



On-Machine™ Solutions

Selection Guide



Allen-Bradley

**Rockwell
Automation**





On-Machine™ Solutions

Using this guide correctly. . .

This document will help you choose components for your On-Machine™ solutions. The process on pages 6 and 7 highlights an approach to defining and selecting components to meet your application needs.

Each section includes a brief list of considerations to aid in your product selection. In each instance, we've explained the product and its connectivity to other products. If more product information is needed, check the references listed at the bottom of each "Considerations" page.



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On-Machine™ Solutions

An Approach to Application

On-Machine™ solutions are based on a machine control design philosophy that moves industrial controls and hardware closer to the application or on the machine. Many controls have always been on the machine, such as sensors, pushbuttons, tower lights and connection systems, but what's changing is the number and type of products that are moving closer to the application. These products feature enhanced environmental characteristics, as well as modular designs and plug-and-play electronic capabilities. This allows for increased speed of installation and simplicity of control applications. The combination of the On-Machine philosophy and the types of products being developed for these applications provides excellent benefits for OEMs and end users alike.

Ease of Design

Fewer prints to draw, less layout and less customization all lead to decreased time and money to develop solutions. Using On-Machine technology is one of the most effective ways to accelerate design time. This is an area that often surprises machine builders. Most builders don't realize how much time was spent in this area until it is dramatically reduced.

Re-Useable Solutions

Some customers compare the On-Machine approach to that of an erector set. Pull parts off the shelf, snap them together, and it's done.

This allows OEMs to provide standard product offerings once considered to be customized solutions. In the material handling industry, for example, conveyors that 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.

Quicker Installation with Fewer Mistakes

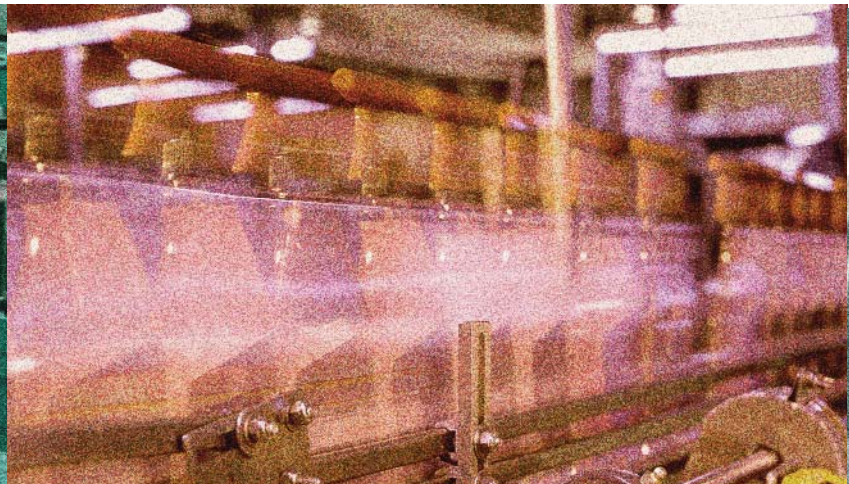
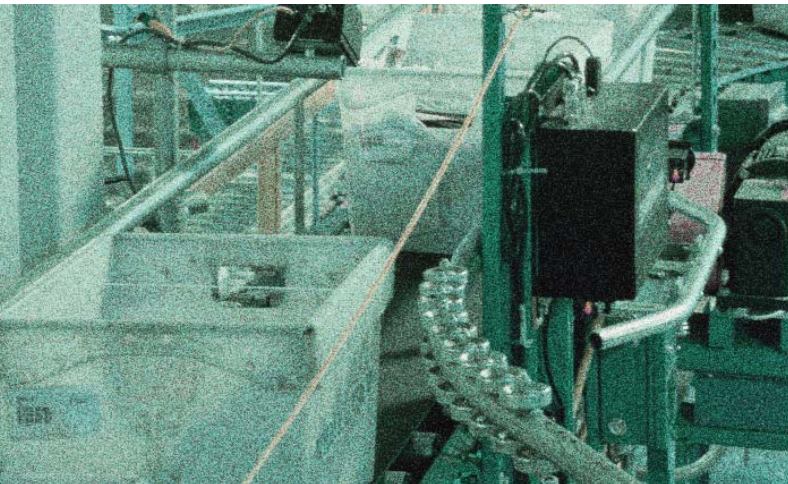
A recent study by a consortium of European manufacturers and machine tool technology groups concluded that On-Machine assembly costs are up to 30 percent less than conventional methods. This is created by both the On-Machine approach as well as the product technology that is most often used in these solutions. These product features include enhanced environmental characteristics, modular designs and plug-and-play electronic capabilities.

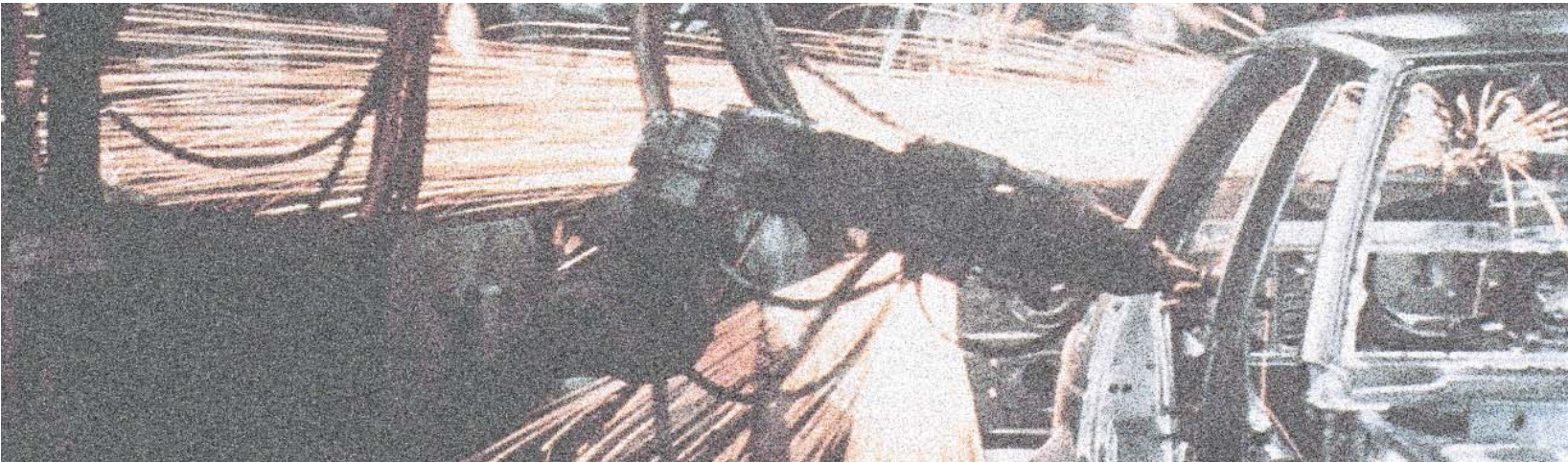
Re-Configurability

We know the difficulties that can be encountered with change orders. The project is halfway complete and something has to be done differently. No need to redesign the panel, run new pipe and re-terminate wires that have already been run. Simply add the desired component and go.

Simplified Testing

Because of the greatly reduced number of wiring terminations associated with On-Machine solutions, testing is much simpler. On-Machine designs allow OEMs to more cost-efficiently build a





machine at their site, pre-test it and then disassemble it for transport to an end user's plant. Both OEMs and end users find testing quicker and with lower probability of mistakes.

Reliability

On-Machine solutions can minimize wiring errors because wiring is pre-manufactured with quick-disconnect features. With less manual wiring involved, there are fewer points of failure. Some studies suggest that a large portion of system failures come from installation rather than part failures. The decrease in errors associated with pre-manufactured wiring leads to an increase in the overall reliability of the control system. In the end, this helps speed installation and commissioning, maintenance, troubleshooting, and ultimately boosts a plant's production.

Faster Maintenance/Repair

On-Machine architectures eliminate the need for maintenance technicians and operators to access a control panel every time they have to check a connection or make an adjustment. With the simplicity of wiring layout and connections, end users can efficiently isolate problems and replace a starter or I/O locally, rather than sorting through a complex panel. The result is significantly easier troubleshooting and shorter Mean-Time-To-Repair (MTTR).

