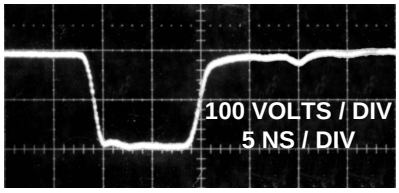
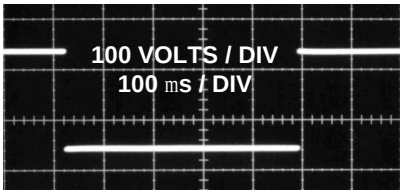
AVRL SERIES

200 AND 700 VOLT GATING PULSE GENERATORS FOR MCP IMAGE INTENSIFIERS





- Amplitudes of 200 and 700 Volts
- Pulse widths from 5 ns to 1 ms
- Propagation delays as low as 15 ns
- Seven models

The seven members of the AVRL series were designed for gating microchannel plate image intensifiers such as the ITT F4144 and F4129. This series provides output pulse widths covering the range of 5 ns to 1 ms and output amplitudes of 200 Volts and 700 Volts. Note that the versatile AVRL technology can be readily adapted to provide a wide range of output waveforms. Contact Avtech if your requirement is not covered by the seven standard models.

Model AVRL-1-PS generates a -200 Volt pulse having a pulse width which is variable from 5 to 100 ns via a ten-turn control. This model provides a 2 ns rise time but a 1 ns rise time option is available. Model AVRL-1-PS requires a 50 Ohm termination, will operate a pulse repetition frequency as high as 5 kHz, and has a propagation delay time of 250 ns (with an optional 100 ns version). For applications requiring both very fast rise times and very short propagation delays, Avtech has introduced Model AVRL-2-PS. This model exhibits a propagation delay time of less than 15 ns and provides a rise time of 2 ns. The output pulse width is variable from 5 to 100ns and is controlled by means of an externally applied delay line (rather than via a ten-turn control).

For applications requiring much higher pulse repetition rates, Avtech now offers Model AVRL-3-PS which operates at PRF as high as 1 MHz. This model provides an amplitude of -200 Volts with a pulse width variable from 10 to 200 ns and a rise time of 5 ns.

Model AVRL-4-PS features a rise and fall time of 2 ns with a pulse width range of 0.1 to 5.0 µs and a pulse repetition frequency range of 0 to 1 kHz.

For applications requiring still wider pulse width ranges, Avtech has introduced Models AVRL-5-PS and AVRL-6-PS which respectively cover the pulse width ranges of 20ns to 1ms and 5 ns to 1 ms.

Model AVRL-7-PS was designed for applications requiring voltages in the range of -200 to -700 Volts and pulse widths in the range of 100 ns to 1 ms.

All models in this series require a TTL-level (+5 Volts) input trigger pulse and a prime power of 120/240V (switchable), 50-60 Hz. In addition, all models are also available with variable delay options covering the following ranges:

-D1 option:	0 to 100 ns (one range)
-D2 option:	0 to 1 µs (two ranges)
-D3 option:	0 to 10 µs (three ranges)
-D4 option:	0 to 100 µs (four ranges)

The delay options introduce a variable delay which is in addition to the minimum insertion propagation delay specified for each model. All models are available with optional electronic control (0 to +10 Volts) of the delay (and also of the output pulse width). In addition, all models are available with an optional DC offset feature which allows an externally applied DC offset of 0 to ± 50 Volts to be superimposed on the output pulse.

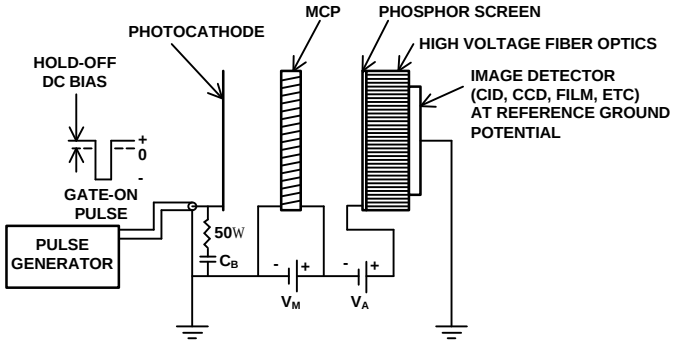
A typical connection of an AVRL series pulse generator to a grounded MCP input device is shown on the following page. This configuration is particularly suitable for pulse generators requiring a 50 Ohm termination. The DC blocking capacitor C_B is necessary if a DC offset is employed. (See ITT technical note E23 for guidance on connecting pulse generators to MCP image intensifiers).

Contact Avtech for assistance with your special requirements.

