstepped the permissible range even more, in so doing the LED and display start blinking until reset button is pressed. The Remote controlling circuit is closed if the signal on contact #4 (Remote In) of the slot is present.
- **Voltmeter mode with sag and swell indication and feature of breaking the controlling circuit (red LED)** - the device displays and checks the value of measured voltage for correspondence with the range set in configuration menu. If the voltage oversteps the defined range, the device comes into the pick hold mode changing the value on-screen only in case if value overstepped the permissible range even more, in so doing the Remote controlling circuit is broken, the LED, and display start blinking until reset button is pressed. The Remote controlling circuit is closed if the signal on contact #4 (Remote In) of the slot is present.