FLEX I/O to FLEX 5000 I/O Migration Guide

Bulletins 1794, 5094

Allen-Bradley
by ROCKWELL AUTOMATION

Reference Manual

Original Instructions

Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

In no event will Rockwell Automation, Inc. be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment.

The examples and diagrams in this manual are included solely for illustrative purposes. Because of the many variables and requirements associated with any particular installation, Rockwell Automation, Inc. cannot assume responsibility or liability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, Inc. with respect to use of information, circuits, equipment, or software described in this manual.

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Throughout this manual, when necessary, we use notes to make you aware of safety considerations.

WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which may lead to personal injury or death, property damage, or economic loss.

ATTENTION: Identifies information about practices or circumstances that can lead to personal injury or death, property damage, or economic loss. Attentions help you identify a hazard, avoid a hazard, and recognize the consequence.

IMPORTANT Identifies information that is critical for successful application and understanding of the product.

These labels may also be on or inside the equipment to provide specific precautions.

SHOCK HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that dangerous voltage may be present.

BURN HAZARD: Labels may be on or inside the equipment, for example, a drive or motor, to alert people that surfaces may reach dangerous temperatures.

ARC FLASH HAZARD: Labels may be on or inside the equipment, for example, a motor control center, to alert people to potential Arc Flash. Arc Flash will cause severe injury or death. Wear proper Personal Protective Equipment (PPE). Follow ALL Regulatory requirements for safe work practices and for Personal Protective Equipment (PPE).

The following icon may appear in the text of this document.

Identifies information that is useful and can help to make a process easier to do or easier to understand.

Preface

Chapter 1

Migration Overview

Chapter 2

Plan Hardware Migration with Integrated Architecture Builder

Chapter 3

Wiring Diagram Comparisons

About This Publication

This document serves as a guide for migrating your existing FLEX™ I/O system to a FLEX 5000® I/O system. The FLEX 5000 I/O system includes adapters, I/O modules, terminal base assemblies, power supplies, and accessories. Descriptions, wiring diagrams, dimensions, features, and specifications are provided to help you select the appropriate adapter, I/O module, terminal base assembly, or accessory to replace your FLEX I/O system.

Audience

This document is intended for users of FLEX I/O modules in a Logix control system. You must create a Studio 5000 Logix Designer® application project for the Logix controller that owns the FLEX 5000 adapters and I/O modules.

Software Requirements

Migration paths may require a controller platform or software version upgrade.

FLEX 5000 I/O modules require the following to use Add-on Profile (AOP):

- Studio 5000 Logix Designer application version 31.00.00 or later
- RSLinx® Classic software version 4.10.00

Hardware Considerations

Controller Compatibility

The following controllers are compatible with the Studio 5000 Logix Designer application when using FLEX 5000 I/O modules.

- ControlLogix® 5580
- CompactLogix® 5380
- CompactLogix 5480
- GuardLogix® 5580
- Compact GuardLogix 5380

Hardware Limitations

For information on controller specifications such as compatibility, memory limits, and network limitations (including connection and node limits), see these publications:

- ControlLogix and GuardLogix Controllers Technical Data, publication 1756-TD001
- CompactLogix 5380, Compact GuardLogix 5380, and CompactLogix 5480 Controllers Specifications Technical Data, publication 5069-TD002

Download Firmware, AOP, EDS, and Other Files

Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes from the Product Compatibility and Download Center at rok.auto/pcdc.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Additional Resources

Resource	Description
FLEX I/O and FLEX I/O-XT Selection Guide, publication 1794-SG002	Describes how to select the FLEX I/O and FLEX I/O-XT™ modules based on your requirement.
FLEX I/O Dual-port EtherNet/IP Adapters User Manual, publication 1794-UM066	Describes how to configure and troubleshoot the EtherNet/IP™ adapters.
Remote I/O Adapter Module User Manual, publication 1794-UM009	Describes how to configure and troubleshoot the remote I/O adapters.
FLEX I/O Diagnostic Modules User Manual, publication 1794-UM061	Describes an overview and how to configure the diagnostic modules.
FLEX I/O High-Density Analog Modules User Manual, publication 1794-UM062	Describes an overview and how to configure and program the high-density analog modules.
FLEX I/O HART Analog Modules User Manual, publication 1794-UM063	Describes how to configure and calibrate HART analog modules.
FLEX I/O Isolated Analog Modules User Manual, publication 1794-UM008	Describes how to program, configure, and calibrate isolated analog modules.
FLEX I/O Isolated Input/Output HART Analog Modules User Manual, publication 1794-UM065	Describes how to configure and troubleshoot isolated input/output HART analog modules.
8 Input RTD Module User Manual, publication 1794-UM004	Describes an overview and how to program, configure, and calibrate an 8 input RTD module.
FLEX I/O Thermocouple/RTD/Millivolt Input Module User Manual, publication 1794-UM012	Describes an overview and how to program, configure, calibrate, and troubleshoot the thermocouple/RTD/ millivolt input module.
FLEX I/O Thermocouple/Millivolt Input Module User Manual, publication 1794-UM007	Describes an overview and how to program, configure, and calibrate the thermocouple/millivolt input module.
FLEX I/O Frequency Input Module User Manual, publication 1794-UM011	Describes an overview and how to program, configure, and troubleshoot the frequency input module.
FLEX I/O Very High-speed Counter Module User Manual, publication 1794-UM010	Describes an overview and how to communicate and configure the very high-speed counter module.
FLEX I/O 2 Input Incremental Encoder Module User Manual, publication 1794-UM015	Describes an overview and how to program, configure, calibrate, and troubleshoot the 2 input incremental encoder module.
FLEX I/O 4 Channel Pulse Counter Module User Manual, publication 1794-UM016	Describes an overview and how to program, configure, and troubleshoot the 4 channel pulse counter module.
FLEX 5000 Module Specifications Technical Data, publication 5094-TD001	Provides specification details for FLEX 5000 I/O modules.
Replacement Guidelines: Logix 5000 Controllers Reference Manual, publication 1756-RM100	Provides guidelines on how to replace the following: • ControlLogix 5560/5570 controller with a ControlLogix 5580 controller • CompactLogix 5370 L3 controllers with a CompactLogix 5380 controller
FLEX 5000 Standard and Safety I/O Modules User Manual, publication 5094-UM001	Provides information on how to configure and operate FLEX 5000 I/O standard and safety digital modules.
FLEX 5000 Analog I/O Modules User Manual, publication 5094-UM002	Provides information on how to configure and operate FLEX 5000 I/O analog modules.
FLEX 5000 High Speed Counter I/O Modules User Manual, publication 5094-UM003	Provides information on how to configure and operate FLEX 5000 I/O high-speed counter modules.
FLEX 5000 I/O Standard and Safety Frequency Input Modules User Manual, publication 5094-UM004	Provides information on how to configure and operate FLEX 5000 I/O standard and safety frequency input modules.
FLEX 5000 EtherNet/IP Adapter User Manual, publication 5094-UM005	Provides information on how to configure and operate FLEX 5000 EtherNet/IP adapters.
FLEX 5000 Serial Modules User Manual, publication 5094-UM006	Provides information on how to configure and operate FLEX 5000 I/O serial modules.
FLEX 5000 I/O Analog Isolated Current/Voltage/HART Standard and Safety Modules User Manual, publication 5094-UM007	Provides information on how to configure and operate FLEX 5000 I/O analog isolated HART standard and safety modules.
EtherNet/IP Network Devices User Manual, publication ENET-UM006	Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network.

Additional Resources (Continued)

Resource	Description
Ethernet Reference Manual, publication ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
System Security Design Guidelines Reference Manual, publication SECURE-RM001	Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment.
Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002	Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies.
Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1	Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components.
Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1	Provides general guidelines for installing a Rockwell Automation industrial system.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

Notes:

Migration Overview

To migrate your FLEX I/O system to a FLEX 5000 I/O system, you must understand your existing system requirements and then compare them to what is available in the family of products for your migration path. To simplify the process, you can read through this chapter to understand the migration options and process.

Figure 1 - FLEX I/O to FLEX 5000 I/O Migration

Product Lifecycle Status Website

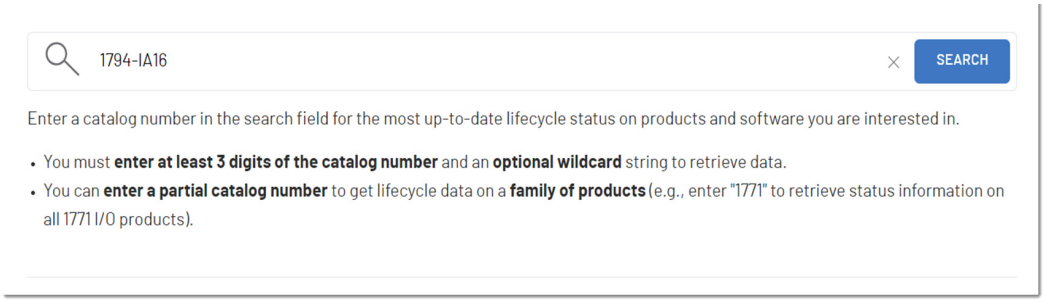
Use the Rockwell Automation Product Lifecycle Status website to plan pro-actively and manage the transition from existing equipment to leading-edge products and technologies. With the search tool, you can view up-to-date product lifecycle status and identify the most contemporary Rockwell Automation products.

The product lifecycle status is one of the following:

- Active – Most current offering within a product category.
- Active Mature – Product is fully supported, but a new product or family exists. Gain value by migrating.
- End of Life – Discontinued date announced - Actively execute migrations and last time buys. Product orderable until the Discontinued date.(1)
- Discontinued – New product no longer manufactured or procured.(2) Repair/exchange services may be available.

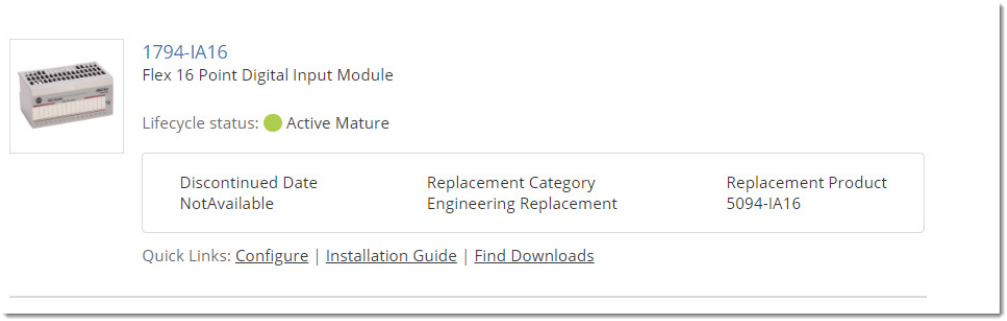
To view the lifecycle information for a product:

1. Go to the Rockwell Automation Support Center website at rok.auto/support.
2. Select Product Lifecycle Status.
3. Enter the catalog number of the product in the search field.



(1) Outages on specific items may occur prior to the Discontinued date.
(2) Limited stock may be available in run-out mode, regionally.

4. Select Search.
   The product lifecycle data displays.



   The lifecycle data provides recommended replacement catalogs or product family if available.

FLEX 5000 I/O Product Family

The FLEX 5000 I/O platform provides a wide range of input and output modules to span many applications, from high-speed digital to process control. The platform uses Producer/Consumer technology that allows input information and output status to be shared among multiple Logix 5000® controllers.

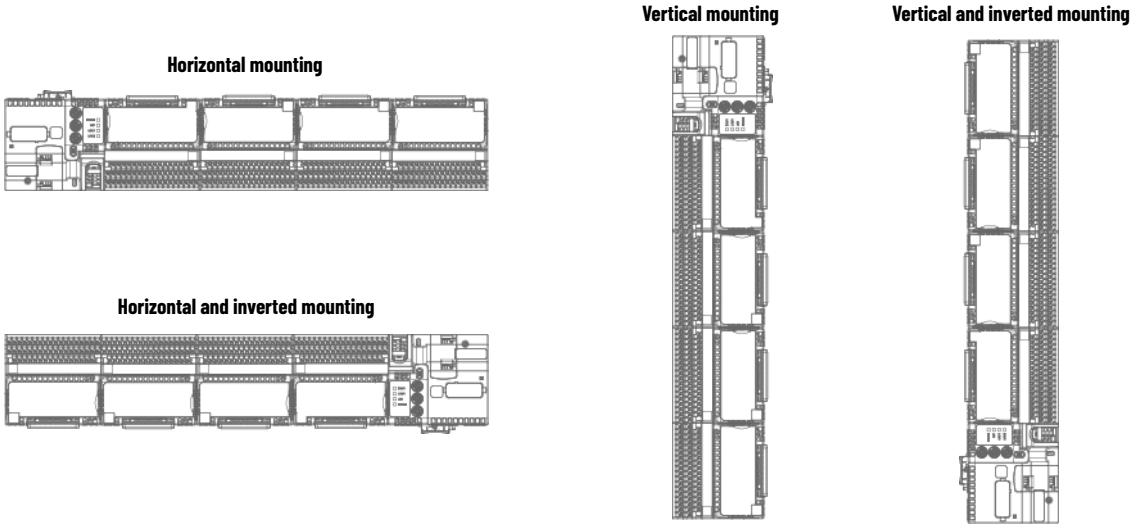
FLEX 5000 I/O systems are used as remote I/O modules with Logix 5000 controllers such as ControlLogix 5580, CompactLogix 5380, and CompactLogix 5480. The modules are configured with the Studio 5000 Logix Designer application.

The I/O modules require a terminal base (TB) assembly to connect field-side wiring. A mounting base (MB) and removable terminal block (RTB) are referred to as a TB. Mounting bases (MBs) and removable terminal bases (RTBs) do not ship with the FLEX 5000 I/O modules. You must purchase an MB and an RTB individually for each I/O module.

TBs are mounted onto a zinc-plated chromate-passivated steel DIN rail such as the Allen-Bradley® 199-DR1; 46277-4; EN 60715 – 35 x 7.5 mm (1.38 x 0.30 in.). You must also install DIN rail end anchors (Allen-Bradley 1492-EAJ35 or 1492-EAHJ35) at both ends of your system for vibration or shock environments.

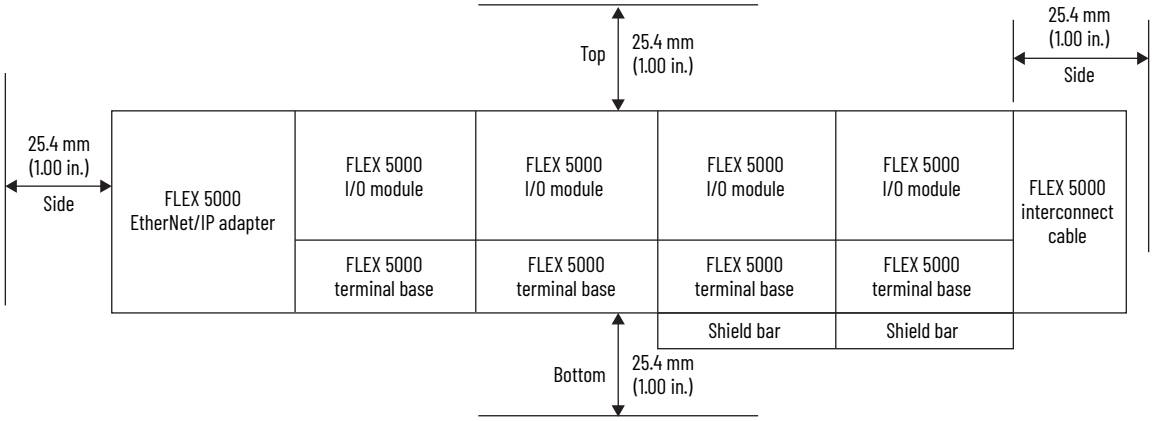
The FLEX 5000 I/O system can be oriented in the following positions.

FLEX 5000 I/O System Mounting Orientations



Maintain spacing from enclosure walls, wireways, and adjacent equipment. Allow 25.4 mm (1.00 in.) of space on all sides for adequate ventilation. Accessories such as the shield bar (5094-STB) and interconnect cable (5094-CEx) do not affect ventilation and are not included in the clearance requirement.

FLEX 5000 I/O Mounting Clearance Requirement



FLEX 5000 I/O modules support Removal and Insertion Under Power (RIUP), however you can leave only up to four consecutive empty slots.

Features of FLEX 5000 I/O

- Simplifies the I/O design with support for direct termination of 2-wire, 3-wire, and 4-wire devices
- Allows mix and match of standard and safety modules in one platform to meet unique Process safety requirements
- Offers integrated safety and automation control in one distributed I/O platform with analog and digital fail-safe I/O modules, TÜV certified up to SIL 3/PLe/Cat. 4
- Built on a gigabit architecture for higher speed and increased bandwidth
- Provides enhanced communication support with 1 Gb EtherNet/IP connectivity through copper or fiber-optic adapter ports with support for Parallel Redundancy Protocol (PRP), Device Level Ring (DLR), Star, and Linear topologies
- Allows you to replace modules while the system is in operation with easy snap-on installation via Removal and Insertion Under Power (RIUP)
- Supports the online addition of both terminal bases and I/O modules while the system continues to run
- Optimizes footprint with the ability to mount I/O modules vertically or horizontally with no derating and one EtherNet/IP adapter supports up to 16 I/O modules
- Provides interconnect cable bank expansion
- Delivers a consistent experience across the next generation 5000 series of I/O modules
- Operates in -40...+70 °C (-40...+158 °F) temperatures and suitable for hazardous environments Class I Division 2 Zone 2 Groups A, B, C, D
- I/O modules catalog numbers that end with XT are suitable for extreme environments up to Class G3 with conformal coating, which helps protect against environmental stresses
- FLEX 5000 adapter supports Logix SIS solution through implementation of concurrent connections

FLEX I/O Product Family

FLEX I/O is a flexible, low-cost, modular I/O for distributed applications and offers all functions of larger, rack-based I/O without the space requirements.

One adapter communicates with up to eight I/O modules. Allows connection to:

- 256 digital input/output points
- 96 analog input/output points
- Mix of input and output I/O modules to meet your needs

Modularity of the FLEX I/O system provides choice of network and ease of expansion. The wiring terminations are done almost entirely on the terminal base. Terminal base termination selection includes screw-clamp, spring-clamp, and cage-clamp to wire directly to 2-wire, 3-wire, or 4-wire devices. Additional options of D-shell, knife disconnect, and fused terminal bases are also available.

Remove and insert modules under power. No direct wiring to the module enables you to change modules without disturbing field wiring or system power.

Mix and match I/O modules. There is a wide variety of digital, analog and specialty modules.

Each FLEX I/O system contains at least one adapter, one terminal base and one I/O module.

Your FLEX I/O system can communicate on EtherNet/IP, ControlNet®, DeviceNet®, and many other open networks including, but not limited to Remote I/O and PROFIBUS DP.

TBs are mounted onto a zinc-plated chromate-passivated steel DIN rail such as the Allen-Bradley 199-DR1; 46277-4; EN 60715 – 35 x 7.5 mm (1.38 x 0.30 in.).

Product Family Features Comparison

Table 1 - Feature Comparison for Product Families

Attribute	FLEX I/O	FLEX 5000 I/O
Modular capacity	Up to 8 I/O modules if you use adapter 1794-AENT/R	• Up to 8 I/O modules if you use adapter 5094-AENTR[1] or 5094-AENSFPR[2] • Up to 16 I/O modules if you use adapter 5094-AEN2TR[1] or 5094-AEN2SFPR[2]
Network connectivity	Communication adapters for: • ControlNet • DeviceNet • EtherNet/IP • PROFIBUS DP	Communication adapter for EtherNet/IP
Operating temperature[3]	• 0…55 °C (32…131 °F) or -20…+55 °C (-4…+131 °F) for non-XT modules • -20…+70 °C (-4…+158 °F) for XT modules	-40…+70 °C (-40…+158 °F) for non-XT and XT modules
Fiber connectivity	No	Yes - With small form-factor pluggable (SFP) modules 5094-AENSFPR and 5094-AEN2SFPR
RIUP support	Yes	Yes
Parallel Redundancy Protocol (PRP) support	No	Yes
Runtime reconfiguration	No	Yes
CIP Safety™	No	Yes
CIP sync™	No	Yes
Backplane	2 MB	1 GB
Link speed	100 MB	1 GB
Removable terminal block (RTB)	No	Yes
Shield termination	On FLEX I/O terminal base	Requires shield bar accessory
Module field power distribution	External	External prefabricated jumper available

Table 1 - Feature Comparison for Product Families (Continued)

Attribute	FLEX I/O	FLEX 5000 I/O
Z-axis removal of terminal block	No	Yes
Terminal types	• D-shell • Screw-clamp • Spring-clamp • Cage-clamp	• Screw • Spring
Maximum wire size - Signal	2.5 mm^2 (14 AWG)	
Maximum wire size - Power	2.5 mm^2 (14 AWG)	
Thermal clearance	25.4 mm (1.00 in.)	

(1) EtherNet/IP adapter with RJ45 ports

(2) EtherNet/IP adapter with SFP support

(3) Some FLEX I/O catalogs have different operating temperature. See FLEX I/O and FLEX I/O-XT Selection Guide, publication 1794-SG002 for more information.

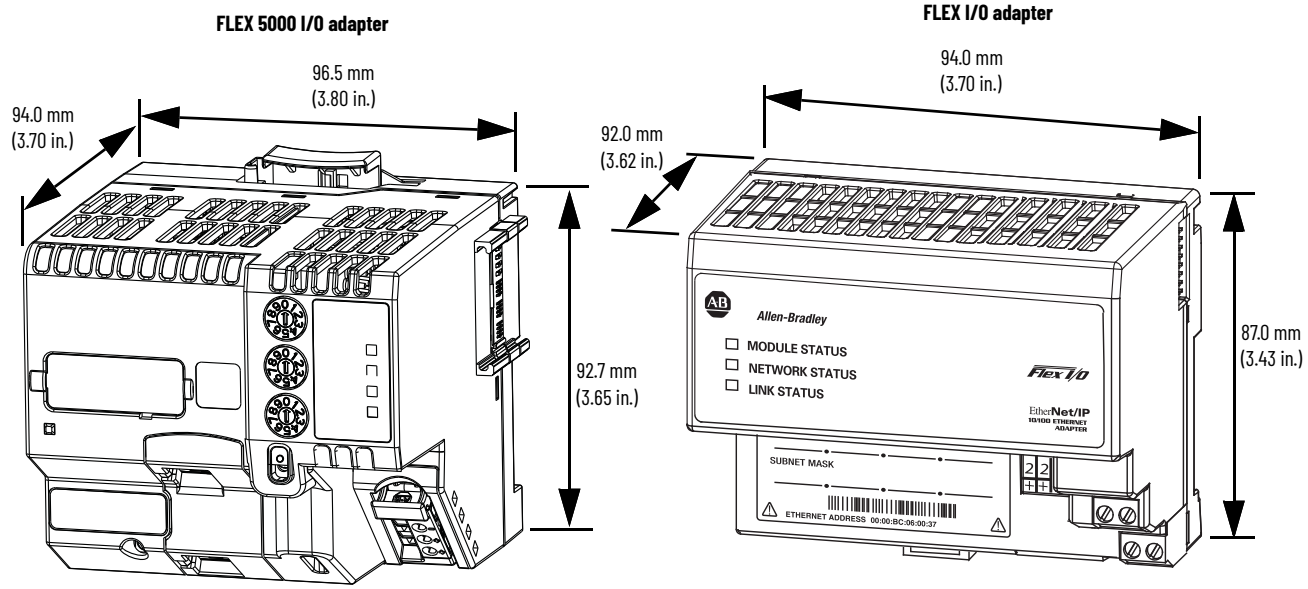
Mounting Dimensions Comparison

Verify that the current cabinet has sufficient space to install the FLEX 5000 I/O modules. In general, the footprint of FLEX I/O and FLEX 5000 I/O bases are the same and do not cause any issues. Depending on the exact modules that are compared, the overall height of the FLEX 5000 I/O modules are 10...30 mm (0.4...1.2 in.) taller than FLEX I/O modules.

