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## G-9694 B SOLID STATE AC/DC ISOLATION RELAYS INSTRUCTION INFORMATION

### GENERAL DESCRIPTION

The Solid-State AC/DC Contact Multiplier, model G-9694B, is a two KYZ input, two outputs per input pulse, contact multiplier. The unit is powered from 120/220/277Vac and has red and green LED indicators per input to show contact activity. The G-9694B is designed with the kWh and kVar installation in mind, with one input for each. The inputs may be driven from the same KYZ pulse and form a one input, 4 output multiplier. The unit comes either mounted in a NEMA-rated enclosure or panel-board mounted with a clear cover.



### INSTALLATION

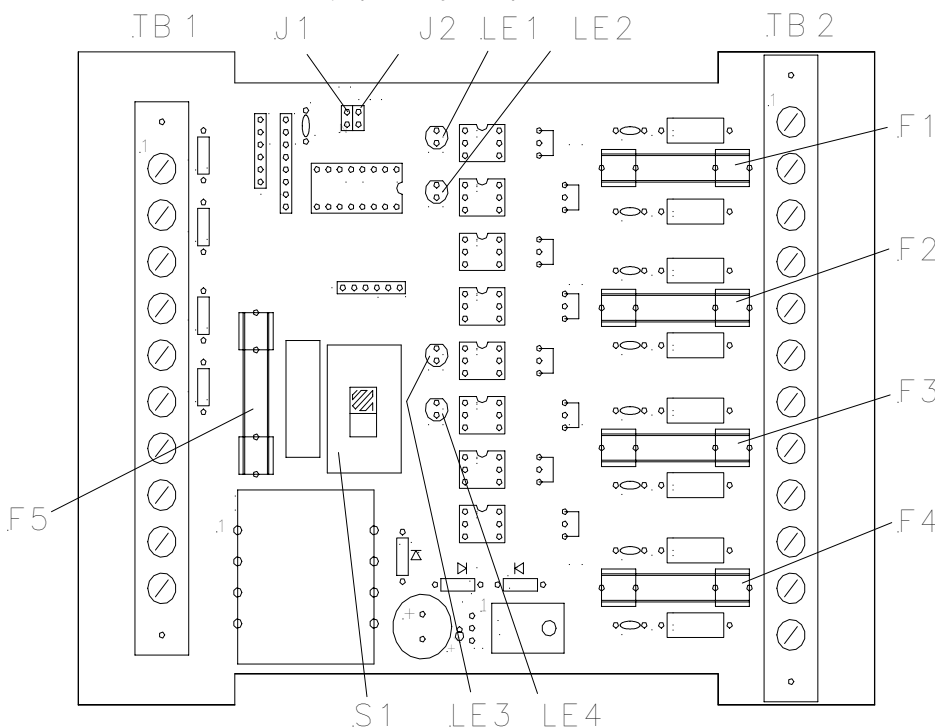
#### Power Connections:

For 115/230Vac installations the line is connected to terminal 7 of TB1 and is labeled "L". S1 must be placed in the ap-

propriate position 115Vac or 230Vac for the system voltage. The neutral is then connected to terminal 8 of TB1 and is labeled "N." For 277Vac system voltages, the line side of the power is moved to terminal 9 of TB1 and is labeled "277V".

S1 must be on the 230Vac setting for proper operation. The chassis connection at terminal 10 of TB1 labeled "CHASSIS" is for the contact in protection circuitry and must be taken to a good ground. The 1/8 Amp fuse, F5, is the power input protection fuse.

