AVTECH ELECTROSYSTEMS LTD.

NANOSECOND WAVEFORM ELECTRONICS
SINCE 1975

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INSTRUCTIONS

MODEL AV-155C-C-P-AB1

0 to 5 AMP, 0 to +25 V, 10 μs RISE TIME

DUAL CHANNEL
PULSED CONSTANT CURRENT GENERATOR

SERIAL NUMBER: _____

WARRANTY

Avtech Electrosystems Ltd. warrants products of its manufacture to be free from defects in material and workmanship under conditions of normal use. If, within one year after delivery to the original owner, and after prepaid return by the original owner, this Avtech product is found to be defective, Avtech shall at its option repair or replace said defective item. This warranty does not apply to units which have been dissembled, modified or subjected to conditions exceeding the applicable specifications or ratings. This warranty is the extent of the obligation assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

TECHNICAL SUPPORT

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INTRODUCTION

The Model AV-155C-C-P-AB1 pulsed constant current generator is capable of producing two channels of rectangular pulses with amplitudes as high as 5 Amperes into load voltages up to 25V, with < 10 μs rise and fall times. The instrument can be triggered either by a manual pushbutton or by an external TTL trigger pulse. The maximum duty cycle is 10%.

This instrument has two output channels. The pulses on one channel may be delayed up to 999.9ms with respect to the pulses on the other channel. An additional delay, common to both channels, of 0 to 9.9 ms may also be added.

The Model AV-155C-C-P-AB1 pulse generator is a current pulser. The current amplitude is largely independent of the load voltage. For proper operation, the load voltage ($V_{LOAD} = I_{LOAD} \times R_{LOAD}$) must lie in the range of 0 to +25V. A "Load Limit Warning" indicator will light if the load voltage exceeds 25V.

The AV-155C-C-P-AB1 features a STANDBY/ARMED pushbutton safety feature for each channel. An output must be in the armed state before it will produce a current pulse in response to a trigger. After provide a single pulse, the output will revert to the standby state and the STANDBY/ARMED pushbutton must be pressed again to allow the next pulse.

SPECIFICATIONS

Model:	AV-155C-C-P-AB1
Channels:	Two
Amplitude:	0 to +5 Amperes, for load voltages of 0 to +25 Volts
Pulse width:	0.0 to 9.9 ms
Rise time:	≤ 10 us
Fall time:	≤ 10 us
PRF:	0 to 1 Hz
Max. duty cycle:	10%
Output current regulation:	≤ 1% for load change from 25V to 0V
Trigger required: (external trigger mode)	+5 Volt, 50 ns or wider (TTL)
Monitor output:	Provides an attenuated coincident replica of the main output current pulse. $V_{MON} = I_{LOAD} \times 0.1\ \Omega$
Inter-channel delay:	0 to ±999.9 ms
Common delay:	0 to ±9.9 ms
Tolerances:	±2% accuracy for inter-channel delay, pulse width, and amplitude settings. Calibration is adjustable with internally-accessible trimpots.
Output protection:	Protection against reverse currents, short circuits, and open circuits
Connectors:	Out 1, Out 2, Trigger In, M1, M2: BNC
Power, AC:	120/240 Volts (switchable) 50 - 60 Hz
Dimensions:	3.9" x 17" x 14.8"
Chassis material:	anodized aluminum, with blue plastic trim
Mounting:	Any
Temperature range:	+ 10° to + 40° C

INSTALLATION

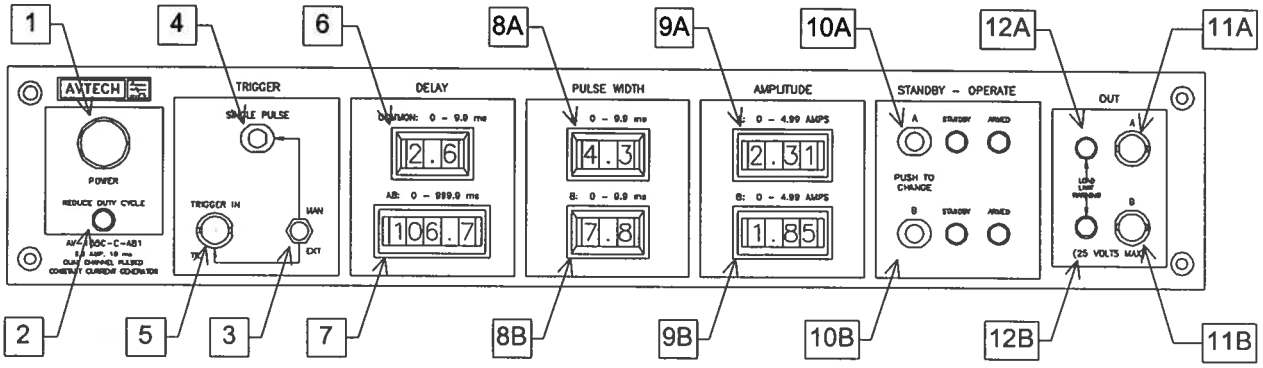
VISUAL CHECK

After unpacking the instrument, examine to ensure that it has not been damaged in shipment. Visually inspect all connectors, knobs, switches, and the handles. Confirm that a power cord and this instrumentation manual are with the instrument. If the instrument has been damaged, file a claim immediately with the company that transported the instrument.