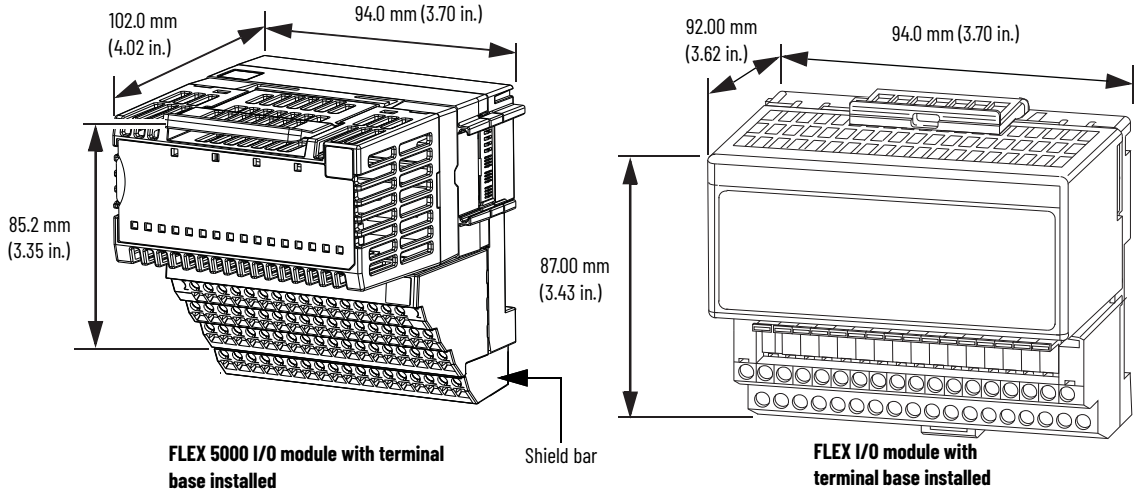
Mounting Dimension Comparison

Component	Dimension (HxWxD)	
	FLEX I/O	FLEX 5000 I/O
Adapter	87.00 x 94.00 x 92.00 mm (3.43 x 3.70 x 3.62 in.)	92.70 x 94.00 x 96.50 mm (3.65 x 3.70 x 9.80 in.)
I/O module with terminal base	87.00 x 94.00 x 92.00 mm (3.43 x 3.70 x 3.62 in.)	85.2 x 94.00 x 102.00 mm (3.35 x 3.70 x 4.02 in.)

For more information about the dimensions of all FLEX 5000 I/O modules, see FLEX 5000 Module Specifications Technical Data, publication 5094-TD001.



Mounting Dimensions Comparison - I/O Module with Terminal Base



Choose Your FLEX 5000 Adapters, I/O Modules, and Terminal Bases

The FLEX I/O and FLEX 5000 I/O platforms have a large selection of module types from both platforms but in some cases, there is no direct equivalent. Verify that the recommended module suits your application.

Adapters

Adapters Network Compatibility

FLEX I/O Adapters Support	FLEX 5000 I/O Adapters Support
Remote I/O	–
ControlNet	
DeviceNet	
PROFIBUS DP	
PROFIBUS DPV1	
EtherNet/IP	EtherNet/IP

The FLEX 5000 I/O adapters are only available in an EtherNet/IP version. If your existing system uses another network type, you must plan accordingly by determining what additional work is needed to move from your existing network to an EtherNet/IP network. If your existing system is ControlNet, see ControlNet to EtherNet/IP Migration Reference Manual, publication CNET-RM001 for migration to EtherNet/IP.

Table 2 - Recommended Migration Path for Your FLEX I/O Adapters

Migrate from FLEX I/O Adapter(1)		Migrate to FLEX 5000 I/O Adapter(1)	
Catalog Number	**Network Type**	**Catalog Number**	**Network Type**
1794-AENT 1794-AENTK 1794-AENTR	EtherNet/IP	5094-AENTR(2)	EtherNet/IP
1794-ASB 1794-ASB2	Remote I/O(3)		
1794-ACN 1794-ACNR 1794-ACN15 1794-ACNR15	ControlNet(3)		
1794-ADN 1794-ADNK	DeviceNet(3)		
1794-APBDPV1	PROFIBUS DPV1(3)		
1794-APB	ROFIBUS DP(3)		

(1) Available in XT versions.

(2) You can also migrate to 5094-AEN2TR, 5094-AENSFPR, or 5094-AEN2SFPR based on your requirement.

(3) You must migrate your existing system to an EtherNet/IP network to use FLEX 5000 I/O modules.

The FLEX 5000 EtherNet/IP adapters are available in following configurations:

- 5094-AENTR, 5094-AENTRXT
  - Supports up to 8 FLEX 5000 I/O modules
- 5094-AEN2TR, 5094-AEN2TRXT
  - Supports up to 16 FLEX 5000 I/O modules
- 5094-AENSFPR, 5094-AENSFPRXT
  - Supports up to 8 FLEX 5000 I/O modules
  - Supports fiber or copper SFP modules via two SFP slots
- 5094-AEN2SFPR, 5094-AEN2SFPRXT
  - Supports up to 16 FLEX 5000 I/O modules
  - Supports fiber or copper SFP modules via two SFP slots

The FLEX I/O EtherNet/IP adapters are available in a non-DLR capable (1794-AENT) and DLR capable (1794-AENTR) versions, and both have a maximum EtherNet/IP speed of 100 Mbps.

All FLEX 5000 I/O EtherNet/IP adapters are DLR capable and have a maximum EtherNet/IP speed of 1 Gbps. If you want to use the FLEX 5000 I/O adapter at 1 Gbps, verify that your cables and switches can handle that speed. The FLEX 5000 I/O adapters with firmware revision 4.011 or later support PRP.

Find publications with a complete list of specifications, wiring diagrams, and other requirements.

Additional Resources

Catalog Number	Resource	Description
1794-AENT	FLEX I/O EtherNet/IP Adapters Installation Instructions, publication 1794-IN082	Provides installation instructions and wiring details for single port EtherNet/IP adapters.
1794-AENTR 1794-AENTRXT	FLEX I/O Dual-port EtherNet/IP Adapters Installation Instructions, publication 1794-IN131	Provides installation instructions and wiring details for dual-port EtherNet/IP adapters.
5094-AENTR 5094-AENTRXT 5094-AEN2TR 5094-AEN2TRXT	FLEX 5000 EtherNet/IP Adapters with RJ45 Ports Installation Instructions, publication 5094-IN001	Provides installation instructions and wiring details for EtherNet/IP adapters with RJ45 ports.
5094-AENSFPR 5094-AENSFPRXT 5094-AEN2SFPR 5094-AEN2SFPRXT	FLEX 5000 EtherNet/IP Adapters with SFP Support Installation Instructions, publication 5094-IN002	Provides installation instructions and wiring details for EtherNet/IP adapters with SFP support.

I/O Modules

The FLEX I/O system and FLEX 5000 I/O system have similar categories of input and output modules (analog, digital and specialty). The FLEX I/O modules communicate on EtherNet/IP, ControlNet, DeviceNet, and many other open networks including, but not limited to Remote I/O and PROFIBUS DP. However, the FLEX 5000 I/O modules can only communicate on EtherNet/IP networks.

Module Isolation

The FLEX I/O system has several module types, both analog and digital, that have isolated inputs/outputs. The FLEX 5000 I/O system has the 5094-IF8IH and 5094-OF8IH analog HART modules that are isolated, and the 5094-OW8I and 5094-OW4IS isolated relay output modules. Verify that the FLEX 5000 I/O replacement module meets your isolation needs.

Module Sorting Consideration

The FLEX I/O modules starts at slot 0 and goes up to slot 7. The first module must always be at slot 0 or slot 1. The FLEX 5000 I/O starts at slot 1 and goes up to slot 8 when you use a 5094-AENTR adapter or up to slot 16 when you use a 5094-AEN2TR adapter. The same slots apply to XT and SFP adapters offerings for FLEX 5000 I/O.

Digital Modules

Recommended Migration Path for Your FLEX I/O Digital Modules

Migrate from FLEX I/O Catalog Number	Migrate to FLEX 5000 I/O Catalog Number	Remarks
1794-IA8	5094-IA16	FLEX 5000 I/O has more channels.
1794-IA8I		FLEX 5000 I/O does not offer channel isolation.
1794-IA16		—
1794-IB8	5094-IB16	FLEX 5000 I/O has more channels.
1794-IB16	5094-IB16	—
1794-IB16XT	5094-IB16XT	
1794-IB10XOB6	5094-IB16 5094-OB8	FLEX 5000 I/O requires multiple modules and slots to achieve functionality.
1794-IB10XOB6XT	5094-IB16XT 5094-OB8XT	
1794-IB16D	5094-IB16	No direct replacement. FLEX 5000 I/O has no diagnostic.
1794-IB16DK	5094-IB16XT	
1794-IB16XOB16P	5094-IB16 5094-OB16	FLEX 5000 I/O requires multiple modules and slots to achieve functionality and does not offer electronic fusing.
1794-IB32	5094-IB32	—
1794-IB32K	5094-IB32XT	
1794-IC16	No replacement is available.	
1794-IG16		
1794-IH16		
1794-IM8	5094-IM8	
1794-IM16	5094-IM8	FLEX 5000 I/O is not a direct replacement because it requires 2 modules and slots to achieve the same channel density.
1794-IV16	No replacement is available.	FLEX 5000 I/O system does not support sourcing input points.
1794-IV32	No replacement is available.	
1794-OA8	5094-OA16	FLEX 5000 I/O has more channels.
1794-OA8I		No direct replacement. FLEX 5000 I/O has more channels and does not offer channel isolation.
1794-OA16	5094-OA16	—
1794-OA16K	5094-OA16XT	
1794-OB4D	5094-OB8	No direct replacement. FLEX 5000 I/O has no diagnostic and has more channels.
1794-OB8		—
1794-OB8EP		No direct replacement. FLEX 5000 I/O does not offer electronic fusing.
1794-OB8EPXT	5094-OB8XT	No direct replacement. FLEX 5000 I/O has more channels and does not offer electronic fusing.
1794-OB16	5094-OB16	—
1794-OB16D	5094-OB16	No direct replacement. FLEX 5000 I/O has no diagnostic.
1794-OB16P	5094-OB16	FLEX 5000 I/O is not a direct replacement for FLEX I/O protected output module.
1794-OB16PXT	5094-OB16XT	

Recommended Migration Path for Your FLEX I/O Digital Modules (Continued)

Migrate from	Migrate to	Remarks
FLEX I/O Catalog Number	FLEX 5000 I/O Catalog Number	
1794-OB32P	5094-OB32	FLEX 5000 I/O is not a direct replacement for FLEX I/O protected output module.
1794-OC16	No replacement is available.	FLEX 5000 does not support voltage range of this module.
1794-OM8	5094-OA16	FLEX 5000 I/O has more channels.
1794-OM16	5094-OA16	–
1794-OV16	No replacement is available.	
1794-OV16P		
1794-OV32	No replacement is available.	
1794-OW8	5094-OW8I	
1794-OW8XT	5094-OW8IXT	

Find publications with a complete list of specifications, wiring diagrams, and other requirements.

Additional Resources

Catalog Number	Resource	Description
1794-IB8 1794-IB16 1794-IB32	FLEX I/O Digital Input Modules Installation Instructions, publication 1794-IN093	Describes how to install and wire the 8-point, 16-point, and 32-point FLEX I/O digital input modules.
1794-IB16D 1794-OB16D	FLEX I/O Digital Input and Output Modules with Diagnostics Installation Instructions, publication 1794-IN096	Describes how to install and wire the 16-point FLEX I/O digital input and output modules with diagnostics.
1794-IB10XOB6XT 1794-IB16XT 1794-OB8EPXT 1794-OB16PXT	FLEX I/O-XT Digital DC Input/Output Modules Installation Instructions, publication 1794-IN124	Describes how to install and wire the FLEX I/O digital DC input/output modules.
1794-IB10XOB6 1794-IB16XOB16P	FLEX I/O Digital Input and Output Modules Installation Instructions, publication 1794-IN083	Describes how to install and wire the FLEX I/O digital input and output modules.
1794-IC16 1794-OC16	FLEX I/O 48V DC Digital Input and Output Modules Installation Instructions, publication 1794-IN105	Describes how to install and wire the 48V DC FLEX I/O digital input and output modules.
1794-IG16 1794-OG16	FLEX I/O 5V DC TTL Digital Input and Output Modules Installation Instructions, publication 1794-IN119	Describes how to install and wire the 5V DC TTL FLEX I/O digital input and output modules.
1794-IH16	FLEX I/O 125V DC Digital Input Module Installation Instructions, publication 1794-IN118	Describes how to install and wire the 125V DC FLEX I/O digital input module.
1794-IV16 1794-OV16 1794-OV16P	FLEX I/O Digital Sourcing Input and Sinking Output Modules Installation Instructions, publication 1794-IN095	Describes how to install and wire the 16-point FLEX I/O digital sourcing input and sinking output modules.
1794-IV32 1794-OV32	FLEX I/O Digital Sourcing Input and Sinking Output Modules Installation Instructions, publication 1794-IN122	Describes how to install and wire the 32-point FLEX I/O digital sourcing input and sinking output modules.
1794-OB8 1794-OB8EP 1794-OB16 1794-OB16P 1794-OB32P	FLEX I/O Digital DC Output Modules Installation Instructions, publication 1794-IN094	Describes how to install and wire the 8-point, 16-point, and 32-point FLEX I/O digital DC output modules.
1794-OW8 1794-OW8XT	FLEX I/O 8 Relay Output Modules Installation Instructions, publication 1794-IN019	Describes how to install and wire the FLEX I/O 8 relay output modules.
5094-IB16 5094-IB16XT	FLEX 5000 Digital 16-point Sinking Input Modules Installation Instructions, publication 5094-IN003	Describes how to install and wire the 16-point FLEX 5000 I/O digital sinking input modules.
5094-OB16 5094-OB16XT	FLEX 5000 Digital 16-point Sourcing Output Modules Installation Instructions, publication 5094-IN004	Describes how to install and wire the 16-point FLEX 5000 I/O digital sourcing output modules.
5094-OW8I 5094-OW8IXT	FLEX 5000 Digital 8-point Isolated Relay Output Modules Installation Instructions, publication 5094-IN005	Describes how to install and wire the 8-point FLEX 5000 I/O digital isolated relay output modules.
5094-IB32 5094-IB32XT	FLEX 5000 Digital 32-point Sinking Input Modules Installation Instructions, publication 5094-IN022	Describes how to install and wire the 32-point FLEX 5000 I/O digital sinking input modules.
5094-OB32 5094-OB32XT	FLEX 5000 Digital 32-point Sourcing Output Modules Installation Instructions, publication 5094-IN024	Describes how to install and wire the 32-point FLEX 5000 I/O digital sourcing output modules.

Additional Resources (Continued)

Catalog Number	Resource	Description
5094-IA16 5094-IA16XT	FLEX 5000 Digital 16-point 120V AC Input Modules Installation Instructions, publication 5094-IN025	Describes how to install and wire the 16-point FLEX 5000 I/O digital 120V AC input modules.
5094-IM8 5094-IM8XT	FLEX 5000 Digital 8-point 240V AC Input Modules Installation Instructions, publication 5094-IN026	Describes how to install and wire the 8-point FLEX 5000 I/O digital 240V AC input modules.
5094-OA16 5094-OA16XT	FLEX 5000 Digital 16-point 120/240V AC Output Modules Installation Instructions, publication 5094-IN027	Describes how to install and wire the 16-point FLEX 5000 I/O digital 120/240 V AC output modules.

Analog Modules

Recommended Migration Path for Your FLEX I/O Analog Modules

Migrate from	Migrate to	Remarks
FLEX I/O Catalog Number	FLEX 5000 I/O Catalog Number	
1794-IE12	5094-IF8	FLEX 5000 I/O module is not a direct replacement because it requires 2 modules and slots to achieve the same channel density.
1794-IE12K	5094-IF8XT	
1794-IE4XOE2	5094-IF8 5094-OF8	No direct replacement. Your existing module is a combo and must be replaced with multiple FLEX 5000 I/O modules. Replacement modules have more points than existing.
1794-IE4XOE2XT	5094-IF8XT 5094-OF8XT	
1794-IE8	5094-IF8	—
1794-IE8H	5094-IF8IH	
1794-IE8XOE4	5094-IF8 5094-OF8	No direct replacement. Your existing module is a combo and must be replaced with multiple FLEX 5000 I/O modules. The FLEX 5000 output module has more output points than your existing module.
1794-IE8XOE4K	5094-IF8XT 5094-OF8XT	
1794-IE8XT	5094-IF8XT	—
1794-IF2XOF2I	5094-IF8IH 5094-OF8IH	No direct replacement. Your existing module is a combo and must be replaced with multiple FLEX 5000 I/O modules. The FLEX 5000 modules have more points than your existing module.
1794-IF2XOF2IXT	5094-IF8IHXT 5094-OF8IHXT	
1794-IF4I	5094-IF8IH	FLEX 5000 I/O has more channels.
1794-IF4ICFXT	No replacement is available.	—
1794-IF4IXT	5094-IF8IHXT	FLEX 5000 I/O has more channels.
1794-IF8IH	5094-IF8IH	—
1794-IF8IHNFXT	5094-IF8IHXT	
1794-OE4	5094-OF8	FLEX 5000 I/O has more channels.
1794-OE4XT	5094-OF8XT	
1794-OE8H	5094-OF8IH	—
1794-OE12	5094-OF8	FLEX 5000 I/O module is not a direct replacement because it requires 2 modules and slots to achieve the same channel density.
1794-OF4I	5094-OF8IH	FLEX 5000 I/O has more channels.
1794-OF4IXT	5094-OF8IHXT	
1794-OF8IH	5094-OF8IH	—

Find publications with a complete list of specifications, wiring diagrams, and other requirements.

Additional Resources

Catalog Number	Resource	Description
1794-IE8 1794-OE4 1794-IE4XOE2	FLEX I/O Input, Output, and Input/Output Analog Modules Installation Instructions, publication 1794-IN100	Provides information on how to install and wire the FLEX I/O input, output, and input/output analog modules.
1794-IE8XT 1794-OE4XT 1794-IE4XOE2XT	FLEX I/O Input, Output, and Input/Output Analog Modules Installation Instructions, publication 1794-IN125	
1794-IE12 1794-OE12 1794-IE8XOE4	FLEX I/O DC Input, Output, and Input/Output Analog Modules Installation Instructions, publication 1794-IN106	
1794-IE8H	FLEX I/O 8 Input HART Analog Module Installation Instructions, publication 1794-IN108	Provides information on how to install and wire the FLEX I/O 8 input HART analog module.
1794-OE8H	FLEX I/O 8 Output HART Analog Module Installation Instructions, publication 1794-IN109	Provides information on how to install and wire the FLEX I/O 8 output HART analog module.
1794-IF4I	FLEX I/O Isolated Analog Input Module Installation Instructions, publication 1794-IN038	Provides information on how to install and wire the FLEX I/O isolated analog input module.
1794-IF4IXT 1794-OF4IXT 1794-IF2XOF2IXT	FLEX I/O-XT Isolated Analog Input and Output Modules Installation Instructions, publication 1794-IN129	Provides information on how to install and wire the FLEX I/O-XT isolated analog input and output modules.
1794-IF4ICFXT	FLEX I/O-XT Isolated Analog Input Module Installation Instructions, publication 1794-IN130	Provides information on how to install and wire the FLEX I/O-XT isolated analog input module.
1794-IF8IH	FLEX I/O Isolated Input HART Analog Module Installation Instructions, publication 1794-IN115	Provides information on how to install and wire the FLEX I/O isolated input HART analog module.
1794-IF8IHNFXT	FLEX I/O-XT 8-Input Channel Isolated HART Analog Module Installation Instructions, publication 1794-IN134	Provides information on how to install and wire the FLEX I/O-XT 8-input channel isolated HART analog module.
1794-OF4I	FLEX I/O Isolated Analog Output Module Installation Instructions, publication 1794-IN037	Provides information on how to install and wire the FLEX I/O isolated analog output module.
1794-OF8IH	FLEX I/O Isolated Output HART Analog Module Installation Instructions, publication 1794-IN120	Provides information on how to install and wire the FLEX I/O isolated output HART analog module.
1794-IF2XOF2I	FLEX I/O Isolated Analog Input/Output Module Installation Instructions, publication 1794-IN039	Provides information on how to install and wire the FLEX I/O isolated analog input/output module.
5094-IF8 5094-IF8XT	FLEX 5000 Analog 8-channel Current/Voltage Input Modules Installation Instructions, publication 5094-IN006	Describes how to install and wire the FLEX 5000 I/O analog input modules.
5094-OF8 5094-OF8XT	FLEX 5000 Analog 8-channel Current/Voltage Output Modules Installation Instructions, publication 5094-IN007	Describes how to install and wire the FLEX 5000 I/O analog output modules.
5094-IF4IHS 5094-IF4IHSXT	FLEX 5000 Analog 4-channel Isolated Current/Voltage/HART Safety Input Modules Installation Instructions, publication 5094-IN016	Describes how to install and wire the FLEX 5000 I/O analog 4-channel safety input modules.
5094-IF8IH 5094-IF8IHXT	FLEX 5000 Analog 8-channel Isolated Current/Voltage/HART Input Modules Installation Instructions, publication 5094-IN020	Describes how to install and wire the FLEX 5000 I/O analog isolated HART input modules.
5094-OF8IH 5094-OF8IHXT	FLEX 5000 Analog 8-channel Isolated Current/Voltage/HART Output Modules Installation Instructions, publication 5094-IN021	Describes how to install and wire the FLEX 5000 I/O analog isolated HART output modules.

