

- ◆ 40 Watt and 400 Watt series (average output)
- ◆ 20 - 200 Ampere models
- ◆ IEEE-488.2 GPIB and RS-232 control
- ◆ Network control (Telnet & Web) is optional
- ◆ Pulse widths from 10 us to 10 ms
- ◆ 5, 10 or 15 us rise times
- ◆ 20, 50, or 100 Volt compliance voltage ratings
- ◆ Current monitor output

The AV-108E and AV-108F series of pulsed constant current generators are designed for driving laser diodes and other low impedance loads with constant current pulses as high as 200 Amperes, pulse widths from 10 us to 10 ms and average output powers to 40 or 400 Watts.

The 40 Watt models (the AV-108E series) are entirely self-contained in a single chassis, and are powered from a standard AC line connection (100-240 Volts, 50-60 Hz). The AV-108E-1A-B can generate current pulses of up to 50 Amps peak (2A average), for load voltages in the range of 0 to 20 Volts. Similarly, the AV-108E-2A-B operates to 100 Amps peak (0.8A average) and 50 Volts, and the AV-108E-3A-B operates to 200 Amps peak (2A average) and 20 Volts. The pulse width for these models is adjustable from 20 us to 1 ms. The AV-108E-4A-B operates to 150A (0.4A average) for load voltages of up to 100V, with pulse widths from 20 to 200 us, and the AV-108E-5A-B operates to 12.5 Amps peak and 90 Volts, making these models ideal for testing diode arrays.

The high-power 300 and 400 Watt models (the AV-108F series) require an external user-supplied DC power supply in addition to standard AC power. This permits operation at higher duty cycles. The AV-108F-1A-B operates to 50 Amps peak (20A average) and 20 Volts, the AV-108F-2A-B operates to 100 Amps peak (8A average) and 50 Volts, and the AV-108F-3A-B operates to 200 Amps peak (20A average) and 20 Volts.

The higher-voltage AV-108F-4A-B operates to 150A peak (4A average) into loads of up to 100V, and the AV-108F-5A-B operates to 12.5 Amps peak (3.3A average) and 90 Volts, making these models ideal for testing diode arrays.

The duty cycle, peak current, and average current are related by $I_{AVG} = I_{PEAK} \times \text{duty cycle}$. (The duty cycle is never permitted to exceed 50%).

For the AV-108F models, the external DC power supply must be capable of supplying the necessary average current to the instrument (I_{AVG}). The peak current is supplied by a large capacitor bank inside the pulser. The voltage from the external power supply (V_{DC}) must be at least 2 Volts greater than the maximum expected load voltage (V_{LOAD}). The maximum difference between V_{DC} and the maximum V_{LOAD} must also be controlled to limit the power dissipation in the instrument to 80 Watts:

$$V_{DC} - V_{LOAD} > 2 \text{ Volts (5V for the AV-108F-4A-B)}$$

$$(V_{DC} - V_{LOAD}) \times I_{AVG} < 80 \text{ Watts}$$

For example, if the AV-108F-1A-B is operating at maximum current (50A) and duty cycle (40%), then V_{DC} should be between 2 and 4 Volts higher than V_{LOAD} . The same range applies to the AV-108F-3A-B. For the AV-108F-2A-B at maximum amplitude and duty cycle, V_{DC} should be 2 to 10 Volts higher than V_{LOAD} . For the AV-108F-4A-B at maximum amplitude and duty cycle, V_{DC} should be 5 to 20 Volts higher than V_{LOAD} . Protective sensors will disable the output if these conditions are violated.

The output signal is provided on a high-voltage, high-current rear-panel safety connector. Users can connect to their loads

using the optional AK9 accessory kit, which provides a 1 meter long cable and an adapter for the load end. The adapter also provides four contact posts (two identical posts for the signal, and two for the ground), to which the load may be attached using M6x1 threaded screws (maximum depth of 15 mm). The adapter may be plugged into the cable, and the cable into the rear panel. Alternatively, the adapter may be plugged directly into the rear panel. (Some AV-108 models used different connector schemes historically, including DB-37 connectors and Multi-Contact 6 mm plug / 4 mm socket combination connectors. These older output connector styles can still be provided by special order, for compatibility with existing test set-ups.)