PLUGGING IN THE INSTRUMENT

Examine the rear of the instrument. There will be a male power receptacle, a fuse holder and the edge of the power selector card visible. Confirm that the power selector is in the correct orientation - it should be marked either 120 or 240, indicating whether it expects 120V AC or 240V AC. If it is not set for the proper voltage, remove the fuse and then grasp the card with a pair of pliers and remove it. Rotate horizontally through 180 degrees. Reinstall the card and the correct fuse. In the 120V setting, a 2A slow blow fuse is required. In the 240V setting, a 1A slow blow fuse is required.

FRONT PANEL CONTROLS



1. POWER Switch. The POWER push button switch applies AC prime power to the primaries of the transformer, turning the instrument on. The push button lamp (#382 type) is connected to the +15V DC supply.

2. OVERLOAD. As protection against damage that can occur if the instrument is operated at excessive duty cycles, an automatic overload circuit exists, which controls the front panel overload light. If the internal power supply is overloaded due to improper operation, the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation.

   The overload indicator may come on briefly at startup. This is not a cause for concern.

3. MAN/EXT SWITCH. This switch controls the trigger source for the instrument. If the switch is in the MAN position, the instrument is triggered when the SINGLE PULSE pushbutton is pressed. In the EXT position, the instrument is triggered by a TTL-level pulse applied to the TRIGGER IN connector.

4. SINGLE PULSE. This pushbutton can be used to trigger the instrument when the MAN/EXT switch is set to the MAN position.

5. TRIGGER IN CONNECTOR. When the MAN/EXT switch is in the EXT position, the instrument can be triggered by a TTL-level pulse applied to this connector. The pulse must be at least 50 ns wide.

6. COMMON DELAY THUMBWHEEL. This thumbwheel control allows the output pulses to be delayed relative to the trigger pulse by 0.0 to 9.9 ms. Both output channels are delayed by the same amount.

7. AB DELAY THUMBWHEEL. The output pulse on the B channel will be delayed relative to the output pulse on the A channel by the amount set by this thumbwheel control. The AB delay can be set between 0.0 and 999.9 ms.

8. PULSE WIDTH THUMBWHEELS. These thumbwheel controls set the pulse widths on the A and B channels. They may vary from 0.0 to 9.9 ms.

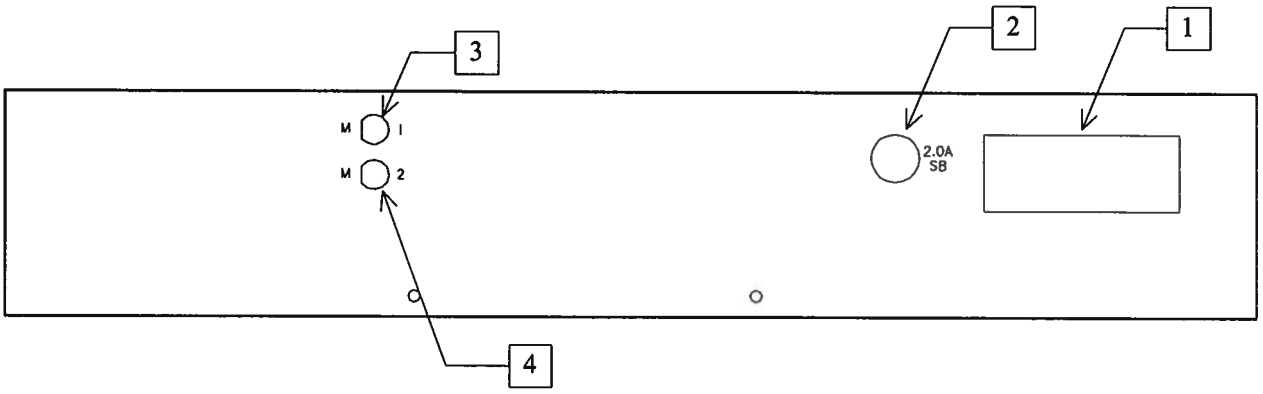
9. AMPLITUDE THUMBWHEELS. These thumbwheel controls set the output current amplitude on the A and B channels. They may vary from 0.00 to 5.11A. Settings higher than 5.11A will result in zero amplitude.

10. STANDBY/ARMED SWITCH AND INDICATORS. The A and B outputs will not produce an output unless the respective red ARMED indicator is lit. To toggle between the STANDBY and ARMED modes, press the A or B pushbutton. The two channels have independent controls. When an output is in the STANDBY state, it is shorted to ground with a relay.