Specialty Modules

Recommended Migration Path for Your FLEX I/O Specialty Modules

Migrate from	Migrate to	Remarks
FLEX I/O Catalog Number	FLEX 5000 I/O Catalog Number	
1794-IR8	5094-IY8	–
1794-IRT8	5094-IY8	
1794-IRT8XT	5094-IY8XT	
1794-IT8	5094-IY8	

Find publications with a complete list of specifications, wiring diagrams, and other requirements.

Additional Resources

Catalog Number	Resource	Description
1794-IT8 1794-IR8	FLEX I/O Thermocouple/mV Input Module and RTD Input Module Installation Instructions, publication 1794-IN021	Describes how to install and wire the FLEX I/O thermocouple/mV input module and RTD input modules.
1794-IRT8 1794-IRT8K 1794-IRT8XT	FLEX I/O Thermocouple/RTD Input Analog Module Installation Instructions, publication 1794-IN050	Describes how to install and wire the FLEX I/O thermocouple/RTD input analog modules.
5094-IY8 5094-IY8XT	FLEX 5000 Analog 8-channel Current/Voltage/RTD/Thermocouple Input Modules Installation Instructions, publication 5094-IN008	Describes how to install and wire the FLEX 5000 I/O analog current/voltage/RTD/thermocouple input modules.

Counter Modules

Recommended Migration Path for Your FLEX I/O Counter Modules

Migrate from	Migrate to	Remarks
FLEX I/O Catalog Number	FLEX 5000 I/O Catalog Number	
1794-ID2	5094-HSC	–
1794-IJ2	5094-IJ2I	
1794-IJ2XT	5094-IJ2IXT	
1794-IP4	No replacement is available.	
1794-VHSC	5094-HSC	

Find publications with a complete list of specifications, wiring diagrams, and other requirements.

Additional Resources

Catalog Number	Resource	Description
1794-IJ2 1794-IJ2K 1794-IJ2XT	FLEX I/O 2-input Frequency Modules Installation Instructions, publication 1794-IN049	Describes how to install and wire the FLEX I/O 2-input frequency modules.
1794-VHSC	FLEX I/O Very High-speed Counter Module Installation Instructions, publication 1794-IN067	Describes how to install and wire the FLEX I/O very high-speed counter module.
1794-ID2	FLEX I/O 2-channel Incremental Encoder Module Installation Instructions, publication 1794-IN063	Describes how to install and wire the FLEX I/O 2-channel incremental encoder module.
1794-IP4	FLEX I/O 4-channel Pulse Counter Module Installation Instructions, publication 1794-IN064	Describes how to install and wire the FLEX I/O 4-channel pulse counter module.
5094-IJ2I 5094-IJ2IXT	FLEX 5000 2-channel Isolated-frequency Input Modules Installation Instructions, publication 5094-IN029	Describes how to install and wire the FLEX 5000 I/O 2-channel isolated-frequency input modules.
5094-HSC 5094-HSCXT	FLEX 5000 High-speed Counter I/O Modules Installation Instructions, publication 5094-IN009	Describes how to install and wire the FLEX 5000 I/O high-speed counter modules.

Terminal Bases

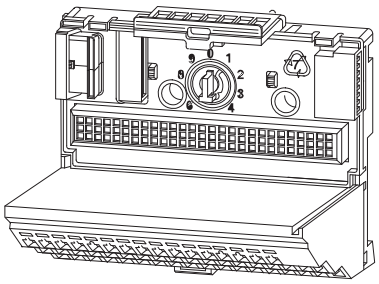
The FLEX I/O terminal bases are supplied as one unit. The FLEX 5000 I/O terminal bases come as a two-piece unit that consists of:

- Mounting base (MB)
- Removable terminal block (RTB)
  - RTB catalog number with letter 'S' at the end is spring-type RTB (for example, RTB3TS).
  - RTB catalog number without letter 'S' is screw-type RTB (for example, RTB3T).

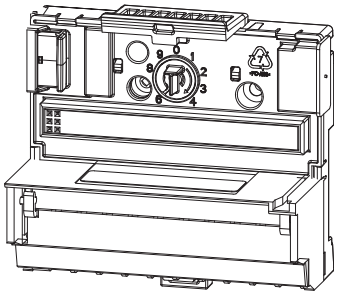
The FLEX 5000 terminal base is selected based on the chosen FLEX 5000 I/O module. See FLEX 5000 Module Specifications Technical Data, publication 5094-TD001 to select terminal base for your I/O module.

FLEX I/O Terminal Base Types

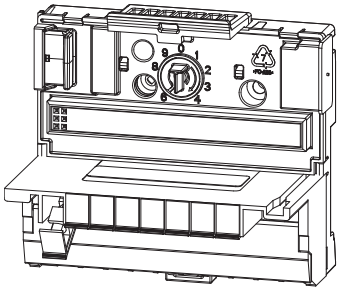
Spring-clamp terminal base



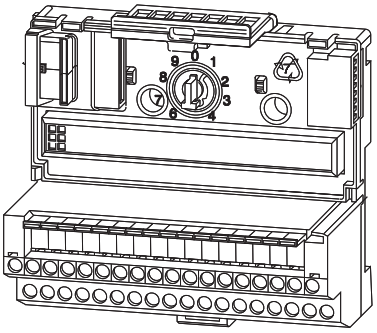
Screw-clamp terminal base



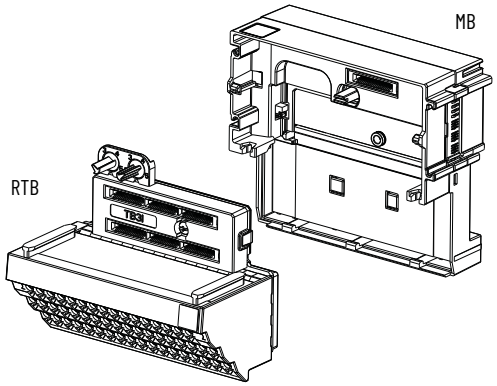
Screw-clamp terminal base (fused)



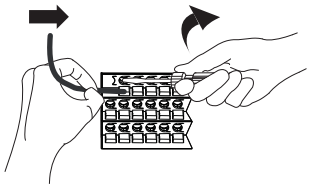
Cage clamp terminal base (knife disconnect)



FLEX 5000 I/O Terminal Base Types



Screw-type TB



Spring-type TB

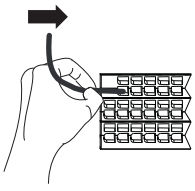


Table 3 - Terminal Base Comparison

FLEX I/O Terminal Base	FLEX 5000 I/O Terminal Base
Single unit	Two-piece unit (MB+RTB)
You can order terminal base individually.	You cannot order terminal base individually. You must order MBs and RTBs separately to assemble as a TB required for your system.
Types:(1) • Cage-clamp • Spring-clamp • Screw-clamp • D-shell	Types:(2) • Spring • Screw

(1) For more detailed information about the FLEX I/O terminal base, see FLEX I/O and FLEX I/O-XT Selection Guide, publication 1794-SG002.

(2) For more detailed information about the FLEX 5000 I/O terminal base, see FLEX 5000 Module Specifications Technical Data publication 5094-TD001.

Find publications with a complete list of specifications, wiring diagrams, and other requirements.

Additional Resources

Catalog Number	Resource	Description
1794-TB2 1794-TB2K 1794-TB3 1794-TB3K 1794-TB3S 1794-TB3SK 1794-TB32 1794-TB32K 1794-TB32S 1794-TB32SK 1794-TB3T 1794-TB3TK 1794-TB3TS 1794-TB3TSK 1794-TB3G 1794-TB3GK 1794-TB3GS 1794-TB3GSK 1794-TBKD 1794-TBN 1794-TBNK 1794-TBNF	FLEX I/O Terminal Base Units Installation Instructions, publication 1794-IN092	Describes how to install the FLEX I/O terminal base units.
1794-TB3GT	FLEX I/O Grounded Cage Clamp Temperature Terminal Base Unit Installation Instructions, publication 1794-IN133	Describes how to install the FLEX I/O rounded cage clamp temperature terminal base assemblies.

Additional Resources (Continued)

Catalog Number	Resource	Description
1794-TB62DS 1794-TB37DS 1794-TB62EXD4X15 1794-TB37EXD4CM8 1794-TB37EXD4VM8	FLEX I/O D-Shell Terminal Base Units and Distribution Boards Installation Instructions, publication 1794-IN107	Describes how to install the FLEX I/O D-shell terminal base assemblies.
5094-MB 5094-MBXT	FLEX 5000 Terminal Base Assembly Modules Installation Instructions, publication 5094-IN010	Describes how to install the FLEX 5000 terminal base assemblies.
5094-RTB3 5094-RTB3S 5094-RTB3T 5094-RTB3TS 5094-RTB3W 5094-RTB3WS 5094-RTB3I 5094-RTB3IS 5094-RTB3IT 5094-RTB3ITS 5094-RTB32V 5094-RTB32VS 5094-RTB32C 5094-RTB32CS 5094-RTB3AC 5094-RTB3ACS 5094-RTB3XT 5094-RTB3SXT 5094-RTB3TXT 5094-RTB3TSXT 5094-RTB3WXT 5094-RTB3WSXT 5094-RTB3IXT 5094-RTB3ISXT 5094-RTB3ITXT 5094-RTB3ITSXT 5094-RTB32VXT 5094-RTB32VSXT 5094-RTB32CXT 5094-RTB32CSXT 5094-RTB3ACXT 5094-RTB3ACSXT		

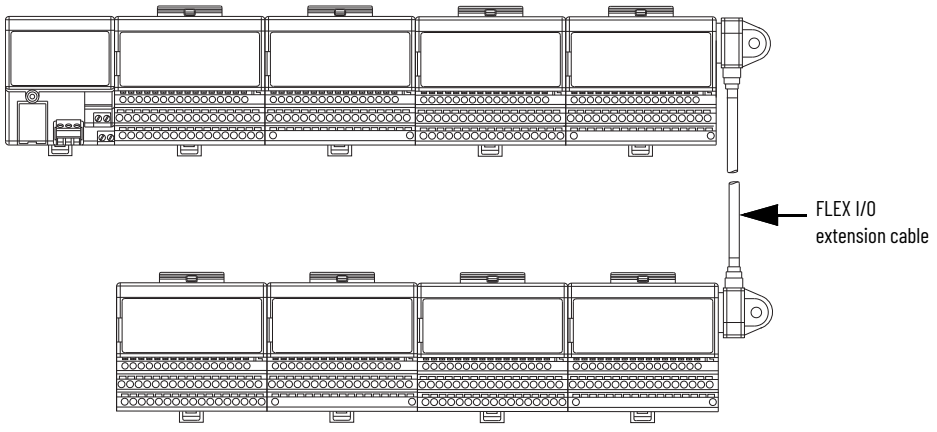
Power Supply

The FLEX 5000 I/O does not need a separate power supply module whereas FLEX I/O uses a separate power supply module to power the adapter and I/O modules. However, you can use Bulletin 1606 power supplies if you need additional power.

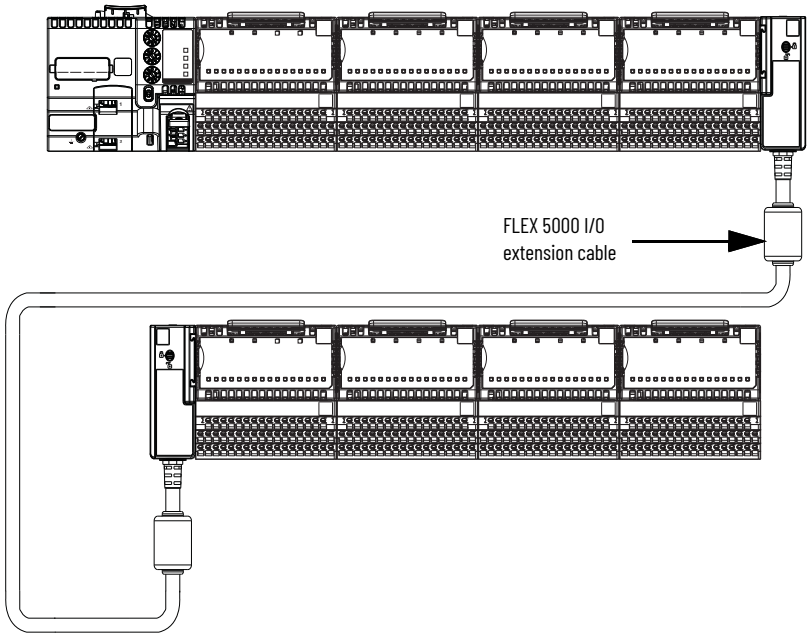
Choose your Accessories

Extension or Interconnect Cables

FLEX I/O system



FLEX 5000 I/O system



Consider the following points before migrating FLEX I/O to FLEX 5000 I/O interconnect cables:

- The connector end of the FLEX 5000 I/O cable is approximately 12.7 mm (0.5 in.) wider than the FLEX I/O cable. You need approximately 12.7 mm (0.5 in.) more space at each end of your FLEX 5000 I/O system to accommodate the FLEX 5000 I/O cable.
- The cable gender/orientation is different between the FLEX I/O and FLEX 5000 I/O. For FLEX I/O, each end of the interconnect cable connects to the rightmost terminal base of both banks of modules. For FLEX 5000, one end of the interconnect cable connects to the rightmost terminal base of the first bank, and the other end connects to the leftmost terminal base of the second bank of modules. You can consider using a longer FLEX 5000 I/O interconnect cable or mounting the second bank of modules upside down. By mounting the second bank of modules upside down, the physical order of the modules within the chassis remains the same as FLEX I/O. Keep in mind that FLEX 5000 I/O has no ambient temperature derating when mounted upside down.

FLEX I/O Cable to FLEX 5000 I/O Cable Migration

Migration from FLEX I/O Cable		Migration to FLEX 5000 I/O Cable(1)	
Catalog Number	**Cable Length**	**Catalog Number**	**Cable Length**
1794-CE1	0.3 m (1.0 ft)	5094-CE05	0.5 m (1.64 ft)
1794-CE3	0.91 m (3 ft)	5094-CE10	1 m (3.3 ft)

(1) The 0.7 m (2.3 ft) length cable 5094-CE07 and 3 m (9.8 ft) length cable 5094-CE30 can also be the possible migration option for your system, based on your requirement.

Find publications with a complete list of specifications, wiring diagrams, and other requirements.

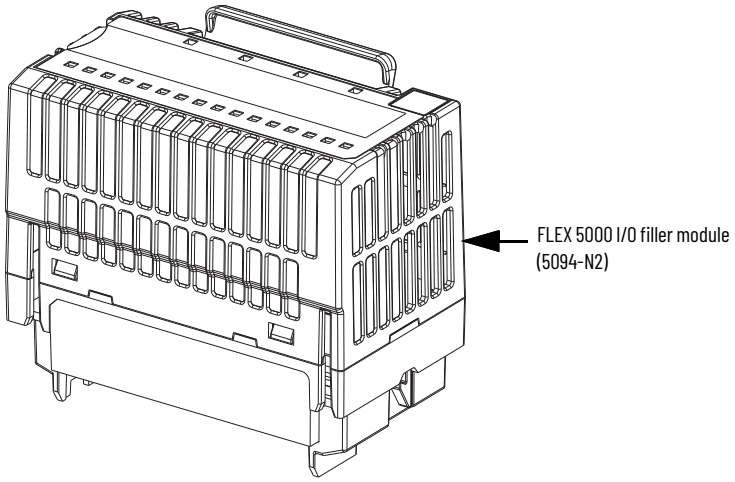
Additional Resources

Catalog Number	Resource	Description
1794-CE1 1794-CE3	Interconnect Cable Installation Instructions, publication 1794-IN012	Describes how to install the FLEX I/O interconnect cables.
5094-CE05 5094-CE07 5094-CE10 5094-CE30	FLEX 5000 Interconnect Cable Installation Instructions, publication 5094-IN011	Describes how to install the FLEX 5000 interconnect cables.

Empty Slots and Filler Modules

The filler modules are used to occupy empty slots in a rack or I/O chassis, for example a terminal base with no I/O module. The filler module contains no electronics.

Both FLEX I/O and FLEX 5000 I/O systems support empty slots for future use by simply having an empty terminal base present. The FLEX 5000 I/O has a protective empty slot cover, 5094-N2 that you can place on an empty base to protect the base from the environment. The 5094-N2 is a plastic cover and contains no working parts.

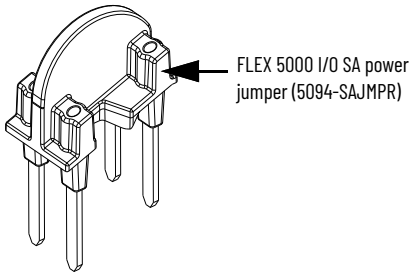


Filler Module Migration

Migration from FLEX I/O Filler Module	Migration from FLEX 5000 I/O Filler Module
1794-N2	5094-N2

Sensor Actuator (SA) Field Power Jumper

Both FLEX I/O and FLEX 5000 I/O bases use a method of jumpering the field power/SA power between bases. Both FLEX I/O and FLEX 5000 I/O jumper the terminal 33 to terminal 16 for the common and jumper the terminal 51 to terminal 34 for the DC+. The terminal markings vary between terminal bases. The FLEX 5000 I/O simplifies this process by providing a 4-prong jumper (5094-SAJMPR) that connects the appropriate terminals together. The jumper 5094-SAJMPR is available in package of 10 units.



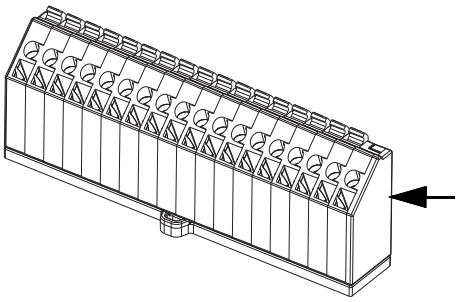
IMPORTANT	Use jumper 5094-SAJMPR only for FLEX 5000 I/O screw-type terminal bases. Do not use this jumper for spring-type terminal bases.

Jumper Migration

From FLEX I/O (Manual Jumpering)	To FLEX 5000 I/O (Jumpering Accessory)
Individual wires are used to jumper the terminals.	Use a SA filed power jumper, 5094-SAJMPR to jumper the screw-type terminals.

Shield Termination

Most FLEX I/O modules that require a shield termination have multiple landing points on the FLEX I/O terminal base for the shield. This means that the base itself had a place to terminate all shields, with one shield connected to one point on the base.



The FLEX 5000 I/O base does not have a place to land the individual shields on it. Install a shield termination bar 5094-STB to the FLEX 5000 I/O terminal base and provide an individual screw terminal to land each shields. The shield termination bar 5094-STB is typically used with all FLEX 5000 I/O analog modules and the specialty module 5094-HSC. The addition of 5094-STB increases the dimension of the FLEX 5000 I/O terminal base approximately 33 mm (1.3 in.). The dimension footprint of the FLEX 5000 I/O terminal base is now taller than the FLEX I/O terminal base.

The 5094-STB is available in package of five units.

Shield Termination Migration

From FLEX I/O	To FLEX 5000 I/O
No separate shield termination bar is required.	A shield termination bar 5094-STB is required.

Power Considerations

Depending on the module and its configuration and operating conditions, FLEX 5000 I/O modules might draw more SA power compared to the backplane power drawn by the FLEX I/O modules. Make sure to calculate the expected SA current of your FLEX 5000 I/O system and verify that the existing power supply can accommodate your needs.

Power Considerations

From FLEX I/O	To FLEX 5000 I/O
Backplane power	SA power

Network Considerations

EtherNet/IP Network Overview

EtherNet/IP networks offer a comprehensive suite of messages and services for many automation applications. This open network standard uses standard Ethernet communication products to support real-time I/O messaging, information exchange, and general messaging. EtherNet/IP networks support CIP Safety applications. Such support makes the simultaneous transmission of safety and standard control data and diagnostics information over a common network possible. EtherNet/IP networks also support CIP Motion™ and CIP Security™.

FLEX I/O supports ControlNet, DeviceNet, EtherNet/IP, Remote I/O communications, and PROFIBUS networks. FLEX 5000 I/O only supports EtherNet/IP communication.

We recommend that you migrate your existing ControlNet, DeviceNet, Remote I/O communications, or PROFIBUS to an EtherNet/IP network. Migration from non-EtherNet/IP network to EtherNet/IP requires addition of a communication module (such as 1756-EN2TR) to communicate with the FLEX 5000 I/O system.

There are two versions of the FLEX 5000 I/O adapter:

- 5094-AENTR/5094-AENSFPR supports a maximum of eight modules per adapter.
- 5094-AEN2TR/5094AEN2SFPR supports a maximum of 16 modules per adapter.

For more information, see the following publications:

- ControlNet to EtherNet/IP Migration Guide Reference Manual, publication CNET-RM001
- Bridge DeviceNet and EtherNet/IP networks with a 1788-EN2DR or 1788-EN2DROM linking device. See EtherNet/IP to DeviceNet Linking Device User Manual, publication 1788-UM059
- Ethernet Media Specifications Technical Data, publication 1585-TD001

Controller Considerations

The FLEX 5000 I/O family supports the following controllers:

- ControlLogix 5580
- CompactLogix 5380 and 5480
- GuardLogix 5580 safety
- Compact GuardLogix 5380 safety

If your existing FLEX I/O system uses ControlLogix 5570 or CompactLogix 5370 controller, migrate to the suitable controllers based on your system requirement. See Replacement Guidelines: Logix 5000 Controllers Reference Manual, publication 1756-RM100.

You must use Studio 5000 Logix Designer application version 31 or later to configure the FLEX 5000 I/O modules.

