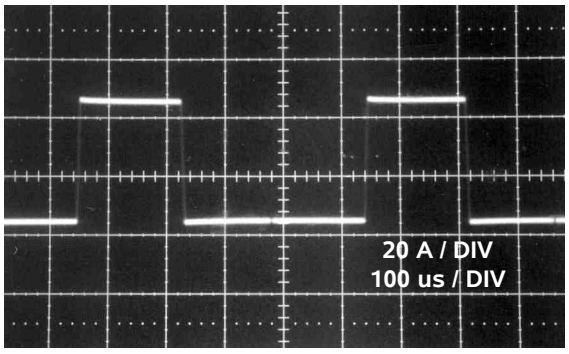
AV-109 SERIES

10 TO 100 AMPERE
WIDE PULSE & HIGH DUTY CYCLE
CONSTANT CURRENT LASER DIODE DRIVERS



- 10, 20, 50 and 100 Ampere models
- Pulse widths from 10 us to 1 sec
- Duty cycles as high as 75%
- 37 to 200 Watts (average output)
- 5 Volt compliance voltage rating
- 10 us rise times
- IEEE-488.2 GPIB and RS-232 control
- Current monitor output

The AV-109E and AV-109F series of pulsed constant current generators are designed for driving laser diodes and other low impedance loads with constant current pulses as high as 100 Amperes, pulse widths from 10 us to 1 second, and average output powers of up to 200 Watts. All models will operate for load voltages in the range of 0 to 5V, making them suitable for most single-diode loads.

The 10 Amp and 20 Amp models (the AV-109E 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-109E-1-B can generate current pulses of up to 10 Amps at duty cycles up to 75%. Similarly, the AV-109E-2-B operates to 20 Amps at duty cycles to 50%.

The higher-current 50 Amp and 100 Amp models (the AV-109F series) require an external user-supplied DC power supply in addition to standard AC power. This permits operation at higher average output power levels. The AV-109F-3-B operates to 50 Amps and 75% duty, and the AV-109F-4-B operates to 100 Amps and 40% duty. In terms of current, the external DC power supply must be capable of supplying the necessary average current to the instrument (I_{AVG} = I_{PULSE} × duty cycle). For narrow pulse widths (< 1 ms) the peak current is supplied by a large capacitor bank inside the pulser. For wider pulse widths, the DC power supply must be capable of supplying the full peak current. Voltage-wise, 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:

$$V_{DC} - V_{LOAD} > 2 \text{ Volts}$$
$$(V_{DC} - V_{LOAD}) \times I_{PULSE} \times \text{duty cycle} < 80 \text{ Watts}$$

For example, if the AV-109F-3-B is operating at 50A and a duty cycle of 50%, then V_{DC} should be between 2.0 and 3.2 Volts higher than V_{LOAD}. Protective sensors will disable the output if these conditions are violated.

For all models, the main output is provided on a rear-panel DB-37 output connector that will mate to the Avtech AV-CLZ series of low impedance transmission lines. (See http://www.avtechpulse.com/transmission/av-clz1). Order the -AK6 option to include a 60 cm length of mating AV-CLZ1-60 cable and an AV-CTLX cable-to-PCB adapter.

All AV-109 units include a monitor output feature that provides an attenuated coincident replica of the main output current pulse (V_{MON} = k × I_{OUT}).

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. A DC offset feature is optional on all models, ideal for biasing laser diodes below threshold.

The pulse repetition frequency is variable for all models from 0.1 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-109F 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, and LabView drivers are available for download (http://www.avtechpulse.com/labview). Optional telnet or web-based remote control is also available (for details see (http://www.avtechpulse.com/options/tnt) for control over local area networks or the internet.

The AV-109F models are available with the -AK3 option, which includes high-current cables and adapters to assist in connecting to DC power supplies.