11. OUT A and B CONNECTORS. The A and B outputs are the main outputs.

12. LOAD LIMIT WARNING INDICATORS. If the load voltage on the A or B output exceeds 25V, the associated indicator will light. In this case, the load voltage should be reduced either by reducing the output amplitude or by reducing the load resistance.

REAR PANEL CONTROLS



1. AC POWER INPUT. A three-pronged recessed male connector is provided on the back panel for AC power connection to the instrument. Also contained in this assembly is a 2.0A slow blow fuse and a removable card that can be removed and repositioned to switch between 120V AC in and 240V AC in.

2. 2.0A SB. This fuse protects the internal +35V DC power supply.

3. M 1. This is a current monitor output. This output provides a voltage waveform that is proportional to the current waveform on the Channel 1 output. The monitor relationship is: $V_{MON} = 0.1\Omega \times I_{OUT}$, for a load of > 10 kΩ. (This output is short-circuit protected.)

4. M 2. This is a current monitor output. This output provides a voltage waveform that is proportional to the current waveform on the Channel 2 output. The monitor relationship is: $V_{MON} = 0.1\Omega \times I_{OUT}$, for a load of > 10 kΩ. (This output is short-circuit protected.)

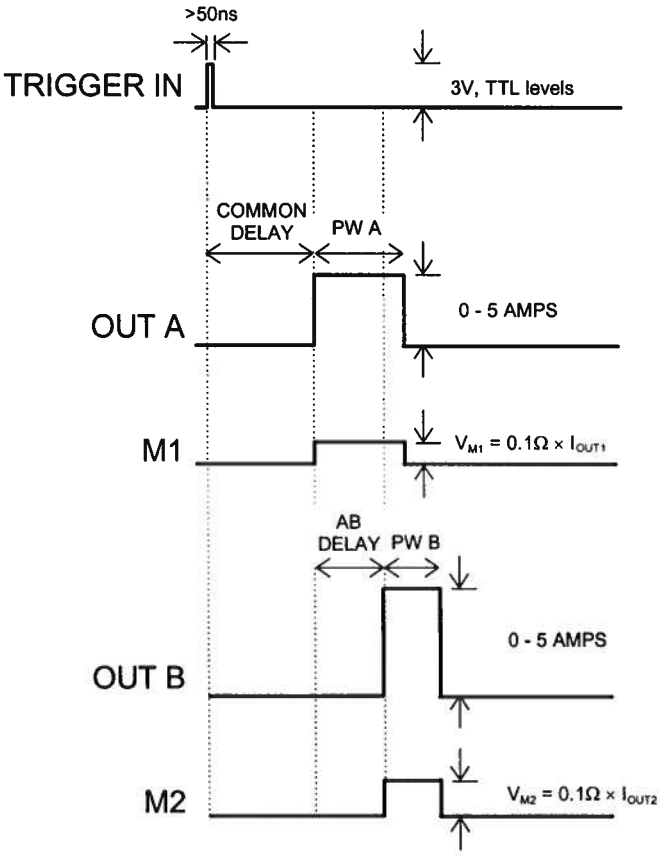
GENERAL INFORMATION

BASIC PULSE CONTROL

This instrument can be triggered by the front-panel "SINGLE PULSE" pushbutton or an external TTL trigger signal. In either case, four output channels respond to the trigger: OUT1, OUT2, M1, and M2. OUT1 and OUT2 are the signals that are applied to the devices under test. Their amplitudes and pulse widths are variable. The M1 and M2 outputs are voltage waveforms that are proportional to the current waveforms on OUT1 and OUT2, respectively. $V_{M1} = 0.1\Omega \times I_{OUT1}$ and $V_{M2} = 0.1\Omega \times I_{OUT2}$ for monitor loads of > 10 kΩ.

When the AB delay is set greater than zero, the B channel will lag the A channel.

These pulses are illustrated below:



Basic Output Pulses

TRIGGER MODES

This instrument has two trigger modes:

- External Trigger: the instrument is triggered by an external TTL-level clock on the front-panel TRIGGER IN connector.

- Manual Trigger: the instrument is triggered by the front-panel "SINGLE PULSE" pushbutton.

For an output to be produced in response to a trigger, the output must be in the ARMED mode.

STANDBY/ARMED MODES

In order for an output to be produced in response to a trigger, the output must be in the ARMED mode. When an output is ARMED, the red ARMED indicator will be lit. Otherwise, the green STANDBY indicator will be lit.

When the output is in the STANDBY mode, no output is generated, and the output is short circuited to ground by a relay.

Each output will revert to the STANDBY mode after every pulse. Use the STANDBY/ARMED switch to toggle between the two modes.

AVOID EXCESS POWER DISSIPATION

To prolong the life of the output stages of the instrument, the internal power dissipation should be minimized whenever practical. The power dissipated in each of the two output stages can be calculated using:

$$P_{DISS} = (35\,\text{Volts} - V_{LOAD}) \times I_{PEAK} \times \text{Duty Cycle}$$

To minimize power dissipation, keep the current amplitude and duty cycle as low as practical. Operation into larger load resistance is preferred over operation into a low load resistance, since $V_{LOAD} = I_{PEAK} \times R_{LOAD}$.

