



The AV-156 series of pulsed constant current generators was designed for a wide variety of component testing applications. The AV-156 series is used to test a wide range of devices, including laser diodes, LED lighting arrays, airbag squibs, fuses, power resistors, and power semiconductors. All AV-156 models described here include IEEE-488.2 GPIB and RS-232 computer control interfaces, making them ideal for many automatic test and R&D applications.

Model AV-156K-B is a 0 to +2 Amp pulser, with 200 ns rise and fall times. The pulse width is variable from 1 us to 10 ms, with repetition rates to 100 kHz. The maximum duty cycle is 80% for amplitudes below 1A, and 40% for amplitudes to 2A. The usable load voltage range is 0 to +20 Volts.

Model AV-156A-B is a 0 to +5 Amp pulser, providing 4 us rise times, pulse widths from 10 us to 10 ms (100 ms optional), pulse repetition frequency (PRF) to 10 kHz and a load voltage range of 0 to +15 Volts. An option allowing a DC offset of up to +500 mA to be added to the output is available.

The model AV-156G-B is similar, but the maximum amplitude is increased to 10 Amps, and the maximum duty cycle is 10%.

The load voltage of both the AV-156A-B and AV-156G-B can be increased to +25V by adding the -HC option.

Some models also available with a voltage-to-current converter mode option. In this mode, an externally generated voltage waveform is applied to a rear-panel connector. The current waveform on the main output is then proportional to the voltage input waveform, that is,  $I_{OUT} = k \times V_{IN}$ . The value of  $k$  is such that the maximum value of  $V_{IN}$  is 10V.

The higher-current AV-156H-B offers amplitudes of 30 mA to 30 Amps, with a load voltage range of 0 to +30 Volts, and pulse widths variable from 0.3 to 30 ms. This model is intended primarily for "single-shot" use (i.e., low repetition rates).

The AV-156M-B offers an unusually high compliance voltage of 350V, with peak amplitudes up to 1.5A, making it useful for testing series arrays of LED lighting devices.

LabView drivers are available for these single-output instruments at <http://www.avtechpulse.com/labview>. The instrument may be controlled by the GPIB and RS-232 ports, or by the front-panel keypad and adjust knob.

For more complex test applications, two dual-channel units are available. Model AV-156E-B is dual-channel 5 Amp, 25 Volt unit ideal for airbag squib testing. The output pulse widths are independently variable up to 100 ms. The amplitudes are also

- Peak outputs ranging from 1.5 to 30 Amps
- High compliance voltages
- Pulse widths from 1 us to 100 ms
- DC offset option on some models
- Two dual-channel units, ideal for airbag squib testing
- IEEE-488.2 GPIB and RS-232 standard, VXI optional
- Output current monitor and overload protection

independently variable. One of the two channels has a variable delay, of 0 to 1.0 seconds. The pulse repetition frequency is variable from 1 to 100 Hz and the unit includes pushbutton and external triggering capability. Both channels share a common trigger. The AV-156E-B offers 10 us rise and fall times.

Model AV-156F-B is a similar dual-channel pulser, but offers higher amplitudes of 0 to +10 Amps, with 4 us rise & fall times. The pulse repetition frequency is variable from 0.5 to 50 Hz.

All models include a rear-panel monitor output (for display on an oscilloscope) that provides an attenuated coincident voltage replica of the load current. All models are protected against high duty cycle overload conditions by an automatic control feature that limits the average output power for as long as the overload condition persists.

On initial power-up, the output is shorted to ground by a relay, until the output is enabled by the user. The shorting relay may be re-enabled as required.

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

The -VXI option adds a rear-panel Ethernet connector, allowing an instrument to be remotely controlled using the VXI-11.3, ssh, telnet, and web protocols. In particular, the VXI-11.3 features allows software like LabView to control an instrument using standard VISA communications drivers and network cabling, instead of using older-style GPIB cabling and GPIB controller cards. For details, see <http://www.avtechpulse.com/options/vxi>.

All models require 100-240 Volt, 50-60 Hz prime power.

See the AV-108 Series for high duty cycle pulsed constant currents to 200 Amps, the AV-106 Series for currents of 5, 30 and 100 Amps and the AV-107 Series for fast rise time current pulses to 20 Amps. These models are described in detail at <http://www.avtechpulse.com/current>. A parametric search engine is available online at <http://www.avtechpulse.com/pick> to assist you in selecting the best instrument for your application.

Many aspects of the AV-156 family can be adapted to meet your particular requirements. Call or email Avtech today ([info@avtechpulse.com](mailto:info@avtechpulse.com)) with your requirement.