Some aspects of these instruments are readily 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-109E-1-B Front Panel
(Output connectors are on rear panel)

SPECIFICATIONS

AV-109 SERIES

Model[1]:	AV-109E-1-B	AV-109E-2-B	AV-109F-3-B	AV-109F-4-B
Amplitude[2]: Pulse: Optional DC offset[3]: Peak (Pulse + DC offset):	0 to 10 Amps 0 to 1 Amp 10 Amps	0 to 20 Amps 0 to 2 Amps 20 Amps	0 to 50 Amps 0 to 5 Amps 50 Amps	0 to 100 Amps 0 to 10 Amps 100 Amps
Average power out: (maximum)	38 Watts	50 Watts	188 Watts	200 Watts
Load voltage range:	0 to 5 Volts			
Pulse width (FWHM):	10 us – 1.0 seconds			
Maximum duty cycle:	75 %	50 %	75 %	40%
Rise time, fall time (20%-80%):	10 us			
PRF:	Internal trigger: 0.1 Hz to 1 kHz External trigger: 0 Hz to 1 kHz			
Output current regulation:	≤ 5% (for load voltage change from 0 Volts to maximum voltage)			
Polarity[4]:	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			
Telnet / Ethernet control:	Optional[6]. See http://www.avtechpulse.com/options/tnt for details.			
Controls:	Keypad and adjust knob, and GPIB / RS-232 control			
Propagation delay:	≤ 1 us (Ext trig in to pulse out)			
Jitter:	± 100 ps ± 0.03% of sync delay (Ext trig in to pulse out)			
Trigger required:	External trigger mode: + 5 Volts, 50 to 500 ns (TTL)			
Sync delay:	Variable, 0 to ± 1.0 seconds, Sync out to pulse out			
Sync output:	+ 3 Volts, 200 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: OUT & GND:	DB-37 female. Pins 1-19 = signal, pins 20-37 = ground. Suitable for mating to AV-CLZ1 type cables (http://www.avtechpulse.com/transmission/av-clz1).			
DC Power (+ and -):	Not applicable.		6 mm plug / 4 mm sockets[7] (+ red, - black)	
Trig, Sync, Monitor, Gate:	BNC			
Power requirements, AC:	100 - 240 V, 50 - 60 Hz			
Power requirements, DC[5]:	Not applicable.		7V, 50A (worst-case)	7V, 100A (worst-case)
Possible DC power supplies: Xantrex (www.xantrex.com): Sorensen (www.sorensen.com): Kepco (www.kepco.com): Agilent (www.agilent.com):	Not applicable.		 XHR 20-50 LHP 20-50 JQE 15-50M HP 6032A	 XFR 12-100 DCS 10-100E - -
Maximum internal dissipation, $(V_{DC} - V_{LOAD}) \times I_{PULSE} \times$ duty cycle:	Not applicable		80 Watts. V_{DC} must be set appropriately to respect this limit.	
Optional recommended accessory kits:	-AK6 option: includes one AV-CLZ1-60 output cable[9] and one AV-CTLX cable-to-PCB adapter[10].		-AK3 option: Provides two 1m cables (1 red, 1 black) with 6mm safety sockets[8], and two 6mm safety plug to M6 stud adapters[7] (1 red, 1 black) -AK6 option: includes one AV-CLZ1-60 output cable[9] and one AV-CTLX cable-to-PCB adapter[10].	
Cooling:	Self-contained fan			
Dimensions (H x W x D):	138 mm x 430 mm x 425 mm (5.5" x 17" x 16.8")			
Chassis material:	Anodized aluminum, with blue plastic trim			
Rack-mount kit:	Add the suffix -R6 to the model number to include 19" rack mount kit.			
Temperature range:	+5°C to +40°C			

1) -B suffix indicates IEEE-488.2 GPIB and RS-232 control of amplitude, pulse width, PRF and delay. (See http://www.avtechpulse.com/gpib).
2) The minimum useful amplitude is 3% of the maximum amplitude.
3) To specify the DC offset option add the suffix –OT to the model number
4) Indicate desired polarity by suffixing the model number with -P or -N (i.e. positive or negative), or -PN for dual polarity.
5) AV-109B models rated at 50 Amps or more require an end-user-supplied external DC power supply. The voltage rating of the power supply must be greater than VLOADmax + 5V. The current rating must be greater than the peak output current of the pulser.
6) Add the suffix -TNT to the model number to specify the Telnet / Ethernet control option.
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) See http://www.avtechpulse.com/transmission/av-clz1 for details.
10) See http://www.avtechpulse.com/accessories/av-ctlx for details.