TOP COVER REMOVAL

The top cover of the instrument may be removed by removing the four Phillips screws on the top panel. With these four screws removed, the top panel may be slid off by pulling it towards the rear.

The instrument should not be accessed internally unless it has been turned off for several minutes, to allow all internal capacitors to discharge. The internal capacitor bank stores a considerable amount of energy.

RACK MOUNTING

A rack mounting kit is available. The -R5 rack mount kit may be installed after first removing the one Phillips screw on the side panel adjacent to the front handle.

LOAD PROTECTION

LENZ'S LAW AND INDUCTIVE VOLTAGE SPIKES

This instrument is designed to pulse resistive and diode loads and will exhibit a large output spike when used to drive a load with significant inductance (as predicted by LENZ'S LAW). For this reason the load should be connected to the output using low inductance leads (as short as possible and as heavy a gauge as possible).

The voltage developed across an inductance L (in Henries), when the current is changing at a rate given by dI_{LOAD}/dt (in Amps/sec), is: $V_{SPIKE} = L\frac{dI_{LOAD}}{dt}$.

OUTPUT ON/OFF

The main outputs may be switched on and off using the front-panel STANDBY/ARMED controls. See the previous section for a description of this feature.

ATTACHING AND DETACHING LOADS

To avoid damaging the loads connected to main outputs, the loads should only be connected to or removed from the instrument when:

- the instrument is off
- the instrument in on, but the outputs are in the STANDBY condition

Do not connect loads when the instrument is on and the outputs are armed. This can cause mild sparking.

CHANGING PARAMETERS WHEN A LOAD IS ATTACHED

If your load is easily damaged, the outputs should be in STANDBY mode when changing the trigger source, pulse width, or other pulse parameters. This protects the loads from possible short transient effects.

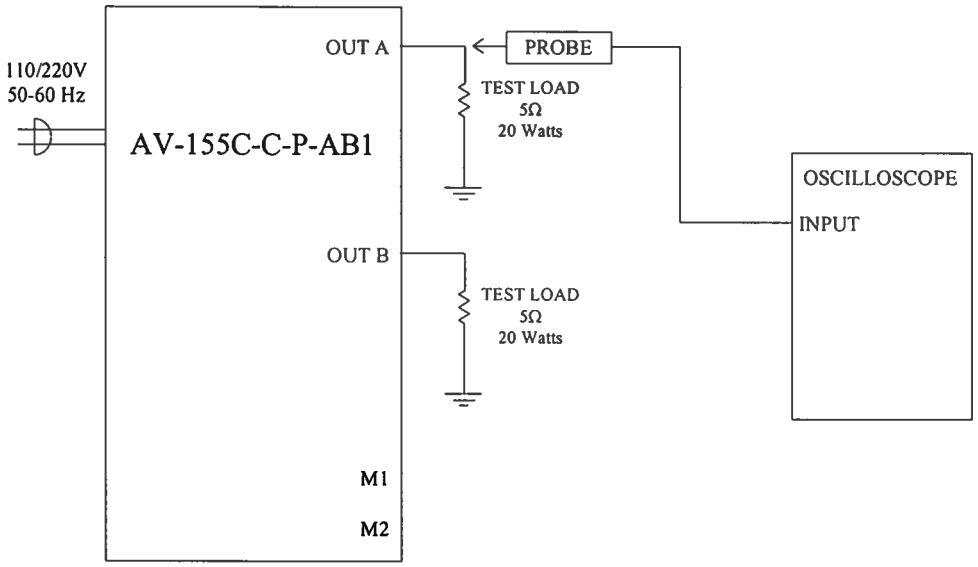
OPEN AND SHORT CIRCUITS

The AV-155C-C-P-AB1 will operate properly into a short circuit to ground.

Operation into an open circuit will not damage the instrument in any way.

OPERATIONAL CHECK

This section describes a sequence to confirm the basic operation of the instrument. It should be performed after receiving the instrument. It is a useful learning exercise as well.



Basic Test Arrangement

1) Connect a 20W, 5Ω test load between the OUT A connector and ground.

2) Connect a 20W, 5Ω test load between the OUT B connector and ground.

3) Set the oscilloscope to trigger internally. Set the oscilloscope to trigger normally, rather than automatically.

4) Connect an oscilloscope probe to the OUT A load. Set the vertical scale to 10 V/div, and the horizontal scale to 10 ms/div.

5) Turn on the AV-155C-C-P-AB1. Allow the instrument to warm up for 30 seconds.

6) Set the MAN/EXT switch to the MAN position.

7) Set the common delay thumbwheel to 0.0 ms.

8) Set the AB delay thumbwheel to 000.0 ms.

9) Set the A pulse width thumbwheel to 5.0 ms, and the B pulse width thumbwheel to 9.9 ms.

10) Set the A amplitude thumbwheel to 5.00A, and the B amplitude thumbwheel to 3.00A.

