REVISIONS							
DCN	LTR	DESCRIPTION	DATE	CHANGED	CHECKED	APPROVED	
	1	PRELIMINARY	200504	SA			
	2	PRELIMINARY	200505	TC			
	A	RELEASED FOR PRODUCTION	200924	SWR			

FILENAME								1	SHT
20-098A.docx								A	REV

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LEAD APPROVAL	DATE	FINAL APPROVAL	DATE
M. MORALES	200924	E. KOSCHMANN	200924

TOLERANCES

DECIMAL
.XX = N/A
.XXX = N/A

TITLE

OPERATING MANUAL
MODEL 8212A-1

ANGULAR
X = N/A

SCALE N / A	SIZE A	FSCM 61651	SHEET 1 OF 6	DRAWING NUMBER 20-098	REV A

Operating Manual Model 8212A-1

WARNINGS:

This equipment must only be operated by qualified personnel.
This device produces 2 kV high voltage pulses. Normal precautions for working with high voltage
must be followed. Improper use of this device may cause injury or death.
There are no user serviceable parts in the driver.

DESCRIPTION:

The *Model 8212A-1* Pockels Cell/Shutter Driver is designed for high repetition rate, pulsed applications.
Solid-state MOSFET technology is used, giving excellent trigger noise immunity and a smooth output
waveform. This technique eliminates common problems associated with avalanche, and transformer driv-
ers. The *Model 8212A* has a rise and fall time of less than 7 ns at output voltages up to 2.0 kV and can
operate at repetition rates up to 50 kHz with no additional cooling required. Much higher repetition rates
are possible with appropriate cooling methods.

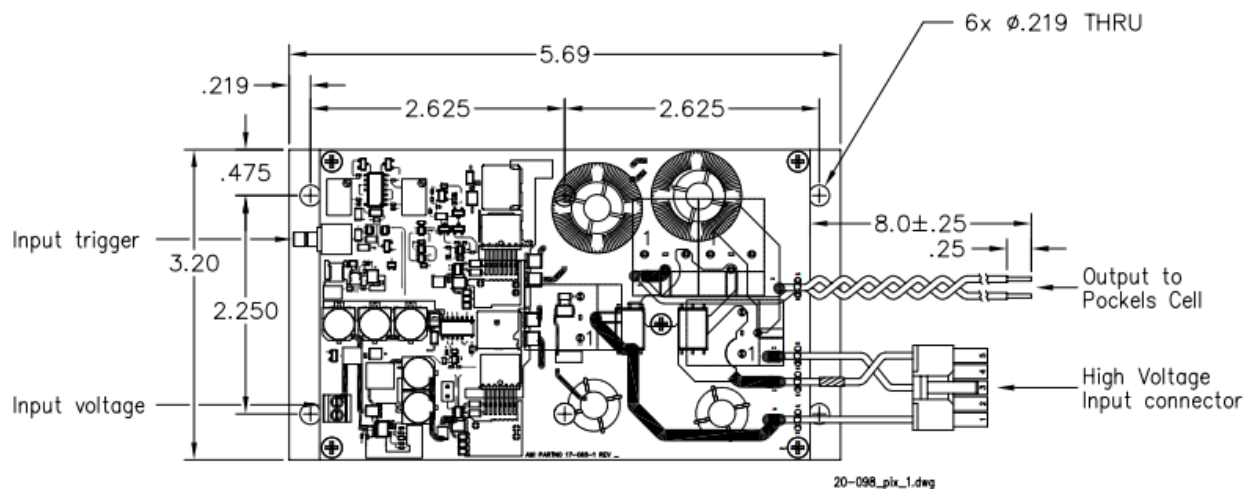Figure 1 below shows a top view of the unit and Table 1 shows the input/output connections.

Figure 1

CONNECTIONS:	
Power:	2-Pin Screw Terminal Block (Molex P/N 39357-0002)
Trigger:	SMB Jack Receptacle
External High Voltage Input:	6.0" $\pm$ 0.5" Cable Assembly with Molex P/N 39-01-4051
High Voltage Output:	8.0" $\pm$ 0.25" Flying Leads
TEMPERATURE:	-40ºC to +70ºC Operating; -40ºC to +85ºC Storage
SIZE:	*5.69" x 3.20" x 2.27"*
WEIGHT:	13.5 oz.
RoHS COMPLIANCE	The 8212A-1 is not classified as electrical or electronic equipment (EEE) under Directive 2011/65/EU per Article 3 Point 1 as the maximum output voltage of this product exceeds 1500 VDC.

