



- ◆ IEEE-488.2 GPIB and RS-232 control (-B units)
- ◆ Peak outputs to 75 Amps
- ◆ Pulse widths from 5 ns to 5 us
- ◆ Rise times as low as 0.6 ns
- ◆ Variable rise times
- ◆ PRF to 5 MHz
- ◆ 7 Models

The AVO-5 series of pulse generators is designed for pulsing laser diodes and other low impedance loads with rectangular current pulses as high as 75 Amps and pulse widths as high as 500 ns or 5 us. Each model consists of an instrument mainframe and a miniature output impedance-matching transformer module that connects to the mainframe via a 2-foot long coaxial cable. The diode load is connected in series with a low-value current limiting resistor between two output solder terminals (OUT, GND) on the output module. Optional plug-in (or screw-in) socket mounting of the diode is also available.

Models AVO-5-C and AVO-5-B provide peak output amplitudes (either polarity available) that are variable from 0 to 26 Amps into a 3Ω load, pulse widths variable from 6 to 100 ns, PRF variable to 5 kHz, and 3 ns rise times. While these models are intended for use with a 3Ω load (to match the output impedance), the amplitude can be extended in some applications up to 50 Amps by lowering (and thus mismatching) the load resistance. See Technical Brief 14 for details (<http://www.avtechpulse.com/appnote/techbrief14>).

The AVO-5A1 models provide a 2 ns rise times and peak outputs of 16 Amps. The AVO-5A models provide peak outputs to 40 Amps and pulse widths to 150 ns. The AVO-5B models provides amplitudes variable from 0 to 48 Amps, pulse widths variable from 25 to 500 ns, PRF variable to 1 kHz, with rise times of 10 ns. For higher current applications, the AVO-5B1-C and AVO-5B1-B provide peak outputs as high as 75 Amps.

For high pulse repetition frequency (PRF) applications, Avtech offers Model AVO-5C-C which operates at PRF to 5 MHz, PW variable from 5 to 50 ns (10% maximum duty cycle) and peak outputs variable to 8 Amps with 3 or 6 ns rise and fall times, depending on the amplitude. For much wider pulse widths, models AVO-5D-C and AVO-5D-B provide pulse widths variable from 0.5 to 5.0 us and peak pulse currents to 30 Amps, at frequencies up to 300 Hz.

Either output polarity can be provided. A dual-polarity option is available on the AVO-5-C and AVO-5-B, which allows the

output polarity to be set by the front-panel controls or by computer command (on the AVO-5-B only).

All models include an adjustable oscillator for internal triggering. A delay control and a sync output are provided for oscilloscope triggering purposes. All models can also be triggered externally with a TTL-level pulse. On “-C” models, the output parameters are controlled by front-panel switches and one-turn controls.

Instruments with the -B suffix include a complete computer control interface. This provides GPIB and RS-232 computer-control, as well as front panel keypad and adjust knob control of the output pulse parameters. A large backlit LCD displays the output amplitude, polarity, frequency, pulse width, and delay. (See <http://www.avtechpulse.com/gpib> for additional details). To allow easy integration into automated test systems, the programming command set is based on the SCPI standard and LabView drivers are available for download on the Avtech web site, at <http://www.avtechpulse.com/labview>.

All models are protected from overload conditions (such as excessively high duty cycle or short circuited load) by an automatic feature that limits the output power for as long as the overload condition persists.

AVO-5 units are available with a monitor output option that provides an attenuated (20 dB or ÷10) coincident replica of the main output pulse. All models are also available with optional analog electronic control (0 to +10V) of the output amplitude. Electronic control units also include the standard front-panel controls. Some models are available with variable rise and fall time options. All models are available with optional plug-in or screw-in socket mounting of the diode. When ordering, the customer must specify the diode package type and the required pin connections (e.g. anode, cathode, ground, etc.). See AVX-S Series for readily available package mounting. Contact Avtech for special or different packages. All models require 100 - 240 V, 50 - 60 Hz prime power.

Application notes and general applications assistance are available online at <http://www.avtechpulse.com/appnote>.