Increased Available Floor Space

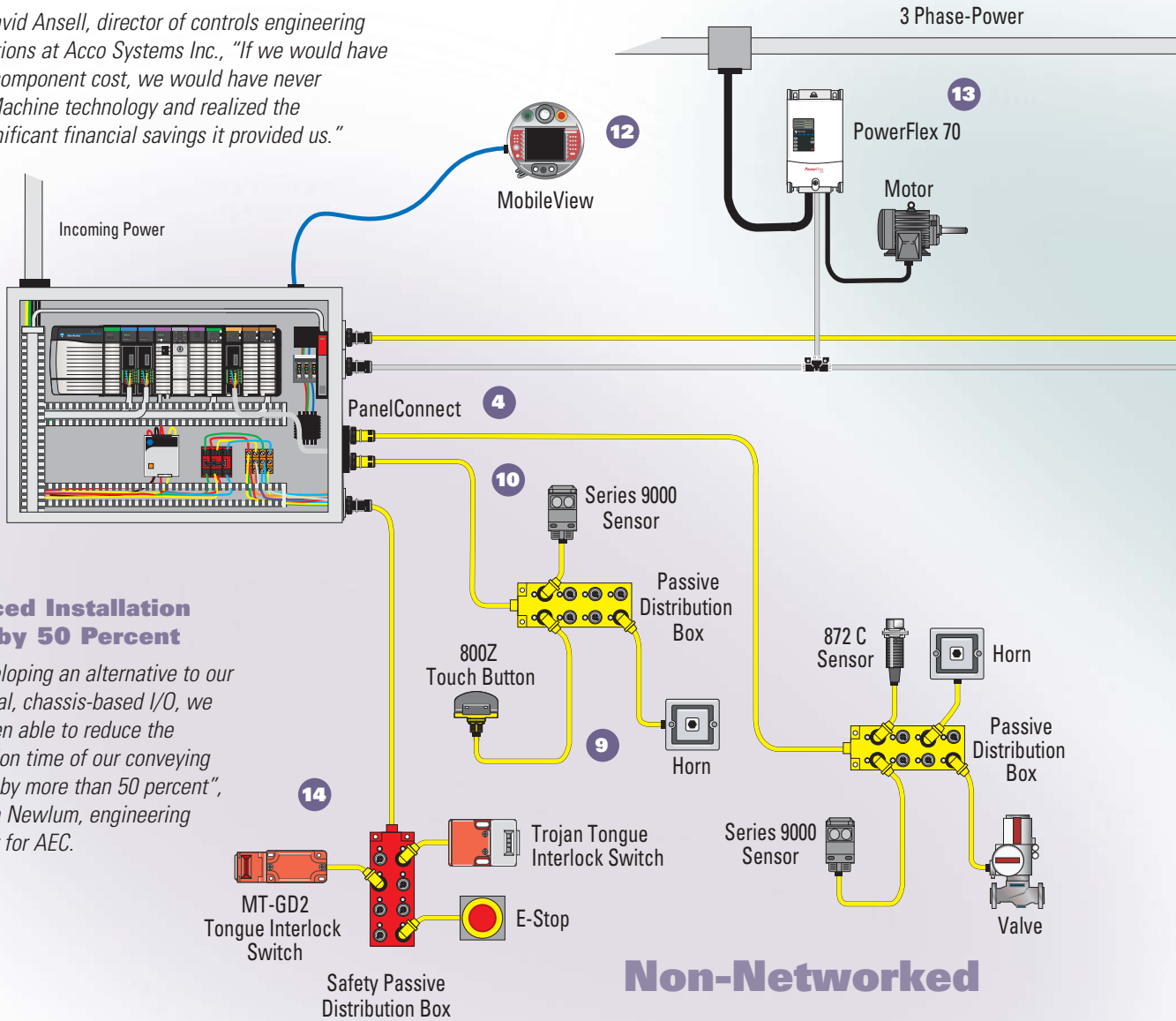
Control cabinets can occupy a substantial amount of the production floor. The On-Machine approach dramatically reduces the need for that real estate, allowing companies to leverage more of their facility. Industries like semiconductor and pharmaceutical manufacturing have realized the benefits of the On-Machine approach for years, as their clean-room space is at a premium.



Non-Networked/Networked On-Machine Solutions

Surprisingly Significant Financial Savings

According to David Ansell, director of controls engineering and field operations at Acco Systems Inc., "If we would have just compared component cost, we would have never embraced On-Machine technology and realized the surprisingly significant financial savings it provided us."



Reduced Installation Time by 50 Percent

"By developing an alternative to our traditional, chassis-based I/O, we have been able to reduce the installation time of our conveying systems by more than 50 percent", says Ron Newlum, engineering manager for AEC.

Non-Networked

Products Ideally Suited for On-Machine Applications

1 Control Tower Stack Lights, Beacons & Horns

Visual and audio indication to enhance safety and increase productivity in your environment

2 800Z Touch Button

Quick Disconnect or pre-cabled

3 DeviceNet Push Button Stations

Allen-Bradley fully-assembled DeviceNet push button stations satisfy environments of light industrial or instrument grade applications

4 PanelConnect

The next generation of plug-and-play interface modules that offer a simple connection through an enclosed cabinet wall

5 ArmorPoint I/O

Modular I/O system with thirty module types. Its tight coupling with ArmorStart and its multi-network support provides additional flexibility for a variety of applications

6 ArmorBlock I/O

Ideal for machinery applications where only input and output status are necessary

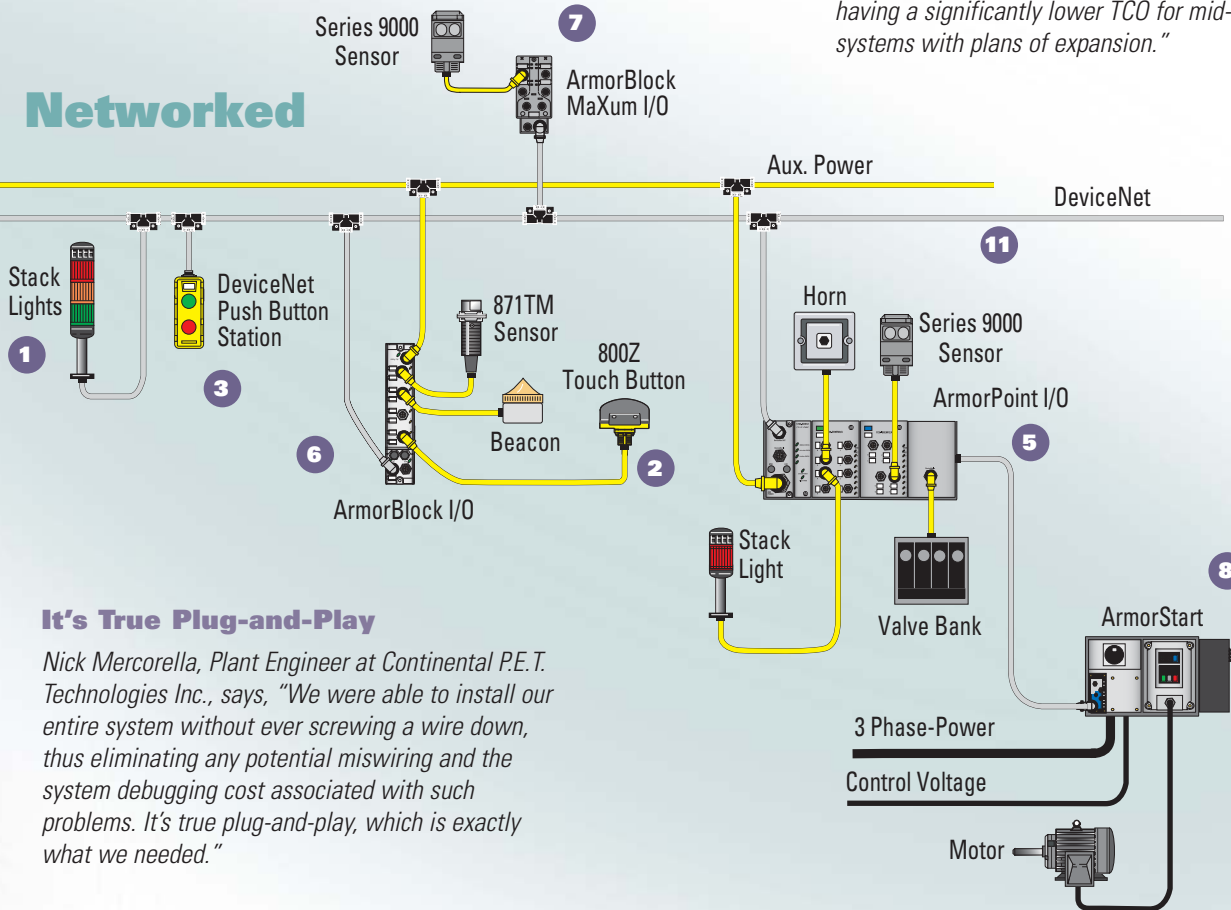
For more information about On-Machine solutions, visit

www.ab.com/onmachine

Significantly Lower TCO (Total Cost of Ownership)

As Ron Newlum at AEC says, "While we have an excellent chassis-based I/O solution with a lower initial acquisition cost, our new [On-Machine] solution ends up having a significantly lower TCO for mid-size to large systems with plans of expansion."

