

Smart Sensors with IO-Link



Enabling Smart Machines for The Connected Enterprise



LISTEN.
THINK.
SOLVE.

Visibility from Plant Floor to Front Office

Enabled by integrated control and information, The Connected Enterprise allows us to create a smarter, more productive and more secure environment. The Connected Enterprise facilitates the convergence of information technology and operations and the real-time information flow between them. Based on IO-Link technology, our portfolio of smart sensors and I/O are the foundation of integrated control and information, providing seamless visibility of field data through your Integrated Architecture® control system.

Enabling The Connected Enterprise with Integrated Control and Information



What is IO-Link?

IO-Link is a worldwide open-standard peer-to-peer serial communication protocol (IEC 61131-9) that allows sensors and actuators to easily integrate into The Connected Enterprise. Through IO-Link you can access all sensor configuration parameters, process data and diagnostics. You can go beyond detecting products on your machine – now you can MONITOR your machine’s health as it runs. Plus, IO-Link simplifies setup and commissioning while offering enhanced flexibility for your current – and future – processes.

By combining simple implementation with powerful data and diagnostics, smart sensors with IO-Link can optimize your machines today – and prepare them for the future – to increase your uptime and productivity.

Faster Time to Market



- Program sensors and the controller in the same software environment (Studio 5000® software)
- Intuitive programming simplifies initial setup and helps eliminate logic errors
- Seamless integration with the Rockwell Automation Integrated Architecture

Lower Total Cost of Ownership



- No incremental cost for IO-Link enabled sensors
- No wiring changes
- Scalable solution – enable IO-Link functionality as needed
- Fully-configurable sensors reduce your device inventory and streamline SKUs by 50%

Improved Asset Utilization



- Easy access to actionable, contextualized data that can help you maximize Overall Equipment Effectiveness (OEE) and Mean Time Between Failures (MTBF)
- Real-time diagnostics optimize preventative maintenance and troubleshooting, reducing issue resolution time by up to 90%
- Multiple profiles facilitate flexible manufacturing by reducing changeover time for each sensor from minutes to seconds

