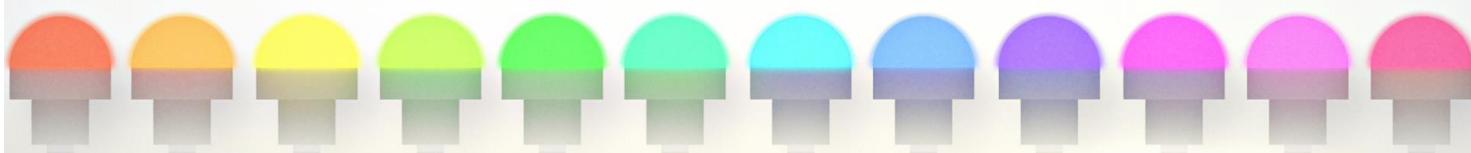




Indication on Demand

How Programmable RGB Indication is
Reshaping Human-Machine Communication



more sensors, more solutions

Robb Weidemann

Indication on Demand

How Programmable RGB Indication is Reshaping Machine-to-Human Communication

Indicator lights have long been the visual language of machines. They allow operators to interpret statuses and make quick decisions based on instant feedback—at least, in theory. However, traditional indicators are limited—typically offering 3-5 colors to represent a wide range of statuses. Sometimes this narrow palette just isn't enough to capture the complexities of modern machines and processes. Users must be creative to make these indicators work for them.

For example, customers often use pulse counts to accommodate more conditions (for example 2 pulses = one condition, 3 pulses = another condition, 4 pulses = yet another). This requires operators to count pulses accurately every time to identify the right condition. Distractions and inconsistent pulse usage between plant locations can create confusion and slow down processes.

Other customers have used several multi-segment tower lights in combination to display more conditions, assembly steps, etc. This means an operator would look at the color and position of the segments on multiple tower lights and compare this to a legend to decode the meaning. This type of complexity can significantly slow down processes and troubleshooting, and it can lead to error if workers confuse similar combinations.

The challenge, then, is to accommodate more complexity while keeping indication simple, intuitive, and cost-effective. The answer: [programmable RGB indicators](#). This article explains how programmable RGB indicators work and how they make machine-to-human communication more intuitive, streamline supply chains, and ultimately save time and costs.



More colors, more solutions

What is Programmable RGB Indication?

RGB LEDs are not just one color; they combine red, blue, and green light to produce a wide range of hues. Programmable RGB indicators let you choose from these colors yourself and change them as needed. Many of these indicators also come with pre-defined animations—such as pulsing or strobing—to further expand indication possibilities.

How More Colors and Animations Improve Indication

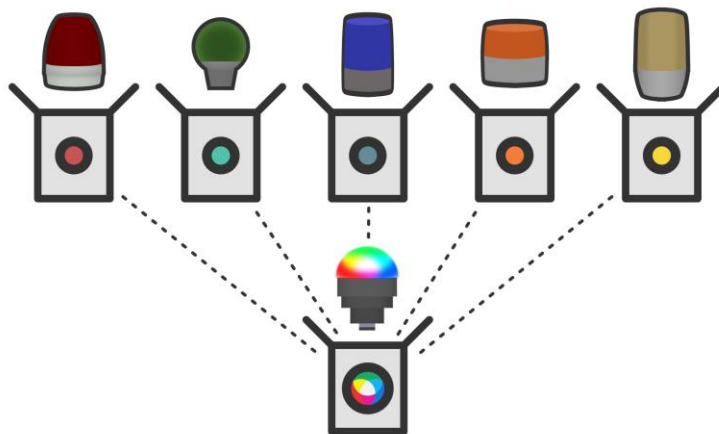
Complex indication requires a broader spectrum of color options. More colors allow each status or assembly step to have totally unique indication from other steps, eliminating confusion and speeding up interpretation of the signals. For example, if there are 7 steps in a process, each step can be indicated by a distinct color (for example: red, orange, yellow, green, blue, purple, and white). Since each color is unique, it is easy to associate steps to each color and remember them quickly. This type of application could potentially replace multiple tower lights with a single indicator.

