

THE TECHNICAL RESOURCE FOR THE PHYSICAL & ELECTRONIC SECURITY SPECIALIST

# LOCKSMITH LEDGER

November 2020 Volume 80, Number 11

International

\$6.00

## STATE OF THE 2020 INDUSTRY



**SDC**  
Security Door Controls

Pages 32, 34

- » Servicing Multipoint Locks
- » Smartphone Locking
- » Stand-alone Lock Installation



[www.locksmithledger.com](http://www.locksmithledger.com)

**ENDEAVOR**  
BUSINESS MEDIA



**YOUR GO-TO**  
Stocking Door  
Hardware Distributor.



**SECURITY**  
LOCK DISTRIBUTORS



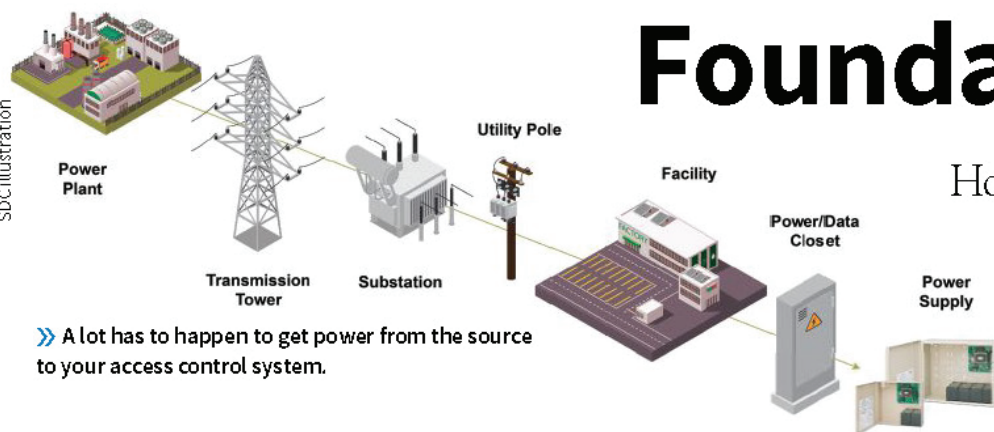
**SCHLAGE** LCN VON DUPRIN



Security Lock  
Distributors  
Calling...

# BUILDING a Good Foundation

SDC illustration



» A lot has to happen to get power from the source to your access control system.

## How to Avoid Access Control Power Problems in the Real World

Last month, we discussed power supply selection as one consideration in avoiding access control power problems ([www.locksmithledger.com/21151112](http://www.locksmithledger.com/21151112)). This month, we'll go a little deeper into common causes of access control power problems.

Believe it or not, unreliable utility power must be considered as a potential problem affecting any access control power system. We assume that a consistent supply of 110VAC, 60-hertz power is available, but this might not always be the case. The power that comes from the power company actually can range from 90 volts to 120 per their contract. Plus, we have to deal with brownouts, power flux, downed lines, surges and lightning coming in over the AC line as well.

Problems with utility power can result in under-powered access control systems. All electronic locks and devices controlling the door openings in these systems are designed to operate at certain voltage and amperage values. A general rule is that access control panels require clean power and surge suppression before the power ever gets to the door.

### Clean Power

All access control systems require steady DC electricity, because:

- Control panels contain the system configuration and credentials.
- Transients and voltage spikes often disable access control panels and connected devices.
- Printed circuit boards are vulnerable to damage from dirty power and nearby lightning strikes.

With the introduction of motorized door-locking devices, motors are being substituted for solenoids or

coils, and they require clean power with surge protection to protect motor-control-board components and the motors themselves from damage. This new technology provides highly efficient, reliable operation, lower current draw and longer lifespans.

Transients are a type of power surge or spike. They cost U.S. businesses up to \$26 billion annually in damage to electric/electronic equipment and devices. Some facts:

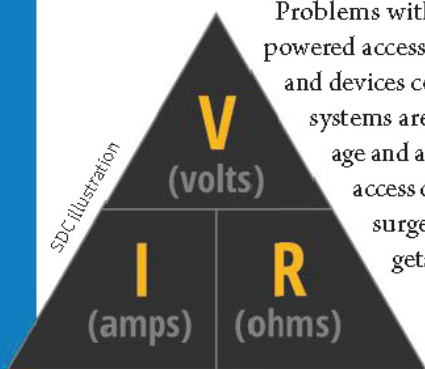
- Transients range from lightning strikes to static discharge from a human finger.
- Sixty percent of transient events occur inside a facility.
- Transients can occur when a utility restores power after a power failure.
- Up to 75 percent of integrated circuit failures can be attributed to power transients.

Transients also can be caused by door-locking devices installed without protective metal-oxide varistors (MOVs) or diodes through "coil kickback." Coil kickback is when the device has a built-up charge of power and sends that charge back to the control panel. If output isn't protected, this can damage the panel.

**A Simple Solution:** Consider installing commercial-grade uninterruptible power supplies (UPS) that have surge protection between the AC mains and your access control power supplies. You must ensure you have proper grounding for the surge protection to work properly.