AV-156E-B



## SPECIFICATIONS

## AV-156 SERIES

Model:	AV-156K-B	AV-156A-B	AV-156G-B	AV-156H-B	AV-156M-B	AV-156E-B	AV-156F-B	
Amplitude:	0.01 - 2.0 A	0.01 - 5.0 A	0.01 - 10 A	0.03 - 30 A	0.15 - 1.5A	0.01 - 5.0 A	0.01 - 10.0 A	
Number of output channels:	One					Two, with independent control of amplitude and pulse width.		
Pulse width (FWHM):	1 us to 10 ms	10 us to 10 ms Optional <sup>9</sup> : 10 us to 100 ms		0.3 to 30 ms	1 to 50 ms	1 to 100 ms		
Max. pulse repetition freq:	100 kHz	10 kHz		1 Hz	10 Hz	100 Hz	50 Hz	
Max. duty cycle:	80% for 0-1A, 40% for 1-2A.	20%	10%	1%	2.5%	10%	5%	
Rise & fall time <sup>1</sup> (20%-80%):	< 200 ns	< 4 us		< 50 us	< 300 us	< 10 us	< 4 us	
Load configuration:	Referenced to ground.							
Polarity:	Positive - sources current.							
Output current regulation:	< 2 % load voltage change from 0 Volts to maximum rated voltage							
Load voltage range:	0 to +20V	Standard: 0 to +15V With -HC option <sup>2</sup> : 0 to +25V		0 to +30V	0 to +350V	0 to +25V		
Voltage-to-current amplifier mode:	With -VI option <sup>3</sup> : I <sub>OUT</sub> waveform tracks V <sub>IN</sub> waveform. +10V full-scale. Average current 1A maximum.				N/A			
DC offset / bias option <sup>8</sup> :	N/A	0.01 - 0.5 A (optional <sup>8</sup> )		N/A				
Overshoot <sup>4</sup> :	< 10 %							
Jitter:	< ± 200 ps ± 0.03% of sync delay (Ext trig in to pulse out)							
Trigger modes:	Internal trigger, external trigger (TTL level pulse, > 10 ns, 1 kΩ input impedance), front-panel "Single Pulse" pushbutton, or single pulse trigger via computer command.							
Sync delay: (Sync out to pulse out)	0 to ±1.0 seconds					Channel 1: 0 to 1.0 seconds Channel 2: 0 (fixed)		
Sync output:	> +3 Volts, > 50 ns, will drive 50 Ohm loads							
Amplitude accuracy <sup>1,5</sup> :	± 3 mA ± 3%							
Frequency accuracy <sup>5</sup> :	± 3%							
Pulse width accuracy <sup>1,5</sup> :	± 50 ns ± 3%	± 1 us ± 3%						
Sync delay accuracy <sup>1,5</sup> :	± 50 ns ± 3%	± 1 us ± 3%						
Gate input:	Active high or low, switchable. Suppresses triggering when active.							
Monitor output:	N/A	Back-panel BNC connector provides a coincident replica of the output current.						
Connectors, main output:	DB-37, rear-panel <sup>10</sup>	BNC, front-panel <sup>6</sup>		Banana jacks, rear-panel	BNC, front-panel <sup>6</sup>			
Connectors, other:	Sync output: BNC, front-panel. Gate, Ext Trig, Monitor: BNC, rear-panel							
GPIB and RS-232 control:	Standard feature. See page See <a href="http://www.avtechpulse.com/gpib">http://www.avtechpulse.com/gpib</a> for details.							
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>7</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.							
Power requirements:	100 - 240 Volts, 50 - 60 Hz							
Dimensions (H×W×D): mm:	100 × 430 × 375				138×430×425		100 × 430 × 425	
inches:	3.9 × 17 × 14.8				5.5×17×16.8		3.9 × 17 × 16.8	
Chassis material:	cast aluminum frame & handles, blue vinyl on aluminum cover plates							
Temperature range:	+5°C to +40°C							

1) Valid when driving a load impedance that is between zero Ohms and the impedance given by (Maximum Compliance Voltage) / (Maximum Rated Current). For load impedances higher than this value, de-rate the rise and fall times proportionally.  
 2) To specify the high compliance voltage option, add the suffix -HC to the model number.  
 3) To specify the voltage-to-current amplifier mode option, add the suffix -VI to the model number.  
 4) Valid for amplitudes greater than 5% of the full-scale value, into non-inductive loads.  
 5) At room temperature after 10 minute warmup, when operating into a resistive load. For high-accuracy applications requiring traceable calibration, verify the output with a calibrated oscilloscope.

6) To add a duplicate main output connector on the rear panel, add the suffix -RP to the model number.  
 7) Add the suffix -VXI to the model number to specify the Ethernet port.  
 8) Add the suffix -OT to the model number to specify the DC offset option. The total sum of the offset plus the amplitude can not exceed the maximum amplitude rating. That is, the amplitude and offset can not both be set to their maximum settings at the same time.  
 9) Add the suffix -PW to the model number to specify the wider pulse width range.  
 10) Pins 1-19 = signal, pins 20-37 = ground. Includes one AV-CLZ11-100 cable and one AV-CTL11 test load. See <http://www.avtechpulse.com/transmission/av-clz11/> for details.

Visit <http://www.avtechpulse.com/appnote> for these helpful application notes:

Choosing & Using Pulsed Constant-Current Sources, and Blue Diode Considerations  
 How to Connect Loads to your Pulsed Constant Current Generator for Optimum Performance  
 How to Deliver a Fast 2 Amp Pulse to a Diode in a Probing Station