Table 4 - FLEX 5000 I/O Controller and Software Compatibility Requirements

Modules	Controllers		Studio 5000 Logix Designer Application Version
	System	Catalog Numbers	
Standard Modules 5094-IA16, 5094-IA16XT, 5094-OA16, 5094-OA16XT, 5094-IB16, 5094-IB16XT, 5094-IB32, 5094-IB32XT, 5094-OB8, 5094-OB8XT, 5094-OB16, 5094-OB16XT, 5094-OB32, 5094-OB32XT, 5094-OW8I, 5094-OW8IXT, 5094-IF8, 5094-IF8XT, 5094-IM8, 5094-IM8XT, 5094-IY8, 5094-IY8XT, 5094-OF8, 5094-OF8XT, 5094-IJ2I[1], 5094-IJ2IXT[1], 5094-HSC, 5094-HSCXT, 5094-SERIAL, 5094-SERIALXT	CompactLogix 5380	5069-L320ER, 5069-L340ERM	31.00.00 or later
		5069-L306ER, 5069-L306ERM, 5069-L310ER, 5069-L310ERM, 5069-L310ER-NSE, 5069-L320ERM, 5069-L330ER, 5069-L330ERM, 5069-L340ER	31.00.00 or later
		5069-L350ERM, 5069-L380ERM, 5069-L3100ERM	31.00.00 or later
	Compact GuardLogix 5380	5069-L306ERMS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERMS2, 5069-L320ERS2, 5069-L320ERMS2, 5069-L330ERS2, 5069-L330ERMS2, 5069-L340ERS2, 5069-L340ERMS2, 5069-L350ERS2, 5069-L350ERMS2, 5069-L380ERS2, 5069-L380ERMS2, 5069-L3100ERS2, 5069-L3100ERMS2	31.00.00 or later
		5069-L306ERMS3, 5069-L310ERMS3, 5069-L310ERMS3K, 5069-L320ERMS3, 5069-L320ERMS3K, 5069-L330ERMS3, 5069-L330ERMS3K, 5069-L340ERMS3, 5069-L350ERMS3, 5069-L350ERMS3K, 5069-L380ERMS3, 5069-L3100ERMS3	32.00.00 or later
	ControlLogix 5580	1756-L81E, 1756-L81E-NSE, 1756-L81EP, 1756-L82E, 1756-L82E-NSE, 1756-L83E, 1756-L83E-NSE, 1756-L83EP, 1756-L84E, 1756-L84E-NSE, 1756-L85E, 1756-L85E-NSE, 1756-L85EP	31.00.00 or later
	ControlLogix 5580 High Availability Controller	1756-L81E, 1756-L81E-NSE, 1756-L81EP, 1756-L82E, 1756-L82E-NSE, 1756-L83E, 1756-L83E-NSE, 1756-L83EP, 1756-L84E, 1756-L84E-NSE, 1756-L85E, 1756-L85E-NSE, 1756-L85EP	33.00.00 or later
	GuardLogix 5580	1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	31.00.00 or later
		1756-L85ES	36.00.00 or later
	CompactLogix 5480	5069-L46ERMW, 5069-L450ERMW, 5069-L430ERMW, 5069-L4200ERMW, 5069-L4100ERMW	32.00.00 or later

Table 4 - FLEX 5000 I/O Controller and Software Compatibility Requirements (Continued)

Modules	Controllers		Studio 5000 Logix Designer Application Version
	System	Catalog Numbers	
HART Modules 5094-IF8IH, 5094-IF8IHXT, 5094-OF8IH, 5094-OF8IHXT	CompactLogix 5380	5069-L320ER, 5069-L340ERM	32.02 or later
		5069-L306ER, 5069-L306ERM, 5069-L310ER, 5069-L310ERM, 5069-L310ER-NSE, 5069-L320ERM, 5069-L330ER, 5069-L330ERM, 5069-L340ER	32.02 or later
		5069-L350ERM, 5069-L380ERM, 5069-L3100ERM	32.02 or later
	Compact GuardLogix 5380	5069-L306ERMS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERMS2, 5069-L320ERS2, 5069-L320ERMS2, 5069-L330ERS2, 5069-L330ERMS2, 5069-L340ERS2, 5069-L340ERMS2, 5069-L350ERS2, 5069-L350ERMS2, 5069-L380ERS2, 5069-L380ERMS2, 5069-L3100ERS2, 5069-L3100ERMS2	32.02 or later
		5069-L306ERMS3, 5069-L310ERMS3, 5069-L310ERMS3K, 5069-L320ERMS3, 5069-L320ERMS3K, 5069-L330ERMS3, 5069-L330ERMS3K, 5069-L340ERMS3, 5069-L350ERMS3, 5069-L350ERMS3K, 5069-L380ERMS3, 5069-L3100ERMS3	32.00.00 or later
	ControlLogix 5580	1756-L81E, 1756-L81E-NSE, 1756-L81EP, 1756-L82E, 1756-L82E-NSE, 1756-L83E, 1756-L83E-NSE, 1756-L83EP, 1756-L84E, 1756-L84E-NSE, 1756-L85E, 1756-L85E-NSE, 1756-L85EP	32.02 or later
	ControlLogix 5580 High Availability Controller	1756-L81E, 1756-L81E-NSE, 1756-L81EP, 1756-L82E, 1756-L82E-NSE, 1756-L83E, 1756-L83E-NSE, 1756-L83EP, 1756-L84E, 1756-L84E-NSE, 1756-L85E, 1756-L85E-NSE, 1756-L85EP	33.00.00 or later
	GuardLogix 5580	1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	32.02 or later
		1756-L85ES	36.00.00 or later
Safety Modules 5094-IB16S, 5094-IB16SXT, 5094-OB16S, 5094-OB16SXT, 5094-OW4IS, 5094-OW4ISXT	Compact GuardLogix 5380	5069-L306ERMS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERMS2, 5069-L320ERS2, 5069-L320ERMS2, 5069-L330ERS2, 5069-L330ERMS2, 5069-L340ERS2, 5069-L340ERMS2, 5069-L350ERS2, 5069-L350ERMS2, 5069-L380ERS2, 5069-L380ERMS2, 5069-L3100ERS2, 5069-L3100ERMS2	32.00.00 or later
		5069-L306ERMS3, 5069-L310ERMS3, 5069-L310ERMS3K, 5069-L320ERMS3, 5069-L320ERMS3K, 5069-L330ERMS3, 5069-L330ERMS3K, 5069-L340ERMS3, 5069-L350ERMS3, 5069-L350ERMS3K, 5069-L380ERMS3, 5069-L3100ERMS3	32.00.00 or later
	GuardLogix 5580	1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	32.00.00 or later
		1756-L85ES	36.00.00 or later
5094-IF4IHS, 5094-IF4IHSXT, 5094-OF4IHS, 5094-OF4IHSXT, 5094-IJ2IS, 5094-IJ2ISXT, 5094-IRT8S, 5094-IRT8SXT	Compact GuardLogix 5380	5069-L306ERMS2, 5069-L306ERS2, 5069-L310ERS2, 5069-L310ERMS2, 5069-L320ERS2, 5069-L320ERMS2, 5069-L330ERS2, 5069-L330ERMS2, 5069-L340ERS2, 5069-L340ERMS2, 5069-L350ERS2, 5069-L350ERMS2, 5069-L380ERS2, 5069-L380ERMS2, 5069-L3100ERS2, 5069-L3100ERMS2	33.00.00 or later
		5069-L306ERMS3, 5069-L310ERMS3, 5069-L310ERMS3K, 5069-L320ERMS3, 5069-L320ERMS3K, 5069-L330ERMS3, 5069-L330ERMS3K, 5069-L340ERMS3, 5069-L350ERMS3, 5069-L350ERMS3K, 5069-L380ERMS3, 5069-L3100ERMS3	33.00.00 or later
	GuardLogix 5580	1756-L81ES, 1756-L82ES, 1756-L83ES, 1756-L84ES	33.00.00 or later
		1756-L85ES	36.00.00 or later

(1) The modules 5094-IJ2I and 5094-IJ2IXT are compatible with Studio 5000 Logix Designer Application version 34.00.00 or later.

For more information about the features and differences between the standard ControlLogix controllers, see the following publications:

- ControlLogix and GuardLogix Controllers Technical Data, publication 1756-TD001
- CompactLogix 5380, Compact GuardLogix 5380, and CompactLogix 5480 Controllers Specifications Technical Data, publication 5069-TD002

Redundant Controllers

The ControlLogix redundant controllers require Studio 5000 Logix Designer application version 33.00.00 or later to support FLEX 5000 I/O modules. The Logix Safety Instrumented System (Logix SIS) safety controller requires the use of Studio 5000 Logix Designer application version 37.00.00 or later and FLEX 5000 adapter firmware revision 6.011 or later.

You cannot use Listen Only or Input Only connections for FLEX 5000 I/O and ControlLogix 1756 HART I/O from a redundant controller. There is no ability for another controller to listen or dual-own connections to FLEX 5000 I/O. So, there is no sharing of FLEX 5000 I/O or highly integrated HART between the redundant controller pair and other controllers.

Other Considerations

You must replace the references to FLEX I/O with FLEX 5000 I/O, by making changes in the code. As such, migrating from the FLEX I/O system to the FLEX 5000 I/O system is considered as an engineered solution.

Channel Data Formats and Scaling

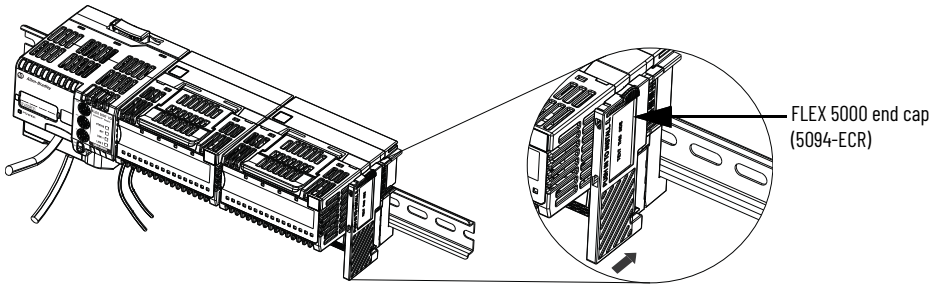
The FLEX I/O analog channel data uses an INT data type. The FLEX 5000 I/O analog channel data uses a REAL data type. Scaling of channel data is different between the two I/O systems. The FLEX I/O uses ranges such as 0...22,000, 0...65,535, and -32,767...+32,767. The FLEX 5000 I/O modules by default are scaled 0...100% but can be reconfigured for engineering units. When converting from FLEX I/O to FLEX 500 I/O, verify whether your associated ladder program must adjust the values returned or used by the FLEX 5000 I/O modules.

RPI Comparison between FLEX I/O and FLEX 5000 I/O

RPI ranges are not the same between FLEX I/O and FLEX 5000 I/O. In general, the RPIs for FLEX I/O range from 2...750 ms. The RPIs for FLEX 5000 I/O range from 0.2...750 ms. Depending on your existing configuration and application requirements, these differences can have an impact on performance. This performance impact must be evaluated and proper RPIs must be configured before you migrate your system.

Termination - End Cap

The FLEX I/O does not have any type of termination at the end of a chassis. The FLEX 5000 I/O requires an end cap, 5094-ECR to the right of the last base installed. The 5094-ECR ships with the FLEX 5000 I/O adapter but can also be purchased separately if necessary. The end cap 5094-ECR-QTY5 is available in package of five units.



Termination Consideration

From FLEX I/O	To FLEX 5000 I/O
Termination is not required.	Termination is required. Use end cap 5094-ECR.

Notes:

Plan Hardware Migration with Integrated Architecture Builder

This chapter describes how to use the Integrated Architecture® Builder (IAB) application to generate bill of materials (BOM) for FLEX 5000 I/O system from your existing FLEX I/O system.

Some FLEX I/O modules do not have direct replacement or migration options to FLEX 5000 I/O system. The IAB migration wizard tool helps you to identify the modules that do not have direct replacements and which do not have a viable migration option.

Before you start, download and install the latest IAB application, if not installed already. Follow this procedure:

1. Go to https://raiseinstall.rockwellautomation.com/pst-lite.html. The IAB application installer file starts to download automatically.
2. Once downloaded, run the installer file (.exe) and follow the on-screen instructions to complete the installation.

The following procedure describes how to convert a ControlLogix 5570 controller (1756-L71) with a FLEX I/O system to a ControlLogix 5580 Controller (1756-L8) with FLEX 5000 I/O system. This procedure is a typical example and the procedure can vary based on your existing system.

This example includes the following FLEX I/O and controller hardware:

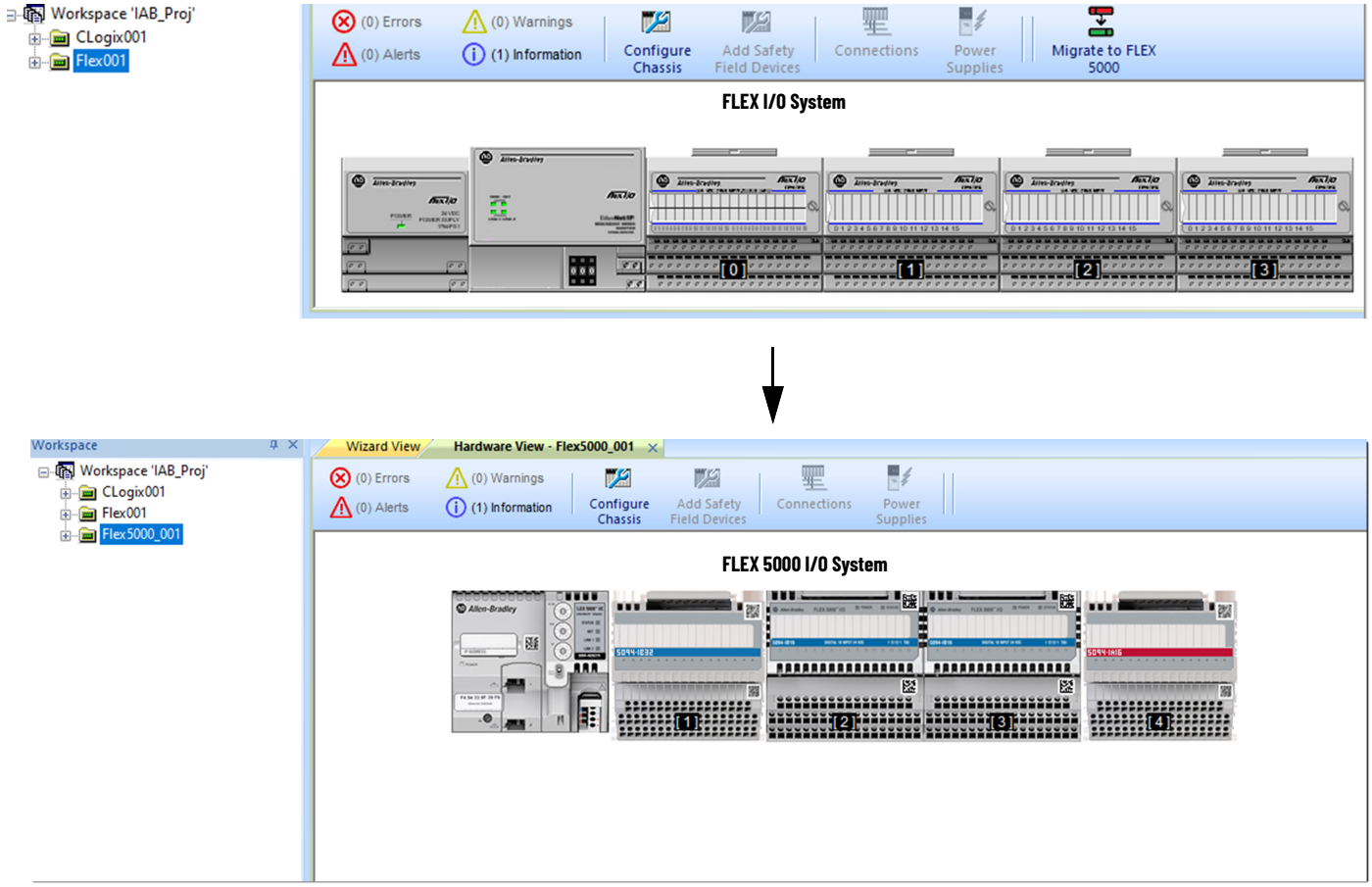
Table 5 - Sample FLEX I/O system

Adapter	Slot 0	Slot 1	Slot 2	Slot 3
1794-AENTR	1794-IB32	1794-IB16	1794-IB16	1794-IA16

Table 6 - Sample Controller System

Power Supply	Slot 0	Slot 1	Slot 2	Slot 3
1756-PA75	1756-L71	1756-EN2T	1756-N2	1756-N2

Example Architecture of FLEX I/O System to FLEX 5000 I/O System Migration



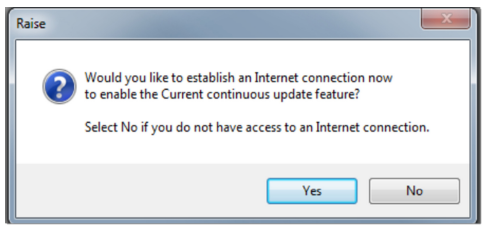
Convert ControlLogix 5570 Controller (1756-L71) with FLEX I/O System to ControlLogix 5580 Controller (1756-L8) with FLEX 5000 I/O System

Launch IAB and Create a New Project with Hardware

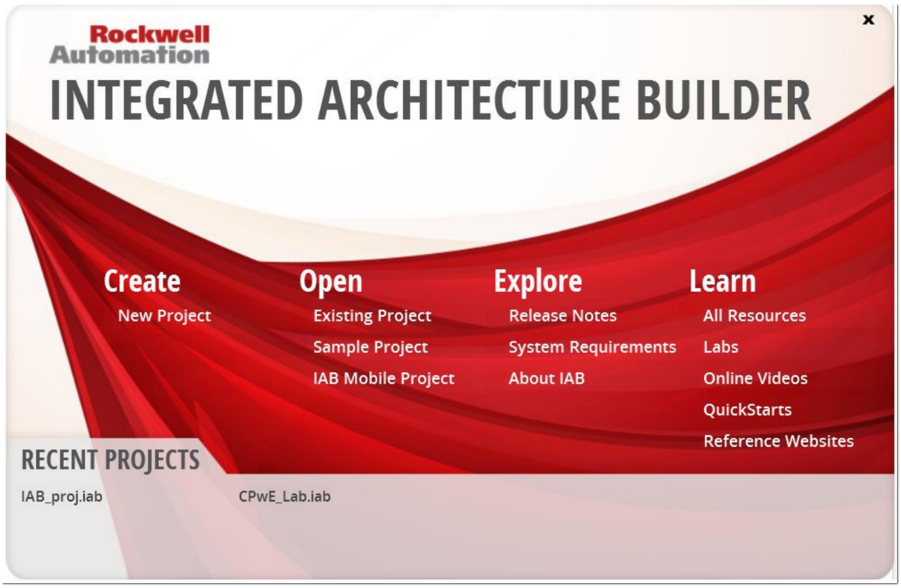
To add your existing FLEX I/O system, proceed as follows:

1. Launch Integrated Architecture Builder application from Start –> Programs –> Rockwell Automation –> Integrated Architecture Builder –> Integrated Architecture Builder. Alternatively, you can double-click the IAB icon on your computer.

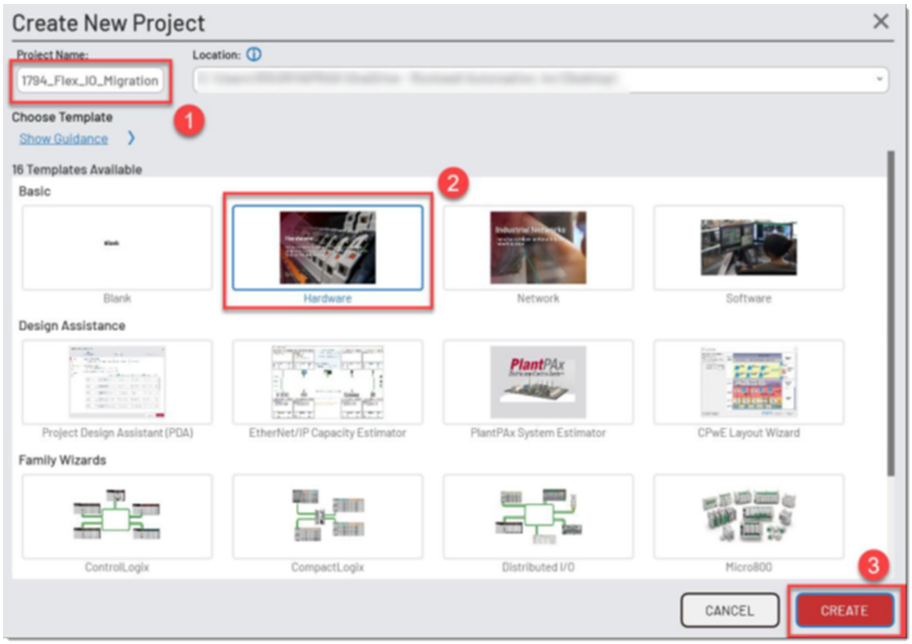
2. If the Raise dialog appears, select No for this example. Update your PC regularly to ensure that the latest offerings are included in IAB.



The IAB start page appears.



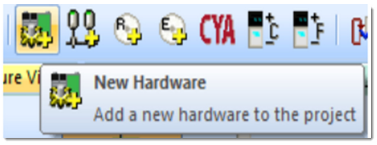
3. Select New Project.
4. Create New Project dialog appears. Enter the Project Name as 1794_Flex_IO_Migration. Select Hardware and CREATE.



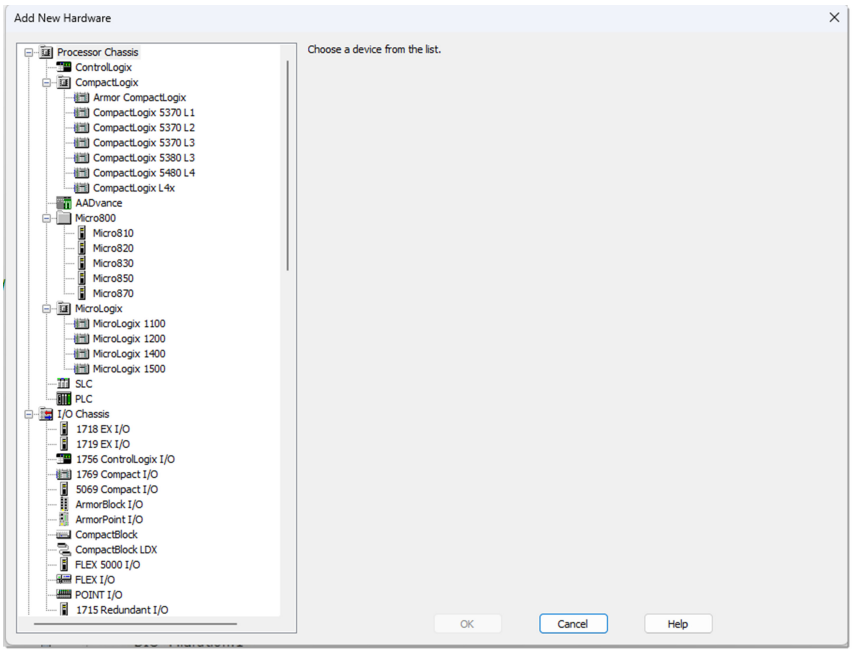
5. The 1794_Flex_IO_Migration project workspace with Wizard View appears.

