INSTALLATION AND WIRING GUIDELINES FOR DC/AC INVERTERS

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ABSTRACT

The installation of JKL's DC/AC inverters is relatively simple, but a few precautions observed during the installation and wiring of the inverters to CCFL's will help to insure a smooth integration into your application. Wiring diagrams for the most common DC/AC inverters are included.

INTRODUCTION

DC/AC inverters designed to light Cold Cathode Fluorescent Lamps (CCFL's) are a very specific sub-class of inverters in general. These inverters tend to have very low output currents and very high output voltages. Since the lamps are used in signage where constant light output is needed as well as in LCD panels where variable light output is sometimes required the inverters come in several classes. Besides the single or multiple lamp classes, there are fixed output, and dimmable output variations.

FIXED OUTPUT INVERTERS

The fixed output inverters are very simple to set up. They have a DC voltage input, a DC voltage return or ground, a high voltage output, and a high voltage return. Applying the recommended input voltage to the inverter provides the designed output voltage. There is some variation available to the output by changing the input voltage to the inverter this is not recommended.

Several of the dual output inverters can be configured for different output currents. By using a dual output inverter with a single lamp and with the different configurations additional light output can be achieved. This will be with a reduction of life hours as a tradeoff.

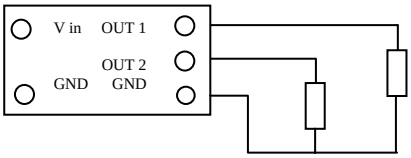

Figure 1

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Figure 1 shows the typical two lamp configuration for a fixed output inverter. An example of this type of inverter is the BXA-12529. The lamps will each have 5mA of output current and will produce their standard output brightness. Figure 2 shows how a dual output inverter can be hooked up with one lamp to produce a standard output with rated life hours. The output current would be 5mA with the full output voltage.

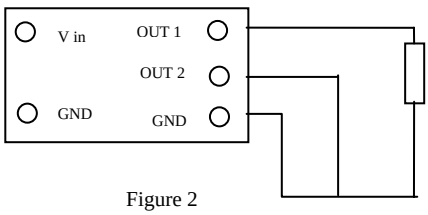

Figure 2

Figure 3 shows the same lamp with 6mA of output current and a brightness of 110% of the standard lamp output with a reduction of 10% of life hours.

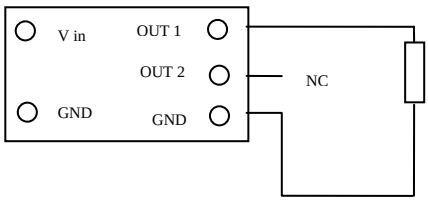

Figure 3

Finally figure 4 shows a lamp/inverter hooked up to produce 150% of standard lamp output with a reduction of 40% life hours. In this case the output current would be 10mA. This will not work for every inverter, only those where the output are in phase with each other.

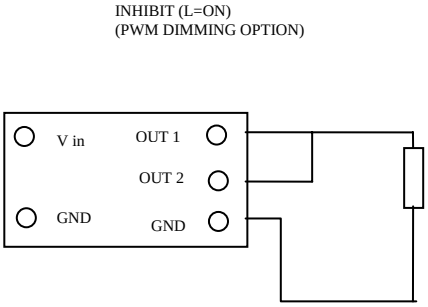

Figure 4

DIMMABLE OUTPUT INVERTERS

The dimmable output inverters will require wire harnesses as described on the drawing for the specific inverter. These wire harnesses are available through JKL Components Corporation. The description for each pin can be found on the inverter drawing, and each wire harness drawing has the wires listed by color and pin location. These two lists must be carefully compared in order to make the connections properly. Two different examples of the types of pin out connections is the popular BXA-

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12579/MOD4 and the new BXA-12665-5M. Figure 5 shows the BXA-12579/MOD4 and Figure 6 shows the BXA-12665-5M inverters.

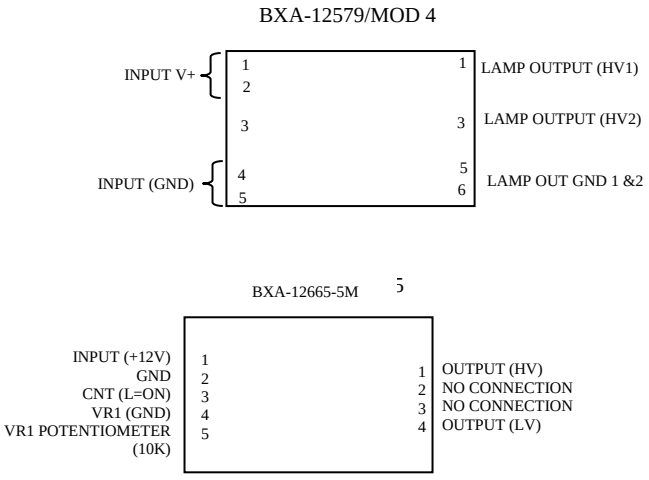

Figure 6

The BXA-12579/MOD4 has a five pin input connector and the associated BXC-10605 wire harness. Pins one and two are labeled “INPUT +V” on the inverter drawing and “RED” on the wire harness drawing. Pins four and five are labeled “INPUT (GND) on the inverter and “BLACK” on the wire harness. Finally pin three is labeled “INHIBIT (L-ON) (PWM DIMMING OPTION)” on the inverter drawing and “WHITE” on the wire harness. Figure 7 shows the chart from the BXA-12579/MOD4 inverter and the associated wire harness.