11) Both the A and B STANDBY indicators should be lit. Press the A-channel STANDBY/ARMED switch, so that the A-channel ARMED indicator is lit, and the STANDBY indicator is off.

12) While observing the oscilloscope, press the SINGLE PULSE pushbutton. A 25V (5.00A × 5Ω), 5 ms wide pulse should appear on the oscilloscope.

13) Move the probe to the M1 output, and set the oscilloscope vertical scale to 200 mV/div.

14) Press the A-channel STANDBY/ARMED switch, so that the A-channel ARMED indicator is lit, and the STANDBY indicator is off.

15) While observing the oscilloscope, press the SINGLE PULSE pushbutton. A 500 mV (5.00A × 100mV/A), 5 ms wide pulse should appear on the oscilloscope.

16) Move the probe to the OUT B output, and set the oscilloscope vertical scale to 10 V/div.

17) Press the B-channel STANDBY/ARMED switch, so that the B-channel ARMED indicator is lit, and the STANDBY indicator is off.

18) While observing the oscilloscope, press the SINGLE PULSE pushbutton. A 15V (3.00A × 5Ω), 9.9 ms wide pulse should appear on the oscilloscope.

19) Move the probe to the M2 output, and set the oscilloscope vertical scale to 200 mV/div.

20) Press the B-channel STANDBY/ARMED switch, so that the B-channel ARMED indicator is lit, and the STANDBY indicator is off.

21) While observing the oscilloscope, press the SINGLE PULSE pushbutton. A 300 mV (33.00A × 100mV/A), 9.9 ms wide pulse should appear on the oscilloscope.

22) This completes the operational check.

If additional assistance is required:

Tel: (613) 226-5772, Fax: (613) 226-2802
Email: info@avtechpulse.com

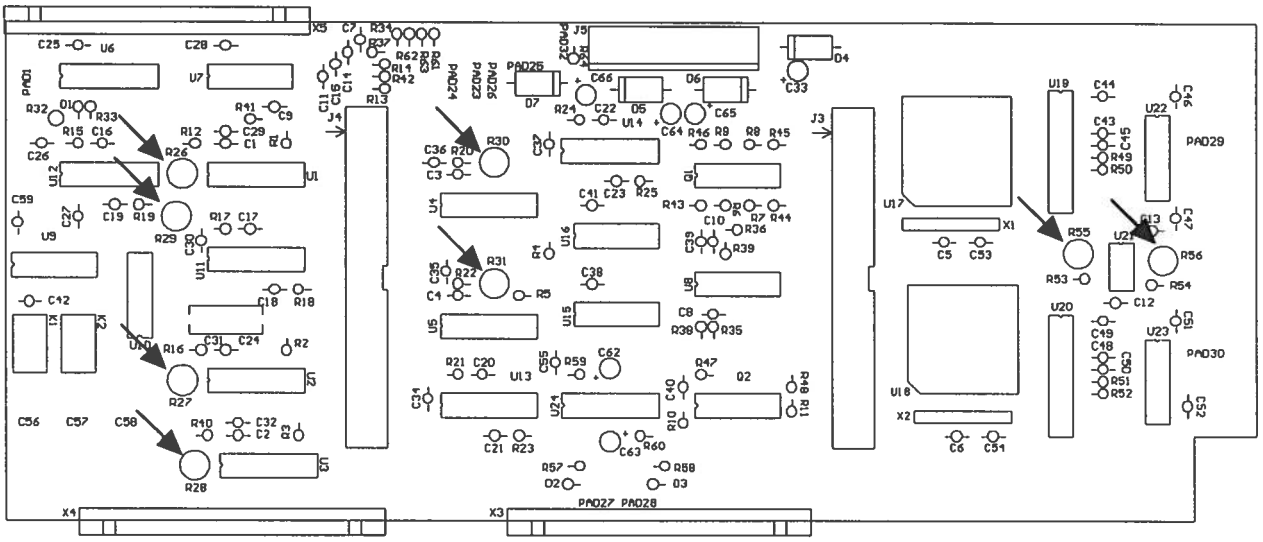
CALIBRATION ADJUSTMENTS - INTERNAL TRIMPOTS

The calibration of most of the output parameters can by adjusted using internally-accessible trimpots. There are three groups of trimpots:

1) on the main internal circuit board
2) on the "A" output module
3) on the "B" output module

MAIN CIRCUIT-BOARD TRIMPOTS

Several calibration trimpots are located on the main circuit board. These controls can be accessed by removing the top panel of the instrument, and by locating the large horizontal circuit board on the right side of the instrument.



The main circuit board contains trimpots to adjust the following parameters:

1) Common delay calibration

   Adjust trimpot R26 if the common delay step-size is not exactly 0.1 ms when the thumbwheel is adjusted.

2) AB delay calibration, step-size for 0.1 and 1 ms digits

   Adjust trimpot R28 if the AB delay step-size is not exactly 0.1ms when the lower two digits of the AB delay thumbwheel are adjusted.