*Simplified layout of the G-9694B*

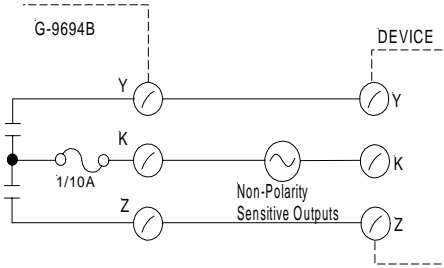


#### Contact Input Connections:

The K-lead of the KYZ contact input is powered by the internal supply of the G-9694B and has a +15Vdc level. If the contact initiator device is polarity sensitive, pay particular attention to this polarity. If the contact initiator is a Form-C device having both a "Y" and a "Z" leg, connect them in the proper position for each input as shown in Table 1. For Form-C inputs, J1 and J2 should be open. If the input devices are only Form-A, the positive side will connect to the K-lead and the remaining side to the Y inputs. J1 and J2 must then be installed. Note that J1 is for Input #1 and J2 is for Input #2. This clearly indicates that each input is separate and that one could be a Form-A input and the other a Form-C input. Once the connections have been made activity on the inputs can be seen by LED activity, LE1 and LE2 for Input #1 and LE3 and LE4 for Input #2.

**Contact Output Connections:**

The output OPTO-MOS relays for each input are protected by way of a 1/10A fuse in the K-lead of each set. The drive for the devices is shown in Figure 1 with the proper connections made according to Table 1. Note that the OPTO-MOS relays are rated for 100ma continuous load current, AC/DC configuration 100 ma and DC configuration 180ma. The 1/10 Amp fuse gives a slight safety margin for voltage levels up to 350V.



**FIGURE 1**

**SPECIFICATIONS:**

**WEIGHT:** 18 oz. without NEMA-rated enclosure or cover.

**SIZE:** 6.75"L x 7"W x 3"H, minus safety cover

**PANEL MOUNTING HOLES:**  
2 Holes on vertical center spaced 6.25".

**TEMPERATURE RANGE:** -20° to +70°C.

**POWER INPUT:**  
100-130Vac (115Vac), 200-260Vac (230Vac), and 250-300Vac (277Vac).  
Burden is less than 2 watts, 50/60Hz.

**CONTACT INPUTS:**  
Form-C or Form-A, Maximum Keying Rate is 20 pulses per second.  
Transient protected above 20Vrms.  
Wetted from internal 15Vdc source

**OPTO-MOS Relay OUTPUTS:**  
Form-C, current limited to 100ma, Rated 350V, maximum peak load current for 10ms is 350 ma. Arc suppression applied.

**INPUT/OUTPUT ISOLATION:**  
3750Vrms.

**OPERATIONAL LIFE EXPECTANCY:**  
As long as the life expectancy of the electrolytic capacitors in the on-board power supply.

**SCREW TERMINAL SIZE:**  
6-32 Screw accommodating up to 0.3" lug for #14 AWG wire.

**TABLE 1**

INPUT	K	Y	Z	LED#	OUTPUT	K	Y	Z	FUSE				
#1	TB1-2	TB1-1	TB1-3	LE1	#1	TB2-2	TB2-1	TB2-3	F1				
				LE2									
#2	TB1-5	TB1-4	TB1-6	LE3	#2	TB2-5	TB2-4	TB2-6	F2				
				LE4									
				#3						TB2-8	TB2-7	TB2-9	F3

