Go the distance

Voltage boost technology increases battery capacity

EDWARDS has a long history of innovation that has influenced the detection and alarm industry for more than 140 years. Today, its exclusive *Voltage Boost*™ technology is among the latest breakthroughs to carry that tradition forward. As a result, new EDWARDS control panels meet specifications that shut out the competition when it comes to the stamina of its power supply. But winning bids is only part of the story: Voltage Boost Technology can make life safety systems more efficient to install and maintain. With easier designs, this solution will help exceed all your customers expectations.

How it works...

Voltage Boost technology incorporates sophisticated regulator circuitry that not only maintains voltage at a constant level – but actually amplifies it when the batteries would otherwise drop below the prescribed threshold. This ensures that the power supply delivers a consistent voltage, even as batteries discharge. As a result, fire alarm signaling devices, such as strobes, will continue to operate within UL specifications right up until the batteries' predetermined cut-off voltage.

This is an important consideration when performing circuit loading calculations, which are required to be based on worst-case scenarios: operating the system on standby power with batteries at near cut-off levels (as determined by the power supply). Typically, this cut-off level is about 20.4 VDC, below which the signals may no longer operate within UL test specifications. This is a result of voltage lost due to wire resistance connecting devices to the power source.

Voltage Boost Technology is an important feature because it results in constant power to notification devices such as horns and strobes. Drawing less current from the batteries during the long part of the discharge period when the batteries have plenty of juice, results in more efficient operation and extended run times.

The implications of this breakthrough can lead to considerable cost savings as well as improved system survivability during abnormal use conditions.

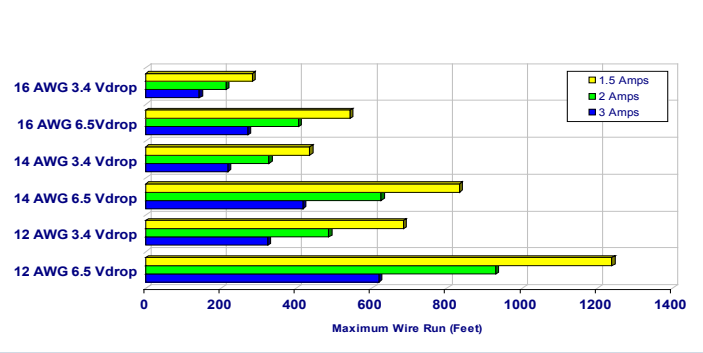
Why it works...

Ohm's Law describes the (linear) relationship between voltage, current, and impedance in an electrical circuit where voltage and current are directly proportional. Because notification appliances are not linear devices, Ohm's Law does not accurately describe the relationship between voltage, current, and power consumed by the device. A typical notification appliance is a constant-power device, i.e.: power is related to voltage and current as P = V*I. A decrease in voltage necessitates a corresponding increase in current to maintain constant power. This is the problem Voltage Boost Technology overcomes by boosting the voltage when the batteries become discharged below 23 Vdc. Given these principals, a designer was obligated to use a device's worst case operating current draw at the lowest operating voltage tested by UL of 16 Vdc when doing line loss calculations.

In general practice, a line loss of 3.4V due to wiring resistance is used as a guide for Notification Appliance Circuit (NAC) calculations. This calculation assumes

Number crunching

The Voltage Drop Values shown on the left of the chart below demonstrate the difference in wire run limits between a 3.4 V drop (without Voltage Boost) and a 6.5 V drop (with Voltage Boost). The contrast is striking: Voltage Boost technology results in longer wire runs among all three commonly used wire gauges. In fact, Voltage Boost technology nearly doubles the load or run distance using the same wire gauge.



To understand the minimum battery voltage before battery cut-off by the power supply, one must understand what is happening at the battery and how that relates to what is required at the output terminals of the field wiring for the circuit. When the battery is at the UL specified minimum of 20.4Vdc, and there is an average 1Vdc loss internally as a result circuitry and connection losses, then the resultant terminal voltage that connects to the field notification device wiring is 19.4Vdc. (20.4 – 1 = 19.4). This is an estimate, some panels have more loss then others.

For this example, with a maximum of 3.4Vdc voltage drop due to wire resistance will yield 16Vdc at the end of line (19.4 – 3.4 = 16). The assumption here is that the end of line will have 16 Vdc, then all devices closer to the panel's wiring terminals would have a voltage greater than the 16 Vdc. Remember: this is the minimum operating voltage of a notification appliance as tested and approved by UL.

With Voltage Boost technology, the terminal voltage at the panel never falls below 22.5Vdc – even when the battery voltage is at 20.4 Vdc. This means that the circuit designer will have an additional 3.1Vdc, or a total of 6.5 Vdc to use in their line loss calculations, providing almost double the load or distance runs using the same gauge of wire.

Voltage boost technology increases battery capacity

an operating voltage of 16 Vdc at the last device on the circuit (16 Vdc is the UL tested lower operating voltage for all devices). The system designer will account for these losses in the design phase of the project, and specify the correct wire gauge, length and load for each circuit to ensure proper operation at all times.

When it pays off...

Having this expanded flexibility in system design gives designers the freedom to build in added headroom without added costs. This extra capacity can be reserved for retrofits and expansions, or it can be used to reduce installation costs up-front – all with no impact to the design calculations other than battery capacity sizing.

Specifying engineers can leverage Voltage Boost technology by including the extra capacity into their specifications using performance based criteria. This would enhance their project's design detail while providing their clients greater value for their services.

Regardless of how Voltage Boost fits into the design or specification criteria of a project, the goal is to deliver the best designs available at the most cost effective price points. Voltage Boost achieves this, and by doing so, lives up to the legacy of excellence and innovation that has been the hallmark of EDWARDS detection and alarm solutions since 1872.

EDWARDS Strategic Partners:

Innovation, leadership, and a rich tradition of excellence...

Our strength is in our Strategic Partners — the people and organizations we entrust with the technology that has charted the course of life safety protection for decades. Strategic Partners are not middlemen or go-betweens. They are independent contractors who add value to the EDWARDS life safety solution. As insiders, they enjoy exclusive access to products, custom design innovations, and factory training. Yet as successful independent contractors, they are adept at ensuring that each submittal is strong and competitive, and that each bid is locally relevant to your installation. As local businesses they not only have to earn your trust — they have to keep it.

See what's possible now...
Contact your EDWARDS Strategic Partner today!

10/07/16