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System cabling strategy delivers hidden profits

Cutting installation time can allow labor to be distributed to other resources.

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Incorporating a system cabling solution into a panel or cabinet installation has both advantages and disadvantages. For many already familiar with this argument, the advantages commonly cited are predictable: system cabling speeds up installation and eliminates wiring errors, and in doing so reduces overall installation time and the overhead associated with it.

Likewise, the big disadvantage of system cabling is also predictable: it costs more. This is a simple but extremely meaningful argument, especially to companies trying to survive this most recent economic downturn.

However, these shops often overlook the fact that by cutting installation time, system cabling also cuts labor costs. Labor is one of the biggest overhead expenses for any

Table 1: Control Panel with One 16-Channel I/O Card

Material Cost Analysis

System Cabling		Hard Wiring	
Materials		**Materials**	
- Adapter	$55.00	- Wiring Arm	$60.00
- Cables (2)	$40.00	- Terminal Blocks	$20.00
- Module	$60.00		
Total Cost of Materials	**$155.00**	**Total Cost of Materials**	**$80.00**

Courtesy: Phoenix Contact USA

panel or cabinet builder. Cutting the labor associated with a particular project means that shops can shift resources to other projects (meaning reduced delivery times for end customers and ultimately higher customer satisfaction) or shift those personnel to other responsibilities within the facility.

With extra personnel, a company can allocate some resources to looking for new business. In any event, the extra manpower, if used correctly, can easily help grow the company, even in a rough economy.

Table 2: Control Panel with One 16-Channel I/O Card

Labor Rate = $50.00 fully burdened

System Cabling		Hard Wiring	
Materials		**Materials**	
- Adapter	$55.00	- Wiring Arm	$60.00
- Cables (2)	$40.00	- Terminal Blocks	$20.00
- Module	$60.00		
Total Cost of Materials	***$155.00***	***Total Cost of Materials***	***$80.00***
Labor Charge per Panel	$1.38	Labor Charge per Panel	$21.58
Total Cost of Panel	**$156.38**	**Total Cost of Panel**	**$101.58**

Courtesy: Phoenix Contact USA

Of course, these benefits can only be achieved by spending the money up front. Clearly, this leap of faith has some merit.

Finding the hidden value

What often gets overlooked during the common system cabling "pro/con" discussion is the hidden value that system cabling can bring to certain panel shops and cabinet builders. An argument can be made that these hidden benefits trump all common benefits discussed so far.

The simple reason: instead of simply saving installers time and money, if used correctly, system cabling will actually generate extra profit for a company. Think about what that could mean to your company. While your competitors are fighting to just stay afloat in this weak economy, you could actually be strengthening your finances and positioning yourself to capitalize on opportunities when the economy turns around.

Keep in mind, this "hidden" feature may not apply to every shop. In reality, the benefits are best achieved by larger shops, or at least shops focused on throughput. For shops like these, profits are directly linked to volume. They charge less per panel than competitors, but crank out more panels per day. If these companies could find a way to turn out even more panels or cabinets on a daily basis, they could position themselves even farther ahead of the competition.

Point-to-point vs. system cabling

To demonstrate how this system works, we'll use a very simple example. Let's assume a shop is building a panel with one programmable logic controller that utilizes only one 16-channel output card, nothing more. This is a very simplified scenario, and certainly one unlikely to take place in the real world, but it will be sufficient to visualize our points.

Also, let's stop here to mention that any dollar figures provided in this article are based on approximate list prices. These prices can vary based on manufacturer. Regardless, list price provides the safest approximation of the material costs.

So let's look at the costs associated with the installation of that 16-channel I/O card by comparing the two connection methodologies in question: point-to-point installation and system cabling installation. Both installations require connection to the control card. Of course, they do so by different means. A point-to-point approach hard wires individual conductors to screw terminals located on the controller wiring arm. Let's assume a cost for a wiring arm to be $60.

While that covers the connection costs on the control side, there is also a cost associated with connecting to the field. On the field side, we'll need to connect to a set of terminal blocks. Here we'll assume the connection is to basic screw terminal blocks, so we'll put this cost at $20. Since most shops have large amounts of cable, ferrules, and markers on hand, we'll ignore those costs. So altogether we'll put the material cost of a 16-channel point-to-point installation as $80.

Alternatively, we have the material cost of a system cabling solution. We know this cost will be higher, but here's how it breaks down:

Connection to the controller is made via an adapter that provides a high-density cable connection. Such an adapter will cost around $55.