NO.	PIN NUMBER & DESCRIPTION		HARNESS COLOR
CN1	1	INPUT +V	RED
	2		RED
	3	INHIBIT (L=ON) (PWM DIMMING OPTION)	WHITE
	4		BLACK
	5	INPUT (GND)	BLACK
CN2	1	OUTPUT (HV1)	WHITE
	2	NO CONNECTION	
	3	OUTPUT (HV2)	WHITE
	4	NO CONNECTION	
	5	OUT LAMP GND 1 & 2	WHITE
	6		WHITE

Figure 7

Connecting the red wires to a plus 12 volt supply and the black wires to the ground of the power supply power will be supplied to the inverter but there will be no output. The white wire is connected to an inhibit function; having it floating the inverter will be off. For the BXA-12579/MOD4 inverter this wire needs to be connected to the ground side of the power supply as indicated on the inverter drawing (L-ON). If this connection is done through a switch the inverter and lamp(s) can be turned off or on without affecting the power source. In addition, if the white wire is connected to a Pulse Width Modulator (PWM) (see tech brief TB-1001) the lamps become dimmable from 100% brightness down to approximately 20% brightness. Figure 8 shows the configuration with a switch on the pin 3

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and Figure 9 shows the PWM hook up on pin 3.

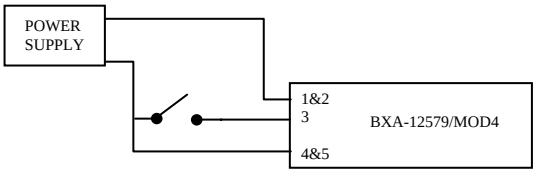

Figure 8

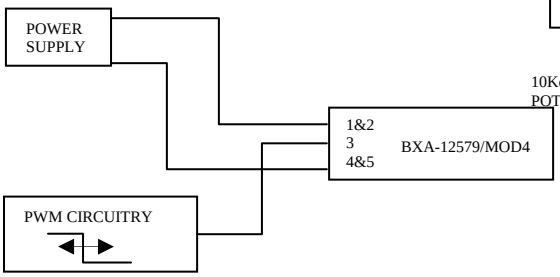

Figure 9

The BXA-12665-5M inverter also has a five pin input connector with a different pin connection and a wire harness BXC-10549. Pin one is the plus 12 volt input (red wire on the wire harness), pin two is the supply ground (black wire on the harness), and pin three is the control line (white wire) (grounding this wire will turn on the inverter). Pins four and five are labeled "VR1 (GND)" and "VR1 POTENTIOMETER (10K)" respectively and the harness is labeled black and blue. Besides the pulse width modulation dimming capability as in the BXA-12579/MOD4 there is a linear control to lamp brightness which can be operated with the twist of a knob. By placing a potentiometer between the black and blue wires of the harness as shown the inverter can have an on/off control and a brightness control. See figure 10 for the complete schematic of how to hook up this inverter.

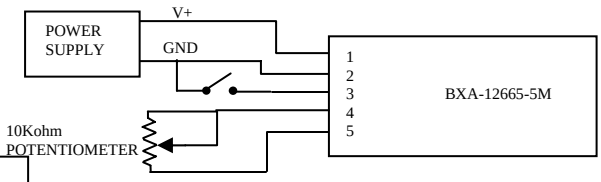

Figure 10

If the brightness control is not needed then the two wires must be connected together but should not be connected to anything else. This will give a 100% brightness output.

SOLDERING

JKL's inverters come as RoHS compatible and as such cautions should be taken when soldering to the inverters. A non-lead containing solder should be used along with the appropriate higher temperature soldering iron. Most normal methods of soldering may be used. These include: "hand-soldering" of wire leads to the interface pins on the

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inverters, "hand-soldering" and "wave-soldering" of the inverter mounted as a daughter-board onto a mother-board.

DO NOT use "IR-reflow", "vapor-phase", "induction-heating", or "convection-oven" methods of soldering, as these methods may cause the components on the inverter to become de-soldered.

CLEANING

Cleaning of the inverters after soldering may be accomplished utilizing standard commercial cleaning techniques. Aerosol-spray, ultrasonic, cold-immersion, vapor degreasing are acceptable methods of cleaning. The solvent for cleaning must be compatible with the soldering flux used, the cleaning method chosen and the entire assembly being cleaned.

The majority of solvents available for PCB cleaning are compatible with JKL's inverters if properly used, following the manufacturers' instructions. For safety considerations, always obtain a MSDS from the supplier of the solvent.

DO NOT use any solvent that is not intended for the cleaning of PCB's. In addition, do not use any solvent containing Methyl Ethyl Ketone (MEK), Methylene chloride (MC) or Methyl alcohol.

WIRING SUGGESTIONS

The wiring of JKL's inverters is a simple and straight-forward procedure. By following the suggestions below in addition to the wiring diagrams, a smooth integration into your system should be assured.

Wire Selection: The selection of the wire used for the DC input may be of any type meeting the particular systems requirements for your application. Since JKL's fixed output inverters are all below 850mA input current, any wire 30 AWG or larger may be safely used for the input voltage wiring. There are wire harnesses for the dimmable output inverters made up of 26 and 28 AWG wires, doubled up as necessary, with matching connectors available through JKL.

The wire selected for output wiring between the inverter and lamp(s) must, in addition to meeting the particular systems requirements, also provide a minimum of 1000 Vac operating voltage. Wire and wire harnesses with

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appropriate connectors are available through JKL.

Lead Length: Since all of JKL's inverters provide a high frequency (>35 KHz) and high voltage (>500 Vrms) output, the lead length for the output wires should be kept as short as possible. The maximum lead length, on an average, should not exceed twelve inches. The maximum lead length will vary depending upon the inverter/lamp combination being wired together and the proximity of the leads and lamp to a ground plane. In addition to the lead length, the high voltage (+) lead should, when practical, be maintained as the shortest lead and the ground (-) lead as the longest lead.