



Agile safety technology

# One safety application, countless variations

Batch-size-one construction of series-produced machines sounds like a contradiction. With a modular design, however, OEMs are able to offer each customer a machine tailored precisely to their needs at a competitive price. Unfortunately, this approach has proven problematic when safety technology gets involved. Until now, that is.



The trend toward product personalization is going stronger than ever. Automotive manufacturers lead the way, allowing their customers to pick and choose from a vast array of features and options until their car is virtually one-of-a-kind. Food and beverage as well as sporting goods producers are following suit with customization options of their own. Producing these goods requires machinery and processes with new levels of flexibility that place heightened demands not only on the hardware and software, but the safety technology as well.

#### **Modularity makes it possible**

OEMs can't afford to go back to the drawing board for every machine just to satisfy

special requests. Instead, they meet their customers' diverse requirements by offering each machine series with a variable set of options. They're able to do this by designing the machines with modular hardware and software.

From a safety standpoint, this unfortunately means that each variant represents an entirely unique machine that must be tested, maintained and certified separately. This is both costly and time consuming. On top of that, every changeover process that is automated adds to the number of axes and I/O modules required for the machine. "As you do this, the safety application grows more and more complex," ex-

plains Franz Kaufleitner, BSR's product manager for integrated safety technology. "For every machine function there is an underlying safety function." To be successful, manufacturers of machinery and equipment must therefore find a way to ensure safety without undermining productivity.

#### **Once-and-done verification**

The only way to achieve this is to make the safety application just as modular as the machine control software. BSR has developed a solution that does precisely that – built around a set of certified safety components that includes user interface templates as well as function libraries and services. The safety solution for a new



B&R's modular X20 system facilitates the construction of series-produced machines with countless options and variants.

machine series begins in B&R's universal engineering environment, Automation Studio, where this set of pre-certified components is used to program a single, maximum configuration that covers all of the options available for the machine. "This configuration may include 100 safety nodes, even if any given machine will seldom have more than 30 safe axes and I/O modules," notes Kaufleitner.

The safety application that corresponds to the machine's maximum possible configuration only needs to be tested and verified once. "This way, we cover all conceivable machine variants," says Kaufleitner, emphasizing the key advantage of B&R's solution over the traditional approach. He adds that "with conventional applications, each new machine configuration must be tested and verified individually." The impact of this is particularly severe when it comes to maintaining a multitude of safety applications. "With the variety of options offered on today's machines, maintenance costs can quickly take on monstrous proportions," says Kaufleitner. In contrast, B&R's solution leaves the OEM with only a single safety application to maintain for the entire machine series.

