

“On-Machine” is a control design philosophy that moves the industrial controls and hardware closer to the application or on the machine while minimizing the number of components in the cabinet. Although many of these controls have always been on the machine, such as sensors, push buttons, tower lights and connection systems, the complete On-Machine strategy involves taking controls that are traditionally found in an enclosure and moving them out to the application as well.

Although the world outside the enclosure may not seem appropriate for many of today’s panel-based industrial controls, the ideal On-Machine component has several key features to enable this migration. Its housing is typically “hardened” to IP67 enclosure standards in order to withstand the harsh environments often found on the factory floor. It tends to be modular and compact in design, with plug-and-play electronic capabilities to ease installation and setup. It can be used as part of a flexible communication network including both standard and intelligent devices. On-Machine solutions are also connectorized for quick system assembly using IP67 connection systems instead of traditional wiring in conduit.

The obvious benefit of moving products out of an enclosure and putting them directly on the machine is the reduced panel space required for an On-Machine system. Secondly, the wiring system is greatly simplified because many connections between components can reside on the machine instead of running back and forth between enclosures. Although the purchase cost of individual components may be slightly higher, the reduction in wiring complexity is so substantial that the decreased wiring time and conduit installation costs make the overall solution more economical.

The end result: the larger and more complex the machine, the greater the potential savings during assembly. A recent study by a consortium of European manufacturers and machine tool technology groups concluded that On-Machine assembly costs are up to 30 percent less than conventional methods.

The features afforded by On-Machine components result in many other benefits, such as decreased systems troubleshooting and repair time as well as enhanced control system reliability—with prewired connection there is less manual wiring, resulting in reduced wiring errors and fewer wiring points to check. Plus, the plug-together connectorized components can often be installed by less technically-trained personnel, providing more flexibility with the workforce. Using plug-and-play components even simplifies design effort and engineering documentation.

On-Machine architectures also reduce the need for maintenance technicians and operators to access a control panel every time they have to check a connection or make an adjustment. Instead, they can efficiently isolate problems and replace a starter or I/O locally, rather than sorting through a complex panel. This gets the machine up and running again both faster and safer.

Startup and commissioning time also are critical, and On-Machine solutions can reduce both considerably. Due to the modularity and simplified connectivity of components, On-Machine designs allow OEMs to more cost efficiently build a machine at their site, pretest it and then disassemble it for transport to an end user’s plant.

Equally important for end users is the flexibility of being able to relocate equipment and make additions with relative ease.

The On-Machine approach also allows OEMs to provide standard product offerings once considered to be custom applications. In the material handling industry, for example, conveyors once sold as large customized systems can now be sold in standard ten-foot

sections. This allows for reduced OEM engineering, quicker delivery times and increased flexibility for the end user.



The migration to the On-Machine approach, like most industrial innovations, will be driven by economics as companies continue to refine their understanding of true assembly and installation costs. OEMs and end users will see different cost advantages depending on their particular industry and equipment environment.

The ability of these solutions to reduce wiring and system costs, improve Mean Time to Repair (MTTR), enhance control system reliability, increase productivity and promote flexibility will make On-Machine solutions a common strategy for reducing costs and increasing reliability of both OEM and end user control systems.



Allen-Bradley Drives