Add a ControlLogix Chassis

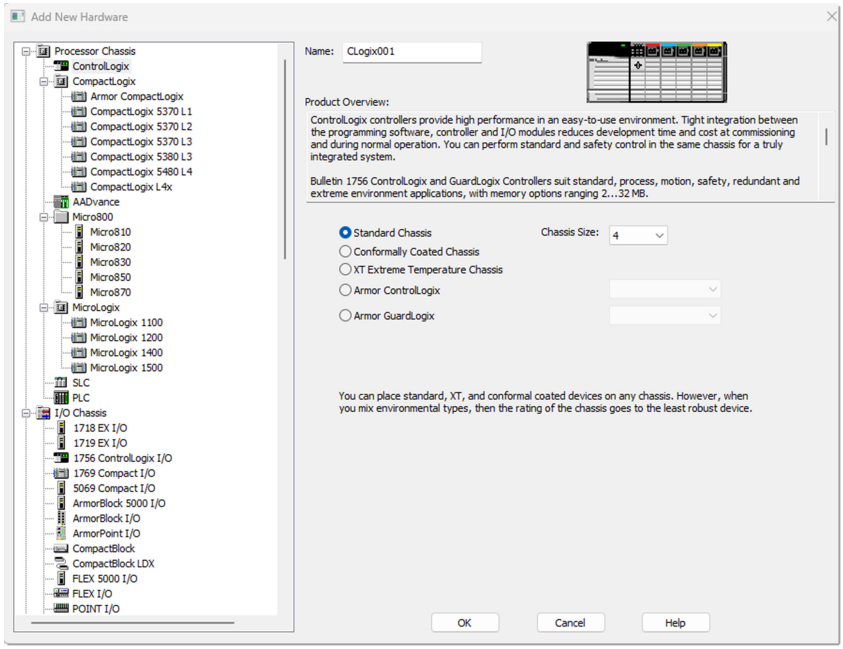
1. Select New Hardware icon to add your existing ControlLogix 5570 controller.



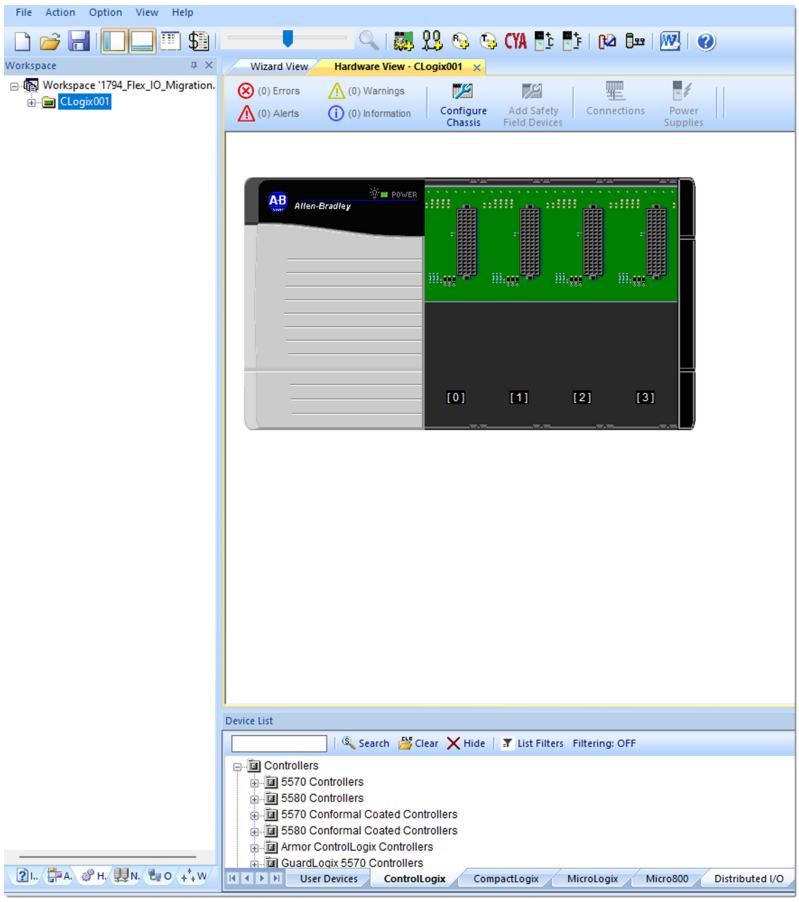
2. The Add New Hardware dialog appears.



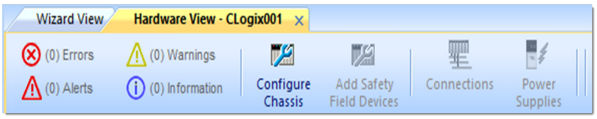
3. From Add New Hardware dialog, add your controller chassis:
   a. Select ControlLogix from the Processor Chassis menu.
   b. Select Standard Chassis.
   c. Select Chassis Size 4 from the dropdown list. You can select chassis size up to 17 based on your existing system.
   d. Select OK.



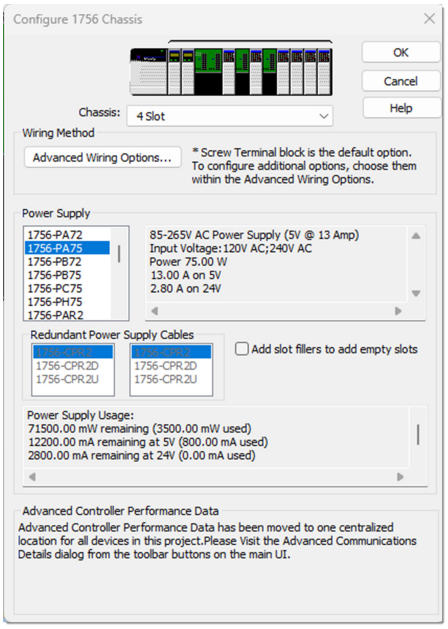
4. The Hardware View dialog appears.



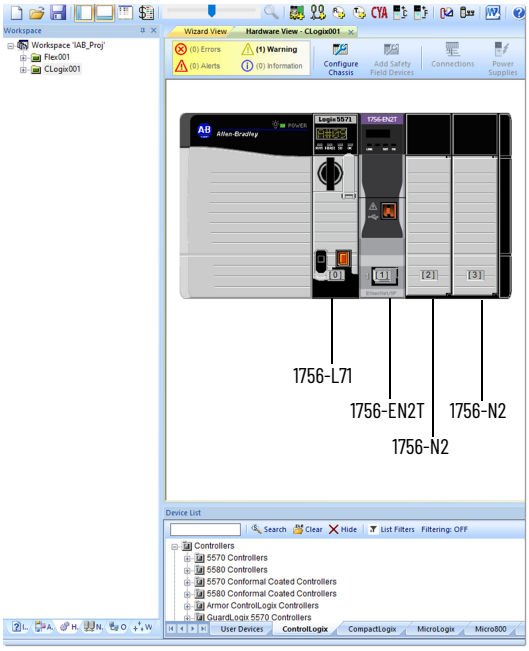
5. Select Configure Chassis icon.



6. The Configure 1756 Chassis dialog appears. From this dialog, select your power supply module catalog number from the Power Supply list, then select OK. You can also change the chassis slot details from the Chassis dropdown list, if necessary.

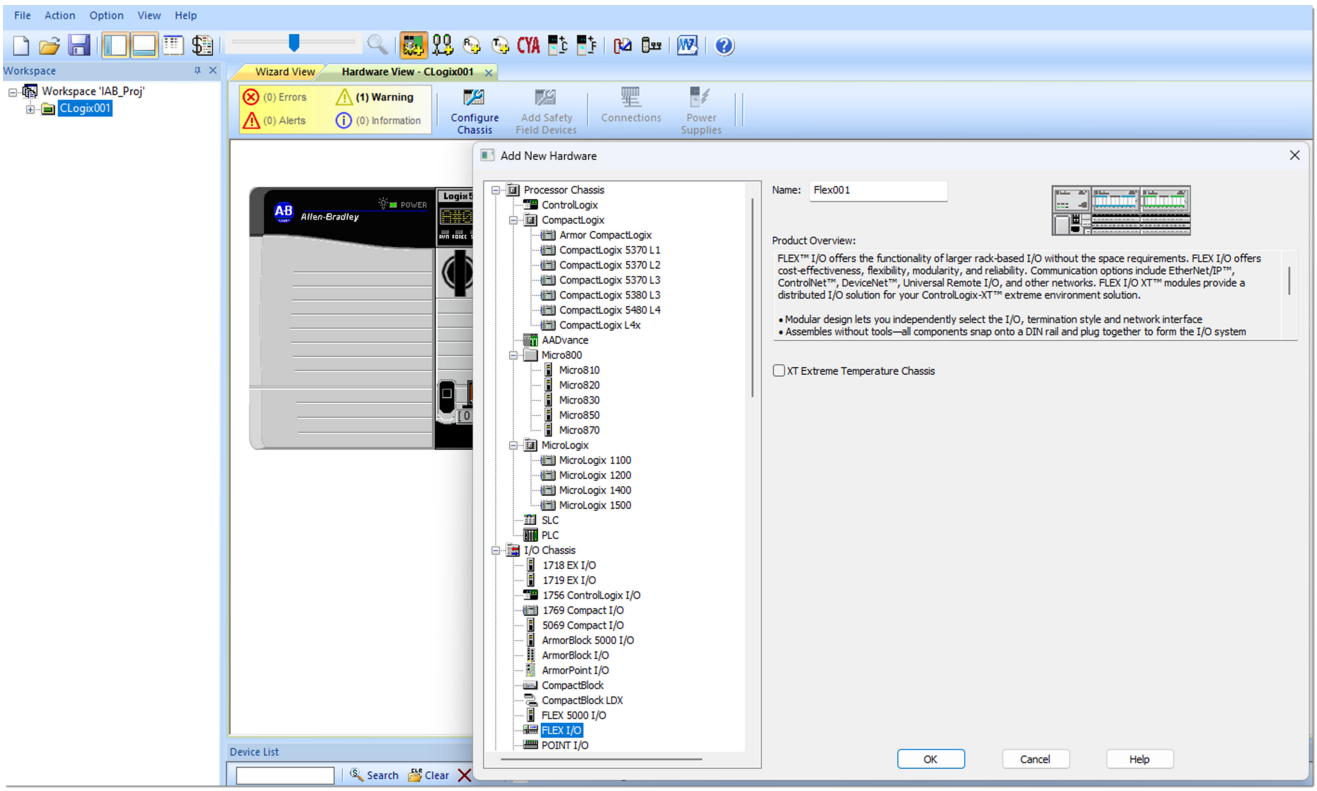


7. From the Device List of the Hardware View dialog, drag-and-drop the following modules on the slots mentioned:
   a. 1756-L71 Controller on Slot 0
   b. 1756-EN2T on Slot 1
   c. 1756-N2 on Slot 3 and Slot 4

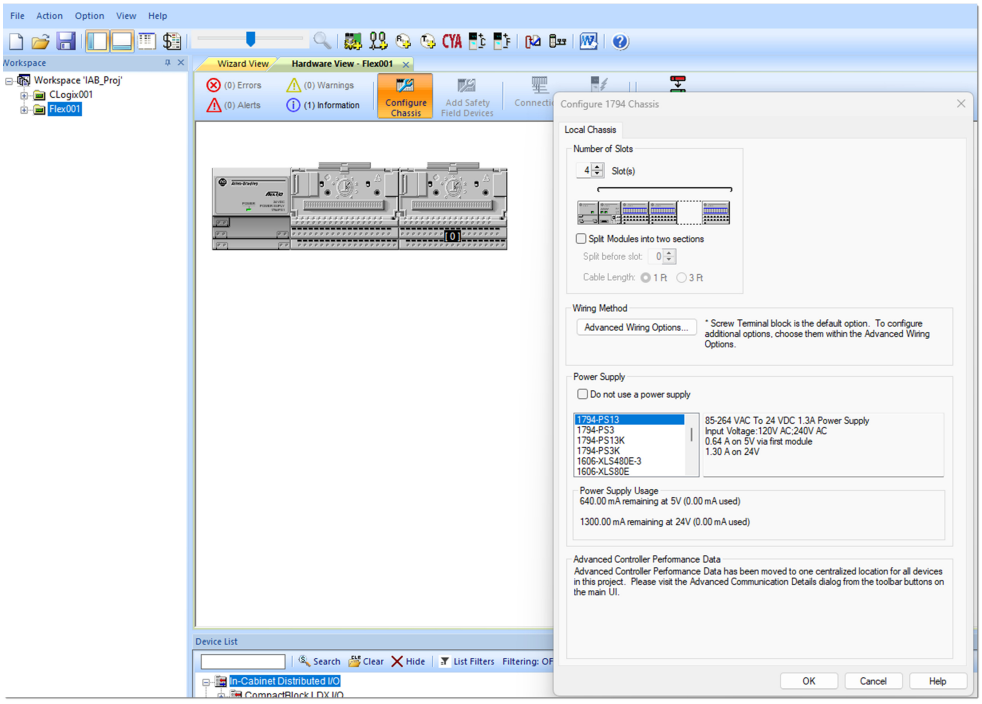


Add a FLEX I/O Chassis Using New Hardware

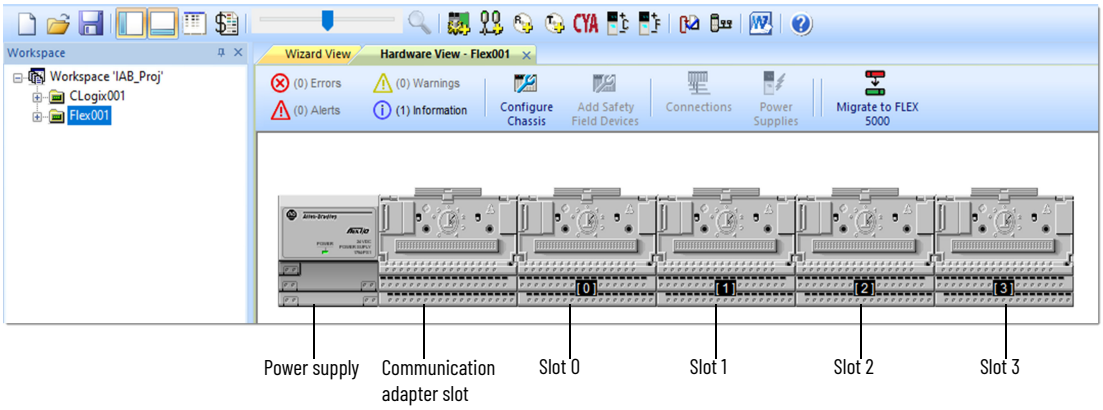
1. Select New Hardware. From Add New Hardware dialog, select FLEX I/O and OK.



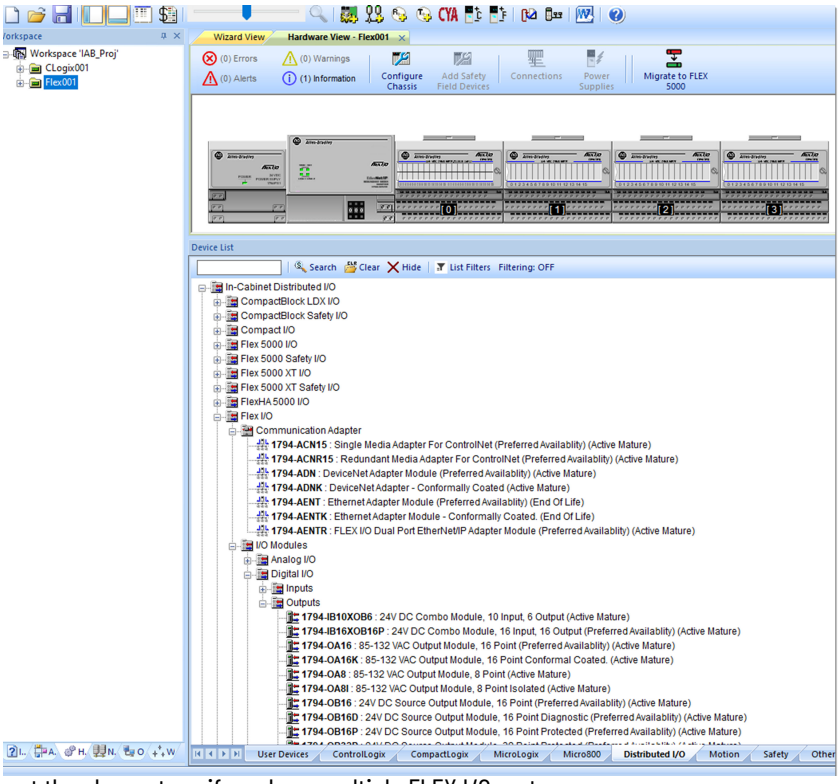
2. In Hardware View, select Configure Chassis. The Configure 1794 Chassis dialog appears.
3. From the Configure 1794 Chassis dialog, do the following:
   a. Set the Number of Slots as 4.
   b. Select your power supply catalog number from the Power Supply list.
   c. Select OK.



4. Observe that one power supply module, one empty slot for the communication adapter, and four empty slots for FLEX I/O modules are added to the Hardware View project workspace.



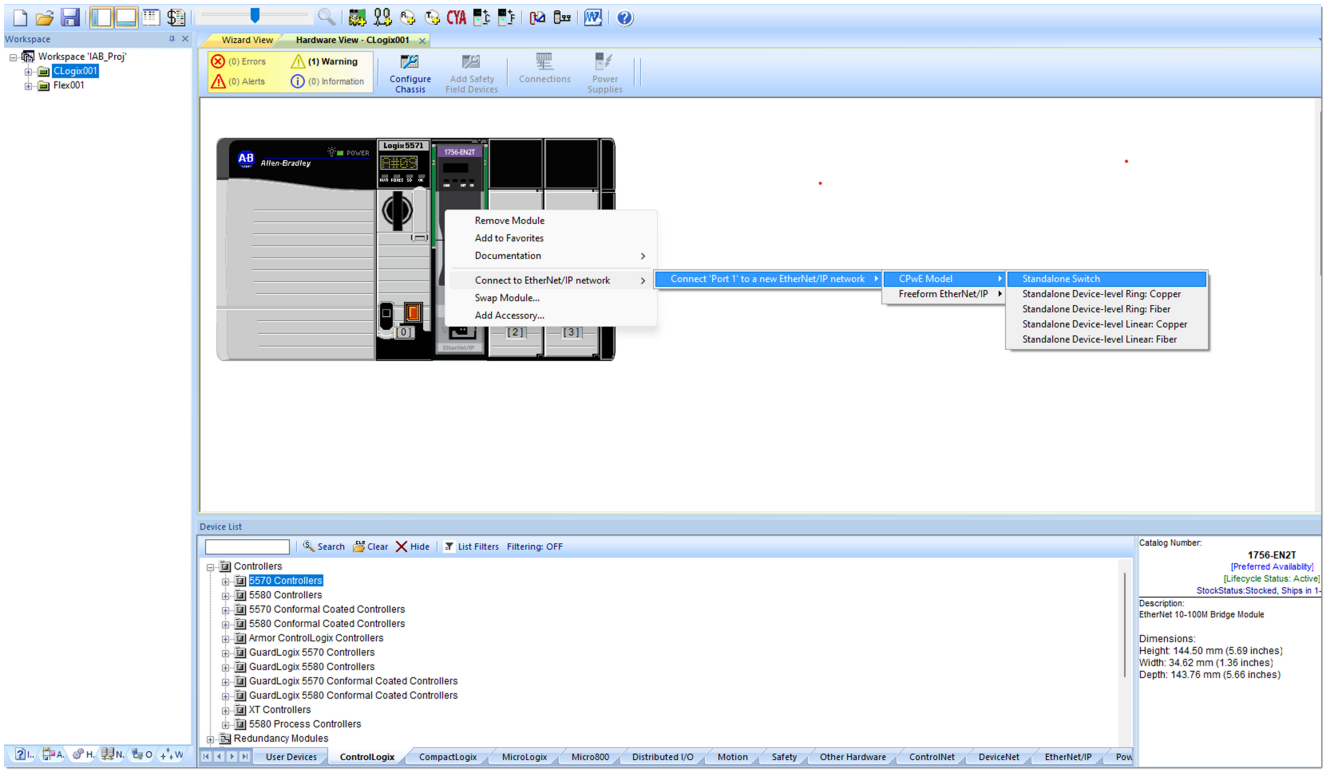
5. From the Device List at the bottom of the Hardware View, drag-and-drop the following modules on the slots that are specified:
   a. Adapter 1794-AENTR on Communication adapter slot
   b. Module 1794-IB32 on Slot 0
   c. Module 1794-IB16 on Slot 1 and Slot 2
   d. Module 1794-IA16 on Slot 3



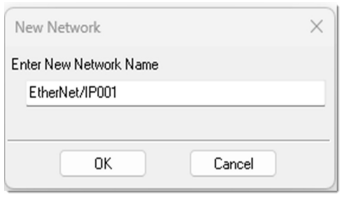
6. Repeat the above steps if you have multiple FLEX I/O systems.

Connect ControlLogix and FLEX I/O system to the Network

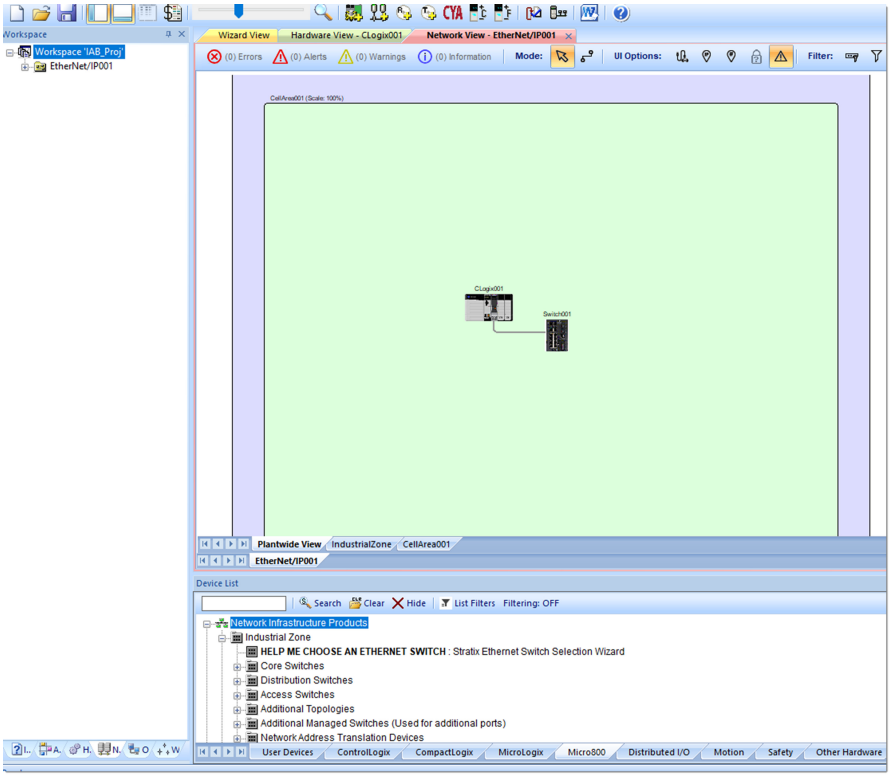
1. On the Hardware View for the Logix system, right-click the 1756-EN2T module.
2. Go to Connect to EtherNet/IP Network –> Connect 'Port 1' to a new EtherNet/IP network –> CPwE Model –> Standard Switch.