#### Easily enable or disable machine options

Not only that, but working with this modular safety application could

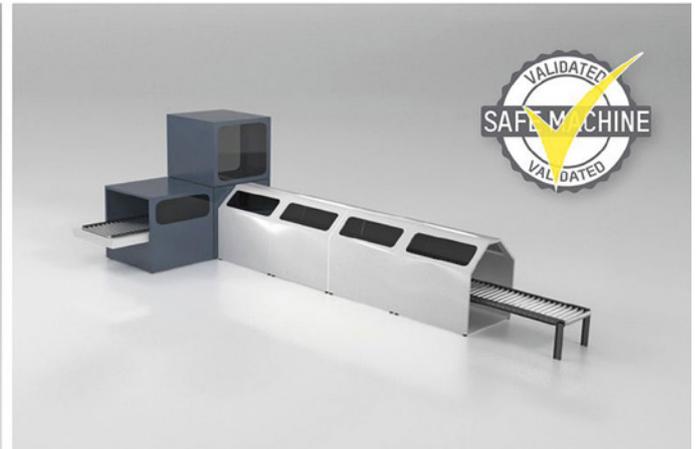
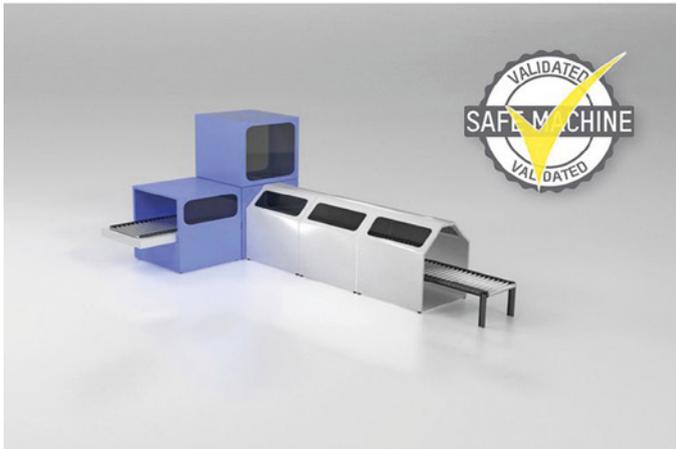
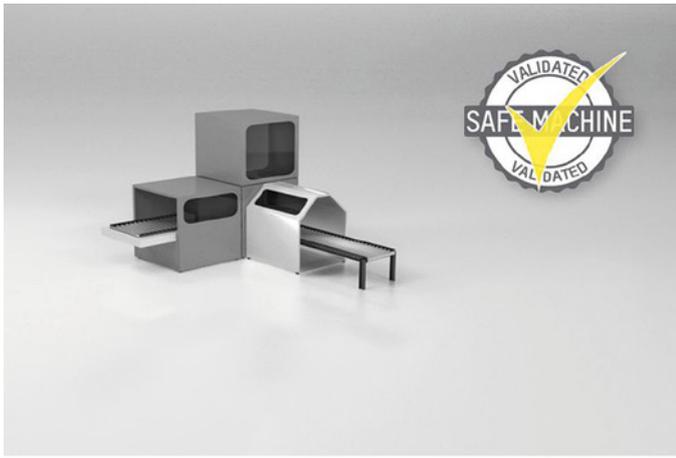
hardly be easier. Machine options with safety functionality, such as light curtains or safe drives, are simply selected or deselected in the configuration file created for the machine's maximum configuration. This can be done by the OEM prior to delivery, or set up by a service technician on the HMI screen during commissioning.

"Some of our customers have even integrated the generation of this XML file into their order management system," explains Kaufleitner. When the configuration file is copied to the safety control-

open   
**SAFETY**

#### Safe communication with openSAFETY

The safety protocol is no exception. It, too, must support the machine's modular architecture. That's why B&R bases its safety communication on openSAFETY, which operates over the real-time POWERLINK network.



Once the safety application has been tested, the results are valid for all variants of the machine.

ler, the system knows immediately which machine configuration it is dealing with and which options are available. In this case, all the on-site service technician has to do is confirm via the HMI screen that the configuration matches the actual machine. "There's no longer any need for a safety programming tool," says the B&R safety expert. "That's unprecedented in our industry."

Essential to this concept is the availability of a safety protocol that supports a modular machine architecture. "That's why we base our safety communication on openSAFETY," explains Kaufleitner, "which operates over the real-time POWERLINK network." To add a palletizer robot to a packaging machine, for instance, you would need only a single network cable to create a safe connection offering up to SIL3 / PL e / Cat. 4.

### Upgrade globally

With this solution, new machine options and the associated safety applications can be installed on site, anywhere in the world. B&R safety functions are certified through internationally recognized bodies such as TÜV Süd, Underwriter Laboratories (UL) and Germanischer Lloyd (GL). This makes machines more flexible and suitable for worldwide use, as well as reducing commissioning and changeover times.

All the service technician has to do is install the new mechanical component in the field and enable the corresponding configuration option via the machine's HMI panel. Alternatively, the machine manufacturer can generate an updated configuration file and send it to the customer on a flash drive along with the mechanical components. The customer then simply installs the components and runs the software update. "A machine builder in Germany can install a new function in India – safety technology and all – without ever having to send out a field technician," illustrates Kaufleitner. "With benefits like this, both OEMs and machine operators will find that B&R safety technology makes life a whole lot easier." ←



**Franz Kaufleitner**  
Product Manager –  
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"Safety technology must not undermine the productivity of machinery and equipment."