



Don't you just hate it when a manufacturer specifies an unrealistic operating voltage range? I do too! It's like saying; if you take this product out of the Lab, it may fail without warrantee!

Recently Jay Piper with Security Data & Cable Headquarters had brought to my attention some cameras that had blown up from too high of voltage. Even though these cameras were powered by a competitors 24vac transformer, I must say that in the regard of output voltage, all transformers are pretty similar. The output AC is a function of input AC voltage and output loading. In Jay's case, the camera manufacturer recommended an input voltage of 24vac +/- 10% (21.6 to 26.4vac). There are some very expensive Ferro resonant transformers that could meet this specification, but not very practical and seldom done. If your line voltage is on the outer edges of normal, your voltage may be out of range for you camera. Let's take a look at the numbers to see what would be a practical working voltage for a 24vac camera.

Nominal Output at 115vac full rated load	24vac
Zero load to full load	-0 +3%
AC Line voltage range around the United States (105-132vac)	-8% +18%
Normal Line Losses from wire run to camera	-10% +0%
Total Practical Voltage tolerance in Percentage	-18% +21%
Total Practical working voltage for 24vac	20.0vac – 29.1vac

As you can see above the practical voltage limits are about 1.6 volts low and 2.7 volts high. I would recommend checking the voltage at the camera and if applicable turn heaters and other devices on the transformer on and off and measure the minimum and maximum voltage.

If your voltage is below specifications with heater on and normal with the heater off, then to wire run will have to be shortened or rerun with larger wire. See application note AN2 24vac wire size table for further information. If the problem is caused by low line voltage, contact ESD about a special order step up transformer.

If the voltage is to high, adding silicon diodes in series with the power can drop some voltage regardless of load unlike a resistor. Each silicon diode will drop about .75volts. When using them to drop AC volts, you must use them in pairs connected in parallel in opposing directions. Figure 1 shows four 1 Amp diodes connected to drop 1.5vac. Figure two illustrates 2 8 Amp diode bridges connected together in opposing directions to drop 1.5vac. We rate this at 4 Amps AC without heat sinking.

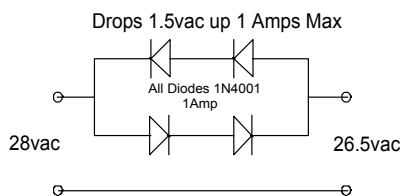


Fig. 1

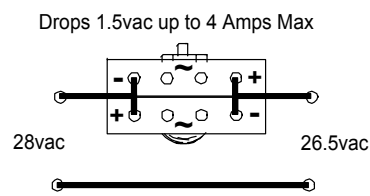


Fig. 2

In Summary most of the time the line voltage within range to keep your 24ac output within 10%; but always check you voltages and your specifications to be sure you are in compliance before applying power.

Comments invited! / JDB@SecurityPower.com Jerry Baker V.P. Engineering



Electronic Security Devices
6111 Southfront Road, Suite J
Livermore, CA 94551

12/03 © Technical Literature jdb 24vac Output Voltage
products\applicationNotes\an724vac.doc

Manufacturers of High Quality Security Devices

Phone: (925) 243-8990 Fax: (925) 243-8999
ESD@SecurityPower.com www.SecurityPower.com