Networked



It's True Plug-and-Play

Nick Mercorella, Plant Engineer at Continental P.E.T. Technologies Inc., says, "We were able to install our entire system without ever screwing a wire down, thus eliminating any potential miswiring and the system debugging cost associated with such problems. It's true plug-and-play, which is exactly what we needed."

7 ArmorBlock MaXum I/O

Excellent for applications when diagnostics and local control are required

8 ArmorStart

An integrated, pre-engineered combination starter for both full voltage, reversing, and variable frequency AC drive applications

9 Connection Systems

A broad offering of rugged cordsets, patchcords, Y-cables, distribution boxes and field-attachable connectors to suit a range of environments from light-duty conveyor applications to automotive welding installations

10 Sensors

The industry's largest selection of presence sensing devices offers one-stop shopping for photoelectric sensors, limit switches, proximity sensors and encoders

11 Network Media

When low node costs, multi-vendor device support and hard wiring replacements are key, turn to Allen-Bradley network media for ControlNet and DeviceNet applications. The products help speed setup of your network to lower system costs and reduce maintenance time

12 MobileView

Operators save time by receiving and sending information from the location where work is performed

13 PowerFlex 70

PowerFlex 70 NEMA 4X AC Drive features a UL-listed and IP66-rated enclosure that protects against high-pressure water spray, corrosion and circulating dust

14 Machine Safety

The broadest line of safety components in the world, teamed with first-class safety systems and services

Suggested On-Machine Selection Process

When developing your On-Machine Solution, there are many control system needs to be considered. Taken in numerical order, the process below suggests one approach to building an On-Machine system. Refer to the numbered Selector sections below for help choosing the components that are appropriate for your particular On-Machine application.



Step 1

Select Sensors

What do you want to detect or control? See page 8 to choose the right sensor for your application.



Step 2

Select ArmorStart

Need motor control? Minimize installation and wiring costs with an ArmorStart motor controller. See page 10.



Step 3

Select I/O

Check pages 12–13 to reduce installation and maintenance with robust I/O.



Choosing the Best Cabling Option for Your Application

As you proceed through this Selection Guide, you'll realize that there may be more than one way to develop an On-Machine solution. Control systems can be placed on the machine, near the machine, or distributed throughout the workplace to meet the flexibility and reliability that your production requires.

A fundamental benefit of On-Machine systems is the simplicity and ease with which the components are connected together, no matter where they're located. Your system can be non-networked, or networked, or simply plugged together with pre-engineered cables. Or it can be a hybrid system, using what's best for a specific application.

With the variety of cabling options available it is important to keep the following considerations in mind when selecting the components for your application:

Number, location and concentration of field devices

If there are only a few field devices, a **non-networked solution** may be the simplest and most effective solution. In the case of machines with higher device counts, a **connector-based solution** could prove to be the easiest to apply and troubleshoot. Those applications with high I/O counts and devices concentrated in key areas may benefit from the same connector-based solution, but with local

hardened terminal blocks. For installations with many devices distributed over distances, a **networked approach** may prove most suitable.

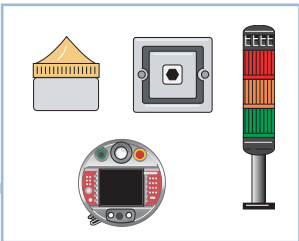
Environment

Consider the environment to which your field devices (and therefore the cabling system) will be exposed. Applications where washdowns or corrosive materials are common will require all devices and the associated cabling to be IP67-rated or have stainless steel hardware. For machines installed in relatively clean, less severe environments, open-style connectors and terminal blocks may be appropriate. If temperature extremes are an

For more information about On-Machine solutions, visit

www.ab.com/onmachine

Other products ideally suited for On-Machine applications



For information regarding the products below, see page 22:

- Control Tower Stack Lights, Beacons and Horns
- 800Z Zero Force Touch Buttons
- MobileView HMI
- PowerFlex 70 Drive
- Machine Safety



Controller



Step 4

Select PanelConnect

Need access to a Programmable Controller (PLC) or special I/O inside a plant-floor panel? PanelConnect lets you easily fit into the robust On-Machine environment. See pages 14–17. Cables for proper PLC I/O module and field device connection to PanelConnect are also listed here.

Step 5

Select Cables

Your On-Machine solution can be hardwired or a plug-and-play installation with rugged cordsets and patchcords (see page 18). See below for some insights into the importance of connectivity to your On-Machine solution.

issue, the need for high-or low-temperature control components may dictate the selection of a wiring solution.

Machine sections and their locations

Many large machines are built in sections and disassembled for shipment only to be reassembled on site. These machines generally need modular wiring solutions. Plug-and-play wiring systems allow for the simplest commissioning/re-commissioning of the control system on the plant floor with minimum marshalling and wiring errors.

Standard vs. networked solutions

Standard wiring solutions can satisfy just about every need, and address the bulk of industrial control applications. But there are instances where system feedback and enhanced diagnostics are a must. In these cases networks such as ControlNet and DeviceNet (both of which have their own topographies and media types) must be considered.

Safety vs. non-safety installations

When installing a machine safety system, there are special wiring practices and considerations that must be employed. The Allen-Bradley Safety Connection System is a connector-based system designed specifically for safety applications. See page 22 for more information.

Special considerations

To choose the best On-Machine wiring scheme, it is important to take other characteristics into account for the cabling components. For example, component selection and installation may be impacted by the need for high-flex cable in motion applications, several device connection options, different routing paths and available space, among other factors.

STEP 1 - SENSORS



What kind of application are you building?

When selecting sensors, note that some sensor types are definitely better for some applications. Consider recommended sensors for your application and choose sensors that integrate well to complete a system that provides optimum performance and productivity. Remember — sensors and actuators are a very important part of the control system.

Considerations for Sensor Selection

What are you sensing or monitoring?

There are a lot of considerations when selecting the right sensor. Are you detecting or controlling a solid or liquid? Metal or non-metal? Often there's more than one sensor technology that can do the job.

How fast do you need to sense it?

Not all sensors work as well in the same high-speed application. But maybe you don't need to keep an accurate count, just detect a presence. Keep an eye on the "response time" of a photoelectric sensor or the "switching frequency" of a proximity sensor to be sure.

What's the environment for the sensor?

Is your application in a hot and dusty location? Does a production cycle involve temperature extremes? Do you need to "wash down" the machine on a regular basis? Check out the "operating temperature" and "operating environment enclosure rating" for your sensor before you choose. For very hot environments (up to 500°F), consider glass fiber optic cables.

Is distance from the item sensed a consideration?

The item may travel slowly enough or be close enough to trip a limit switch. Or perhaps you can't get closer than one meter and need to use a photoelectric sensor.

Is physical size of the sensor a limitation?

Your packaging machine only has room for a small sensor mounted in a unique position. Small package sizes are available. For the smallest spaces, consider using a remote sensor with a fiber optic cable.

Resources

The sensor selector tables (next page) will be helpful, but if you need additional information about available Allen-Bradley sensors, check these Rockwell Automation sources:

Sensors Today Magazine, publication GSM900-BR001

Sensors Catalog, publication C114-CA001

Technology Selection Guide
(<http://www.ab.com/sensors/selectguide/index.html>)

Navigating the Maze of Proximity Sensor Selection
(http://www.ab.com/sensors/sensortoday/jun99/jun99_cover.html)

<http://www.ab.com/sensors>

Selecting Sensors for On-Machine Solutions

As the previous “Considerations” list showed, almost every application starts with the need to sense or monitor something. While sensor selection can be complex, the following tables offer some insight. The sensor types listed below the colored bar are recommended for the applications listed. Following the application table below, additional tables then show the recommended specific Allen-Bradley sensor(s) for each application.