**THEORY OF OPERATION:**

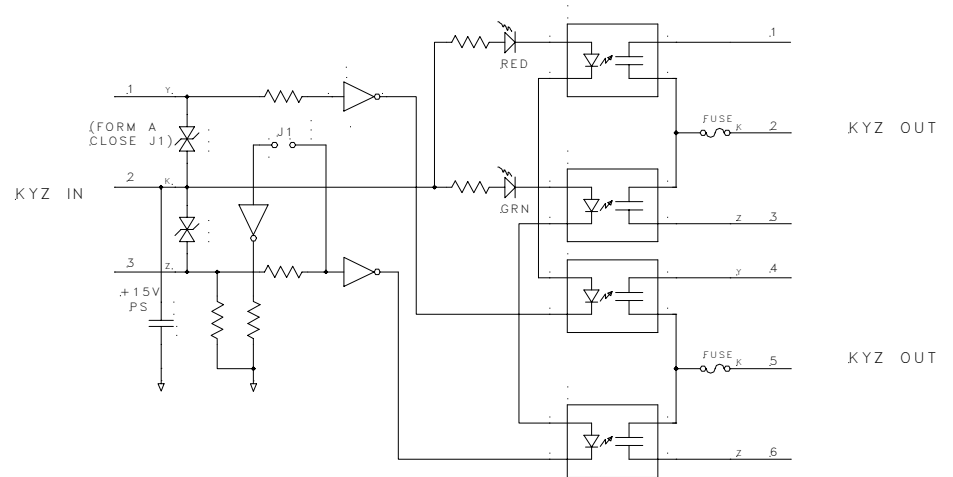
Form-C inputs into the Solid-State AC powered contact multiplier drive the solid state relay-pairs in opposing directions when either input contact is closed. When KY input is closed, the inverter U-9 drives U-1 and U-3 on (low). Conduction through the optocouplers of U-1 and U-3 will close output relay section of U-1 and U-3. When the K-Z input is shorted, the inverter drives U-2 and U-4 on (low) closing U-2 and U-4 relay sections giving K-Z outputs. This Form-C mode is with J1 and J2 Open.

In Form-A mode (J-1 and J-2 installed) K-Z input is not used. When K-Y input is open, U-2 and U4 are driven on (low) by the inverter through jumpers J-1 and J-2. When K-Y input is shorted (closed) U2 and U4 are driven off (high) by the inverter through the jumpers and U1 and U3 are driven on (low).

**TESTING AND CALIBRATION:**

To properly test the Solid-State AC/DC Contact Multiplier, model G-9694B, apply each system voltage and measure pin 1 (square pad on circuit board) of VR1. This voltage should be greater than 18Vdc but less than 22 Vdc.

With a system voltage of 115Vac connect a Form-C contact across each input. Check to see that LE1 through LE4 are changing from green to red at the contact rate. Check the output of each OPTO-MOS relay pair by switching 120V into either an LED or lamp. A slow rate will facilitate this method. For Form-C inputs ensure that J1 and J2 are open. Use a N.O. contact across the K-Y inputs, install J1 and J2 and ensure that the LEDs are changing and the relays making and breaking.



*Simplified Schematic Diagram of the G-9694B*

**REPLACEABLE PARTS LIST, G-9694B**

CIRCUIT SYMBOL	DESCRIPTION	STOCK #
LE1,LE3	LED, Red, 521-9247	010000
CR1,CR2,CR7	Diode, IN4004	010020
LE2,LE4	LED, Green, 521-9251	010150
CR3-CR6	Diode, P6KE20CA	010338
C1	Capacitor, EL., 470uf, 50V	020111
C10	Capacitor, TAN., 1uf, 35V TAP	030150
C2-C9	Capacitor, CER., .001uf, 1KV	040000
U9	I.C., MC14049UBCP	080130
VR1	I.C., MC7815CT	080960
U1-U8	Clair XCA 170	080973
R1	Resistor, W.W., 10K, 3W	120560
R2-R9	Resistor, COMP., 1/2W, 2.2K	130180
RN1	Resnet, 8-2-103 (ISO)	139940
RN2	Resnet, 6-1-332	139974
RN3	Resnet, 6-1-102	139979
T1	Transformer, PSD2-24	150060
S1	Switch, V80212M502Q	180482
F5	Fuse, 3AG, 1/8A, 313.125	190011
F1-F4	Fuse, 3AG, 1/10A, 313	190005

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**NOTICE**

As of the date of this printing, the specifications for the G-9694B in this Instruction Information sheet apply to all G-9694B Solid-State AC Contact Multipliers, except as indicated. Because all Da-Tel products are continually being refined and improved, these specifications are subject to change without notice.