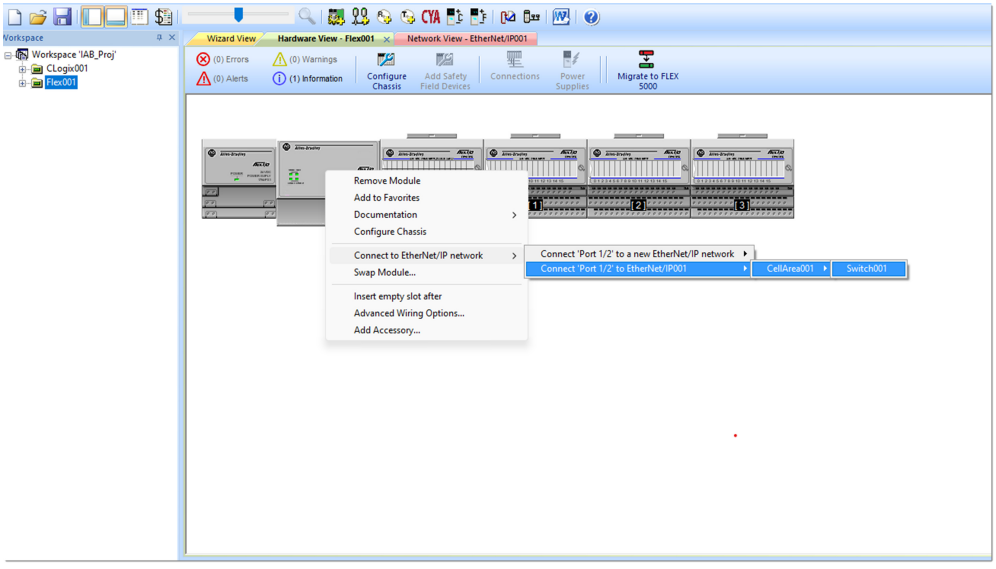
3. The New Network dialog appears with a default name. You can change the default name if necessary. Select OK.



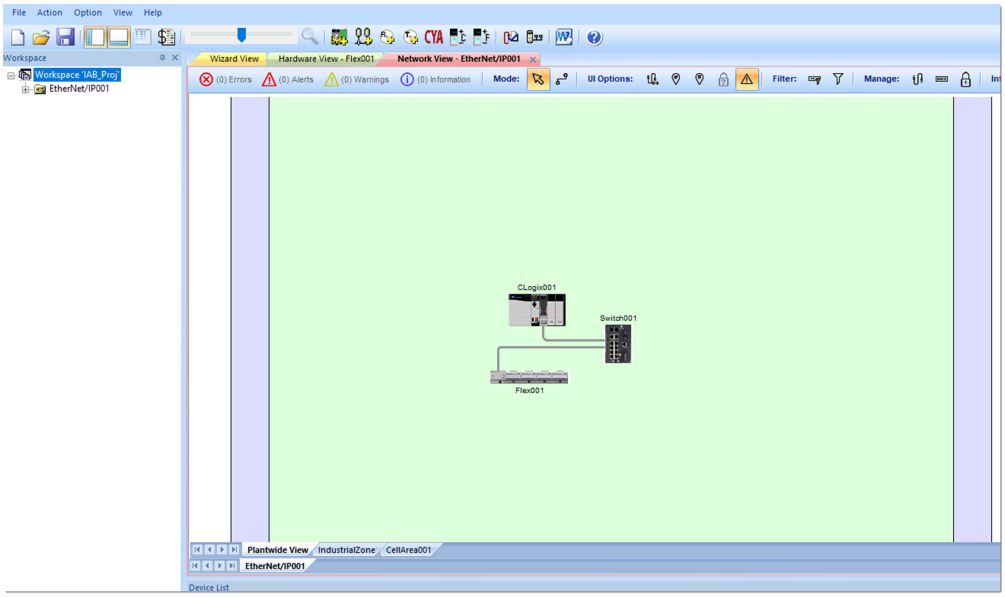
4. The Network View tab appears.



5. Go to Hardware View tab, select FLEX I/O system from the project workspace.
6. On the Hardware View for the FLEX I/O system, right-click the 1794-AENTR adapter.
7. Go to Connect to EtherNet/IP network –> Connect 'Port 1/2' to EtherNet/IP001 –> CellArea001 –> Switch001.

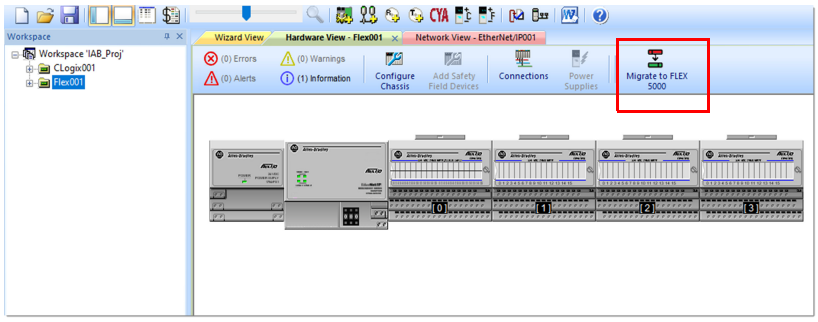


8. Go to Network View - EtherNet/IP001 tab to see your final network configuration.

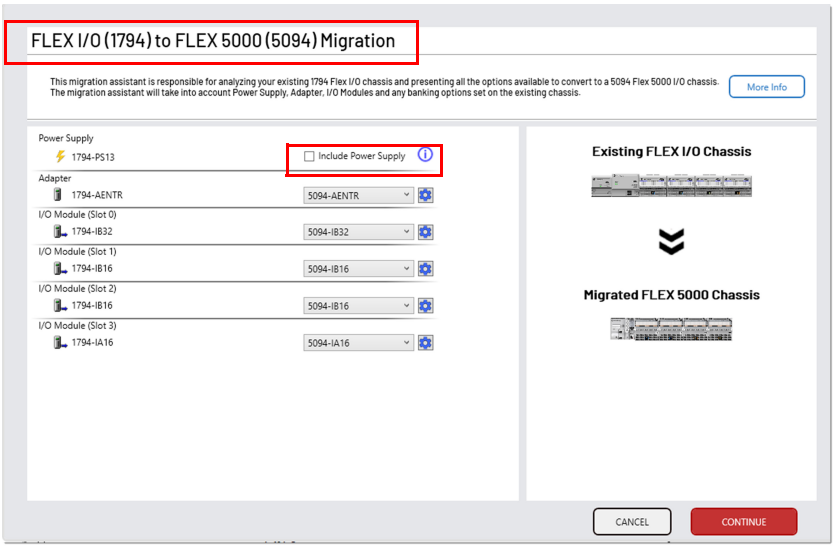


Migrate to FLEX 5000 I/O System in the Hardware View

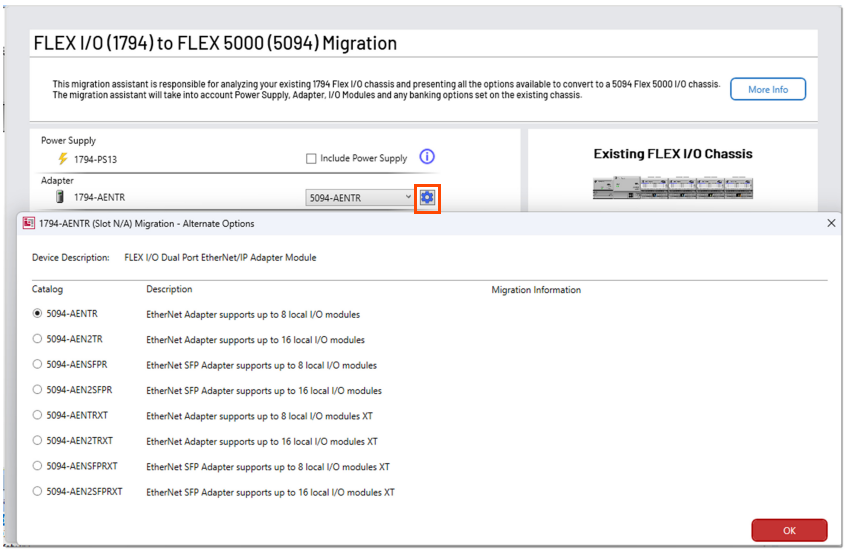
1. On the Hardware View - Flex001 tab, select Migrate to FLEX 5000 icon.



2. The FLEX I/O (1794) to FLEX 5000 (5094) Migration dialog appears.
3. Clear the Include Power Supply checkbox if you do not need a power supply. Select the checkbox to migrate your existing power supply (1794-PS3 or 1794-PS13) to Bulletin 1606 power supply. The default 1606 power supply gets added to the migration chassis. You can also change the default 1606 power supply from the Hardware's View Configure Chassis option.

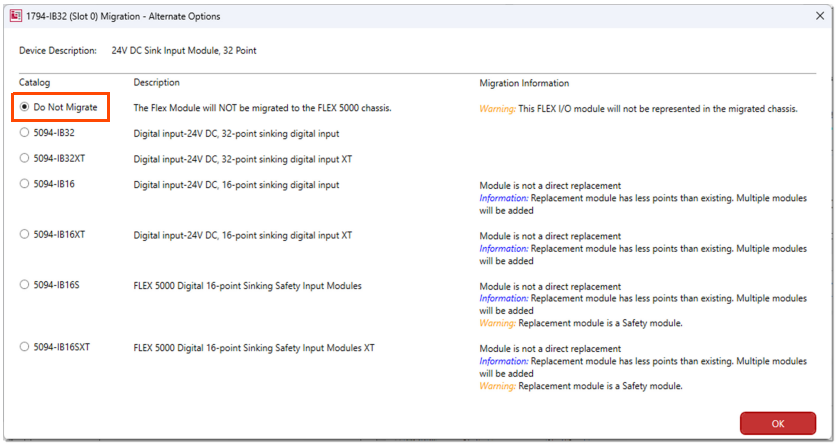


4. The migration wizard automatically selects the FLEX 5000 I/O module that is best suited for your existing FLEX I/O module. However, select setting icon next to the catalog number or dropdown for more migration options.
5. If you select setting icon, an Alternate Options dialog appears.
6. Choose the module based on your requirement and then select OK.

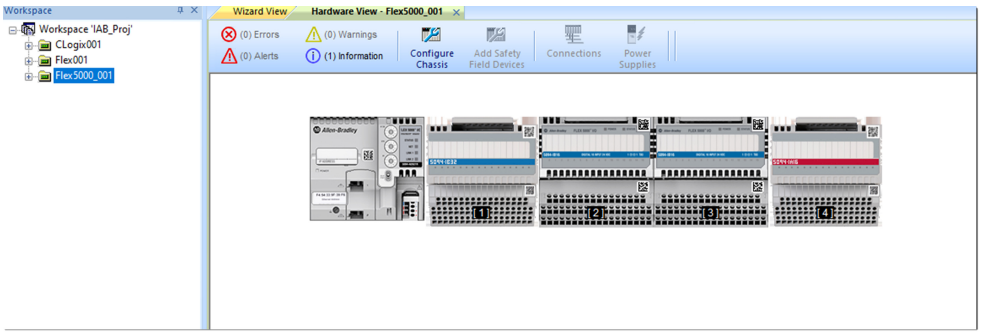


Available migration options are based on your existing system. In some cases, there may not be a direct FLEX 5000 I/O module available for your existing FLEX I/O module. These scenarios are represented in the form of yellow warning, blue information, and red error icons that are shown next to the FLEX 5000 I/O catalog numbers. Mouse over to the respective icon to see the message.

7. If you do not want to migrate your existing module, select Do Not Migrate and then OK.



8. Select Continue to migrate your existing FLEX I/O modules to FLEX 5000 I/O modules. Migrated FLEX 5000 chassis is added automatically in Hardware View as Flex5000_001.

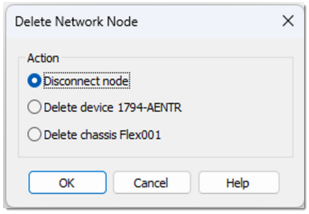


9. Follow the above steps to migrate your other FLEX I/O systems if available.

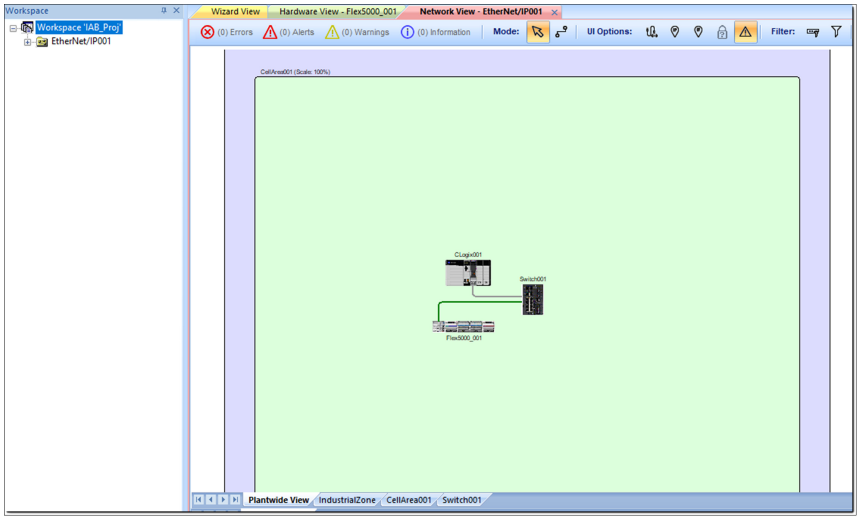
Migrate ControlLogix and Complete Your Network

1. Disconnect the network from the FLEX I/O system as follows:
   a. From the Flex001 Hardware View, right-click 1794-AENTR adapter.
   b. Go to Modify connection to EtherNet/IP001/Switch001 –> Disconnect or delete channel 'Port 1/2' from network EtherNet/IP001/Switch001.
   c. From the Delete Network Node dialog, make sure that the Disconnect node is selected in Action area, then select OK.

      If you have multiple FLEX I/O systems, repeat the procedure to disconnect the network from all systems.



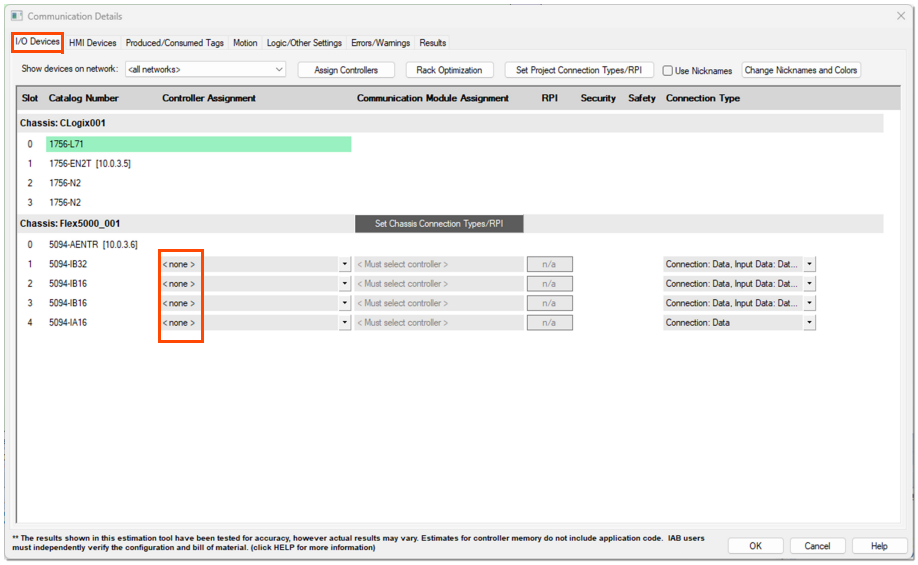
   d. On the Network View - EtherNet/IP001, make sure that all FLEX I/O systems are disconnected from the switch.
2. Connect the network to the FLEX 5000 I/O system as follows:
   a. From the Hardware View - Flex5000_001, right-click 5094-AENTR adapter.
   b. Go to Connect to EtherNet/IP network –> Connect 'Port 1/2' to EtherNet/IP001 –> CellArea001 –> Switch001.
   c. If you have multiple FLEX 5000 I/O systems, repeat the procedure to connect the network to all systems.
   d. On the Network View - EtherNet/IP001, make sure that all FLEX 5000 I/O systems are connected to the switch.



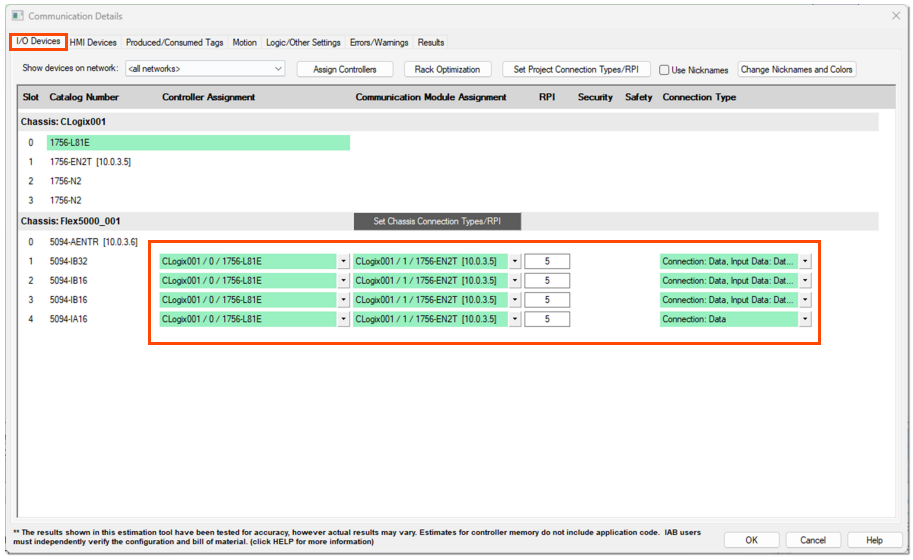
3. Verify the FLEX 5000 I/O module connections to the ControlLogix 5570 controller:
   a. Select the Advanced Communications Details icon. The Communication Details dialog appears.

b. From the Communication Details dialog, select the I/O Devices tab.

- If none of the FLEX 5000 I/O modules are connected to the controller, the controller is not compatible with FLEX 5000 I/O. See Controller Considerations on page 27 for controller compatibility details. Proceed with Step 4 to migrate your existing controller.



- If FLEX 5000 I/O modules are connected to the controller, the controller is compatible. You can see the connection details for all FLEX 5000 I/O modules.

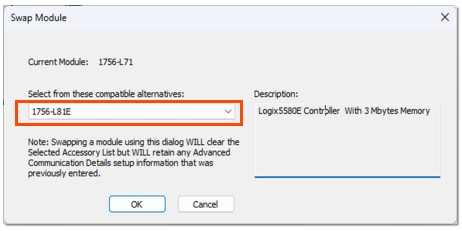


c. Select OK to close the Communication Details dialog.

4. Migrate an incompatible ControlLogix 5570 controller to a compatible controller:

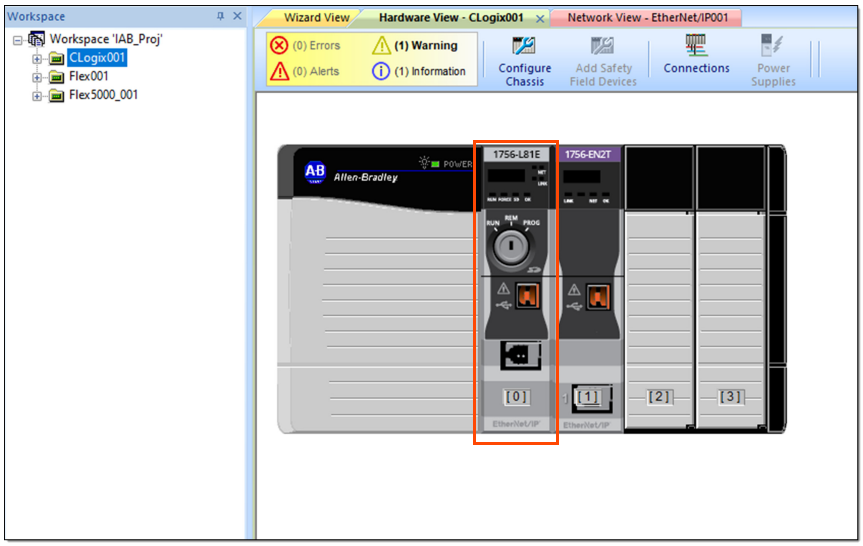
a. From the Hardware View - CLogix001, right-click 1756-L71 controller then select Swap Module.

b. From the Swap Module dialog, select 1756-L81E from the dropdown list. You can also choose any compatible controller from the list based on your requirement.



c. Select OK.

d. The 1756-L71 controller is replaced with the 1756-L81E controller in Hardware View - CLogix001 workspace.



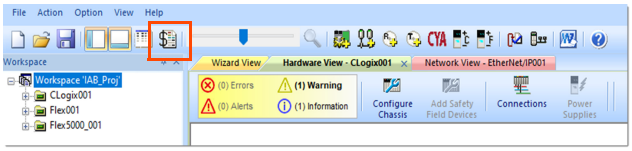
e. Proceed to Step 3 to verify the connections.