Application	Sensor					
	Limit Switch	Encoder	Ultrasonic	Capacitive Proximity	Photoelectric	Inductive Proximity
Motion Control		■				
Liquid Level			■	■	■	
Solids Level			■	■	■	
Print Mark					■	
Clear Object Detect			■	■	■	
Contact	■					
Metal					■	■
Non-metal			■	■	■	

Sensors for Motion Control	Sensor	
Application	Type	Bulletin No.
Robotics/Positioning	Absolute Encoder	842A, 845D, 845G
Machine Tool/Packaging or Speed Control	Incremental Encoder	845F, H, P, T, PY 844A, 844B, 844D

Sensors for Liquid Level Detection	Sensor	
Application	Type	Bulletin No.
Detect Level from Top	Ultrasonic Sensor	873C, 873P
	Liquid Level and Resistance Sensing	13DJ3-3000
Detect Level Through Tank Wall	Capacitive Sensor	875CP, 875C
Detect Level Through Sight Glass	Photoelectric Sensor	Transmitted Beam or Reflex
	Capacitive Sensor	875C, 875CP

Sensors for Solid Level Detection	Sensor	
Application	Type	Bulletin No.
Detect Level from Top	Ultrasonic Sensor	873P, 873C
	Photoelectric Sensor	Standard Diffuse
Detect Level Through Tank Wall	Capacitive Sensor	875CP
Detect From 2 Sides	Capacitive Sensor	875C, 875CP
	Photoelectric Sensor	Through Beam

Sensors for Print Mark Detection	Sensor	
Application	Type	Bulletin No.
Detect Print Mark	Photoelectric Sensor	42CRC, 42FVL, 42KL F/F, 7000 F/F 45LFM, 45LPT

Sensors for Clear Object Detection	Sensor	
Application	Type	Bulletin No.
Very Humid Environment	Photoelectric Sensor	42GRC, 42GTGC
Dry Clean Environment, object at 1m Max.	Ultrasonic Sensor	873C, 873P
	Photoelectric Sensor	42GRC, 42EF-C2, 42GTGC
Dry Clean Environment, object very close	Capacitive Sensor	875C, 875CP

Sensors for Detection by Contact	Sensor	
Application	Type	Bulletin No.
Contact	Limit Switch	802M, 802MC, 802T, 440P, 802B

Sensors for Detecting Metal/Non-metal Objects	Sensor	
Application	Type	Bulletin No.
Metal Object at Distance from 0mm to 50mm	Inductive Sensor	See Note Below
Non-metal Object at Distance from 0mm to 30mm	Capacitive Sensor ¹	See Note Below
Object at Distance from 0mm to 100 Meters	Photoelectric Sensor ²	See Note Below
	Ultrasonic Sensor ³ (up to 10 Meters)	See Note Below

NOTE: When detecting metal/non-metal objects, the selection of technology will depend on the characteristics of the object and on its detectability by the sensing technology.

¹ Best selection where sensing distances are short, contact sensing is not appropriate and use of inductive or photoelectric sensors is not practical. Also best when trying to sense one material through another (i.e., liquid level through a sight glass or product through a box).

² Most reliable non-contact sensing technology for non-metal targets with sensing distances too long for inductive sensors. If configuration does not allow a 2-piece transmitted beam pair, consider retroreflective photoelectric sensing. If configuration does not allow for reflector mounting, consider diffuse photoelectric sensing. If target surface reflectivity/color varies over time or if the environment is too dusty/dirty for diffuse sensing, consider capacitive sensors for short non-contact sensing, ultrasonic sensors for long non-contact sensing or limit switches for short sensing distances with contact.

³ Best selection where sensing distances are large and use of photoelectric sensors is not practical. Ideal selection for monitoring level from above, but mounting critical.

Contact your distributor specialist or Rockwell Automation sensor area manager with additional application questions.

STEP 2 - ARMORSTART



What is an ArmorStart controller?

ArmorStart Distributed Motor Controllers offer a simple, cost-effective method for integrating combination starters, variable frequency control, I/O and network capabilities in your On-Machine architecture. With an ArmorStart controller, you profit and benefit from lower installation costs, reduced engineering time and ease of maintenance/plant operation savings.

Considerations for ArmorStart Motor Controller Selection

What overload current protection is needed?

The Bulletin 280/282 offers selectable trip class settings (Class 10, 15 and 20). The Bulletin 284 offers Class 10 as standard to operate for a variety of applications.

Can the ArmorStart controller operate without a communication network?

The ArmorStart can be used in stand-alone application provided 24V DeviceNet power is supplied. DeviceLogix must be programmed if the use of the inputs and/or outputs is required. DeviceLogix is a stand-alone Boolean program that resides within the

ArmorStart. For example, the input of the ArmorStart can be pre-programmed to control the start/stop of the motor. You should also be familiar with RSNetworx for DeviceNet.

What's the contactor control voltage?

Choices include 24 VDC, 110VAC and 240VAC. The 24VDC is the most common and is considered the international voltage option. The 240VAC is primarily used outside the U.S.

Does your application require a reversing starter?

If your control scheme doesn't include a reversing motor, you can save by not specifying a reversing starter.

Do you need local start/stop control?

The optional Hand/Off/Auto keypad allows for local start and stop control at the ArmorStart controller for stand-alone control if the network communications are disrupted.

What about adding a motor drive to ArmorStart?

The Bulletin 284 ArmorStart Distributed Motor Controller using PowerFlex Technology offers both Volts per Hertz (Sensorless Vector Performance) and Sensorless Vector Control (SVC). This allows for flexibility in product selection based on the application requirements.

Resources

The selector tables (next page) will be helpful, but if you need additional information about available Allen-Bradley ArmorStart motor controllers, check this Rockwell Automation source:

Minimize Installation Costs with a Robust Machine-Mounted Motor Controller, publication 280-SG001

Selecting ArmorStart Motor Controllers

Once the overload protection range is determined and the control voltage is specified, the recommended ArmorStart controller is listed below the colored bar.

	Overload Selection Current Range 0.5A - 2.5A					
	24VDC Control Voltage		120VAC Control Voltage		240VAC Control Voltage	
	ArmorStart Motor Controllers					
Full-Voltage Combination Starter	280D-F12Z-10B-CR		280D-F12D-10B-CR		280D-F12B-10B-CR	
Keypad Option	HOA	HOA w F/R	HOA	HOA w F/R	HOA	HOA w F/R
Reversing Combination Starter	281D-F12Z-10B-CR		281D-F12D-10B-CR		281D-F12B-10B-CR	
Keypad Option	HOA	HOA w F/R	HOA	HOA w F/R	HOA	HOA w F/R

	Overload Selection Current Range 1.1A - 5.5A					
	24VDC Control Voltage		120VAC Control Voltage		240VAC Control Voltage	
	ArmorStart Motor Controllers					
Full-Voltage Combination Starter	280D-F12Z-10C-CR		280D-F12D-10C-CR		280D-F12B-10C-CR	
Keypad Option	HOA	HOA w F/R	HOA	HOA w F/R	HOA	HOA w F/R
Reversing Combination Starter	281D-F12Z-10C-CR		281D-F12D-10C-CR		281D-F12B-10C-CR	
Keypad Option	HOA	HOA w F/R	HOA	HOA w F/R	HOA	HOA w F/R

	Overload Selection Current Range 3.2A - 16A					
	24VDC Control Voltage		120VAC Control Voltage		240VAC Control Voltage	
	ArmorStart Motor Controllers					
Full-Voltage Combination Starter	280D-F23Z-25D-CR		280D-F23D-25D-CR		280D-F23B-25D-CR	
Keypad Option	HOA	HOA w F/R	HOA	HOA w F/R	HOA	HOA w F/R
Reversing Combination Starter	281D-F23Z-25D-CR		281D-F23D-25D-CR		281D-F23B-25D-CR	
Keypad Option	HOA	HOA w F/R	HOA	HOA w F/R	HOA	HOA w F/R

NOTE: Add following suffix to above catalog numbers when purchasing keyboard option: 3 (Hand-Off-Auto Selector Keypad); 3FR (Hand-Off-Auto Selector Keypad with Forward/Reverse)

Starting Mode	Motor HP	200-240 V, 50/60 Hz, 3-phase		
		24V dc Control Voltage	120V ac Control Voltage	240V ac Control Voltage
		ArmorStart Motor Controllers		
Volts per Hertz	0.5	284D-FHB2P3Z-10-CR	284D-FHB2P3D-10-CR	284D-FHB2P3B-10-CR
	1.0	284D-FH-B4P5Z-10-CR	284D-FHB4P5D-10-CR	284D-FHB4P5B-10-CR
	2.0	284D-FHB7P6Z-25-CR	284D-FHB7P6D-25-CR	284D-FHB7P6B-25-CR
Sensorless Vector Control	0.5	284D-FVB2P3Z-10-CR	284D-FVB2P3D-10-CR	284D-FVB2P3B-10-CR
	1.0	284D-FVB5P0Z-10-CR	284D-FVB5P0D-10-CR	284D-FVB5P0B-10-CR
	2.0	284D-FVB7P6Z-25-CR	284D-FVB7P6D-25-CR	284D-FVB7P6B-25-CR