3) AB delay calibration, step-size for 10 and 100 ms digits

   Adjust trimpot R27 if the AB delay step-size is not exactly 10 ms when the

upper two digits of the AB delay thumbwheel are adjusted.

4) AB delay calibration, zeroing

   Adjust trimpot R29 if the inter-channel delay is not exactly 000.0 ms when the AB delay thumbwheel is set at 000.0 ms.

5) Pulse width calibration, A and B channels

   Adjust trimpots R30 and R31 if the pulse width step-size of the A and B channels, respectively, is not exactly 0.1 ms when the thumbwheel is adjusted.

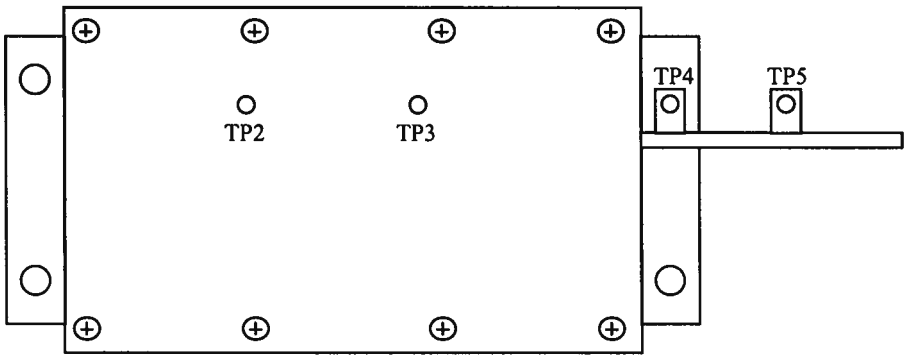
6) Amplitude calibration, A and B channels

   Adjust trimpots R55 and R55 if the amplitude step-size of the A and B channels, respectively, is not exactly 0.01 A when the thumbwheel is adjusted.

OUTPUT MODULE TRIMPOTS

Each output channel has four trimming potentiometers ("trimpots") that can be used to adjust the performance of the output channels. These trimpots are preset at the factory and should not normally require adjusting after delivery. These controls can be accessed by removing the top panel of the instrument, and by locating the two identical output-stage modules. When looking from the front of the instrument, the channel A module is on the left and the channel B module is on the right. Both are near the rear of the instrument.

The locations of the trimpots (designated TP2-TP5) for each channel are shown below. All should be accessible through the heatsinking.



Location of Trimpots

These trimpots can be used to adjust or calibrate the followings properties for each channel:

- Current offsets on the main outputs.
- Voltage offsets on the monitor outputs.
- Monitor calibration.
- Channel output impedance.

NULLING CONSTANT CURRENT OFFSETS

If a small constant current offset is observed on one of the main outputs, TP2 can be rotated to reduce it to zero. Note that the output stage is incapable of generating a negative current, due to the presence of a diode in series with the output.

NULLING CONSTANT MONITOR OFFSETS

If a small constant voltage offset is observed on one of the monitor outputs, TP5 can be rotated to reduce it to zero.

ADJUSTING OUTPUT IMPEDANCE

Ideally, the outputs of the pulsed current sources should be independent of the output voltages, within the 0 to +25V compliance voltage range. This condition represents infinite output impedance. If a load voltage/output current dependence is present, the output impedance needs to be adjusted.

To adjust the output impedance, connect a 20W, 5.0Ω load to the output to be adjusted. Set the output amplitude to 5A and observe the load voltage on an oscilloscope. The load voltage should have an amplitude of approximately 25V (i.e. 5A × 5Ω = 25V). Note the exact value. Now replace the 5.0Ω load with a 2.5Ω load. The load voltage should fall by to approximately 12.5V (i.e. 5A × 2.5Ω = 12.5V). Note the exact value. If the second voltage is not exactly one-half of the first voltage, adjust TP3 and repeat *both* measurements (5.0Ω and 2.5Ω) again. Repeat as required.

ADJUSTING MONITOR CALIBRATION

Just as the current amplitude of the main outputs can exhibit a load-voltage dependence, the voltage amplitude of the current monitors can also exhibit such a dependence if not adjusted properly.

To null out the monitor load voltage dependence, connect a 20W, 5.0Ω load to the main output to be adjusted (i.e. OUT A or OUT B). Set the output amplitude to 5A and observe the monitor voltage (i.e. M1 or M2) on an oscilloscope. The monitor voltage should have an amplitude of approximately 0.5V (i.e. 5A × 0.1 V/A = 0.5V). Note the

exact value. Now replace the 5.0Ω load with a 2.5Ω load. The monitor voltage not change, since the current amplitude has not changed (i.e. 5A × 0.1 V/A = 0.5V). Note the exact value. If the second voltage is not exactly equal to the first voltage, adjust TP4 and repeat *both* measurements (5.0Ω and 2.5Ω) again. Repeat as required.

PERFORMANCE CHECK SHEET

AVTECH ELECTROSYSTEMS LTD.
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March 3, 1997.