Table 1

How to use the 8212A-1:

To operate Model 8212A-1 the following equipment are needed

- 24 V Power Supply rated at 1 Amp
- ±1 kV Variable Power Supply with the correct power rating. AMI Model 533 or equivalent
- Trigger Pulse source
- Pockels Cell load

  Any oscilloscope measurements performed at the output should be done differentially with HV rated probes. Ex: LeCroy PPE 6Kv, 1000:1 with 50 Meg, 6 pf impedance. Keep in mind that the probe capacitance will be added to the load. **DO NOT** connect a probe to or load only one output of the driver. Doing so will result in an excessive voltage being generated in one polarity and may damage output FETs. If the actual high voltage output must be measured, the proper method includes using two high impedance probes, as suggested above. Connect one probe to one contact of the Pockels cell and the second probe the other contact of the Pockels cell. The ground leads of two probes should be connected together. The HV output pulses can be observed using the subtract function of the oscilloscope.

IMPORTANT NOTE:
**The potentiometers on the board are only for factory adjustment and are sealed.
Any adjustment of these potentiometers by the user could cause irreversible damage to the unit and will void the warranty**

How to connect and start the 8212A-1:

Model 8212A-1 requires a +24 V power supply. The connector and polarity are shown in Figure 2 below:
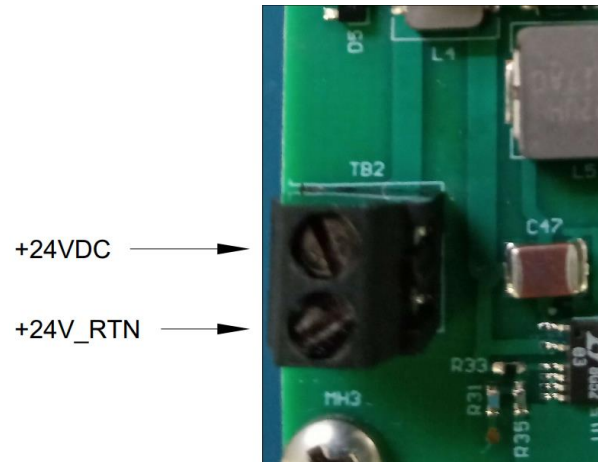

+24VDC ————▶

+24V_RTN ————▶

Figure 2

The input trigger signal is applied via the SMB jack receptacle shown in Figure 3. The trigger input requires a 5 V signal with a minimum pulse width of 200 ns. The input impedance is 50 Ohms. The output pulse will follow the input trigger pulsewidth.
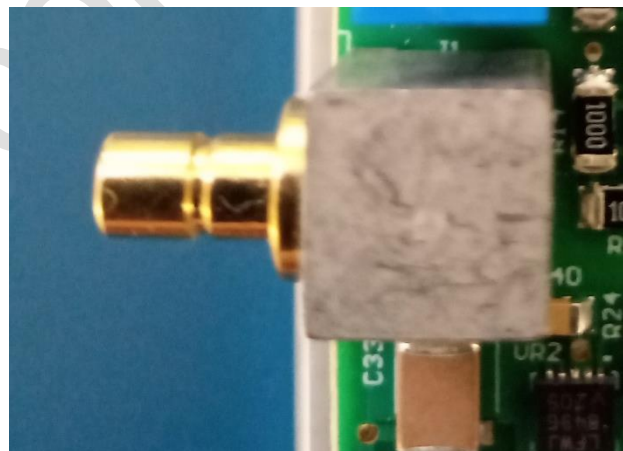

Figure 3

The High Voltage input is applied via the Molex Connector. This connector is compatible with AMI High Voltage Power Supply 533.