Project BOM with and without the Migrated From Chassis

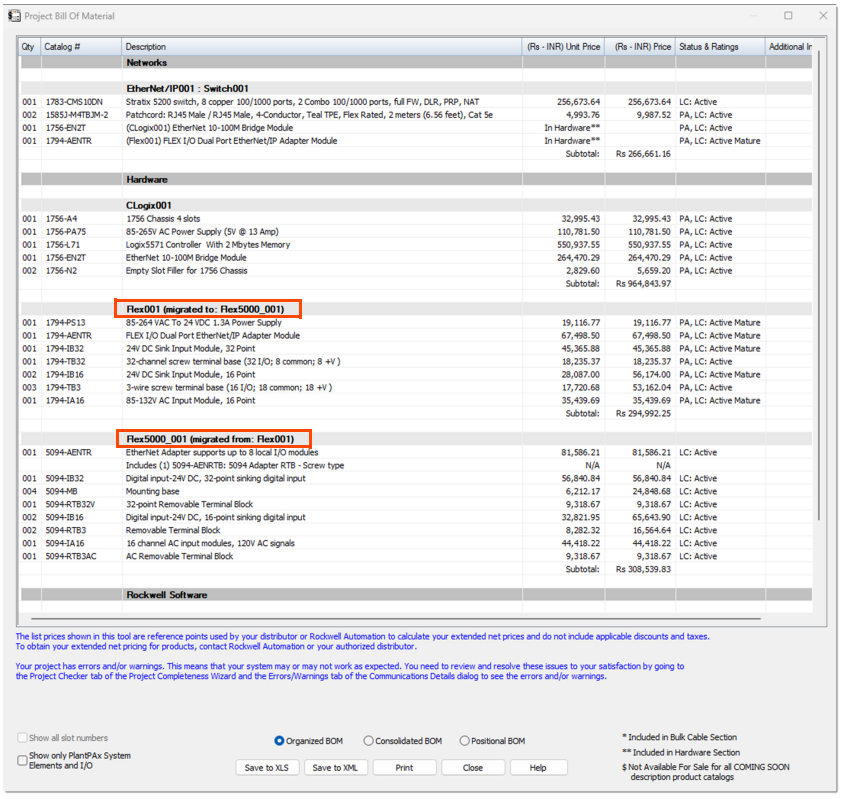
1. Select the Project BOM icon to open the bill of materials for the migrated project.

   If the Warning dialog appears, read the message and select OK to close it.

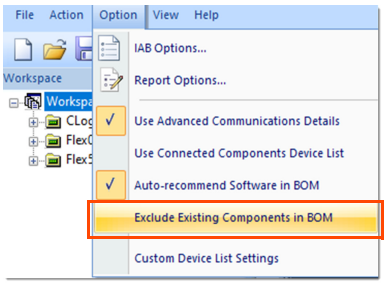
   Select Save if prompted.



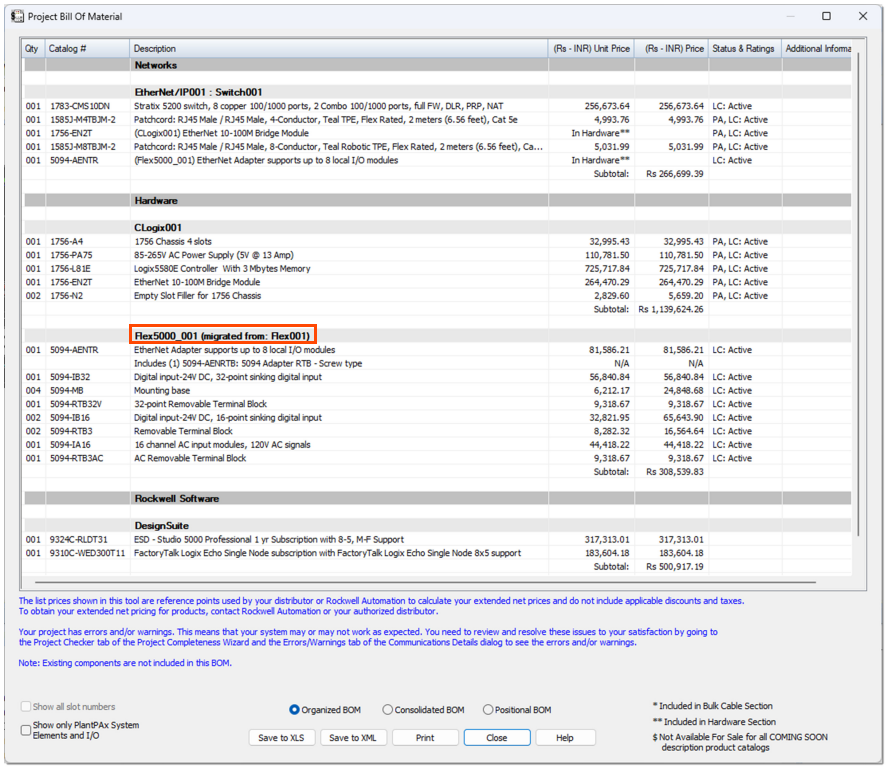
2. The Project Bill Of Material dialog appears with both migrated to and migrated from systems by default. Select Close to exit the dialog.



To exclude your existing FLEX I/O system components from the Project BOM, go to Option and select Exclude Existing Components in BOM.



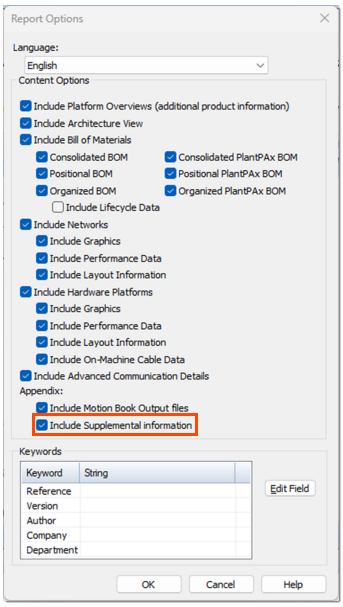
3. Select Project BOM again. Select OK and Continue if warning dialog appears. Save the project if prompted. Now you can see only FLEX 5000 I/O system in the Project BOM.



IMPORTANT All old system components still continue to exist in the Project BOM. If you want to retain your old system in Project BOM, use the option Exclude Existing Components in BOM to enable or disable the old system components. Do not delete the old system from the project workspace. If you delete the old system, you lose all linkage from the old to the new system.

4. Select Close to close the Project BOM dialog.

5. Use the Option —> Report Options —> OK to generate the report. Select/deselect the Supplemental information to either include or exclude migration chassis details in the report.



6. Disconnect the networks from the FLEX I/O system and connect them to the FLEX 5000 I/O system.

Migration Result for the Example System

FLEX I/O System	FLEX 5000 I/O System
I/O Module	
1794-AENTR	5094-AENTR
1794-IB32	5094-IB32
1794-IB16	5094-IB16
1794-IB16	5094-IB16
1794-IA16	5094-IA16
Controller	
1756-L71	1756-L81E

Wiring Diagram Comparisons

Overview

This chapter provides wiring diagram comparisons of the recommended replacements for your existing FLEX I/O system.

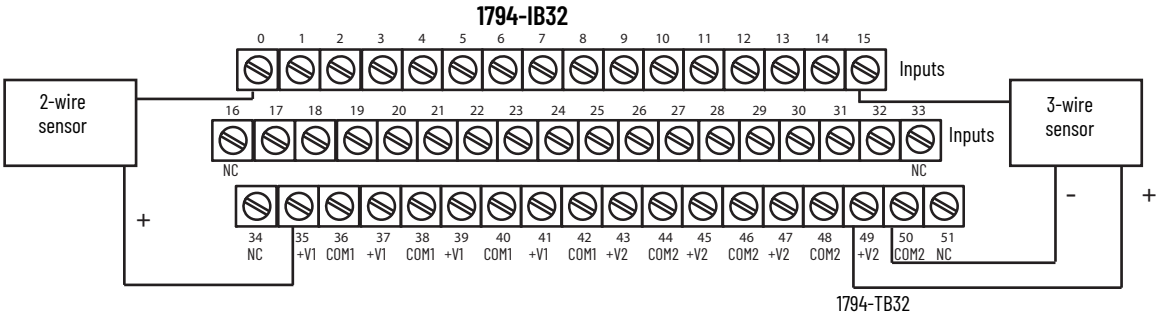
Replace FLEX I/O with FLEX 5000 I/O Wiring

You must manually move the wiring from FLEX I/O to FLEX 5000 I/O modules. Moving the wires can be further complicated if the existing wire lengths are not long enough to move to the new FLEX 5000 I/O module locations.

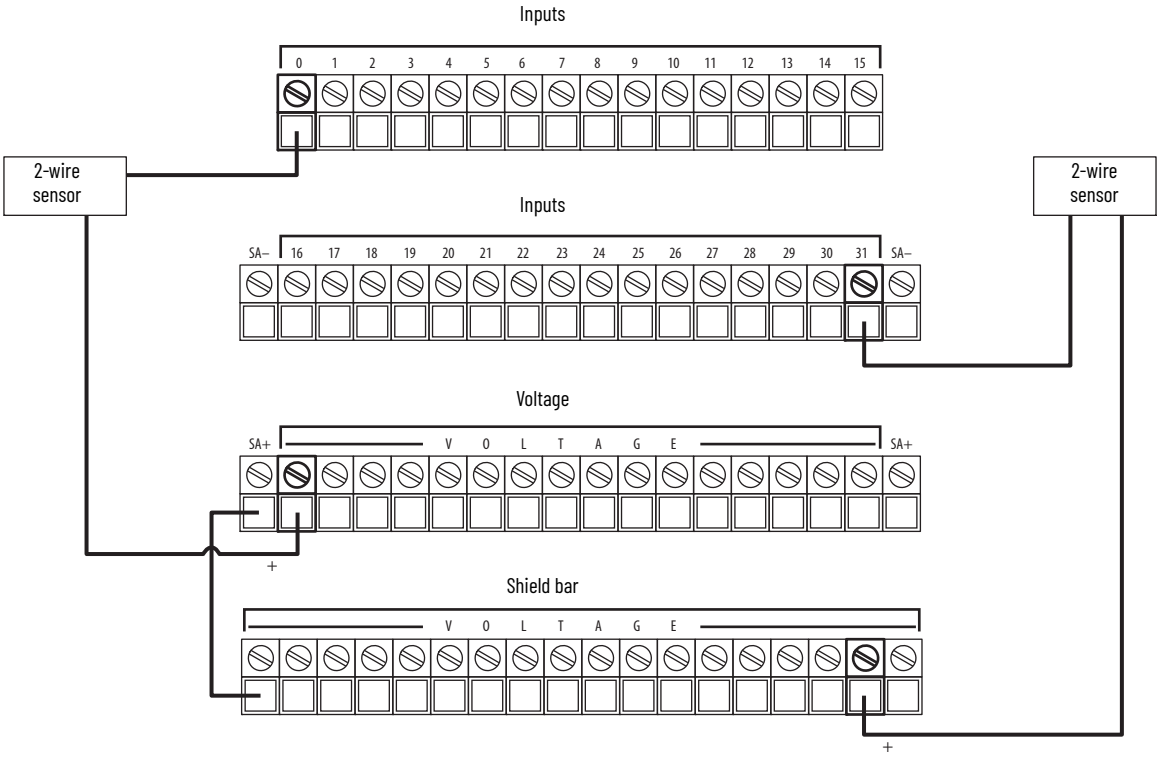
Table 7 lists examples of how to migrate wiring from FLEX I/O to FLEX 5000 I/O modules. For more information on FLEX 5000 I/O modules wiring, see FLEX 5000 Module Specifications Technical Data, publication 5094-TD001.

Table 7 - Migrate Wiring from FLEX I/O to FLEX 5000 I/O

1794–IB32 to 5094–IB32 Wiring

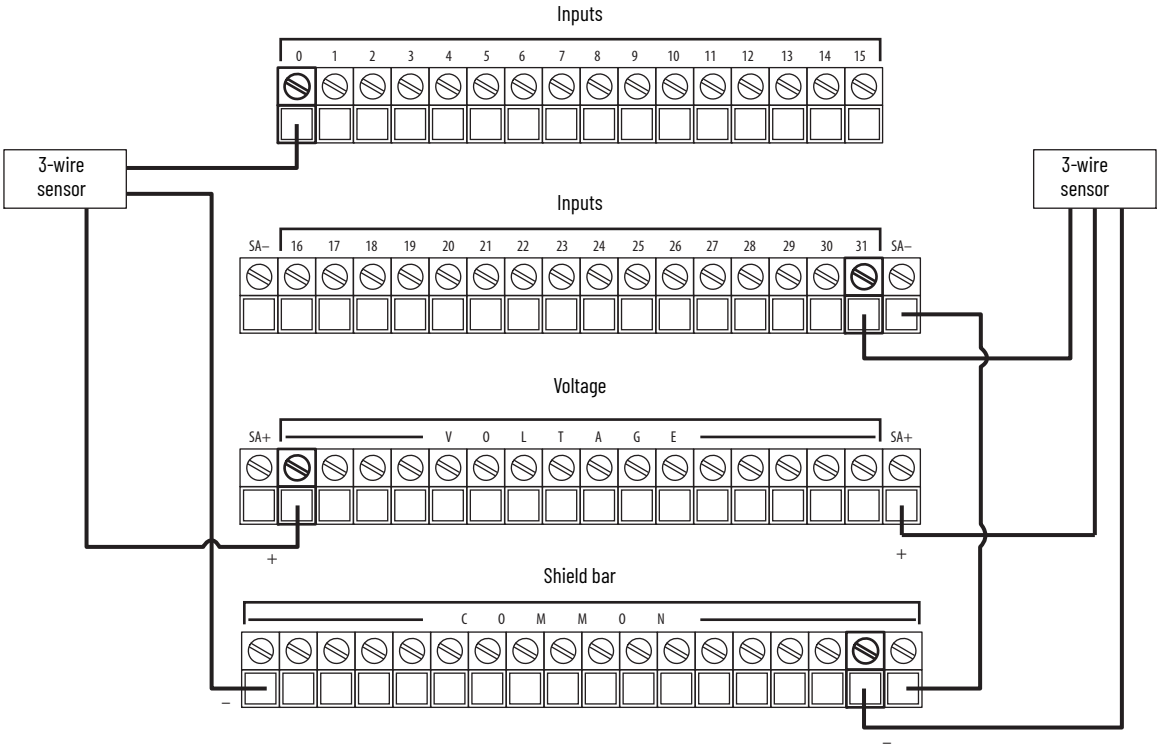


5094-IB32 (2-wire)



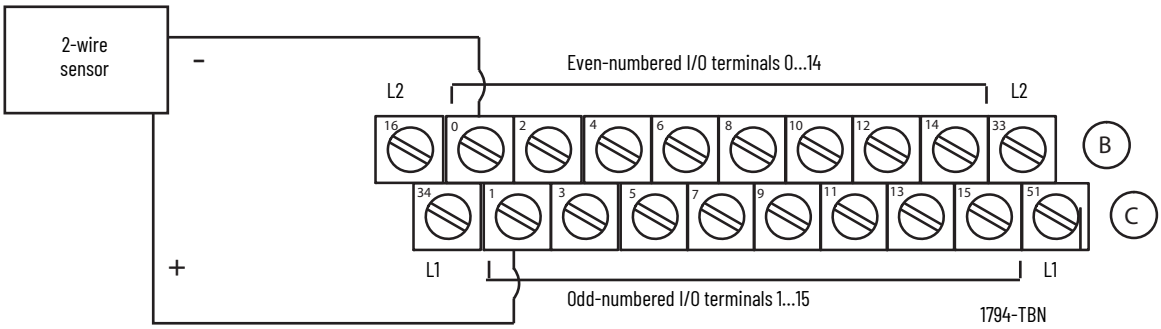
IMPORTANT: The shield bar can be repurposed for voltage or common depending on the application.

5094-IB32 (3-wire)



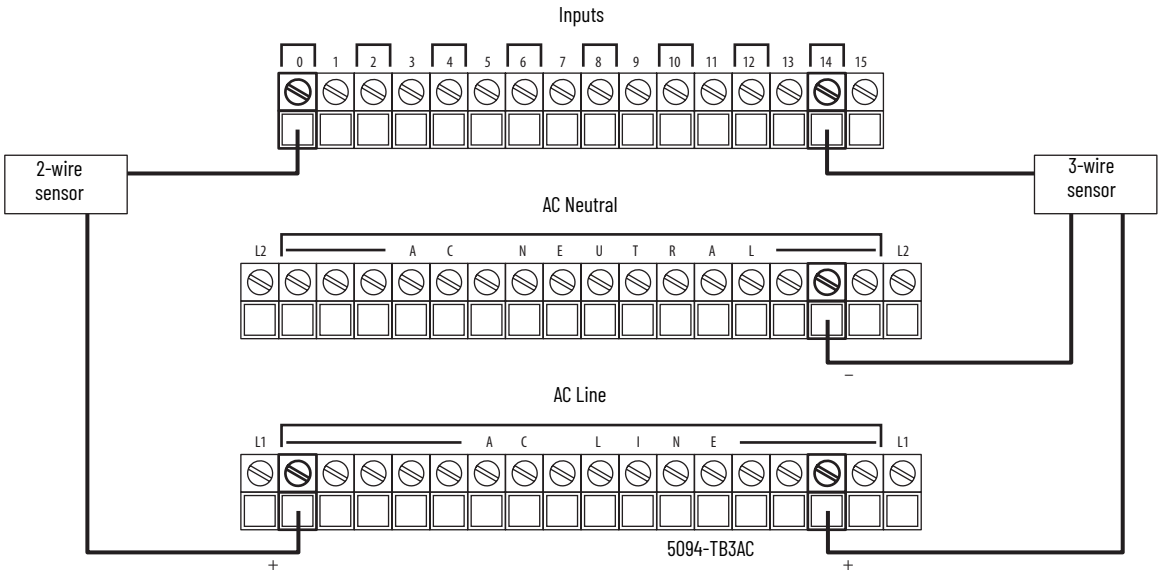
1794-IM8 to 5094-IM8 Wiring

1794-IM8



L1 = 220V AC power - Connect to terminal C-34.
L2 = 220V AC common - Connect to terminal B-16.
Use B-33 and C-51 for daisy chaining to the next terminal base unit.

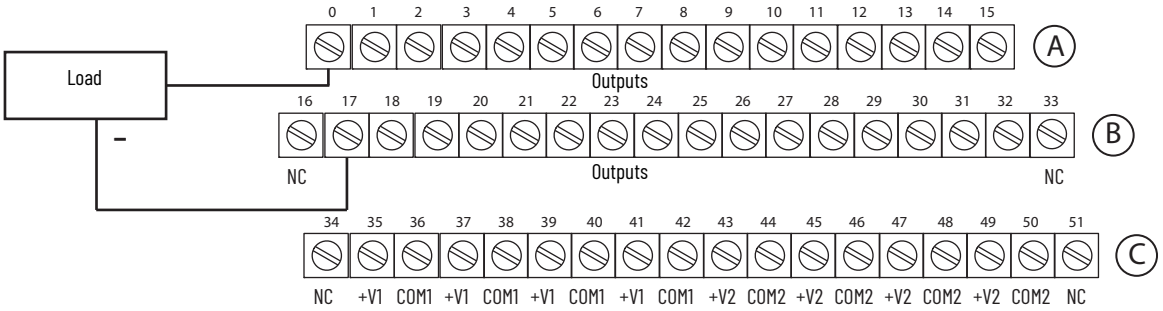
5094-IM8



Note: You must connect a 240V AC power source to the left L1 and L2 terminals to provide the field side power.