Clarence Rebello
Special Devices, Inc.
16830 W. Placerita Canyon Road
Newhall, CA 91321

Tel: 805-259-0753 Ext. 312
Fax: 805-254-7302

Dear Clarence:

Following our telephone conversation of March 3rd, I am pleased to enclose descriptions of two new pulsed constant current generators (Models AV-155C-C-P-AB1 and AV-156A-C) which we now offer to the air bag industry:

Model designation:	AV-155C-C-P-AB1.
Number of channels:	Two (A and B) each with separate amplitude and pulse width controls.
Delay:	Channel B may be delayed with respect to Channel A via a four-digit thumbwheel switch in the range 0.0 to 999.9 ms.
Output amplitude:	0.00 to 4.99 Amp. Controlled by a three-digit thumbwheel switch.
Output pulse width:	0.0 to 9.9 ms. Controlled by a two-digit thumbwheel switch.
Load voltage range:	0 to +25 Volts. A "Load Limit Warning" indicator will light if the output voltage exceeds 25V.
Output current regulation:	≤ 1% for load voltage change from +25 to 0 Volts.

.../2

Rise, fall time:	≤ 10 us (10 to 90%), into a resistive load.
Pulse repetition frequency:	
External trigger: (TTL)	0 to 1.0 Hz. A protective diode clamp limits the input voltage to between -0.7V and +7.0V.
External trigger: (manual)	0 to 1.0 Hz. Manual push button for single pulse operation (push button is rated for 5 million operations).
Maximum duty cycle:	10%.
	Automatic overload function protects instrument and lights the "Reduce Duty Cycle" indicator if maximum duty cycle is exceeded due to excessively fast triggering or internal failure.
External trigger:	TTL, PW ≥ 50 ns.
Standby mode:	Each channel can be switched between ARMED and STANDBY modes by pushing a push button switch (the push button is rated for 5 million operations). After each pulse or instrument start-up, the channel will go into standby mode (standby mode disables triggering and shorts the output to ground).
Monitor outputs:	Each channel provides a monitor output, which monitors the voltage drop across a 0.5 Ohm resistor in series with the current output (eg. a 5A pulse will produce a 2.5V pulse on the monitor output).
Output protection:	The output protection will prevent reverse currents (due to accidentally connecting the A and B inputs together) and will protect against open circuits. The current monitor will accurately reflect these zero-current conditions.

.../3

Tolerances:	±2% accuracy on delay AB, pulse width and amplitude controls. ±2% accuracy on monitor output. Each of these controls and the monitor outputs will have user-accessible trimpots inside the instrument to allow for more accurate calibration.
Dimensions: (H x W x D)	100 mm x 430 mm x 375 mm (3.9" x 17" x 14.8").
Face plate:	See attached drawing.
Chassis material:	Aluminum. Anodized aluminum front panel with cast aluminum side panels (with gray plastic trim) and aluminum top and bottom panels with gray plastic trim (chassis is as per our Model AV-1010-C).
Connectors:	BNC. Note that this special purpose unit does not include the AV-LZ output line as per the standard AV-155C-C.
Rack mounting:	Includes -R5 rack mount kit for 19" rack mounting.
Prime power:	120/240V, 50-60 Hz.
Price:	First unit: $4,998.00 US Second unit: $4,498.00 US Third unit: $3,998.00 US
FOB:	Destination.
Delivery:	60 days ARO.

Model AV-156A-C is described in the enclosed new product announcement. Many of the specifications for Model AV-156A-C and AV-155C-C-AB1 can be modified to suit a particular application. These models employ different technology than the AVO-7E-C unit which you currently have and so are free of drift and slope problems.

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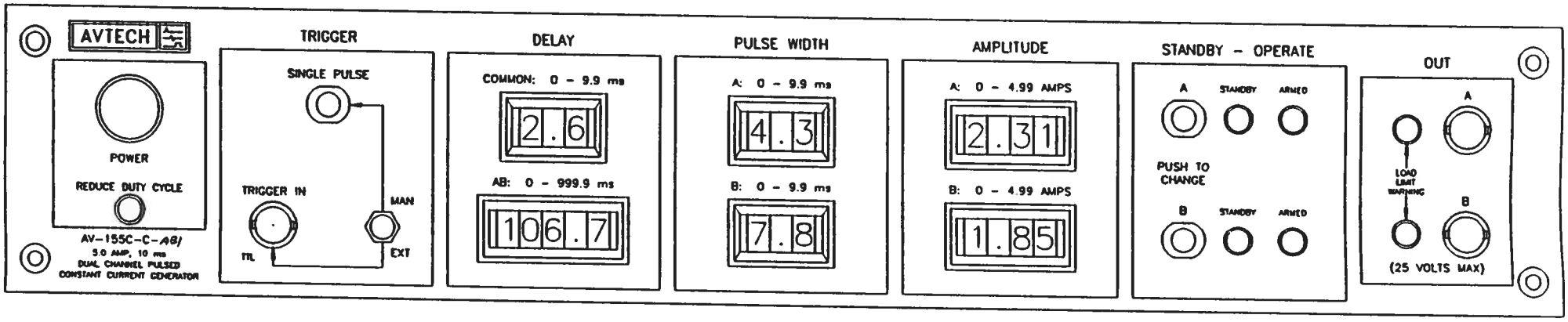
Please call me (1-800-265-6681) if either of these new models are of interest to you.