On the field side, an interface module will replace the standard terminal blocks. This module provides the same functionality as the terminal blocks but does so via a high-density cable header. An interface module for this application will cost about $60.

Finally, linking the control and field levels will be completed through two pluggable, high-density ribbon cables, one for each group of eight. Assuming 1-m cables are being used, the two cables will cost around $40.

So as mentioned earlier, system cabling has a higher material cost compared to point-to-point installations: $80 for point-to-point and $155 for system cabling. Table 1 provides a summarized breakdown of material costs.

However, a panel build involves much more than just the cost of materials. It takes manpower to construct these panels, so we need to factor in labor. For this example, let's assume a fully burdened labor rate of $50 per hour. This rate will then account for everything: labor, facility costs, management, etc.

Now that we've established our costs, let's look at the actual amount of labor required for each. From time studies performed with each installation, we know that it takes approximately 26 minutes to hard-wire a 16-channel I/O card. On the other hand, it takes only 1 minute, 40 seconds to wire the same card using a system cabling solution. Again, most of us already know that system cabling is faster. However, when we examine it further, we can begin to understand what that really means.

If we use the labor rate suggested for this example ($50) and apply it to the actual assembly times, we then formulate the labor charge per panel for each method of installation. At 1:40, the labor charge for the system cabling panel is $1.38. Contrast that with a labor charge of $21.58 for the point-to-point installation.

The labor charges for each installation begin to even out the overall cost between the two panels. Despite the higher labor charge, a point-to-point installation still has a lower cost. Table 2 summarizes the charges for each installation.

Once again, though, digging deeper reveals much more. To reiterate a simple point: panel shops, especially large ones, make more money through increased volume. The more panels they build, the more money they make. This is where we see the hidden value of system cabling.

Table 3: Control Panel with One 16-Channel I/O Card

Labor Rate = $50.00 fully burdened

System Cabling		Hard Wiring	
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Total Cost of Materials	*$155.00*	***Total Cost of Materials***	*$80.00*
Labor Charge per Panel	$1.38	Labor Charge per Panel	$21.58
Total Cost per Panel	*$156.38*	***Total Cost per Panel***	*$101.58*
Charge per Panel	$200.00	Charge per Panel	$200.00
Profit per Panel	$43.62	Profit per Panel	$98.42
Max Panels per Hour*	36	Max Panels per Hour*	2
Profit per Hour	**$1,570.32**	**Profit per Hour**	**$196.84**
** 1:40 wiring time*		** 26:00 wiring time*	

Courtesy: Phoenix Contact USA

Let's go back to our two examples and assume each finished panel is being sold for $200. When we apply this price to the costs we calculated earlier, we find the profit made on each panel. The profit per panel in the system cabling installation would be $43.62 ($200 charge minus $156.38 cost per panel). While that is a fair amount of profit, it is trumped by the profit made through a point-to-point installation: $98.42. That's more than double the profit made through system cabling.

Calculating the time factor

So there you have it: point-to-point installations make more profit and are clearly the better installation method, right? Well, not so fast. Let's go back to a key element of these installations: time. If we recall, a"high-profit," point-to-point installation takes roughly 26 minutes to assemble. That means a panel shop could build two completed panels each hour. Not too bad.

However, let's take another look at the system cabling solution. This installation takes only 1:40. That means a shop could build up to 36 completed panels in only one hour of operation. While it is absolutely true that the profit per panel ($43.62) is lower, the overall potential profit per hour is much, much greater.

Using system cabling in this example would lead to $1,570.32 of profit each hour. Which would you prefer—settling for less than $200 per hour, or making more than $1,500 for each hour of business? Table 3 shows a fully summarized tally of charges and profits.

Of course, such an extreme example does not apply to the vast majority of panel builders. However, the example shows that there is clearly a point for each panel shop where adopting a system cabling solution begins to make sound economic sense.

If sheer profit is the key component driving the decision, then the volume of panels will help dictate whether point-to-point or system cabling is chosen. However, when shops begin to factor in all the other benefits of system cabling (risk mitigation, reduced panel sizes, etc.), the decision becomes a bit more muddled, and profit likely becomes only one factor in the overall decision-making process.

The next time a panel project comes up, keep all of this in mind. Don't ignore the hidden value of system cabling. If you do, you could miss out on a substantial amount of profit.

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