Enterprise Risk Management

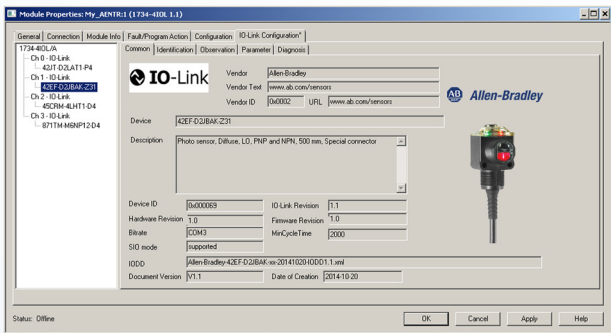
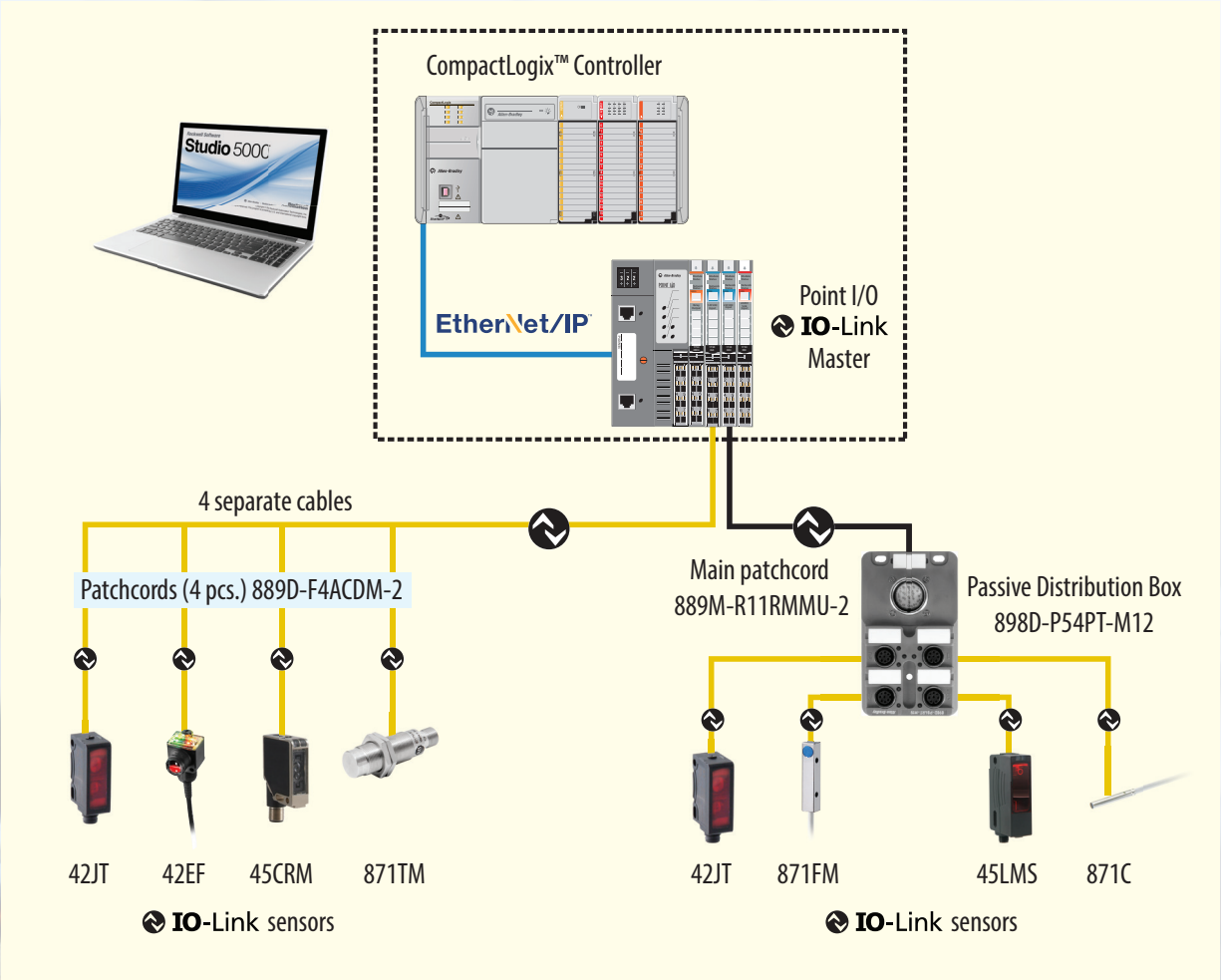


- Automatic Device Configuration (ADC) capabilities reduce errors upon sensor replacement
- Restrict configuration changes to authorized personnel only
- Ensure BOM compliance

Smart Sensors. Smart Machines. Smart Manufacturing.

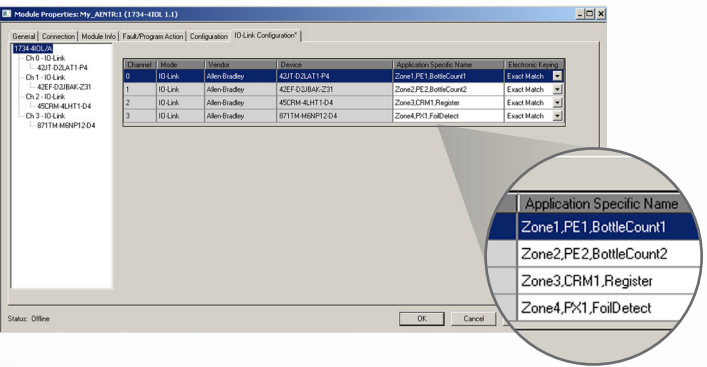
Our Integrated Smart Sensor Solution

When it comes to linking end point devices on the plant floor to The Connected Enterprise, Rockwell Automation offers a wide range of smart sensors that deliver information, advanced functionality and flexibility. All this while increasing efficiency machine- and plant-wide. These Allen-Bradley® sensors use IO-Link technology for visibility of field devices through our Integrated Architecture.