I am enclosing a copy of our new Constant Current Application Note (No. 4).

Yours truly,

Dr. Walter Chudobiak
Chief Engineer

WC:pr
Encl. AV-156A-C New Product Announcement
AV-156A-C Photo
Application Note No. 4
AV-155C-C-AB1 Diagram


AVTECH
POWER
REDUCE DUTY CYCLE
AV-155C-C-AB1
3.0 AMP, 10 ms
DUAL CHANNEL PULSED
CONSTANT CURRENT GENERATOR
TRIGGER
SINGLE PULSE
TRIGGER IN
MAN
TTL
EXT
DELAY
COMMON: 0 - 9.9 ms
2.6
AB: 0 - 999.9 ms
106.7
PULSE WIDTH
A: 0 - 9.9 ms
4.3
B: 0 - 9.9 ms
7.8
AMPLITUDE
A: 0 - 4.99 AMPS
2.31
B: 0 - 4.99 AMPS
1.85
STANDBY - OPERATE
A
STANDBY
ARMED
PUSH TO CHANGE
B
STANDBY
ARMED
OUT
A
LOAD LIMIT WARNING
B
(25 VOLTS MAX)

NEW PRODUCT ANNOUNCEMENT

AV-156A-C

PULSED CONSTANT-CURRENT GENERATOR

Avtech Electrosystems is pleased to introduce the AV-156A-C pulsed constant-current generator which was designed for a wide variety of component testing applications ranging from laser diode driving, semiconductor device characterization, air bag squib testing, fuse testing and electromigration studies. This unique instrument will provide a 3 us rise time, pulsed outputs variable from 0 to 5 Amperes with a compliance voltage rating of 15 Volts at pulse widths to 10 ms and frequencies to 10 kHz. The frequency, amplitude, DC offset, pulse width and delay are all controlled by front panel dials and range switches. The unit may also be triggered externally by a TTL pulse with pulse width control via the front panel controls or by the input pulse width. An output current monitor is included as a standard feature.

Model AV-156A-C may also be used as a linear, DC-coupled, voltage to current amplifier where $I_{OUT} = K \times V_{IN}$ and the output signal's shape, frequency, DC bias and amplitude are all controlled by the input signal.

Model AV-156A-C complements the AV-155-C series which consists of three lower current (and higher frequency) models.

Model AV-156A-C is housed in a 3.9" x 8.5" x 14.8" chassis with BNC connectors and requires 120/240V (switchable), 50-60 Hz prime power.

Price and delivery: $2,495.00 US, FOB Destination
4 weeks ARO

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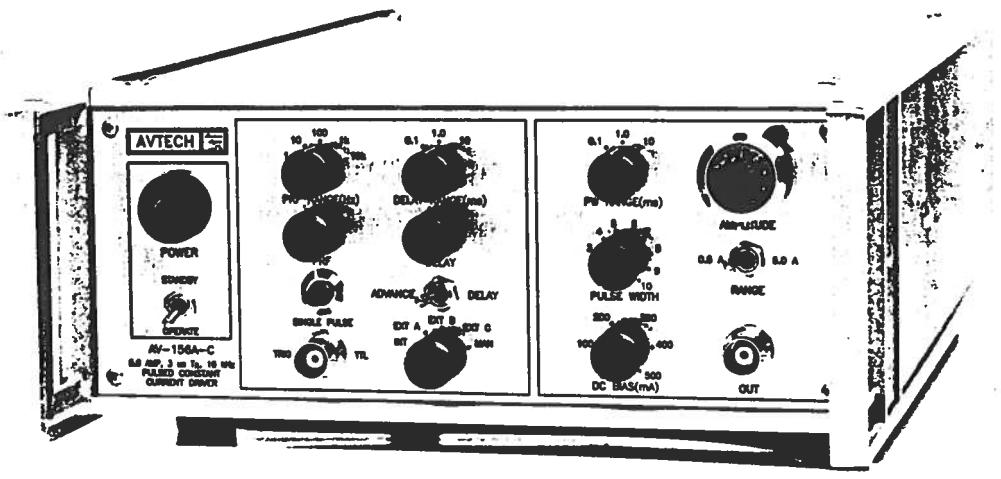
AVTECH
POWER
STANDBY
OPERATE
AV-156A-C
PULSED CONSTANT CURRENT DRIVER
SINGLE PULSE
TRIG
TTL
ADVANCE
DELAY
PULSE WIDTH
AMPLITUDE
RANGE
DC BIAS(mA)
OUT

March 23/97
Michael did this set in Word