Starting Mode	Motor HP	380-480 V, 50/60 Hz, 3-phase		
		24V dc Control Voltage	120V ac Control Voltage	240V ac Control Voltage
		ArmorStart Motor Controllers		
Volts per Hertz	0.5	284D-FHD1P4Z-10-CR	284D-FHD1P4D-10-CR	284D-FHD1P4B-10-CR
	1.0	284D-FHD2P3Z-10-CR	284D-FHD2P3D-10-CR	284D-FHD2P3B-10-CR
	2.0	284D-FHD4P0Z-10-CR	284D-FHD4P0D-10-CR	284D-FHD4P0B-10-CR
	3.0	284D-FHD6P0Z-25-CR	284D-FHD6P0D-25-CR	284D-FHD6P0B-25-CR
	5.0	284D-FHD7P6Z-25-CR	284D-FHD7P6D-25-CR	284D-FHD7P6B-25-CR
Sensorless Vector Control	0.5	284D-FVD1P4Z-10-CR	284D-FVD1P4D-10-CR	284D-FVD1P4B-10-CR
	1.0	284-FVD2P3Z-10-CR	284D-FVD2P3D-10-CR	284D-FVD2P3B-10-CR
	2.0	284-FVD4P0Z-10-CR	284D-FVD4P0D-10-CR	284D-FVD4P0B-10-CR
	3.0	284D-FVD6P0Z-25-CR	284D-FVD6P0D-25-CR	284D-FVD6P0B-25-CR
	5.0	248D-FVD7P6Z-25-CR	284D-FVD7P6D-25-CR	284D-FVD7P6B-25-CR

STEP 3 - I/O

Allen-Bradley I/O for On-Machine Solutions

As you will see, there are three families of I/O available for On-Machine solutions. The **ArmorPoint** modular I/O system has 30 module types. Its tight coupling with ArmorStart motor controllers (see page 10) and multi-network support provides additional flexibility for a variety of applications. **ArmorBlock** I/O is ideal for machinery applications where only input and output status is necessary. **ArmorBlock MaXum** I/O is excellent for applications when diagnostics and local control are required.



Considerations for I/O Selection

What controller and field devices will be connected to this I/O?

The controller platform and overall architecture are important performance considerations to properly configure your On-Machine solution. I/O modules must be able to communicate with the sensor. In Step 1, you selected a sensor for your application. Knowing the electrical specifications and characteristics of that sensor will help define the correct I/O module.

What I/O product groups provide the electrical characteristics, communication interfaces and connector types that your On-Machine application needs?

As presented above, three I/O product families are ideally suited for On-Machine applications. Check the I/O selector on the next page to find the modules that best apply to your control system and interface readily with the sensor or field device selected earlier.

Do the field devices sense something or do they apply control?

If the devices sense something and provide a signal, they will need an input module. If they apply control, an output module is needed.

Resources

The I/O selector table on the next page will be helpful, but if you need additional information about available Allen-Bradley modules, check these Rockwell Automation sources:

Allen-Bradley I/O Module Brochure, publication ACIG-BR002

ArmorPoint I/O Product Profile, publication 1738-PP001

ArmorBlock I/O Product Profile, publication 1732-PP001

ArmorBlock MaXum I/O Product Profile, publication 1792D-PP001

<http://www.ab.com/io>

Selecting I/O Modules

Knowing the electrical and connector specification for the most appropriate sensor, you can now select the needed I/O module (i.e., digital input, 24V DC sinking, with M8 connector — in this example, it's the 1738-IB8M8 module). Reading across the columns with the matching specifications, the correct module is listed under the colored bar.

I/O Module Type			I/O Connectors		
Input	Output	Other	Number	Type	I/O Module
Analog					
24V dc Current, 2-point			2	DC Micro (M12)	1738-IECM12
24V dc Voltage, 2-point			2	DC Micro (M12)	1738-IE2VM12
	24V dc Current, 2-point		2	DC Micro (M12)	1738-OE2CM12
	24V dc Voltage, 2-point		2	DC Micro (M12)	1738-OE2VM12
Digital					
24V dc sink, 8-point			4	DC Micro (M12)	1738-IB8M12
24V dc sink, 8-point			8	Pico (M8)	1738-IB8M8
24V dc sink, 8-point			1	M23	1738-IB8M23
24V dc sink, 4-point			4	DC Micro (M12)	1738-IB4M12
24V dc sink, 4-point			4	Pico (M8)	1738-IB4M8
24V dc sink, 2-point			2	DC Micro (M12)	1738-IB2M12
24V dc source, 4-point			4	DC Micro (M12)	1738-IV4M12
	24V dc source, 8-point		4	DC Micro (M12)	1738-OB8EM12
	24V dc source, 8-point		8	Pico (M8)	1738-OB8EM8
	24V dc source, 4-point		4	DC Micro (M12)	1738-OB4EM12
	24V dc source, 4-point		4	Pico (M8)	1738-OB4EM8
	24V dc source, 2-point		2	DC Micro (M12)	1738-OB2EM12
	24V dc source, 2-point	2A Protection	2	DC Micro (M12)	1738-OB2EPM12
	24V dc sink, 4-point		4	DC Micro (M12)	1738-OV4EM12
24V dc, 8-point			4	DC Micro (M12)	1732D-IB8M12
24V dc, 8-point			8	Pico (M8)	1732D-IB8M8
	24V dc, 0.5A, 8-point		4	DC Micro (M12)	1732D-OB8EM12
	24V dc, 0.5A, 8-point		8	Pico (M8)	1732D-OB8EM8
		24V dc Self-Configuring, 8-point	4	DC Micro (M12)	1732D-8CFGM12
		24V dc Self-Configuring, 8-point	8	Pico (M8)	1732D-8CFGM8
24V dc, 8-point			4	DC Micro (M12)	1732P-IB8M12
24V dc, 8-point			8	Pico (M8)	1732P-IB8M8
	24V dc, 0.5A, 8-point		4	DC Micro (M12)	1732P-OB8EM12
	24V dc, 0.5A, 8-point		8	Pico (M8)	1732P-OB8EM8
		24V dc Self-Configuring, 8-point	4	DC Micro (M12)	1732P-8CFGM12
		24V dc Self-Configuring, 8-point	8	Pico (M8)	1732P-8CFGM8
24V dc sink/source, 2-point		Connector-level diagnostics	2	DC Micro (M12)	1792D-2BV0D
24V dc sink/source, 4-point		Connector-level diagnostics	4	DC Micro (M12)	1792D-4BV0D
24V dc sink/source, 8-point		Point-level diagnostics	8	DC Micro (M12)	1792D-8BV0D
24V dc sink/source, 8-point		Connector-level diagnostics	4	DC Micro (M12)	1792D-8BVT0D
24V dc sink/source, 16-point		Point-level diagnostics	8	DC Micro (M12)	1792D-16BVT0CD
24V dc sink/source, 16-point		Connector-level diagnostics	8	DC Micro (M12)	1792D-16BVT0D
	24V dc, 2 sink/source inputs w/alarm, 2 outputs	Connector-level diagnostics	4	DC Micro (M12)	1792D-2BVA2D
	24V dc, 4 sink/source inputs, 4 outputs	Connector-level diagnostics	4	DC Micro (M12)	1792D-4BVT4D
	24V dc, 4 sink/source inputs, 4 outputs	Point-level diagnostics	8	DC Micro (M12)	1792D-4BV4D
	24V dc, 8 sink/source inputs, 8 source outputs	Point-level diagnostics	8	DC Micro (M12)	1792D-8BVT8CD
	24V dc, 8 sink/source inputs, 8 source outputs	Connector-level diagnostics	8	DC Micro (M12)	1792D-8BVT8D
	24V dc, 8 connectors w 1 input & 1 output per connector	Connector-level diagnostics	8	DC Micro (M12)	1792D-8BIO8E
	24V dc, 12 sink/source inputs, 4 source outputs	Connector-level diagnostics	8	DC Micro (M12)	1792D-12BVT4D
	24V dc, 4 source outputs	2A on 2 connectors only	4	DC Micro (M12)	1792D-0B4D
	24V dc, 16 sink outputs	Connector-level diagnostics	8	DC Micro (M12)	1792D-0VT16E
	24V dc, 8 source outputs	Connector-level diagnostics	8	DC Micro (M12)	1792D-0B8D
AC & Relay					
		24V dc Coil NO DPST Relay	4	DC Micro (M12)	1738-0W4M12
		120V ac Coil NO DPST Relay	4	4-pin AC Micro (M12)	1738-0W4M12AC4
120V ac, 2-point			2	4-pin AC Micro (M12)	1738-IA2M12AC4
120V ac, 2-point			2	3-pin AC Micro (M12)	1738-IA2M12AC3
	120/230V ac, 2-point		2	4-pin AC Micro (M12)	1738-OA2M12AC3
Specialty					
24V dc Thermocouple, 2-point			2	DC Micro (M12)	1738-IT2IM12
24V dc RTD, 2-point			2	DC Micro (M12)	1738-IR2M12
		RS232 Interface	1	DC Micro (M12)	1738-232ASCM12
		RS485 Interface	1	DC Micro (M12)	1738-485ASCM12
	24V dc VHSC source		1	M23	1738-VHSC24M23
		5V dc Incremental Encoder	1	M23	1738-IJ23
		SSI Interface	1	M23	1738-SSIM23

For cable selection, see charts on page 19.