All AV-108 units include a monitor output feature that provides an attenuated coincident replica of the main output current pulse ($V_{MON} = k \times I_{OUT}$). The monitor is accurate within $\pm 3\%$.

Temperature and voltage sensors protect the output from overheating and excessively high power supply voltages. The average output power (P_{AVG}) is also monitored, and the output is disabled if the output power is excessive.

All models include an Output On/Off function, as well as power on/off protection circuitry, to protect attached loads.

The pulse repetition frequency is variable for all models from 1 Hz to 1 kHz using the internal oscillator. A delay control and a sync output are provided for oscilloscope triggering purposes. A pushbutton is provided for one-shot operation. The units can also be triggered externally using a TTL-level pulse. When triggered externally, the output pulse width can be set to follow the input trigger pulse width ($PW_{OUT} = PW_{IN}$), if desired.

Either output polarity can be provided (positive = sourcing current, negative = sinking current).

All models include a complete computer control interface (see <http://www.avtechpulse.com/gpib> for details). 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, frequency, pulse width, and delay. (For the AV-108F models, the DC power supply must be equipped with a GPIB feature, if you wish to remotely control all aspects of the system.) To allow easy integration into automated test systems, the programming command set is based on the SCPI standard.

Some aspects of these instruments are adaptable for special applications. For instance, maximum duty cycles can be extended if the maximum load voltage rating is reduced. Contact Avtech (info@avtechpulse.com) with your special requirement!



AV-108E-1A-B Front Panel



SPECIFICATIONS

AV-108 SERIES

Model ¹ :	AV-108E-5A-B	AV-108E-1A-B	AV-108E-2A-B	AV-108E-3A-B	AV-108E-4A-B	AV-108F-5A-B	AV-108F-1A-B	AV-108F-2A-B	AV-108F-3A-B	AV-108F-4A-B	
Maximum peak amplitude (I_{PEAK}) ² :	12.5 Amps	50 Amps	100 Amps	200 Amps	150 Amps	12.5 Amps	50 Amps	100 Amps	200 Amps	150 Amps	
Load voltage range ¹⁵ :	0 - 90 Volts	0 - 20 Volts	0 - 50 Volts	0 - 20 Volts	0 - 100 Volts	0 - 90 Volts	0 - 20 Volts	0 - 50 Volts	0 - 20 Volts	0 - 100 Volts	
Maximum average amplitude (I_{AVG}) ¹¹ :	0.44 Amps	2 Amps	0.8 Amps	2 Amps	0.4 Amps	3.3 Amps	20 Amps	8 Amps	20 Amps	4 Amps	
Maximum average power out:	40 Watts					300 Watts	400 Watts				
Pulse width (FWHM) ^{6,12} :	20 us - 1 ms				20 - 200 us	20 us - 1 ms	20us - 10ms	20 us - 1 ms		20 - 200 us	
Rise and fall times (20%-80%) ¹⁰ :	5 us	10 us			15 us	5 us	10 us			15 us	
PRF:	Internal trigger: 1 Hz to 1 kHz.					External trigger: 0 Hz to 1 kHz					
Output current regulation:	$\leq 5\%$ (for load voltage change from 0 Volts to maximum voltage)										
Polarity ³ :	Positive or negative (specify)										
GPIB & RS-232 control ¹ :	Standard on -B units.										
LabView drivers:	Check http://www.avtechpulse.com/labview for availability and downloads										
Internet control:	Optional ⁴ .										
Propagation delay:	≤ 1 us (Ext trig in to start of pulse out)										
Jitter:	± 100 ps $\pm 0.03\%$ of sync delay (Ext trig in to pulse out)										
Trigger required:	For external trigger mode: TTL-level (low = 0V, high = 3-5V) pulse, > 50 ns in width										
Sync delay, Sync output:	Variable, ± 1.0 seconds (Sync out to pulse out). +3 Volts, 100 ns, will drive 50 Ohm loads.										
Gate input:	Synchronous or asynchronous, active high or low, switchable. Suppresses triggering when active.										
Monitor output:	Provides an attenuated coincident replica of output current pulse.										
Connectors: Output:	Positronic (www.positronic.com) female connector ¹³										
DC Power (+ and -):	Not required				6 mm plug / 4 mm sockets ⁷ (+ red, - black)						
Power requirements, DC (worst case) ⁵ :	Not required				100V, 3.3A	25V, 20A	55V, 8A	25V, 20A	115V, 4A		
Possible DC power supplies ¹² : Ametek / Xantrex: Ametek /Sorensen: Kepco: Agilent: Delta Elektronika:	Not required				XHR 100-10 LHP 100-10 JQE 100-10M HP 6030A SM120-13	XHR 33-33 LHP 33-33 JQE 25-20M HP 6032A SM35-45	XHR 60-18 LHP 60-18 JQE 55-10M HP 6032A SM70-22	XHR 33-33 LHP 33-33 JQE 25-20M HP 6032A SM35-45	XHR 150-7 LHP 150-7 JQE 150-7M N5750A SM120-13		
Max. internal dissipation:	Not applicable				$(V_{DC} - V_{LOAD}) \times I_{AVG} < 80$ Watts. V_{DC} must be set appropriately to respect this limit.						
Optional recommended accessory kits ⁹ :	-AK3 option: Provides two 1 m cables (1 red, 1 black) with 6mm safety sockets ⁸ , and two 6mm safety plug to M6 stud adapters ⁷ . Recommended for connecting AV-108F units to the DC power supply. Not needed for 108E units.										
<i>108E users should normally order the AK9 kit, and 108F users both the AK3 and AK9 kits.</i>	-AK9 option: Provides one AV-HLZ1-100 cable (100 cm length, $Z_0 = 1$ Ohm. This transmission line cable matches low impedance loads without degrading the signal rise and fall times significantly. The chassis end of the cable is terminated with a Positronic male connector ¹⁴ and the load end is terminated with a Positronic female connector ¹³). Also provides an adapter which mates to the end of this cable, and provides the output on two identical contact posts into which M6x1 threaded screws may be screwed to a maximum depth of 15 mm.										
Power requirements, AC:	100 - 240 Volts, 50 - 60 Hz										
Dimensions (H x W x D):	138 mm x 430 mm x 425 mm (5.5" x 17" x 16.8")										
Rack-mount kit:	Add the suffix -R6 to the model number to include 19" rack mount kit.										
Temperature range:	$+5^{\circ}\text{C}$ to $+40^{\circ}\text{C}$										