AVO-5-B

Model:	AVO-5-C ¹ AVO-5-B ²	AVO-5A1-C ¹ AVO-5A1-B ²	AVO-5A-C ¹ AVO-5A-B ²	AVO-5B-C ¹ AVO-5B-B ²	AVO-5B1-C ¹ AVO-5B1-B ²	AVO-5C-C ¹	AVO-5D-C ¹ AVO-5D-B ²
GPIB and RS-232 control ² :	Standard on -B units. Not available on -C.						
Amplitude ^{3,4} :	0 to 26 A ⁶	0 to 16 A	0 to 40 A	0 to 48 A	0 to 75 A	0 to 8 A	0 to 30 A
Required load impedance:	3 Ω ^{5,6}	10 Ω	0.75 Ω	0.75 Ω	0.6 Ω	1.5 Ω	3 Ω
Pulse width (FWHM):	6 to 100 ns	5 to 100 ns	20 to 200 ns	25 to 200 ns	50 to 500 ns	5 to 50 ns	0.5 to 5 us
Maximum duty cycle:	N/A	N/A	N/A	N/A	N/A	10%	N/A
Rise time (20%-80%):	3 ns or 3 to 10 ns variable (option ⁷)	2 ns	≤ 10 ns	≤ 10 ns	≤ 15 ns	≤ 3 ns (0-4A) ≤ 6 ns (4-8A)	≤ 40 ns
Fall time (80%-20%):	4 ns or 4 to 10 ns variable (option ⁷)	≤ 4 ns	≤ 10 ns	≤ 10 ns	≤ 15 ns	≤ 3 ns (0-4A) ≤ 6 ns (4-8A)	≤ 40 ns
PRF:	0 to 5 kHz	0 to 5 kHz	0 to 5 kHz	0 to 1 kHz	0 to 1 kHz	0 to 5 MHz	0 to 300 Hz
Output impedance:	≈ 3 Ohm	≈ 10 Ohm	≈ 0.75 Ohm	≈ 0.75 Ohm	≈ 0.6 Ohm	≈ 3 Ohm	≈ 1 Ohm
Polarity ⁸ :	Positive or negative or both (specify)	Positive or negative (specify)					
Propagation delay: (Ext trig in to pulse out)	≤ 350 ns	≤ 150 ns					
Jitter:	± 100 ps ± 0.03% of sync delay (Ext trig in to pulse out)						
Trigger required:	External trig mode: +5 Volts, 50 to 500 ns (TTL)						
Variable Sync delay: (Sync out to pulse out)	0 to 200 ns				0 to 500 ns	0 to 200 ns	0 to ± 5 us
Sync output:	+ 3 Volt, 200 ns, will drive 50 Ohm loads						
Gate input: (-B only)	Synchronous or asynchronous, active high or low, switchable. Suppresses triggering when active.						
Monitor output option ⁹ :	Provides a 20 dB attenuated coincident replica of main output.						
Connectors:	OUT: Solder terminals, or optional plug-in socket similar to AVX-S3 series ¹⁰ .				Other: BNC		
Power requirements:	100 - 240 Volts, 50 - 60 Hz						
Dimensions: Mainframe: (H × W × D)	-C models: 100 × 215 × 375 mm (3.9" × 8.5" × 14.8") -B models: 100 × 430 × 375 mm (3.9" × 17" × 14.8")						
Transformer Module:	AVO-5D models: 43 × 66 × 109 mm (1.7" × 2.6" × 4.3") AVO-5B1 models: 41 × 66 × 76 mm (1.6" × 2.6" × 3.0") all other models: 23 × 28 × 38 mm (0.9" × 1.1" × 1.5")						
Chassis material:	Cast aluminum frame and handles, blue vinyl on aluminum cover plates						
Mounting:	Any						
Temperature range:	+ 5°C to + 40°C						

- 1) -C suffix indicates stand-alone lab instrument with internal clock and line powering. (See <http://www.avtechpulse.com/formats> for additional details of the basic instrument formats).
- 2) -B suffix indicates IEEE-488.2 GPIB and RS-232 control of amplitude, pulse width, PRF and delay. (See <http://www.avtechpulse.com/gpiib>).
- 3) For analog electronic control (0 to + 10 V) of amplitude, suffix model number with -EA. Electronic control units also include standard front-panel controls.
- 4) The minimum useful amplitude is approximately 20% of the maximum amplitude. The waveform may be distorted below this level.
- 5) The AVO-5 mainframe is essentially identical to Model AVL-2 and therefore may be used as a 320 Volt, 50 Ohm pulse generator (SMA output connectors). See <http://www.avtechpulse.com/speed/avl-2>.
- 6) The load impedance for the AVO-5 may be reduced to as low as zero Ohms. The maximum output amplitude increases for lower load

- impedances, to a maximum of 50 A at zero Ohms. However, the rise time, fall time, and waveform distortion (ringing) may increase at impedances lower than 3 Ohms, due to the impedance mismatch. See <http://www.avtechpulse.com/appnote/techbrief14> for details.
- 7) For variable rise, fall time option, add suffix -T1 to model number. Control is by a 10-position switch. Not available on -B units.
- 8) Indicate desired polarity by suffixing model number with -P or -N (i.e. positive or negative) or -PN for dual polarity option.
- 9) For monitor option add suffix -M.
- 10) To specify diode socket mounting option, suffix model number with -S3. When ordering, customer must also specify the diode package type (e.g. TO-18) and the required pin connections (e.g. anode, cathode, ground, etc.). See AVX-S Series for readily available package mounting. Contact Avtech for special or different packages.



AVO-5-C