STEP 4 - PANELCONNECT



What is a PanelConnect System?

PanelConnect modules are pre-wired Allen-Bradley modules and cables that provide a low-cost method of connecting inputs or outputs “on the machine” with a PLC I/O module “in the panel”. Installation requires only a PanelConnect module and cables versus the many components used in traditional non-networked systems.

When is PanelConnect needed?

PanelConnect is used when machine or pneumatic valve control must come from a controller or modules located within a panel cabinet. The controller or modules may be located inside the panel for environmental protection or for security reasons. The PanelConnect module is mounted in the panel wall to create a “through the panel” environmental seal for the entry of output connections.

Considerations for Selecting PanelConnect Systems

Inside the panel – what controller or I/O module will be connected to PanelConnect?

Several PanelConnect modules are offered in order to provide compatible connection and allow the proper pre-wired cables and patchcords to be used.

Outside the panel – will PanelConnect connect to a distribution box or to a pneumatic valve manifold?

Knowing these specific components will allow use of the correct patchcords that provide direct plug-in interface for fast, easy start-up and maintenance. With this knowledge, the connector style and size is determined. You should also note if the distribution box uses LED indicators.

What environmental seal is needed at the panel?

The PanelConnect module is mounted through the panel wall to create a complete IP65 and NEMA 4/4X environmental seal for the entry of output connections. The 4X selection is indicated by an “X” suffix on the PanelConnect catalog number.

Resources

The PanelConnect selector tables (next page) will be helpful, but if you need additional information, check these Rockwell Automation sources:

PanelConnect Product Profile, publication 1667-PP002

PanelConnect Selection Guide, publication 1667-SG002

Selecting PanelConnect Products

The purpose of PanelConnect is to allow PLC I/O modules placed in-cabinet to connect to field I/O devices in the “outside” environment. The I/O modules shown below are those that could be included in this category. For more information on these modules, refer to the Allen-Bradley I/O Module Brochure, publication ACIG-BR002. Remember, select a PanelConnect product shown in the colored column.

PanelConnect Systems for Inputs - 16 and 32 Point

Processor Platform	Input Module Type	I/O Module	Wiring Systems Pre-wired Cable	PanelConnect Module	Main Patchcord	Distribution Box Description	Distribution Box	Device Patchcord	Typical End Device
PLC (Bulletin 1771)	16 Input 120 V ac	1771-IAD	1492-CABLE ^① F	1667-16IA1207	889N-F12ACNU- ^②	8-port AC Micro (dual keyway) LEDs	898R-L38PS-N12	889R-F3AERM- ^③	2-wire AC sensor or field device
	16 Input Sinking 10 - 30V dc	1771-IBD	1492-CABLE ^① F	1667-16ID1201	889N-F12ACNU- ^②	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM- ^③	3-wire Sourcing (PNP) sensor or field device
	32 Input Sinking 10 - 30V dc	1771-IBN	1492-CABLE ^① J	1667-32ID1201	889N-F12ACNU- ^②	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM- ^③	3-wire Sourcing (PNP) sensor or field device
SLC (Bulletin 1746)	16 Input 120V ac	1746-IA16	1492-CABLE ^① A	1667-16IA1207	889N-F12ACNU- ^②	8-port AC Micro (dual keyway) LEDs	898R-L38PS-N12	889R-F3AERM- ^③	2-wire AC sensor or field device
	16 Input Sinking 10 - 30V dc	1746-IB16	1492-CABLE ^① B	1667-16ID1201	889N-F12ACNU- ^②	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM- ^③	3-wire Sourcing (PNP) sensor or field device
	32 Input Sinking 10 - 30V dc	1746-IB32	1492-CABLE ^① H	1667-32ID1201	889N-F12ACNU- ^②	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM- ^③	3-wire Sourcing (PNP) sensor or field device
ControlLogix (Bulletin 1756)	16 Input 120V ac	1756-IA16	1492-CABLE ^① X	1667-16IA1207	889N-F12ACNU- ^②	8-port AC Micro (dual keyway) LEDs	898R-L38PS-N12	889R-F3AERM- ^③	2-wire AC sensor or field device
	16 Input Sinking 10 - 30V dc	1756-IB16	1492-CABLE ^① X	1667-16ID1201	889N-F12ACNU- ^②	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM- ^③	3-wire Sourcing (PNP) sensor or field device
	32 Input Sinking 10 - 30V dc	1756-IB32	1492-CABLE ^① Z	1667-32ID1201	889N-F12ACNU- ^②	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM- ^③	3-wire Sourcing (PNP) sensor or field device

① Cables are available in standard lengths of 0.5m, 1.0m, and 5.0m.

To order, insert the desired length code in the catalog number (005 = 0.5m, 010 = 1m, 025 = 2.5m, 050 = 5m). Example: 1492-CABLE005B is for a 0.5m cable for the 1746-IB16 I/O module.

② Mini-Plus patchcords are available in standard lengths of 1m, 2m, 3m, 5m, and 10m.

To order, insert the desired length in the catalog number. Example: 889N-F12ACNU-2 represents a 2m patchcord. Note part number reflects straight male to straight female version, additional models are also available.

③ DC Micro and AC Micro patchcords are available in standard lengths of 1m, 2m, 3m, 5m, and 10m.

To order, insert the desired length in the catalog number. Example: 889D-F4ACDM-3 represents a DC Micro 3m patchcord. Note part number reflects straight male to straight female version, additional models are also available. For use with outputs, 5-pin versions may be required for earth grounding on pin 5 depending on output field device.

PanelConnect Systems for Outputs - 16 and 32 Point

Processor Platform	Output Module Type	I/O Module	Wiring Systems Pre-wired Cable	PanelConnect Module	Main Patchcord	Distribution Box Description	Distribution Box	Device Patchcord	Typical End Device
PLC (Bulletin 1771)	16 Output 120V ac	1771-OAD	1492-CABLE ^❶ F	1667-160A1203	889N-F12ACNU- ^❷	8-port AC Micro (dual keyway) LEDs	898R-L38PS-N12	889R-F3AERM - ^❸	2-wire AC Output Device
	16 Output Sourcing 10 - 50V dc	1771-OB D	1492-CABLE ^❶ F	1667-160D1203	889N-F12ACNU- ^❷	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM - ^❸	3-wire DC Sinking Output Device
	32 Output Sourcing 10 - 50V dc	1771-OB N	1492-CABLE ^❶ L	1667-320D1201	889N-F12ACNU- ^❷	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM - ^❸	3-wire DC Sinking Output Device
SLC (Bulletin 1746)	16 Output 120V ac	1746-OA16	1492-CABLE ^❶ C	1667-160A1201	889N-F12ACNU- ^❷	8-port AC Micro (dual keyway) LEDs	898R-L38PS-N12	889R-F3AERM - ^❸	2-wire AC Output Device
	16 Output Sourcing 10 - 50V dc	1746-OB16	1492-CABLE ^❶ E	1667-160D1201	889N-F12ACNU- ^❷	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM - ^❸	3-wire DC Sinking Output Device
	32 Output Sourcing 10 - 50V dc	1746-OB32	1492-CABLE ^❶ H	1667-320D1201	889N-F12ACNU- ^❷	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM - ^❸	3-wire DC Sinking Output Device
ControlLogix (Bulletin 1756)	16 Output 120V ac	1756-OA16	1492-CABLE ^❶ X	1667-160A1202	889N-F12ACNU- ^❷	8-port AC Micro (dual keyway) LEDs	898R-L38PS-N12	889R-F3AERM - ^❸	2-wire AC Output Device
	16 Output Sourcing 10 - 50V dc	1756-OB16E	1492-CABLE ^❶ X	1667-160D1202	889N-F12ACNU- ^❷	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM - ^❸	3-wire DC Sinking Output Device
	32 Output Sourcing 10 - 50V dc	1756-OB32	1492-CABLE ^❶ Z	1667-320D1201	889N-F12ACNU- ^❷	8-port DC Micro (M12), PNP LEDs	898D-P58PT-N12	889D-F4ACDM - ^❸	3-wire DC Sinking Output Device

❶ Cables are available in standard lengths of 0.5m, 1.0m, and 5.0m.