Premier Integration

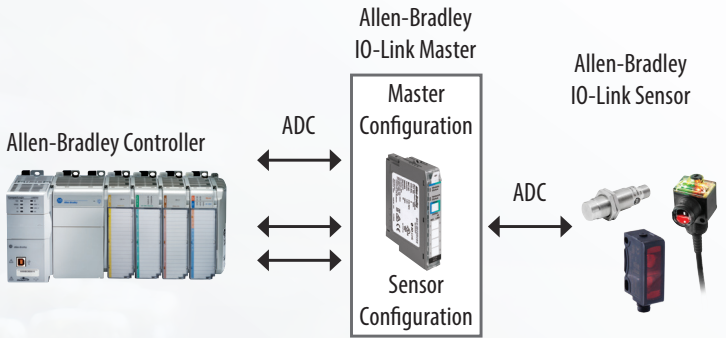
The Studio 5000 Logix Designer™ environment combines design and engineering elements in a single interface, enabling users to access IO and configuration data across the Integrated Architecture system.



Application Specific Names

With numerous sensors on a machine with the same catalog number, the Application Specific Name parameter makes it easy to identify the sensor during commissioning and for data collection over the lifetime of the machine.

871TM	My_1734_4IOL:1:I.Ch3.Triggered
	My_1734_4IOL:1:I.Ch3.MarginStatus
45LMS	My_1734_4IOL:2:I.Ch0.Distance
	My_1734_4IOL:2:I.Ch0.Triggered1
	My_1734_4IOL:2:I.Ch0.Triggered2
	My_1734_4IOL:2:I.Ch0.MarginLevel




Tag Naming for I/O Data

When Allen-Bradley sensors are integrated with an Allen-Bradley control system, I/O tag names are automatically generated, significantly reducing setup time and simplifying troubleshooting and maintenance.

Automatic Device Configuration (ADC)

Replacing IO-Link sensors or masters is easy. Simply remove the old Allen-Bradley IO-Link component and connect the new one – the controller will automatically send the configuration to the new device.


Allen-Bradley IO-Link Enabled Products



1734-4IOL IO-Link Master for Point I/O


- Enables connection of up to four devices (IO-Link enabled or standard I/O)
- Wired the same way as standard I/O
- Supported exclusively by 1734-AENTR series B Ethernet adapter

1734 POINT I/O™ I/O-Link Master



Photoelectric Sensors (42JT, 42EF)

- Sensor diagnostics minimize downtime by indicating when the sensor requires maintenance or replacement
- Unique product serial numbers help ensure that sensors are installed in the proper locations during commissioning
- Multiple teach modes (standard, precision and dynamic) allow the sensors to be set up quickly and easily to best suit the application




42JT VisiSight™ Sensor


42EF RightSight™ Sensor

Proximity Sensors (871TM, 871C, 871FM)


- Margin status helps optimize sensor installation for best performance
- On-delay/off-delay timing and event counter can be set directly in the sensor
- The internal temperature of the sensor is continuously measured and can be used for diagnostic or preventative maintenance



871TM




871C Miniature



Specialty Sensors (45CRM Color Registration, 45LMS Laser Measurement)

- Multiple sensor setups (profiles) can be stored to support manufacturing of different products/packages
- Location indication helps the user to pinpoint the sensor on the machine by temporarily increasing the flash of the diagnostic/status LEDs
- Local sensor settings can be locked when operating in IO-Link mode, preventing adjustments by unauthorized personnel