### Find & Fix Problems

If you encounter power problems in an access control system, start at the door where the failure occurs. Measure voltage, continuity and current at the lock. Visit [www.sdsec.com/multimeter](http://www.sdsec.com/multimeter) for a quick video explaining how to use a voltmeter and its settings. Make sure



» Ohm's Law is  $V = I \times R$

you understand the following:

- That amperage is the “motor under the hood.”
- How to use a voltmeter and its settings.
- How to read current or amperage.
- How to make voltage and current calculations.

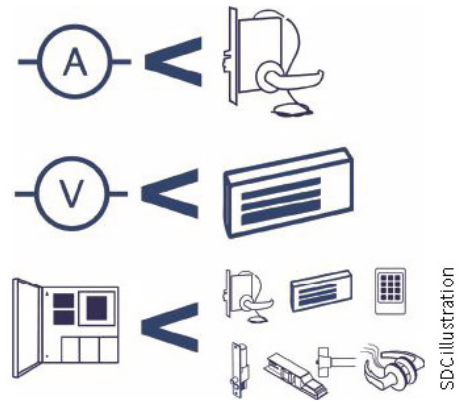
A lack of power is an industrywide problem. At many installations, access control hardware isn't supplied by the same people who provided the power supply, which results in power mismatches. Some common causes of lack of power are:

- Not enough amperage is at the

powered device; the power supply doesn't have adequate capacity.

- Not enough voltage is at the powered device, which is caused by a failure to calculate voltage drop or the use of the wrong wire gauge.
- Too much equipment is connected to each supply.

A lack of power reduces product life and reliability and can cause overheating. Many electrified devices incorporate microprocessors, which become unstable at low voltages and cause unpredictable operation and the loss of component functions. Operational



» Problems arise when there isn't enough juice in amps or volts to power access control equipment or when there's too much equipment for a power supply.

## Access Control Power Basics

**B**efore going any further into access control, make sure you're comfortable with a few basic concepts. Many people who have years of industry experience never have had any electrical training. With the increasing use of increasingly sophisticated electronic systems and circuitry, it's important that you have a strong foundation to avoid creating problems down the road.

For more-technical detail, seek out the content available on industry trade and manufacturers' websites, as well as certified training courses offered by ALOA ([www.aloa.org](http://www.aloa.org)), DHI ([dhi.org](http://dhi.org)) and ESA ([www.esaweb.org](http://www.esaweb.org)).

The following are key concepts and definitions you should be aware of:

**Electric Current:** Electric current is the flow of electricity through a wire or conductor. Current is comprised of free electrons that transfer from one atom to the next. Materials that have more free electrons conduct electric currents better. The three key electrical parameters are volts, amps and ohms.

**Volts (V or E):** Electromotive force (EMF) is the pressure that forces free electrons to flow. The volt is an electrical unit of electromotive force needed to push a 1-amp current through a wire or conductor that has a 1-ohm resistance. It represents the difference that exists between two points in a circuit.

**Amps (A or I):** An amp is a measurement of the electrical current flow rate in a closed circuit. The amount of current is determined by the voltage and the resistance.

**Ohms (Resistance, R,  $\Omega$ ):** The unit of resistance in a conductor is defined as an ohm. Resistance is similar to friction in a mechanical system. Size, material (copper, aluminum, etc.) and temperature determine the amount of resistance in a conductor. Resistance increases as the conductor length or diameter decreases: the more conductive a material is, the lower the resistance. Ohm's Law defines the correlation between electric current, voltage and resistance in a conductor. It's expressed as:  $V = I \times R$ , where: V = volts, I = amps, R = ohms

**Alternating Current (AC):** AC is an electric current that reverses its direction many times per second at regular intervals and is used to deliver power to houses, office buildings, etc. The time rate of variation is expressed in cycles per second (CPS) or hertz (Hz). Typical residential voltage is 110VAC, 60 Hz.

**Direct Current (DC):** DC is an electric current that flows in one direction. The source has positive (+) and negative (-) polarity. An automobile battery is 12VDC.

failure can occur throughout the entire access control system.

## Too Much Power (?)

SDC's Technical Support department gets calls for this more often than any other power issue. Too much power is defined generally as voltage that exceeds a device's rated input voltage by more than 10 percent. Too much power causes overheating of a lock's coil or electronics, contributes to unreliable operation and shortens the product's life expectancy.

Without identifying too little or too much power as the cause of problems, you or your tech probably will be called out to service the same locking device many times, potentially at your cost, not your customer's.

When you ensure that the proper voltage or amperage is present at all system devices per each device's requirements, you'll benefit from more-profitable installations because of the lack of callbacks and enjoy repeat business from happy customers.

Next month, we'll discuss voltage drop, how to troubleshoot power problems, how to customize power for your project and tips and resources. ■■

*Kerby Lecka is marketing director at SDC – Security Door Controls. He can be reached at [kerby@sdsecurity.com](mailto:kerby@sdsecurity.com).*