The outputs to the load are flying leads. Always run these leads close together or twisted for inductance cancellation. The negative lea is indicated with a black piece of heatshrink.
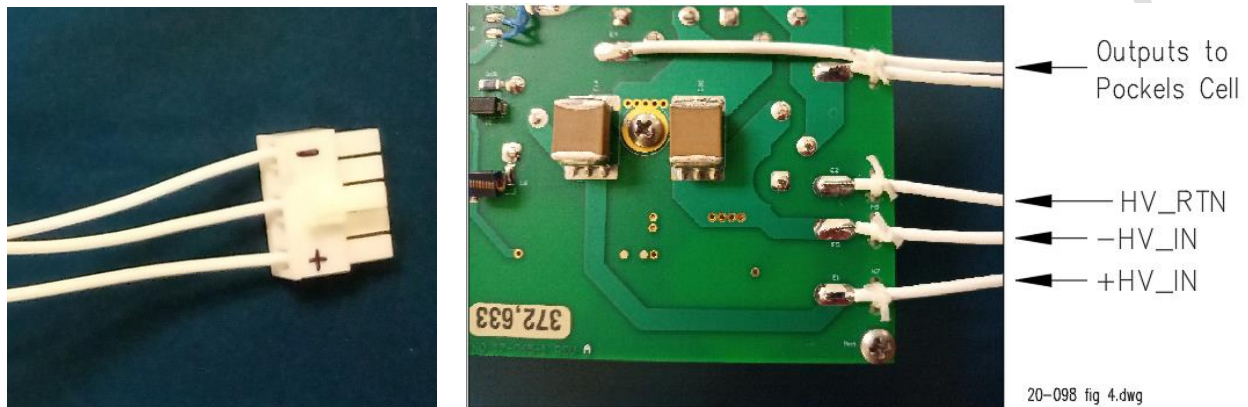

Figure 4

Model 8212A-1 Power Startup Sequence:

To correctly operate Model 8212A-1, the following start-up sequence must be followed:

Power Up

Step 1   With the high voltage source disabled, apply the 24 V input source
Step 2   Enable high voltage and set to the required level
Step 3   Apply trigger pulse

Power Down

Step 1   Remove trigger pulse
Step 2   Disable high voltage
Step 3   Turn off 24 V power supply

Model 8212A-1 High Voltage Output and Heat Sinking:

The oscilloscope screen shot below shows a typical output voltage waveform of the 8212A.
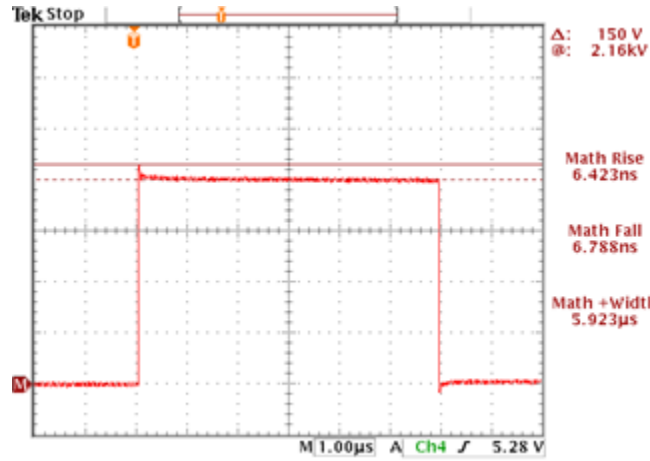

Figure 5

Figure 6 below represents the output of the unit operating at 2 kV and 200 kHz on a heatsink with forced air cooling with a 5 pf load.
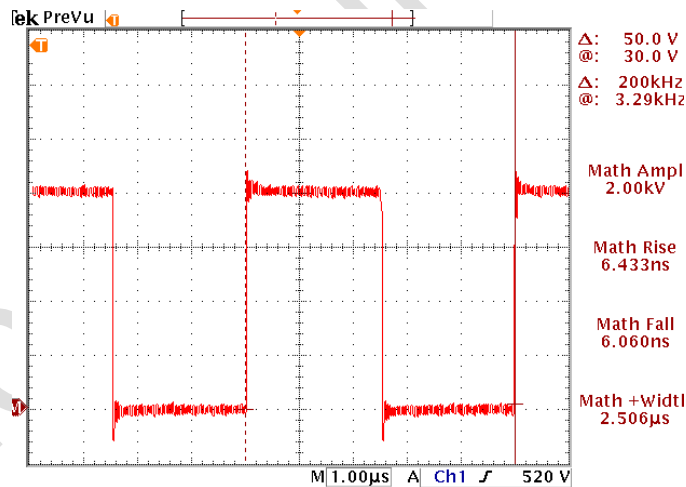

Figure 6

Heatsinking:

Model 8212A-1 can operate up to 50 kHz without additional cooling. For higher repetition rates additional heatsinking is required. Chart 1 below shows the input power required at a particular operating frequency with no heatsink or forced air cooling added for 1500 V and 2000 V outputs. Chart 2 shows the temperature in the power semiconductor devices vs frequency. The mosfets case temperature was limited at 90°C. For repetition rates beyond the ones presented in the graphs proper heatsinking will be required. Consult AMI if a custom heatsink design is needed
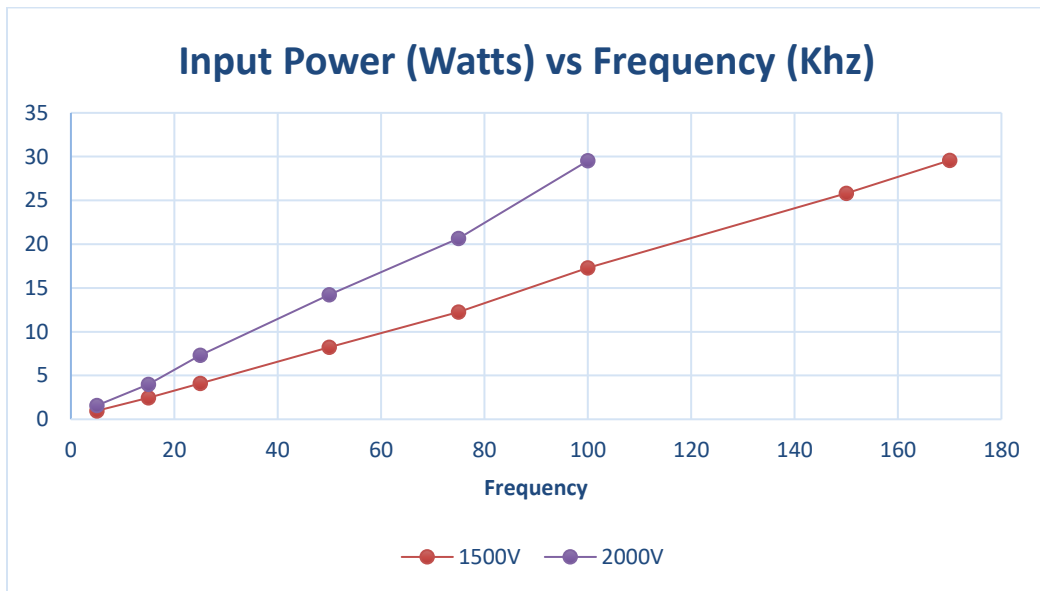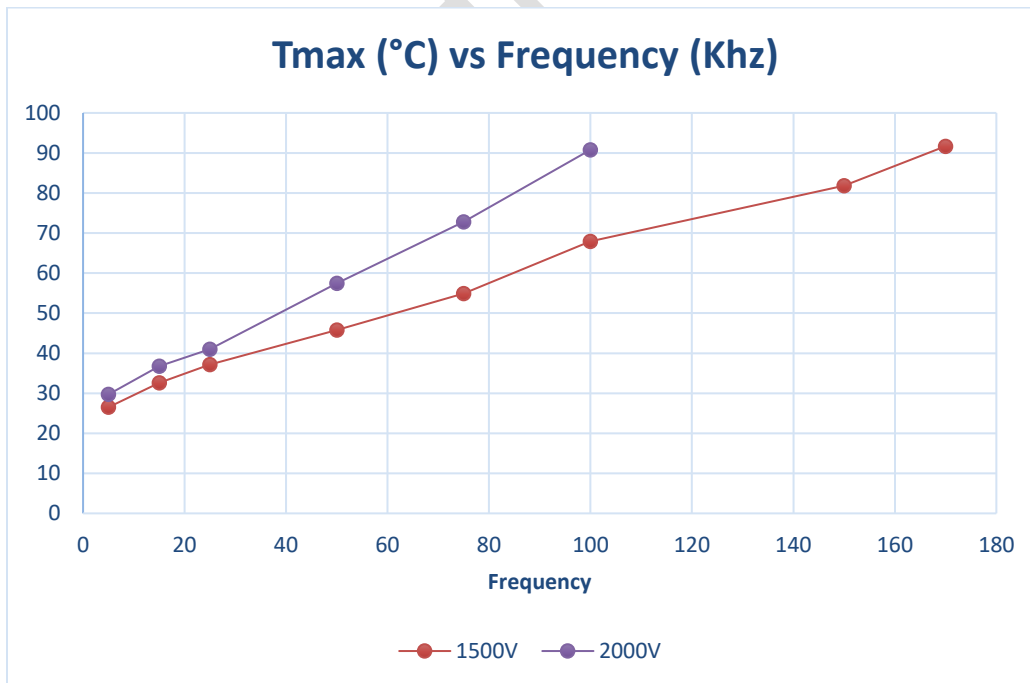

Chart 1

Chart 2