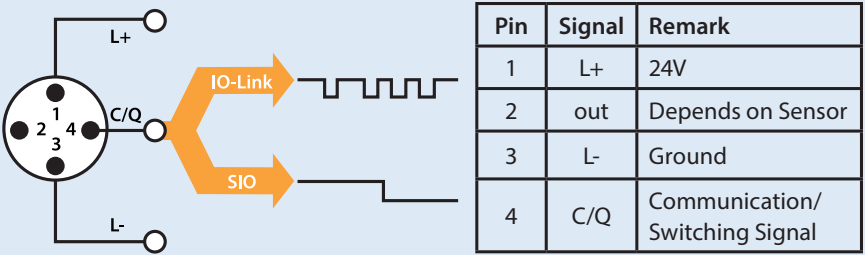


45LMS

45CRM

How Does IO-Link Work?

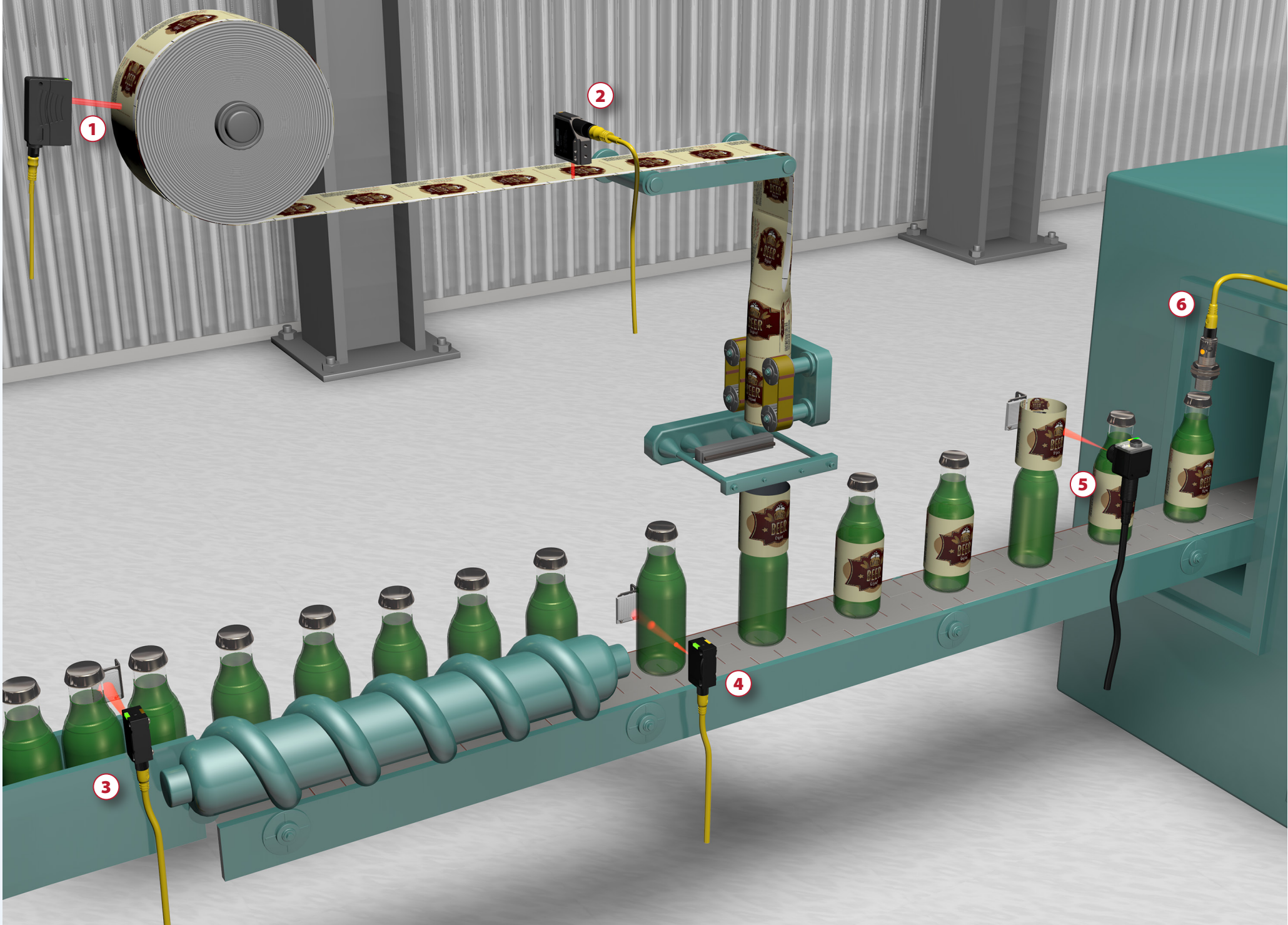
Sensors featuring embedded IO-Link act the same as the standard I/O sensors you're already using until connected to a master. But by interfacing these sensors with an IO-Link master, you can access all the advanced data and configuration capabilities IO-Link has to offer. This means you have the flexibility to install IO-Link sensors as standard I/O today and activate IO-Link functionality later – whenever and wherever you want it – without having to install costly new wiring or sensors.