1) -B suffix indicates IEEE-488.2 GPIB and RS-232 control of pulse width, PRF and delay. (See <http://www.avtechpulse.com/gpiib> for details).
2) The minimum useful amplitude is 3% of the maximum amplitude.
3) Indicate desired polarity by suffixing the model number with -P or -N (i.e. positive or negative).
4) Add the suffix -TNT to the model number to specify the Internet control (Telnet and Web) option.
5) The AV-108F models require a user-supplied DC power supply. Avtech suggests Xantrex as a source of DC power supplies (<http://www.xantrex.com>). Contact Avtech for recommendations about DC power supplies appropriate for your application. The cables for connecting the external DC power supply are not included with the standard models. 6 mm plug to 6 mm plug cables are available in the optional -AK4 and -AK5 accessory kits. These may or may not be suitable for your power supply, depending on the power supply's connectors. It is possible to cut and strip the ends of the optional accessory cables, and to attach other terminations. Multi-Contact (<http://www.multi-contact.com> or <http://www.multi-contact-usa.com>) can supply 6 mm plug to cable lug cables, and other configurations.
6) When externally triggered, the output pulse width can be controlled by the front panel controls (or computer command), or it can be set to follow the input pulse width (i.e., $PW_{in}=PW_{out}$ mode).
7) Multi-Contact (<http://www.multi-contact.com> or <http://www.multi-contact-usa.com>) ID/S6AR-N-B4S series, or similar.
8) Multi-Contact (<http://www.multi-contact.com> or <http://www.multi-contact-usa.com>) SLK616-AR/BGG series, or similar.

