

## Advice to Power Users

**W**hile most of today's alarm panels provide the installer with good basic built-in power supplies, there will shortly come a time when a standalone power supply panel is needed by an installer. Along with this, it is important for the technician to understand which power supply to select for the particular application. Additionally, a better understanding of some low-voltage codes and power supply characteristics will make for a better installer and integrator.

### Only Use 'Classy' Power Supplies

One of the first terms that pop up when looking at power supply specifications is Class 2 output. What is Class 2? Hopefully, you veteran readers have a pretty good idea of what I am talking about.

The general definition given by the National Electrical Code (NEC) for a Class 2 circuit is, "The portion of the wiring system between the load side and a Class 2 power source and the connected equipment. Due to its power limitations, a Class 2 circuit considers safety from a fire-initiation standpoint and provides acceptable protections from electric shock."

OK, now the drill is to read the above statement one more time. What is the intent of this classification? It is fire and life safety; something that is dear to my heart and should be to yours as well.

While this statement may be lacking in detail, on one hand it says a lot. What makes a Class 2 power supply output able to provide fire and life safety? It takes a joint effort between the manufacturer and the installer. If we look closer at the power supply, a UL-Listed Class 2 output is designed to provide not more than 100 volt-amps (VA) of power at a voltage of not more than 30V.

### Good Installations Are Needed

Now that the manufacturer has provided the proper listed power resources, it is up to the installer to make sure the proper cable (Ex. CL2, CLR2) is used, run and terminated according to local code and good workmanship. A typical example of bad workmanship would be tie-wrapping cable to existing conduit (NEC 300-11). Additionally, consider all codes when locating a power supply panel in a utility closet adjacent to non-Class 2 circuits and equipment (NEC 110-26).

You may have noticed that popular alarm 12VAC-24VAC plug-in transformers are Class 2 listed as well since they are less than 30V and 100VA. Remember, for distributed power supplies, one cannot simply take a 450VA 120/24V transformer, limit the circuit with a 4A fuse and, thereby, get 96VA and have a Class 2 circuit supply. The overall fault current is too high and would not conform to a Class 2 listing. Also notice that Class 2 can be either DC or AC.

### Compensating for Current Changes

One of the key features of a power supply with a current-limited output is overcurrent protection. If an overcurrent protection device does not operate quickly and within the specified range, expensive equipment, such as CCTV devices, can be damaged.

In recent years, many installers have enjoyed the use of positive temperature coefficient (PTC) devices, which are often referred to as resettable fuses. Although PTC devices will respond to extreme current surges, they do have a small delay and activation tolerances, but are not as precise as fuses.

Some power supply manufacturers, such as Brooklyn, N.Y.-based Altronix ([www.altronix.com](http://www.altronix.com)), offer an alternative with electronic circuit pro-



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### BOB'S TIPS

- Check with the AHJ on local codes for access, doors with reference to life safety
- Measure power supply voltage levels before connecting sensitive electronic equipment.
- Calculate voltage drops for wire gauge being used and distance of cable to load
- Check with door and lock manufacturer for raccess hardware door mounting instructions.
- Add 10 percent to max load for poster supply specification.

tection in their power supplies.

"Electronic circuit protection is very accurate and has a very fast response time, which is measured in microseconds," says Paul Rizzuto, Altronix technical sales manager, who I recently spoke to about several technical issues. "This is the only type of overcurrent protection that may protect the equipment being powered as opposed to protecting the power supply."

### A Power Supply for Every Use

The system integrator should become familiar with special application power supplies used for CCTV, access control, and fire alarms. Providing power supplies for access control devices such as magnet locks (see "New Opportunities for 1-4 Door Access Control") must also take into account stringent life-safety rules, such as NFPA 101 and NFPA 72, and be interfaced with fire alarm systems.

Power supplies like the Altronix AL600 access power controller in the diagram on page 30 provide a variety of hardware options. Notice the comment for the additional UL power supply for maglocks. This may be a re-

# Tech Talk

With Bob Dolph

quirement by your authority having jurisdiction (AHJ) as many insist on a separate power/battery source for maglocks. I particularly like the battery supervision feature, which allows customers to know battery resources are operating properly.

## Expert Shares Powerful Knowledge

Following is part of the conversation I had with Rizzuto in which he shares his expert knowledge of power supplies.

*What are the most important technical areas to consider when purchasing a power supply?*

**Rizzuto:** What is the application [CCTV, fire, access]; what is the total current draw of all devices being powered? Are there any special requirements such as fire alarm disconnect on access control? Does the installation require multiple outputs and individual control of the outputs? Is battery backup required and how much standby time will be needed?

*What have you found from your tech support to be the three main problem areas for power supplies? Any recommendations?*

**Rizzuto:** Problem No. 1 is voltage drop. The length of the wire run and the total amount of current draw of the circuit is not taken into consideration when choosing the proper wire size gauge for the job.

The solution is to use a voltage drop calculator, such as the one found on our Web site, in choosing the right size wire gauge for the job.

Problem No. 2 is under-sizing CCTV power supplies. When choosing a power supply for outdoor applications, often the total current draw of all the equipment to be powered is not taken into consideration. When installing a system in the spring and summer months, often the heaters are forgotten and a lower current power supply is installed.

When the temperature drops and the weather gets colder, the fuses of the power supply blow due to excessive current draw.

Solution No. 2 is to take the total current draw of all the equipment being used and add a little extra current as a buffer.

Problem No. 3 is proper charging voltage for batteries. When the use of a back-up battery is required, the proper

output voltage for keeping a 12VDC battery charged is 13.7V; for 24V (two 12VDC batteries wired in series), the proper voltage is 27.1V.

A higher amp-hour (AH) is preferred vs. two lower AH batteries in parallel. Parallel batteries do not charge equally. The higher charged battery will continue to discharge while trying to charge the weaker battery, which can cause both batteries not to carry a full charge even though the battery voltage reads at the correct level.

*Do you have any additional comments regarding power supplies and CCTV?*

**Rizzuto:** Does the camera have isolation transformers? If not, select the proper power supply with isolated outputs. Carefully check the maximum voltage specifications for cameras. Some DC cameras will not work at a little more than 12VDC, while others will go to 15VDC. Always measure output voltage before wiring into a power supply. Again, be careful when calculating cable sizes and voltage drops..

### Access Power Supplies Can Meet Variety of Needs

The diagram illustrates the Altronix ACM8 Access Power Controller, a multi-output power supply unit. It features eight individual output channels, each with a fuse (F1-F8) and an LED indicator (LED1-LED8). The unit is connected to various access control components: an Access Control Panel (Output Relay C, NO, NC), a Keypad, N.O. Door Releasing Device, and two Mag Locks. It also interfaces with an Electric Strike and Electromagnetic Door Holders. The power supply is powered by an input from an AL600ULXB and has a FACP INTERFACE section with an Open Switch and a Closed Switch. A note indicates that the UL listed power supply for this application requires the removal of fuse F8.

**This ACM Series power supply from Altronix provides distributed and specialized connections for access control hardware and fire alarm interfacing.**