To order, insert the desired length code in the catalog number (005 = 0.5m, 010 = 1m, 025 = 2.5m, 050 = 5m). Example: 1492-CABLE005B is for a 0.5m cable for the 1746-IB16 I/O module.

❷ Mini-Plus patchcords are available in standard lengths of 1m, 2m, 3m, 5m, and 10m.

To order, insert the desired length in the catalog number. Example: 889N-F12ACNU-2 represents a 2m patchcord. Note part number reflects straight male to straight female version, additional models are also available.

❸ DC Micro and AC Micro patchcords are available in standard lengths of 1m, 2m, 3m, 5m, and 10m.

To order, insert the desired length in the catalog number. Example: 889D-F4ACDM-3 represents a DC Micro 3m patchcord. Note part number reflects straight male to straight female version, additional models are also available. For use with outputs, 5-pin versions may be required for earth grounding on pin 5 depending on output field device.

PanelConnect Systems for Combination Inputs and Outputs - 32 Point

Processor Platform	I/O Module Type	I/O Module	Wiring Systems Pre-wired Cable	PanelConnect Module	Main Patchcord	Distribution Box Description	Distribution Box	Device Patchcord	Typical End Device
PLC (Bulletin 1771)	16 Input Sinking 10 - 30V dc	1771-IBD	1492-CABLE ^❶ F	1667-32CD1203	889N-F12ACNU- ^❷	8-port DC Micro (M12), no LEDs	898D-58PT-P12	889D-F4ACDM - ^❸	3-wire Sourcing (PNP) sensor or field device
	16 Output Sourcing 10 - 50V dc	1771-OB16	1492-CABLE ^❶ F						3-wire DC Sinking Output Device
SLC (Bulletin 1746)	16 Input Sinking 10 - 30V dc	1746-IB16	1492-CABLE ^❶ B	1667-32CD1201	889N-F12ACNU- ^❷	8-port DC Micro (M12), no LEDs	898D-58PT-P12	889D-F4ACDM - ^❸	3-wire Sourcing (PNP) sensor or field device
	16 Output Sourcing 10 - 50V dc	1746-OB16	1492-CABLE ^❶ E						3-wire DC Sinking Output Device
ControlLogix (Bulletin 1756)	16 Input Sinking 10 - 30V dc	1756-IB16	1492-CABLE ^❶ X	1667-32CD1202	889N-F12ACNU- ^❷	8-port DC Micro (M12), no LEDs	898D-58PT-P12	889D-F4ACDM - ^❸	3-wire Sourcing (PNP) sensor or field device
	16 Output Sourcing 10 - 50V dc	1756-OB16E	1492-CABLE ^❶ X						3-wire DC Sinking Output Device

❶ Cables are available in standard lengths of 0.5m, 1.0m, and 5.0m.

To order, insert the desired length code in the catalog number (005 = 0.5m, 010 = 1m, 025 = 2.5m, 050 = 5m). Example: 1492-CABLE005B is for a 0.5m cable for the 1746-IB16 I/O module.

❷ Mini-Plus patchcords are available in standard lengths of 1m, 2m, 3m, 5m, and 10m.

To order, insert the desired length in the catalog number. Example: 889N-F12ACNU-2 represents a 2m patchcord. Note part number reflects straight male to straight female version, additional models are also available.

❸ DC Micro and AC Micro patchcords are available in standard lengths of 1m, 2m, 3m, 5m, and 10m.

To order, insert the desired length in the catalog number. Example: 889D-F4ACDM-3 represents a DC Micro 3m patchcord. Note part number reflects straight male to straight female version, additional models are also available. For use with outputs, 5-pin versions may be required for earth grounding on pin 5 depending on output field device.

STEP 5 - CABLES



What's the big deal about selecting cordsets and cables?

One very significant advantage of On-Machine control is the reduced installation and maintenance costs due to the reduced number of manual connections required. Cables are pre-engineered and wired for trouble-free connection to your I/O modules and field devices. The plug-and-play design for inputs and outputs (as well as communication and motor connection) allows faster installation and reduced wiring errors.

Considerations for Selecting Cordsets and Patchcords

What devices or controls are being connected ?

Knowing these field devices, I/O or controls could be valuable in determining specific cable dimensions or characteristics. While your choice can be flexible in some cases, in most cases it is not.

Does the field device or sensor being connected have a built-in connector, or are individual wire leads needed for connection?

Controllers and input or output modules provide a built-in connector, but many field devices or sensors do not. They need a cable with individual lead wires for connection. In those cases a cordset (connector at one end only) is needed for connection. If the field device does have a built-in connector, then you need a patchcord (connector at both ends) for a simpler, faster connection.

What connector type and style is needed?

Not all connectors are the same – considerations like diameter, number of pins, male or female are important, and determined by the devices and control components being connected.

What other application and environmental requirements are necessary?

Cables and cord sets are available in various lengths to avoid dangling wires or too-tight connections. Some environments need shielded cables to minimize EMI. Environments like high temperature, flexing, and acid exposure will affect the life of a connection if not considered. Perhaps color is important for easier maintenance. Your application may have some special need.

Resources

The patchcord and cable set selection table on the next page will be helpful, but if you need additional information, check these Rockwell Automation sources:

Sensors Today magazine, publication GSM900-BR001

On-Machine Connectivity catalog, publication M115-CA001

<http://www.ab/sensors>

Selecting Patchcords and Cordsets

Now that you know the sensor type and the I/O module to which it will be connected, use the table below to determine the prepared patchcord or cord set that is needed. These cords and cables are listed in the colored columns.

FROM				TO		
Input Module	Output Module	Module - Other	I/O Module No.	Patchcord or Y-cable (double ended)	Cordset Male (single-ended)	A-B Sensor or Field Device
Analog						
24V DC Current, 2-point			1738-IECM12			
24V DC Voltage, 2-point			1738-IE2VM12			
	24V DC Current, 2-point		1738-OE2CM12			
	24V DC Voltage, 2-point		1738-OE2VM12			
Digital						
24V DC sink, 8-point			1738-IB8M12	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	Sourcing (PNP) 3-wire DC sensor
24V DC sink, 8-point			1738-IB8M8	889P-F3ABPM-x 889P-F4ABPM3-x	889P-M3AB-y	Sourcing (PNP) 3-wire DC sensor, 3 pin Sourcing (PNP) 3-wire DC sensor, 4 pin
24V DC sink, 8-point			1738-IB8M23			
24V DC sink, 4-point			1738-IB4M12	889D-F4ACDM-x	889D-M4AC-y	Sourcing (PNP) 3-wire DC sensor
24V DC sink, 4-point			1738-IB4M8	889P-F3ABPM-x 889P-F4ABPM3-x	889P-M3AB-y	Sourcing (PNP) 3-wire DC sensor, 3 pin Sourcing (PNP) 3-wire DC sensor, 4 pin
24V DC sink, 2-point			1738-IB2M12	889D-F4ACDM-x	889D-M4AC-y	Sourcing (PNP) 3-wire DC sensor, 3 pin
24V DC source, 4-point			1738-IV4M12	889D-F4ACDM-x	889D-M4AC-y	Sinking (NPN) 3-wire DC sensor, 4 pin
	24V DC source, 8-point		1738-OB8EM12	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	DC sinking output device
	24V DC source, 8-point		1738-OB8EM8	889P-F3ABPM-x 889P-F4ABPM3-x	889P-M3AB-y	Sinking 3-wire DC output device, 3 pin Sinking 3-wire DC output device, 4 pin
	24V DC source, 4-point		1738-OB4EM12	889D-F4ACDM-x	889D-M4AC-y	DC sinking output device
	24V DC source, 4-point		1738-OB4EM8	889P-F3ABPM-x 889P-F4ABPM3-x	889P-M3AB-y	Sinking 3-wire DC output device, 3 pin Sinking 3-wire DC output device, 4 pin
	24V DC source, 2-point		1738-OB2EM12	889D-F4ACDM-x	889D-M4AC-y	DC sinking output device
	24V DC source, 2-point	2A Protection	1738-OB2EPM12			
	24V DC sink, 4-point		1738-OV4EM12	889D-F4ACDM-x	889D-M4AC-y	Sourcing DC output device
24V DC, 8-point			1732D-IB8M12	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	3-wire DC sensor
24V DC, 8-point			1732D-IB8M8	889P-F3ABPM-x 889PF4ABPM3-x	889P-M3AB-y	3-wire, 3-pin DC sensor 3-wire, 4-pin DC sensor
	24V DC, 0.5A, 8-point		1732D-OB8EM12	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	DC output device
	24V DC, 0.5A, 8-point		1732D-OB8EM8	889P-F3ABPM-x 889P-F4ABPM3-x	889P-M3AB-y	3-pin DC output device 4-pin DC output device
		24V DC Self-Configuring, 8-point	1732D-8CFGM12	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	INPUT: 3-wire DC sensor OUTPUT: DC output device

