



- ◆ Peak outputs to 10 Amperes
- ◆ Pulse widths to 50 ns, 0.5 and 2.5 ns rise times
- ◆ PRF to 100 kHz
- ◆ IEEE-488.2 GPIB control
- ◆ Ethernet control optional

The AVO-2 series of solid-state pulse generators is designed for pulsing laser diode and other low impedance loads with rectangular current pulses as high as 10A and pulse widths as high as 50 ns. The diode load is connected in series with a low-value current limiting resistor between two output solder terminals (OUT and GND).

All AVO-2 models are voltage pulsers. A series resistance is required to limit the output current to the maximum rated level, and to provide proper termination of the output transmission lines and impedance matching transformers. The load is normally soldered to a section of printed circuit board on the miniature transformer module that connects to the instrument mainframe via 2-foot long detachable coaxial cables. Avtech can also supply variants of the AVX-S series of output modules with high-speed sockets (see <http://www.avtechpulse.com/laser-bias>) for the user's device, which contain the necessary matching resistance. The use of an AVX-S module with the AVO-2 mainframe eliminates the need to solder the device under test. Contact Avtech with your requirement.

The output current, when driving a diode load, is given by:

$$I_{DIODE} \approx (V_{OUT} - V_{DIODE}) / (R_{SERIES} + R_{DIODE})$$

where  $V_{DIODE}$  is the voltage drop across the diode,  $R_{DIODE}$  is the parasitic resistance of the diode (normally  $\approx 0\Omega$ ), and  $R_{SERIES}$  is the resistance of the series resistor.

$R_{LOAD} = R_{SERIES} + R_{DIODE}$  should be equal to 6.25 $\Omega$  for the AVO-2W-B, 12.5 $\Omega$  for the AVO-2A-B and AVO-2L-B, and 10 $\Omega$  for the AVO-2M-B.

For a purely resistive load, the load current will be:

$$I_{LOAD} = V_{OUT} / R_{LOAD}$$

Model AVO-2A-B provides amplitudes of up to 5A, with pulse widths variable from 4-50 ns. The rise times are  $\leq 2.5$  ns, and the fall times are  $\leq 3.5$  ns.

Model AVO-2W-B is similar, except that it operates to 10A.

Model AVO-2L-B offers faster rise and fall times of 0.5 ns, for amplitudes up to 2A, with a 1-20 ns pulse width range.

Model AVO-2M-B offers rise and fall times of 1 ns, for amplitudes up to 4.5A, with a 1-10 ns pulse width range.

On some models, the output can optionally be provided on a DB-9 male connector (Pins 1-5 = signal, pins 6-9 = ground), suitable for use with the Avtech AV-CLZ11 series of low impedance cables. The cable must be terminated by a user-supplied 11-13 Ohm impedance. For details, please see <http://www.avtechpulse.com/transmission/av-clz11>.

A delay control and a sync output are provided for scope triggering purposes. The units can also be triggered externally using a TTL-level pulse. The propagation delay in the externally triggered mode is typically 200 ns. Either output polarity or an optional dual output polarity can be provided. A DC offset or bias insertion option is available. AVO-2 units are also available with a monitor output option that provides an attenuated (20 dB or x10) coincident replica of the main output pulse.

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. (See <http://www.avtechpulse.com/gpib> for details.) A large backlit LCD displays the output amplitude, polarity, frequency, pulse width, and delay. To allow easy integration into automated test systems, the programming command set is based on the SCPI standard.



