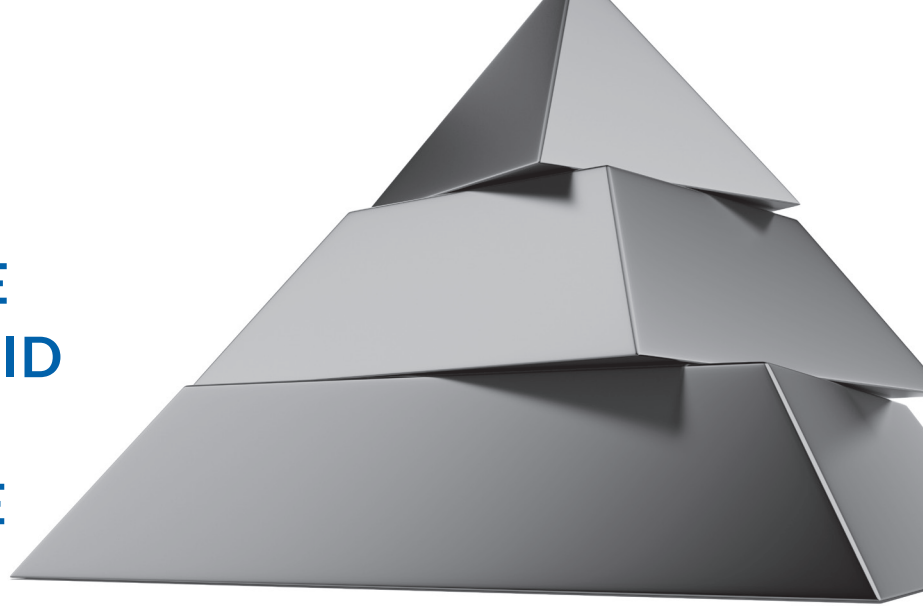# MachineDesign®

UNDERSTANDING THE AUTOMATION PYRAMID FOR IT LEVELS AND M12 CONNECTOR USE

Every level of automation has a particular set of requirements that help users select the product that has been certified to work for the specific needs they are trying to cover. This is particularly true when selecting connectors and cables.

Cables and connectors are critical components in every application, from single application to factory floor wiring. You'll want assurance that your connector and cable selection enable the proper use of sensors and controls at each level of operation so that you can leverage the full capabilities of every device in your system.

But first, understand that the automation level does not have anything to do with the quality of the cable or connector, only where and how it will be used. Each level of operation in the automation pyramid for connectors and cables must be robust enough to handle the placement and operation required for that particular job without over- or under-compensation, which can cost more plus lead to greater maintenance needs.

Level 0 is the field level. This level is the most often required due to the wide number of placements it is used in. The field level

indicates that it is used with transducers, sensors, and actuators—such as temperature, flow, and pressure sensors and valve and motion actuators—to collect production data so that operations can be monitored, and action commands can be executed.

5	Cloud Level
4	Enterprise Level
3	Planning Level
2	Supervisory Level
1	Control Level
	Field Level
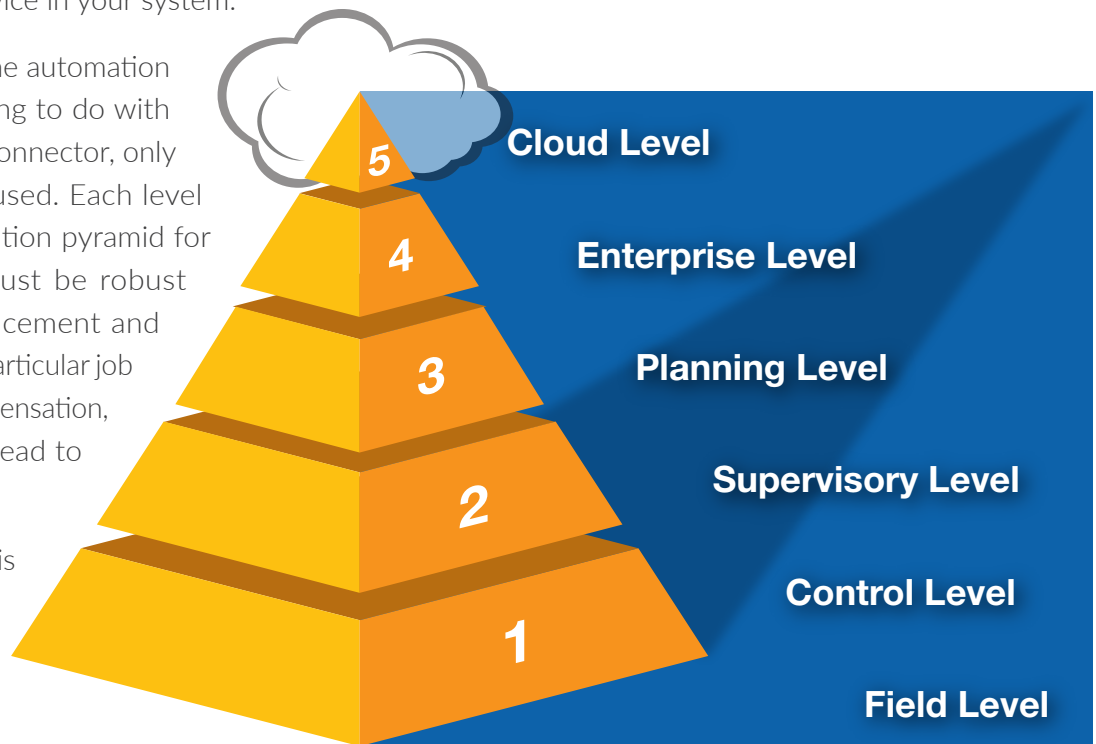
Level 1, the control level, is used to carry the infrastructure used in controlling and steering the devices, such as sensors and transducers, as designated in Level 0. The control level is where you will find interconnections with industrial control protocols such as Ethernet and Fieldbus, which translate data to actionable tasks using I/O modules.

Level 2 is the supervisory level, which pertains to the monitoring and supervision needed to acquire informational data with a process management system. This also means that data is collated properly, and that information gathered from processor nodes are used to provide operator control screens as well.

Level 3, the planning level, is also referred to as the production control level. This is where operations are used to monitor the entire manufacturing process so that planning can be completed through the computer management system.

Level 4, the enterprise level, pertains to the operational management level or production scheduling level of a facility. This includes a number of other interfaces, such as those for general production planning and order management through a company's enterprise resource planning system.

Level 5 is considered the cloud level and represents the highest level of the automation pyramid, where systems are integrated with the cloud as a hub for digital transformation of the factory.

Connectors and cables are a highly important part of any application or facility and must be able to withstand the specific characteristics of the job at hand, whether that be a harsh factory floor environment or a big-data interconnection for managing your business. Using the proper component means you'll avoid unnecessary maintenance and potential downtime.