FROM				TO		
Input Module	Output Module	Module-Other	I/O Module No.	Patchcord or Y-cable (double ended)	Cordset Male (single-ended)	A-B Sensor or Field Device
Digital (continued)						
		24V DC Self-Configuring, 8-point	1732D-8CFGM8	3-pin Pico products 889P-F3ABPM-x 4-pin Pico products 889P-F4ABPM3-x	889P-M3AB-y	INPUT: 3-wire, 3-pin DC sensor INPUT: 3-wire, 4-pin DC sensor OUTPUT: DC output device
24V DC, 8-point			1732P-IB8M12	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	3-wire DC sensor
24V DC, 8-point			1732P-IB8M8	889P-F3ABPM-x 889P-F4ABPM3-x	889P-M3AB-y	3-wire, 3-pin DC sensor 3-wire, 4-pin DC sensor
	24V DC, 0.5A, 8-point		1732P-0B8EM12	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	DC output device
	24V DC, 0.5A, 8-point		1732P-0B8EM8	889P-F3ABPM-x	889P-M3AB-y	DC output device
		24V DC Self-Configuring, 8-point	1732P-8CFGM12	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	INPUT: 3-wire DC sensor OUTPUT: DC output device
		24V DC Self-Configuring, 8-point	1732P-8CFGM8	3-pin Pico products 889P-F3ABPM-x 4-pin Pico products 889P-F4ABPM3-x	889P-M3AB-y	INPUT: 3-wire, 3-pin DC sensor INPUT: 3-wire, 4-pin DC sensor DC output device
24V DC sink/source, 2-point		Connector-level diagnostics	1792D-2BV0D	889D-F4ACDM-x	889D-M4AC-x	3-wire DC sensor
24V DC sink/source, 4-point		Connector-level diagnostics	1792D-4BV0D	889D-F4ACDM-x	889D-M4AC-x	3-wire DC sensor
24V DC sink/source, 8-point		Connector-level diagnostics	1792D-8BV0D	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	3-wire DC sensor
24V DC sink/source, 8-point		Connector-level diagnostics	1792D-8BVT0D	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	3-wire DC sensor
24V DC sink/source, 16-point		Point-level diagnostics	1792D-16BVT0CD	Both inputs on each connector 879D-F4ACDM5-x One input per connector 889D-F5ACDM-x	Both inputs on each connector 1485P-P1D5-RR4 + (2) 889D-M5AC-x One input per connector 889D-M5AC-x	3-wire DC sensor
24V DC sink/source, 16-point		Connector-level diagnostics	1792D-16BVT0D	Both inputs on each connector 879D-F4ACDM-x One input per connector 889D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5 One input per connector 889D-M4AC-x	3-wire DC sensor
24V DC, 2 sink/source inputs w/alarm, 2 outputs		Connector-level diagnostics	1792D-2BVA2D	889D-F4ACDM-x	889D-M4AC-x	3-wire DC sensor

FROM				TO		
Input Module	Output Module	Module-Other	I/O Module No.	Patchcord or Y-cable (double ended)	Cordset Male (single-ended)	A-B Sensor or Field Device
Digital (continued)						
24V DC, 4 inputs, 4 outputs			1792D-4BV4D	One input per connector 889D-F4ACDM-x	One input per connector 889D-M4AC-x	3-wire DC sensor
24V DC, 4 sink/source inputs, 4 outputs		Connector-level diagnostics	1792D-4BVT4D	Both inputs on each connector 879D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5	3-wire DC sensor
				One input per connector 889D-F4ACDM-x	One input per connector 889D-M4AC-x	
24V DC, 8 sink/source inputs, 8 source outputs		Point-level diagnostics	1792D-8BVT8CD	Both inputs on each connector 879D-F4ACDM5-x	Both inputs on each connector 1485P-P1D5-RR4 + (2) 889D-M5AC-x	3-wire DC sensor
				One input per connector 889D-F4ACDM-x	One input per connector 889D-M4AC-x	
24V DC, 8 sink/source inputs, 8 source outputs		Connector-level diagnostics	1792D-8BVT8D	Both inputs on each connector 879D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5	3-wire DC sensor
				One input per connector 889D-F4ACDM-x	One input per connector 889D-M4AC-X	
24V DC, 8 connectors w 1 input & 1 output per connector		Connector-level diagnostics	1792D-8BI08E	Both inputs on each connector 879D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5	3-wire DC sensor
				One input per connector 889D-F4ACDM-x	One input per connector 889D-M4AC-x	
24V DC, 12 sink/source inputs, 4 source outputs		Connector-level diagnostics	1792D-12BVT4D	Both inputs on each connector 879D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5	3-wire DC sensor
				One input per connector 889D-F4ACDM-x	One input per connector 889D-M4AC-X	
	24V DC, 4 source outputs	2A on 2 connectors only	1792D-0B4D	889D-F4ACDM-x	889D-M4AC-x	DC output device
	24V DC, 16 sink outputs	Connector-level diagnostics	1792D-0VT16E	Both inputs on each connector 879D-F4ACDM-x	Both inputs on each connector 879-C3AEDM4-5	DC output device
				One input per connector 889D-F4ACDM-x	One input per connector 889D-M4AC-x	
	24V DC, 8 source outputs	Connector-level diagnostics	1792D-0B8D	889D-F4ACDM-x	889D-M4AC-x	DC output device
AC & Relay						
		24V DC Coil NO DPST Relay	1738-0W4M12	889D-F4ACDM-x	889D-M4AC-y	
		120V AC Coil NO DPST Relay	1738-0W4M12AC4	889R-F4AERM-x	889R-M4AEA-y	
120V AC, 2-point			1738-IA2M12AC4	889R-F4AERM-x	889R-M4AEA-y	
120V AC, 2-point			1738-IA2M12AC3	889R-F3AERM-x	889R-M3AEA-y	
	120/230V AC, 2-point		1738-OA2M12AC3	889R-F3AERM-x	889R-M3AEA-y	
Specialty						
24V DC Thermocouple, 2-point			1738-IT2IM12			
24V DC RTD, 2-point			1738-IRM12			
		RS232 Interface	1738-232ASCM12	889D-F4ACDM-x	889D-M4AC-y	
		RS485 Interface	1738-485ASCM12	889D-F4ACDM-x	889D-M4AC-y	
	24V DC VHSC source		1738-VHSC24M23			
		5V DC Incremental Encoder	1738-IJ23			
		SSI Interface	1738-SSIM23			

Other Products Ideally Suited for On-Machine Applications

For our suggested product selection process, and additional products, see page 6.

Control Tower Stack Lights, Beacons & Horns

Offering visual and audio indication to enhance safety and increase productivity in your environment.

Publication 855-SG001

50MM Tower Lights: http://www.ab.com/industrialcontrols/products/signaling/tower_lights/855E.html

70mm Tower lights: http://www.ab.com/industrialcontrols/products/signaling/tower_lights/855T.html

Beacons: <http://www.ab.com/industrialcontrols/products/signaling/beacons/beacons.html>

Horns: <http://www.ab.com/industrialcontrols/products/signaling/horns/horns.html>

800Z Zero-Force Touch Buttons

Available as quick-disconnect or pre-cabled.

Publication 800Z-BR002

http://www.ab.com/industrialcontrols/products/push_buttons/touch-palm/index.html

MobileView HMI

Using MobileView terminals can help operators save time and effort while reducing overall installation costs. The terminal can be carried by an operator to the location where work needs to be completed. Installation costs can be reduced by eliminating the need for bulky, expensive enclosures.

<http://www.ab.com/eoi/mobileview.html>

Publication VIEW-BR004

PowerFlex 70

This PowerFlex drive features a UL-listed and IP66-rated enclosure that protects against high-pressure water spray, corrosion and circulating dust. The drive is designed to be mounted directly in harsh production environments and can be used in wash-down applications without the need for a custom enclosure.

Publication 20A-TD001

http://www.ab.com/drives/powerflex/70/70_nema.html

Machine Safety (including safety connection systems)

Rockwell Automation helps businesses become both safer and more successful with the broadest line of safety components in the world.

Safety Now magazine, Publication SAFETY-BR001

Safety Products Catalog, publication S115-CA001

<http://www.ab.com/safety>

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