However, even this solution isn't foolproof. For example, colorblindness (especially red/green colorblindness) can pose a challenge for any visual status indication solution. The position of the color on a tower light can help, but the more positions there are, the more difficult it is to quickly and correctly identify the position—even for typical vision. Adding motion (like pulsing, spinning, and strobing lights) makes status differentiation even easier. Having the option both to add unique colors and to animate lights with motion helps facilitate indication for virtually any user and situation. When all users can read signals quickly and accurately, they are more efficient and make fewer errors—ultimately saving time and costs.

Custom Indication on Demand

In the past, custom indication solutions were impractical, often costing more and requiring longer lead times than standard indicators. This is because tower lights and other indicators have typically been constructed with either colored plastic or individually colored LEDs. For non-standard configurations, you would need to know upfront what colors or other options you needed and special order them in the desired combination. Now, however, programmable RGB indicators make it possible to customize indication solutions very quickly on your own versus having to order a custom solution from the manufacturer.

There are currently two options available for programmable RGB indicators. First, if you have IO-Link communication, you can choose an IO-Link compatible indicator that allows you to customize colors and animations from your PLC or HMI. Second, some manufacturers have developed their own user interfaces that allow you to program compatible devices without requiring an IO-Link system. This means virtually anyone can integrate a custom RGB indication solution without added costs or lead times.



Simplify your supply chain by standardizing on a few customizable indicators.

In addition, being able to program devices as needed means stocking fewer parts, which helps streamline your supply chain. You can order one type of indicator—whether single- or multi- segment—and program each segment to your

exact specifications. If you ever need to change the settings, simply reprogram the device. This gives you the flexibility to quickly adapt to changes, without ordering a new configuration and waiting for delivery.

3 Practical Applications of Programmable RGB Indication

The following three applications are just a few examples of how programmable RGB solutions can improve indication, increase efficiency, and save costs.

1. Intuitive Operator or Assembler Guidance

Operator or assembler guidance is a tremendous application where RGB indication solutions truly shine. Unique colors make it easy to define many steps and conditions without confusion. For example, some assembly applications currently use pulse counting—where the assembler must count the correct number of pulses to identify the status. This can lead to errors if the assembler mis-counts the pulses.

In contrast, a single pulse or solid light in a unique color is much easier to identify and reduces the risk of mistakes. As another example, in part-picking applications, indicators can be programmed to match the color of the next bin to pick from. Workers simply match the color of the indicator to the same colored bin.

2. Machine Warmup Time and Other Transition States

Many machines have a “warm-up” period after being turned on before the machine is ready to go. With traditional indication, an indicator light might be off when the machine is off and then turn green when the machine is turned on. This can be misleading and confusing to an operator if the light is green, but the machine is still warming up.

An indicator with a 2-color rotating animation mimics the “loading” icons used in a PC environment and can indicate that the machine is working but not quite ready to start the next process. The animation can then turn to a solid light when the machine is ready to go. The operator then can easily identify the state of the machine. Operators can also spend warm-up time on other productive activities versus just waiting.

3. Simpler, More Efficient Panels

Finally, control panels are an excellent application for RGB indicators. Space is at a premium on industrial panels, so a single indicator light that can display a wide range of colors—or even two colors side-by-side in a single segment—is an ideal solution. This reduces the amount of space required for indication, reducing panel manufacturing and assembly time as well as hole count in the panel.

Conclusion: The Next Generation of Indicators

Programmable RGB indication solutions give your machines a clearer voice, give you control over your supply chain, and allow you to do more with fewer devices compared to traditional indicators. By improving the interaction between human workers and machines, the next generation of indicators are making human-machine collaboration more efficient and saving costs.

For more information on programmable RGB indication, visit www.bannerengineering.com/rgb