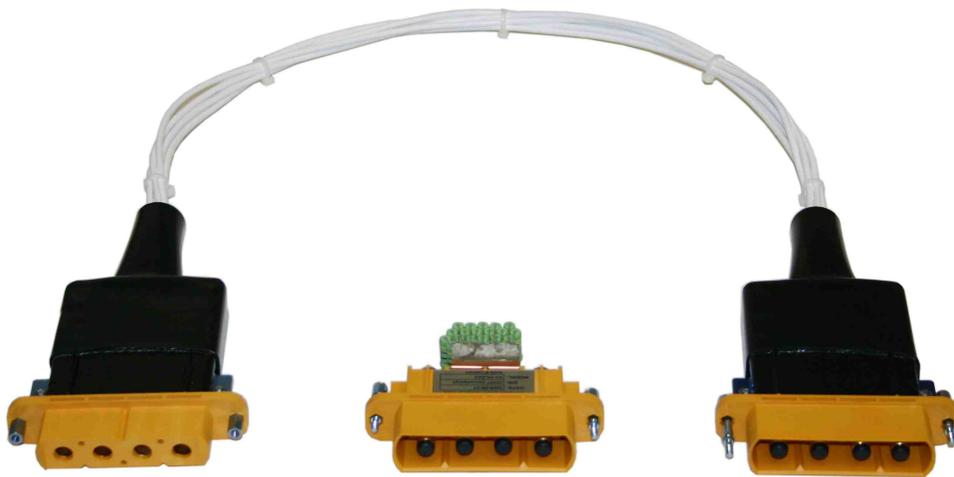
9) Add the suffix(es) -AK3 and/or -AK9 as appropriate, to the model number to include the accessory kit(s).
10) Valid for non-inductive loads installed directly on the output connectors (i.e., zero cable length), or loads connected directly to the output end of the AK9 kit cable and adapter. Lengths of cable or inductive loads may degrade the observed rise and fall times.
11) Subject to a maximum duty cycle limit of 50%.
12) Many other models are also possible. These are just suggestions. A higher power supply current rating will provide better operation at wide pulse widths. Most power supply manufacturers offer reasonably priced 1 kW models. We do not recommend models with power ratings below 1 kW.
13) Positronic part number GG8888F1, with four GGFIT00MS/AA high-current contacts. The inner two contacts carry the signal, and the outer two carry the ground lines.
14) Positronic part number GG8888M1, with four GGMIT00MS/AA high-current contacts. The inner two contacts carry the signal, and the outer two carry the ground lines.
15) If the load voltage becomes too high, the output will saturate at the DC power supply voltage, and the output current will be reduced to a level consistent with that voltage. For the AV-108F models, this is the voltage provided by the external DC power supply. For the AV-108E models, this is an internal power supply voltage approximately 4-10V higher than the maximum specified load voltage. The output current is still controlled under these conditions such that it will not exceed the programmed current.



Pulser mainframe (left) with AK9 kit, including the AV-HLZ1-100 output cable (middle) and mating adapter (right)



AV-108F Series Rear Panel. (AV-108E models do not have the DC and GND power supply terminals).



AK9 kit, including the AV-HLZ1-100 output cable (right and left) and mating adapter (middle). The adapter is shown with some test resistors installed on copper brackets. The copper brackets are screwed into the four contact posts on the rear of the adapter. These brackets and resistors are not included with the adapter; this is just a sample configuration.