AVRL-6-PS

Model:	AVRL-1-PS[1]	AVRL-2-PS[1]	AVRL-3-PS[1]	AVRL-4-PS[1]	AVRL-5-PS[1]	AVRL-6-PS[1]	AVRL-7-PS[1]
Amplitude:	- 200 V	- 200 V	- 200 V	- 200V	- 200 V	- 200 V	-200 to -700V
Pulse width[2]:	5 - 100 ns	5 - 100 ns[3]	10 - 200 ns	0.1 to 5 µs	20 ns to 1 ms	5 ns to 1 ms	0.1 µs to 1 ms
Rise time[4]:	2 ns (or 1 ns[5])	2 ns	5 ns	2 ns	PW <100ns: 5ns PW >100ns: 10ns	PW < 100ns: 2ns PW > 100ns:10ns	30 ns
Fall time:	3 ns	3 ns	5 ns	2 ns	PW<100 ns: 5ns PW>100ns: 10ns	PW < 100ns: 3ns PW > 100ns: 10ns	30 ns
PRF:	0 to 5 kHz	0 to 5 kHz	0 to 1 MHz	0 to 1 kHz	0 to 1 kHz	0 to 1 kHz	0 to 1 kHz
Required load impedance[6]:	50 Ohm[5]	≥ 10 K[7]	≥ 1 K	50 Ohms	> 10 K	PW<100ns:50 Ohm PW>100ns: >10K	> 100 K
Duty cycle (max):	NA	NA	20 %	NA	20 %	20 %	20 %
Propagation delay[8]:	≤ 250 ns (or 100 ns[9])	≤ 15 ns	≤ 100 ns	≤ 100 ns	≤ 100 ns	≤ 100 ns	≤ 100 ns
Variable propagation delay option[10]:	-D1 option: 0 to 100 ns (one range) -D2 option: 0 to 1 µs (two ranges)				-D3 option: 0 to 10 µs (three ranges) -D4 option: 0 to 100 µs (four ranges)		
Jitter: (ext trig in to pulse out)	± 100 ps						
DC offset or bias insertion[11]:	Option available. Apply required DC offset or bias in the range of ± 50 Volts (1 mA max) to back-panel solder terminal. See note 11.						
Trigger required:	+ 5 Volt, 50 ns or wider (TTL)						
Monitor output option[12]:	Provides an attenuated coincident replica of main output pulse						
Connectors: OUT:	BNC (microstrip solder terminal for T1 option)	microstrip solder terminal	BNC				N[13]
TRIG:	BNC	BNC	BNC				BNC
Power requirement:	120/240 Volts (switchable) 50 - 60 Hz						
Dimensions: (H x W x D) Mainframe:	100x215x375 mm (3.9" x 8.5" x 14.8")	100x215x375 mm (3.9" x 8.5" x 14.8")	100 x 215 x 375 mm (3.9" x 8.5" x 14.8")		100 x 430 x 375 mm (3.9" x 17" x 14.8")		
Output module:	23 x 28 x 38 mm (0.9" x 1.1" x 1.5") (-T1 units only)	23 x 28 x 38 mm (0.9" x 1.1" x 1.5")	NA		NA		
Chassis: Mainframe:	anodized aluminum, with blue plastic trim						
Output module:	cast aluminum, blue enamel						
Mounting:	Any						
Temperature range:	+ 15° to + 40°C						

1) -PS suffix indicates line powered instrument requiring external trigger.
2) For electronic control (0 to + 10V) of pulse width suffix model No. with -EW. Electronic control units also include the standard front-panel ten-turn controls and 4 position range switch (for units operating to 1 ms).
3) Output pulse width is controlled by the addition of 50 Ohm cable (eg. RG 58A) to rear-panel BNC connector. Output pulse width increases 3 ns for each additional foot of cable added.
4) Assumes load capacitance ≤ 36 pF.
5) To denote 1 ns rise time option add suffix -T1 to model number. -T1 units include a 23 mm x 28 mm x 38 mm (0.9" x 1.1" x 1.5") output module which connects to the mainframe via 3' of two parallel 50 Ohm cables. Cables may be extended. Load connects to microstrip output terminals on output module using extremely short leads (≤ 0.5 in). 50 Ohm termination not required.
6) This termination must be placed across the input to image intensifier. If a DC offset is employed a DC block capacitor must be placed in series with the termination.
7) This model includes a 23 mm x 28 mm x 38 mm (0.9" x 1.1" x 1.5") output module which connects to the mainframe via a 3' long 50 Ohm cable (which may be extended). The output module has a 0.5 cm long output microstrip terminal to which the load is connected.
8) Most units can be provided with a variable delay option which allows the propagation delay to be varied from the stated minimum to about 100 µs. Contact Avtech with your specific requirement.
9) For 100 ns propagation delay option suffix model No. with -TN.
10) The delay options introduce a variable delay which is in addition to the minimum insertion propagation delay specified for each model. All models are available with optional electronic control (0 to + 10 Volts) of the delay within each range. To specify electronic delay control option add suffix -ED1, -ED2, etc.
11) For externally applied DC offset option suffix model No. by -OS.
12) For monitor option add suffix -M.
13) SHV and MHV output connectors can also be provided. To specify, suffix model No. by -SHV or -MHV as required.



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