FE180 Stimulus Isolator

Signal Conditioner Series future

Description

The FE180 Stimulus Isolator uses the analog output from a PowerLab to produce isolated constant current pulses. The unit provides adjustable pulse amplitude, width and frequency. It is electronically isolated for subject safety and approved to the IEC601-1 standard for human connection as a body protected (BF rated) instrument.

Compatibility

The Stimulus Isolator is compatible with all PowerLab and MacLab models and requires the following ADInstruments software versions or later: LabChart v6, Chart v4 or Scope v3.3.

Visit www.adinstruments.com/downloads/ for Windows and Mac operating system compatibility. For more information please contact your ADInstruments representative.

Operation

The output stage consists of a high-voltage constant-current source that can produce pulses of variable duration and amplitude under software control. The current source can deliver pulses up to 10 mA at 100 V compliance levels; its amplitude is set by a digital attenuator network, which is in turn controlled by the I^{2}C logic. The output to the subject is through high-isolation optical couplers.

Power for the stimulator current source is derived from the safety approved power pack External AC wall Transformer (plug pack) coupled through a custom isolation transformer (from which the isolated low voltage and 100 V supplies are derived). The power pack complies with medical safety requirements. Under no circumstance should any other transformer be used with the FE180 Stimulus Isolator.

During operation an indicator light on the front panel lights green with every pulse (it will glow yellow if the Stimulus Isolator is out of compliance). A small internal beeper can also be enabled to give an audible beep with every pulse delivered.

Applications

The FE180 Stimulus Isolator is suitable for both transcutaneous human nerve stimulation and stimulation of isolated nerves when obtaining evoked response measurements.

Specifications

Output

Connection type:	Two shrouded 4 mm sockets
Configuration:	Constant-current stimulator with hardware limited repetition rate
Waveform:	Rectangular, monophasic pulses with software-set pulse amplitude and duration
Safety:	Approved to IEC601-1 BF (body protection) standard

Isolation rating:	4000 V AC_{rms} for 1 minute
Safety indicators:	A single multi-colour indicator displays the isolated stimulator status. A green flash indicates delivery of a valid stimulus. A yellow flash indicates an out-of compliance condition
Safety switch:	Isolating on-off switch flicks down to disconnect quickly
Compliance voltage:	100 V fixed
Current ranges:	100 µA, 1 mA, or 10 mA full scale
Current rise time:	<1 µsec (1 kΩ load @ 10 mA)
	25 µsec (100 kΩ load@ 0.5 mA)
Current fall time:	<1 µsec (1 kΩ load @ 10 mA)
	25 µsec (100 kΩ load @ 0.5 mA)
Operating duty cycle:	up to 20%
Resolution:	1% of full scale (1 µA, 10 µA, or 100 µA)
AC line leakage current:	<200 nA p–p
Differential output noise:	<1 µA rms
Power source:	Non-isolated circuitry supplied by PowerLab via I^2C connection
	Isolated and high-voltage circuitry derives power from the external 12-volt AC, 300 mA_{rms}, wall-plug transformer. High voltage isolation is provided by an internal isolation transformer. No batteries required.

Pulse Control (internal pulse duration control)

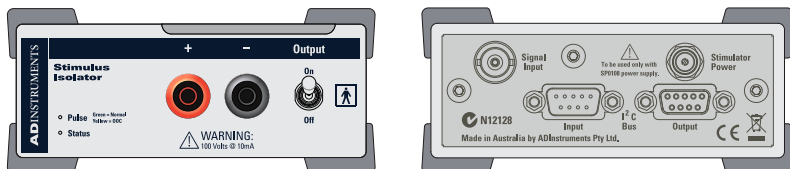|	
Pulse duration range:	0.01 ms to 2.56 ms in 0.01 ms steps
Duration accuracy:	±0.01% ±5/-0 µs
Repetition rate:	up to 2000 Hz
Repetition accuracy:	±0.1% (determined by PowerLab)
Current rise delay:	12 to 22 µs (variable)

Control Port

I2C port:	Provides control and power.
	Interface communications rate of ~50 Kbits/s.

Physical Configuration

Dimensions (h × w × d):	55 mm × 120 mm × 260 mm
Weight:	1.3 kg
Operating temperature range:	0 to 35 °C, 0 to 90% humidity (non-condensing)

ADInstruments reserves the right to alter these specifications at any time.

Front and Back Panels

Caution

Read "Statement of Intended Use" on our website or in "Getting Started with PowerLab" before use.

Ordering Information

FE180 Stimulus Isolator

Includes:

Shrouded Plugs (one RED, one BLACK) (2)

I²C Cable (9-pin plug to 9-pin receptacle)

BNC to BNC Cable

Stimulus Isolator Owner's Guide

Power Plug Pack (12 V AC, 20 V AC)

For use with:

MLADDF30 Stimulating Bar Electrode