Applying IO-Link

This example illustrates how IO-Link can change how you perceive and maintain your machine. Instead of using sensors to count/detect product, they can also provide valuable machine health information to prevent downtime while improving process efficiency.

Note: This example highlights only a few key functions and not all of those offered by IO-Link and the enabled sensors.



Product	Function	Key IO-Link Function	How Performed	Application Specific Name	Tag Name in Controller (Automatically Generated)
① 45LMS – Laser Measurement Sensor	Monitors label roll diameter	Multiple Profiles	Set up in controller to trigger on different rolls of film (and when a new roll is needed)	Zone2, LMS1, RollSize	My_1734_4IOL:1:I.Ch0.Distance My_1734_4IOL:1:I.Ch0.Triggered1 My_1734_4IOL:1:I.Ch0.Triggered2 My_1734_4IOL:1:I.Ch0.MarginLevel
② 45CRM – Color Registration Mark Sensor	Detects label web registration marks		Message instructions can configure the sensor to detect new packaging during line changes	Zone3, CRM1, Register	My_1734_4IOL:1:I.Ch1.Triggered
③ 42JT – Photoelectric Sensor A	Detects product leaving the accumulator	Automatic Device Configuration (ADC)	If a sensor is replaced with another compatible sensor, the controller will send the "golden" configuration to the new sensor	Zone1, PE1, Bottle Detect1	My_1734_4IOL:1:I.Ch2.Triggered My_1734_4IOL:1:I.Ch2.MarginLowAlarm
④ 42JT – Photoelectric Sensor B	Detects product for label placement			Zone1, PE2, BottleDetect2	My_1734_4IOL:1:I.Ch3.Triggered My_1734_4IOL:1:I.Ch3.MarginLowAlarm
⑤ 42EF – Photoelectric Sensor	Detects improperly placed label sleeves	Low Margin Alarm	Monitors sensor operating margin to check for diminishing performance due to a dirty lens. If the lens becomes dirty it will notify the system that cleaning is recommended BEFORE the sensor fails to detect material	Zone2, PE2, LabelDetect	My_1734_4IOL:2:I.Ch0.Triggered My_1734_4IOL:2:I.Ch0.MarginLowAlarm
⑥ 871TM – Inductive Proximity Sensor	Monitors presence of the bottle cap	Sensor Health	If sensor head is damaged, the controller receives a report that the sensor has failed and IO data is compromised	Zone4, PX1, CapDetect	My_1734_4IOL:2:I.Ch1.Triggered My_1734_4IOL:2:I.Ch1.MarginStatus



Local Distributor

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The Connected Enterprise

Learn more about the Connected Enterprise transforms real-time data, from intelligent assets and multi-disciplined control from a plant, or a remote site into actionable information.
www.rockwellautomation.com/go/lit/ce



Product Selection Toolbox

Our powerful range of product selection and system configuration tools assist you in choosing and applying our products.
www.rockwellautomation.com/en/e-tools



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