AVO-2W-B



## SPECIFICATIONS

## AVO-2 SERIES

Model <sup>1</sup> :	AVO-2W-B	AVO-2A-B	AVO-2L-B	AVO-2M-B
Voltage amplitude at output module ( $V_{OUT}$ ) <sup>2,3</sup> :	< 3.0 to 62.5 Volts	< 3.0 to 62.5 Volts	< 1 to 25 Volts	< 2 to 45 Volts
Required load impedance ( $R_{LOAD} = R_{SERIES} + R_{DIODE}$ ):	6.25 $\Omega$	12.5 $\Omega$	12.5 $\Omega$	10 $\Omega$
Resulting maximum current into a resistive load ( $V_{OUT}/R_{LOAD}$ ):	10 A	5 A	2 A	4.5 A
Pulse width (FWHM):	4 to 50 ns		1 to 20 ns	1 to 10 ns
Rise time (20%-80%):	$\leq 2.5$ ns		$\leq 0.5$ ns	$\leq 1$ ns
Fall time (80%-20%):	$\leq 3.5$ ns		$\leq 0.5$ ns	$\leq 1$ ns
PRF:	0 to 20 kHz		0 to 100 kHz	0 to 20 kHz
Output impedance:	$\approx 6.2$ Ohms	$\approx 12.5$ Ohms		
Polarity <sup>4</sup> :	Positive or negative or both (specify)			
DC offset or bias insertion:	Optional <sup>6</sup> . Apply required DC offset in the range of $\pm 50$ Volts (250 mA max) to solder terminal.			
GPIB and RS-232 control <sup>1</sup> :	Standard on -B units.			
LabView drivers:	Check <a href="http://www.avtechpulse.com/labview">http://www.avtechpulse.com/labview</a> for availability and downloads			
Ethernet port, for remote control using VXI-11.3, ssh, telnet, web:	Optional <sup>5</sup> . Recommended as a modern alternative to GPIB / RS-232. See <a href="http://www.avtechpulse.com/options/vxi">http://www.avtechpulse.com/options/vxi</a> for details.			
Settings resolution:	The resolution of the timing parameters (pulse width, delay, period) varies, but is always better than 0.15% of ( set value  + 20 ns). The amplitude resolution is < 0.1% of the maximum amplitude.			
Settings accuracy, after 10 minute warm-up:	Amplitude: Typically $\pm$ (5% of setting) $\pm$ (3% of maximum). Delay, Period: Typically $\pm$ (3% of setting) $\pm$ (5 ns) Pulse width: Typically $\pm$ (3% of setting) $\pm$ (2 ns), at maximum amplitude. For high-accuracy applications requiring traceable calibration, verify the output with a calibrated oscilloscope <sup>9</sup> .			
Trigger modes:	Internal trigger, external trigger (TTL level pulse, > 10 ns, 1 k $\Omega$ input impedance), front-panel "Single Pulse" pushbutton, or single pulse trigger via computer command.			
Variable delay (Sync to main out):	0 to 1.0 seconds, for all trigger modes (including external trigger).			
Propagation delay:	$\leq 200$ ns (Ext trig in to pulse out)			
Jitter: (Ext trig in to pulse out)	$\pm 100$ ps $\pm$ 0.03% of sync delay			
Sync output:	> +3 Volts, > 50 ns, will drive 50 Ohm loads			
Gate input:	Synchronous or asynchronous, active high or low, switchable. Suppresses triggering when active.			
Monitor output option <sup>7</sup> :	Provides a 20 dB attenuated coincident replica of main output			
Output connectors, standard:	Solder terminals			
Output connectors, optional:	N/A	-CLZ option <sup>8</sup> : The output can be provided on a DB-9 male connector (Pins 1-5 = signal, pins 6-9 = ground), suitable for use with the AV-CLZ11 series of low impedance cables. Includes one AV-CLZ11-100 cable and one AV-CTLX DB-9-to-PCB adapter (see <a href="http://www.avtechpulse.com/transmission/av-clz11">http://www.avtechpulse.com/transmission/av-clz11</a> and <a href="http://www.avtechpulse.com/accessories/av-ctlx">http://www.avtechpulse.com/accessories/av-ctlx</a> for details.) The cable must be terminated by a user-supplied 11-13 Ohm resistance (or resistance in series with a diode).		
Other connectors:	Trig, Sync, Gate, Monitor: BNC			
Power requirements:	100 - 240 Volts, 50 - 60 Hz			
Dimensions (H x W x D):	Mainframe: 102x430x375mm (3.9"x17"x14.3"), Output module: 23x28x38mm (0.9"x1.1"x1.5")			
Temperature range:	+5°C to +40°C			