

DS2A-Mk.II & DS3 Isolated Stimulators

Brief pulses of electricity are used in various biomedical research applications as a stimulus to excite nerve or muscle fibres. Several factors need to be considered when choosing the right stimulator.

- In order to minimise artefacts introduced into electrophysiological data, it is desirable that the stimulator should be electrically isolated both from ground and from the trigger device.
- The voltage required to send current through tissues can vary greatly, making it important to have control over the stimulus driving force.
- Large impedance variations during an experiment can result in loss of the stimulus. In this event, a constant current stimulator may be more suitable.

Our two isolated stimulators either provide constant voltage (*DS2A-Mk.II*) or constant current (*DS3*), giving you the ability to choose the stimulator which best suits your experimental needs.

DS2A-Mk.II Constant Voltage Stimulator

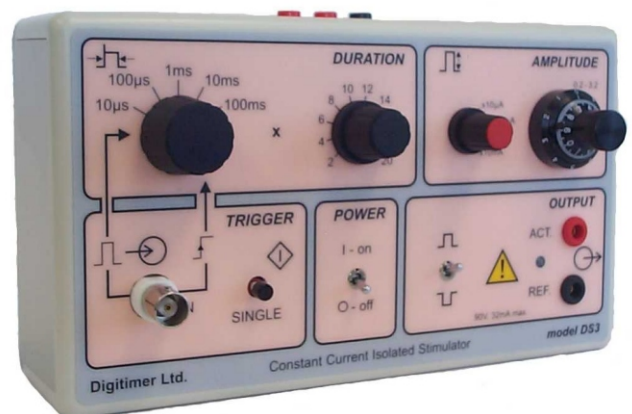


The latest version of the DS2A gives:

- External control of pulse duration.
- Overload protection circuit preventing current in excess of 50mA being delivered

DS3 Constant Current Stimulator

- Four current ranges allow precise control of output between 2µA and 32mA.
- Output discharge (Clamp) circuit prevents capacitance build-up during stimulus trains, which is important to prevent stimulus loss.
- 90V compliance provided.



Both units feature:

- Accurate and reproducible stimulus characteristics.
- Switchable polarity, variable output and duration ranges (20µs to 2s).
- External pulse duration control through the BNC trigger input.
- A single-shot button, which operates irrespective of trigger inputs.
- Cases manufactured from insulating material may be rack mounted using an optional mounting frame (Model D121-11) available from **Digitimer Ltd.**
- Power provided by standard batteries. Note that current is only drawn during pulse delivery.

Technical Specifications

Output:	DS2A-Mk.II (Constant voltage) Two ranges provide 99V (high) and 9V (low) maximum output. A multi-turn dial allows output to be selected as a percentage of maximum. Square wave pulse profile with typical rise time $<1\mu\text{s}$ and fall time $<3\mu\text{s}$ into resistive load. DS3 (Constant current) Output between $2\mu\text{A}$ and 32mA . Control is achieved by a variable range switch with four selections ($10\mu\text{A}$, $100\mu\text{A}$, 1mA , 10mA) and a three-turn dial. Pulses from high impedance stimulators (constant current units) can result in cells “charging-up” between stimuli, leading to stimulus loss. This problem has been overcome in the DS3, which has an Output Discharge (Clamp) Circuit that operates for $20\mu\text{s}$ after each stimulus pulse. This will discharge cells with capacitances as high as 1000pF .
Pulse Duration:	Range: $20\mu\text{s}$ to 2s. One dial allows continuous adjustment from 2 to 20, while another is used to select the range (from $10\mu\text{s}$, $100\mu\text{s}$, 1ms , 10ms , 100ms or external source). Internal pulse duration values have $\pm 10\%$ accuracy.
Output terminals:	A pair of 2mm touch-proof sockets on the front panel spaced at 0.75”.
Polarity Switch:	<i>Normal:</i> Red output terminal positive. <i>Reverse:</i> Red output terminal negative.
Indicator:	An LED operates for the duration of each output pulse.
Compliance: (DS3 only)	90V from 10 x 9V batteries. This reduces to 87V at the top of each output range. Note that battery voltage will drop from 9V to $\sim 6\text{V}$ with “old” batteries.
Overload: (DS2A only)	An automatic overload circuit prevents excessive output current being drawn by reducing the output pulse duration to $<10\mu\text{s}$ when a current of greater than 50mA is detected.
Single Shot:	A single-shot push button is provided. This operates at all times irrespective of trigger input.
Trigger:	A positive pulse of between 3V and 20V is required to trigger the stimulator. The trigger input current varies from 6mA to 62mA over the above voltage range. Trigger pulse duration should not normally be less than $4\mu\text{s}$.
Trigger Isolation:	Optical coupling is employed between the trigger source and the stimulator circuitry. The capacity coupling is less than 3pF .
Batteries:	11 x PP3, IEC-6R61 style batteries. Current is only drawn when delivering a pulse. Note that battery test sockets are built-in.
Mounting:	One or two stimulators may be mounted in a 19” rack using a specially fabricated frame (model D121-11) available from Digitimer Ltd.
Dimensions:	Panel size: $190\text{mm} \times 110\text{mm}$. Depth: 80mm over knobs.
Weight:	800g complete with batteries.

Digitimer reserve the right to alter specifications and price without prior notification



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