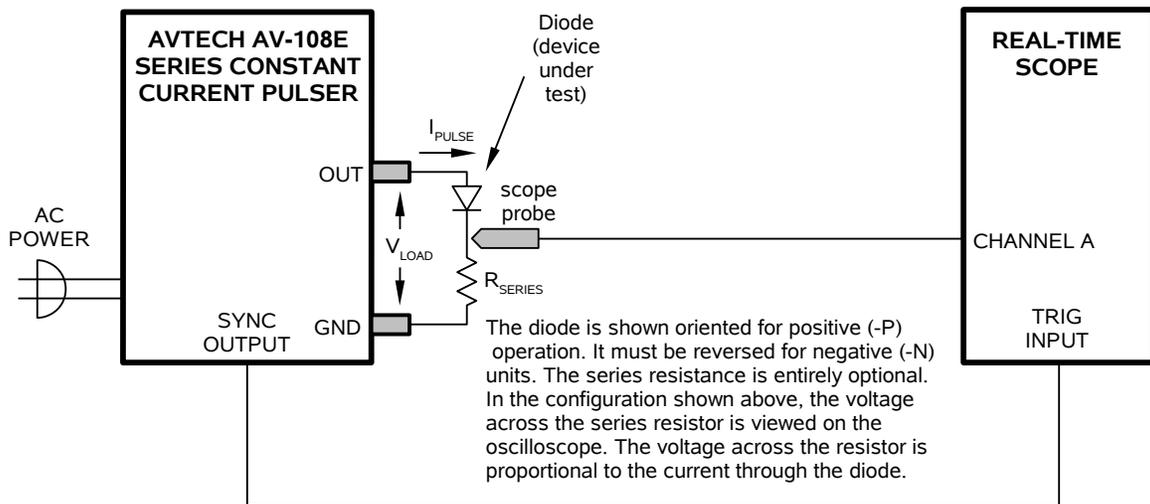


Front view of the adapter included with the AK9 kit. This end may be plugged directly into the rear panel output connector, or into the output end of the AV-HLZ1-100 cable.

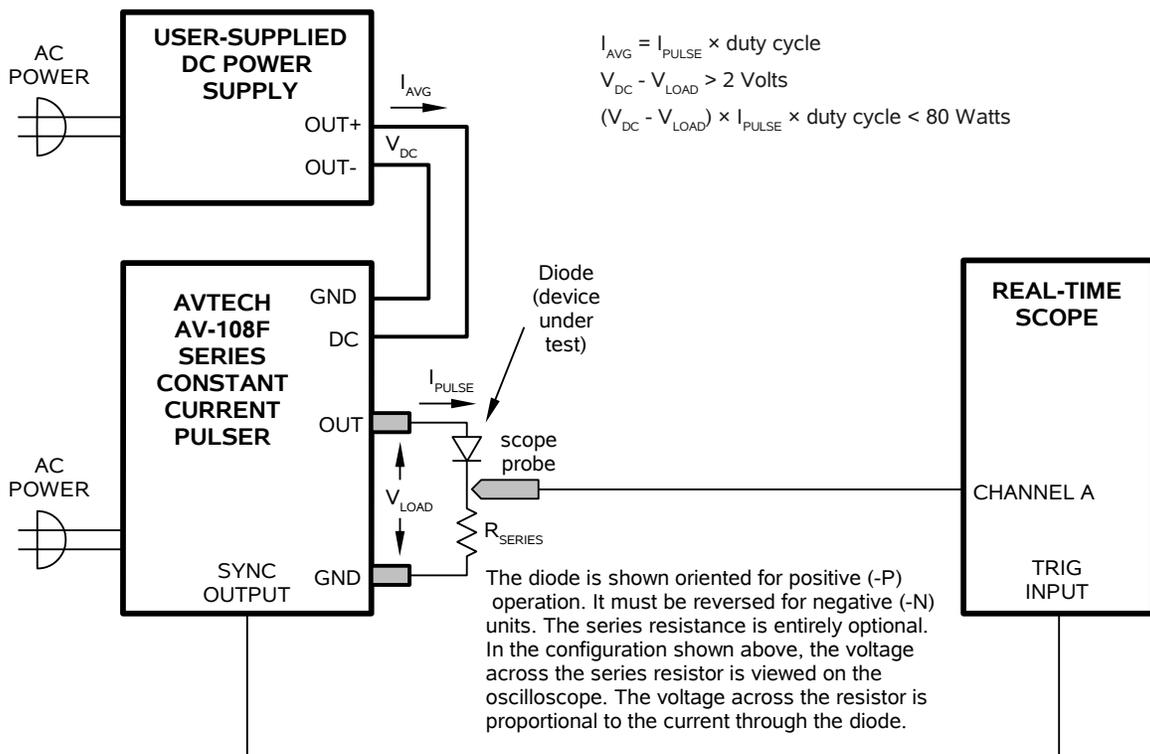


Rear view of the adapter included with the AK9 kit. The outer two contact posts are grounded, and the inner two carry the signal. The user may screw into these posts, to attach the user's load.

Typical Connection Arrangement for AV-108E Series



Typical Connection Arrangement for AV-108F Series



Contact Avtech (info@avtechpulse.com) with your special requirement!

Avtech regularly adapts standard models for special and "one-of-a-kind" applications.