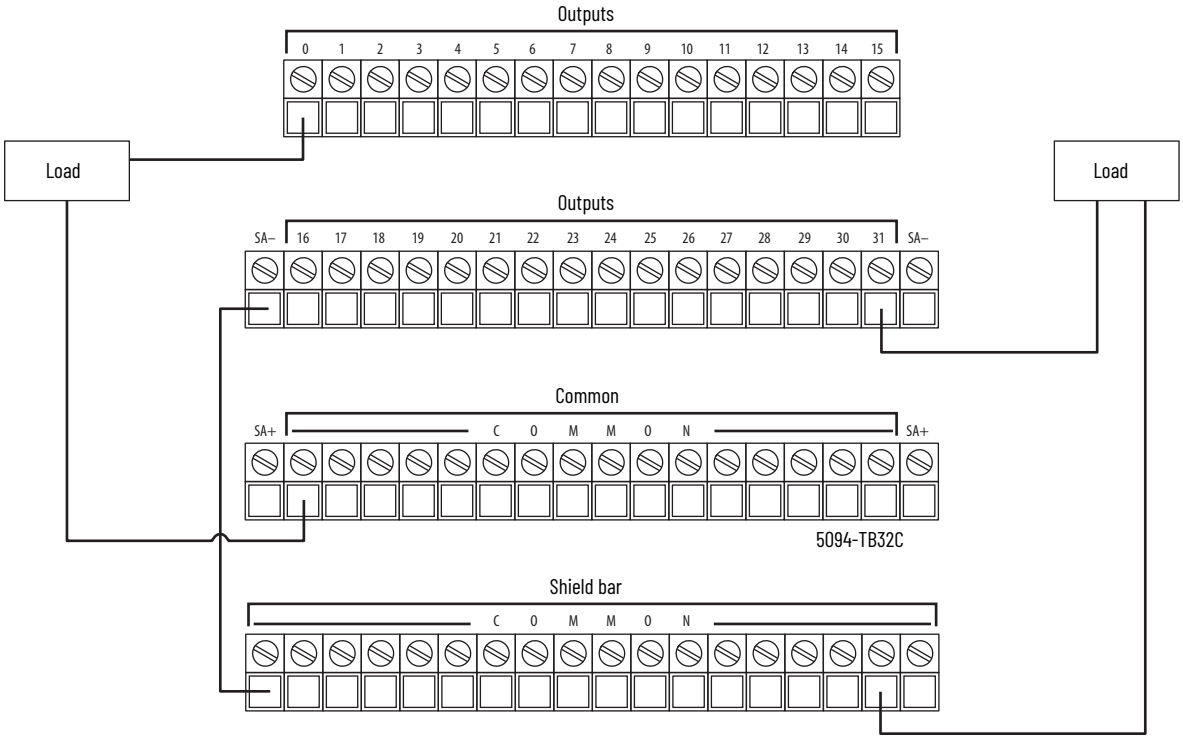
1794-OB32P to 5094-OB32 Wiring

1794-OB32P

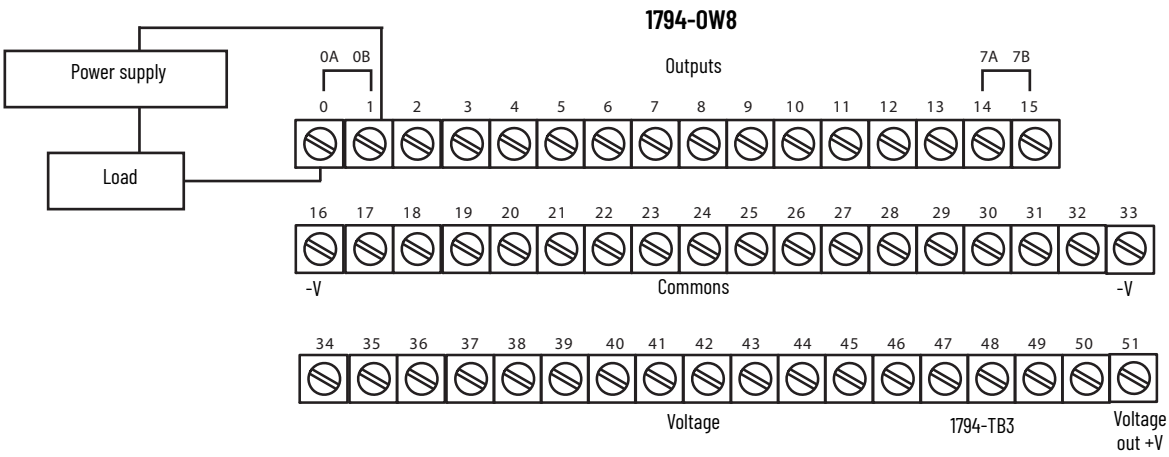


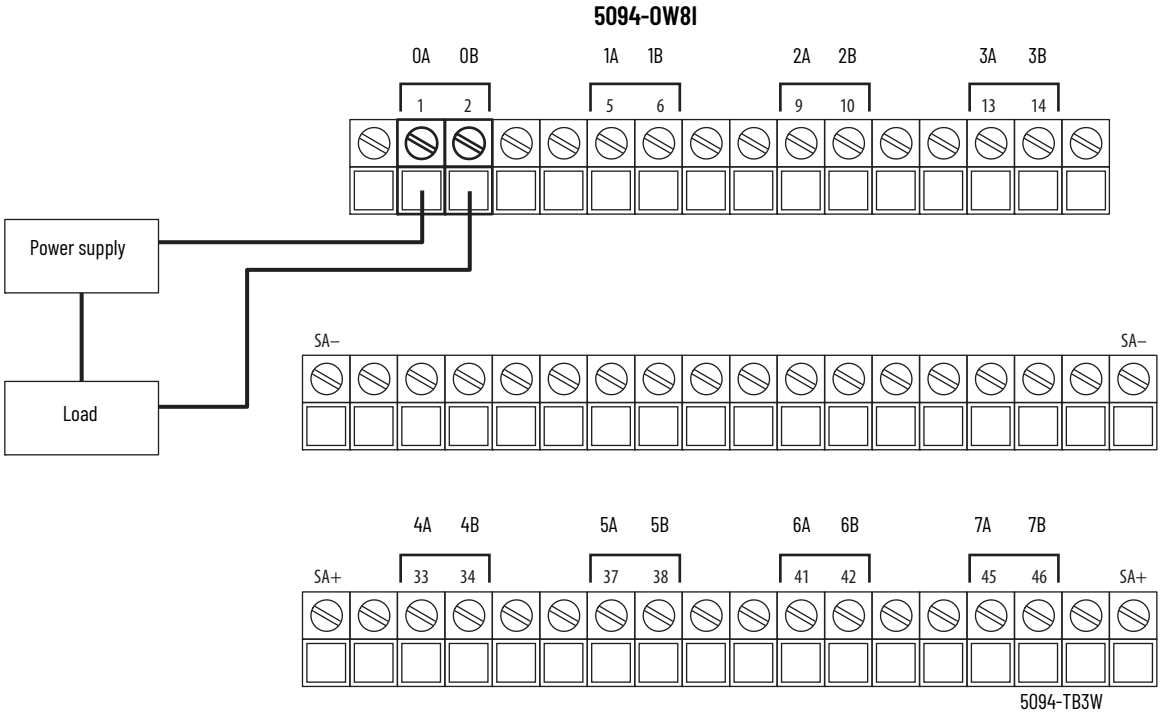
+V1 = Terminals 35, 37, 39, and 41
+V2 = Terminals 43, 45, 47, and 49
COM1 = Terminals 36, 38, 40, and 42
COM2 = Terminals 44, 46, 48, and 50
NC = No connections (Terminals 16, 33, 34, and 51)

5094-OB32



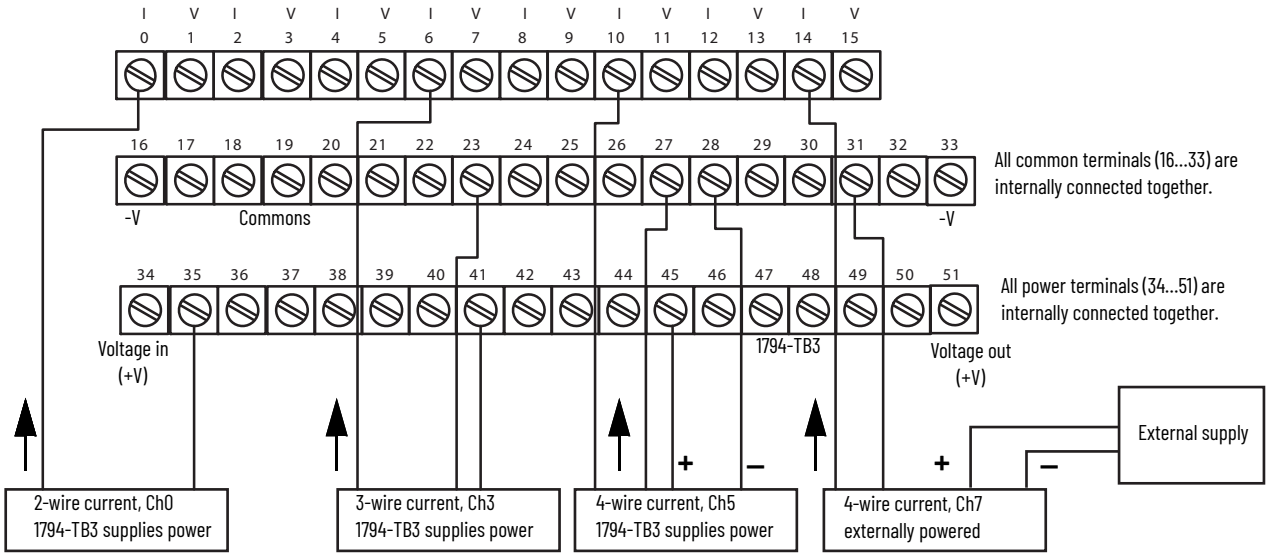
1794-OW8 to 5094-OW8I Wiring



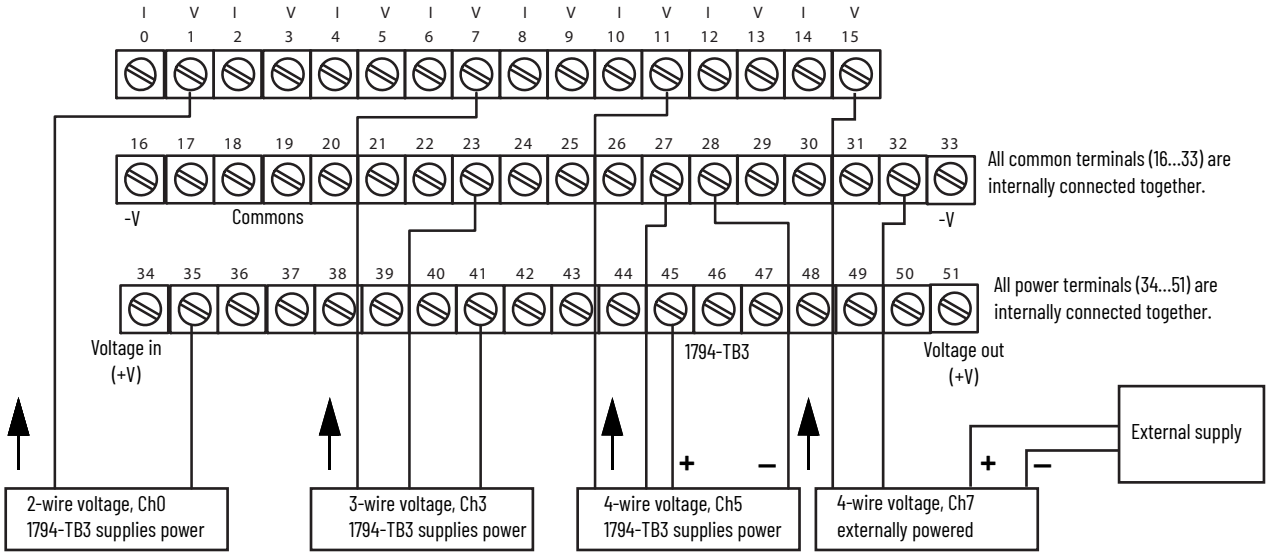


1794-IE8 to 5094-IF8

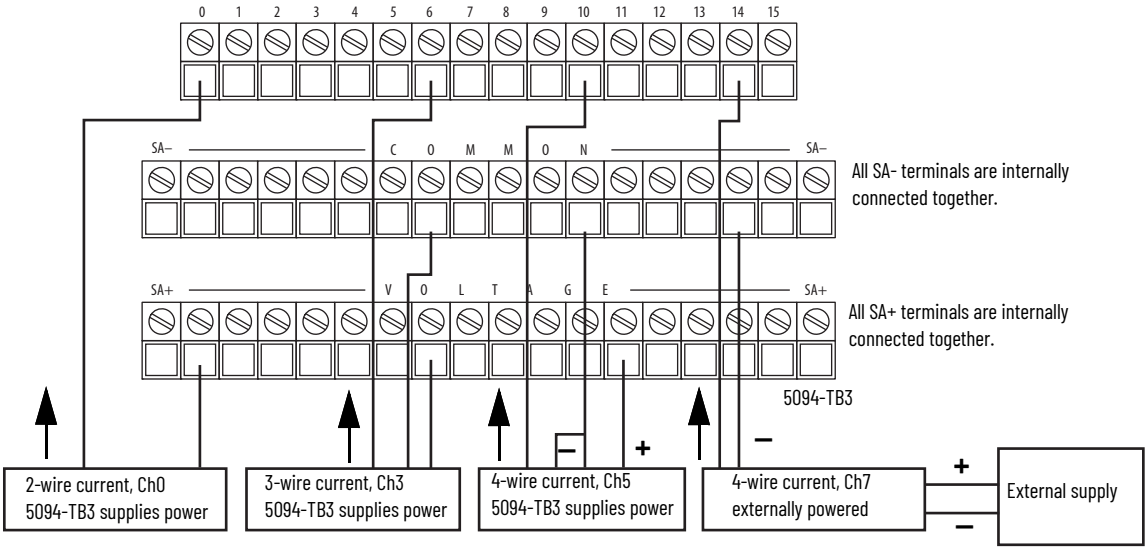
1794-IE8 (Current)



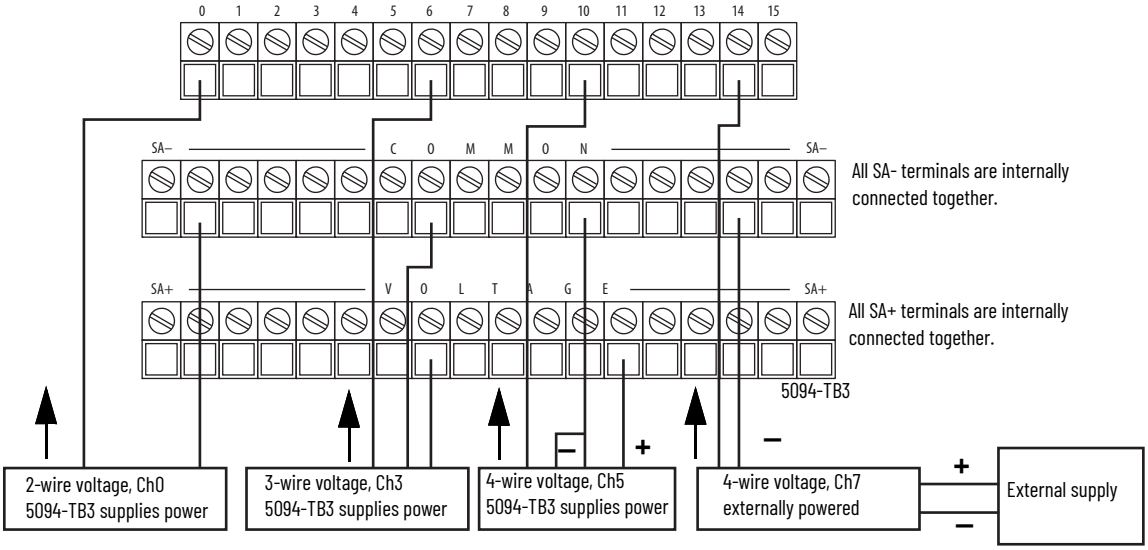
1794-IE8 (Voltage)



5094-IF8 (Current)

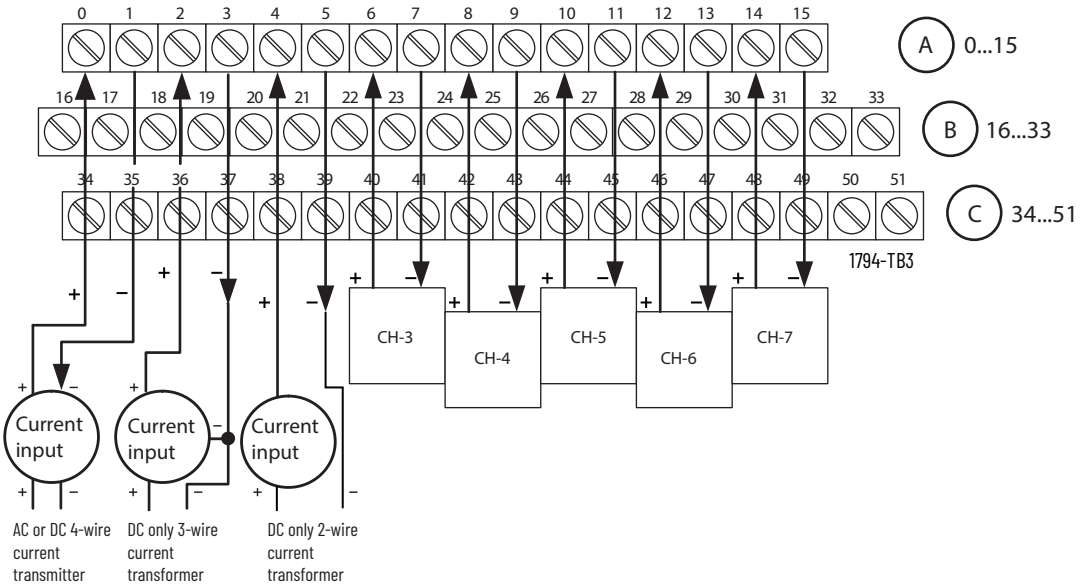


5094-IF8 (Voltage)



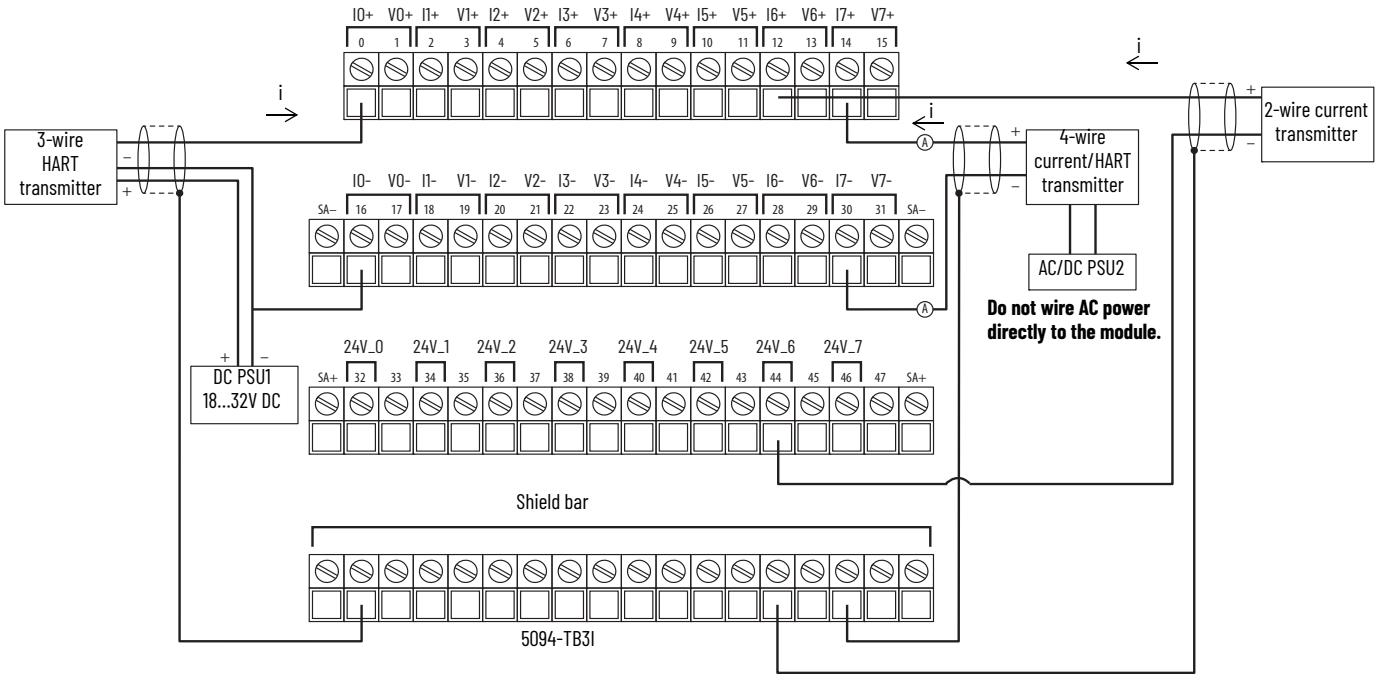
1794-IF8IH and 1794-IF8IHNFXT to 5094-IF8IH Current

1794-IF8IH



Note: Loop power is not provided for the inputs. Each input requires an external power source.

5094-IF8IH (Only Current Shown)

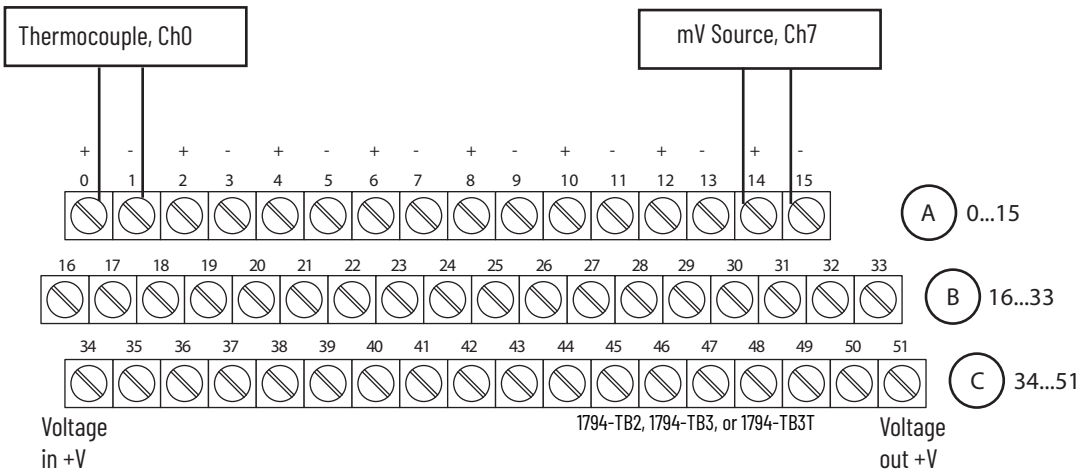


IMPORTANT:

- The 5094-STB shield bar accessory is required to wire the shields for all HART modules using the 5094-TB3I, 5094-TB3IS, 5094-TB3IXT, or 5094-TB3ISXT terminal base assemblies. The 5094-STB shield bar accessory is available separately.
- To ensure proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted-pair) or equivalent wire.
- Place a HART handheld or sniffer at locations labeled A in the current loop.

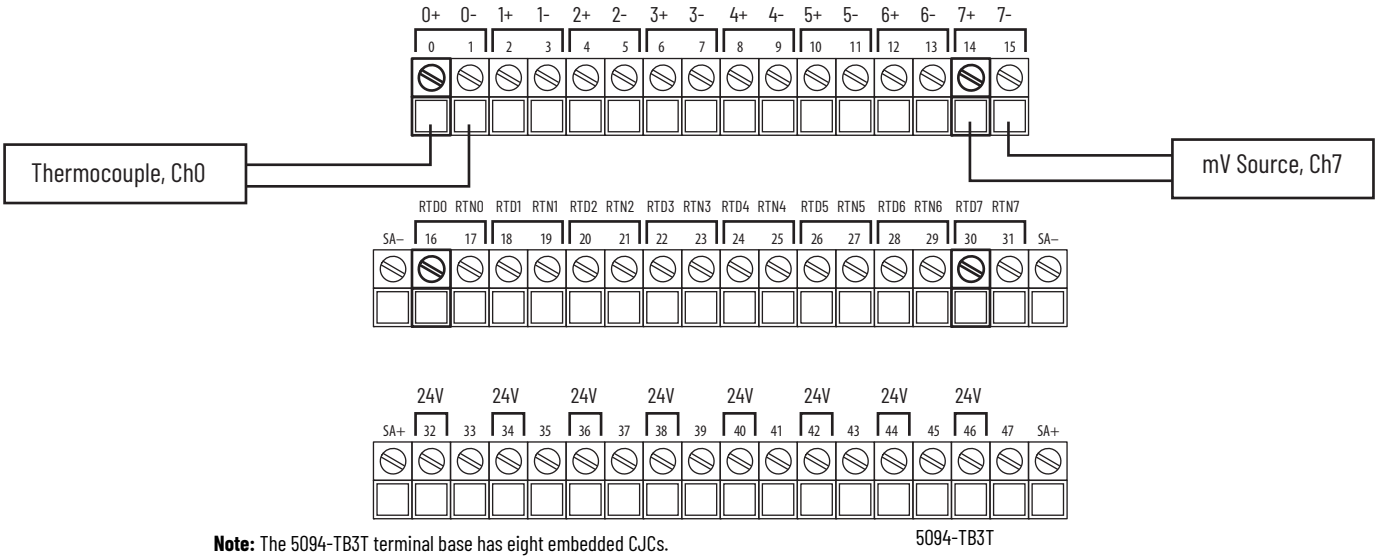
1794-IT8 to 5094-IY8 Thermocouple/mV

1794-IT8 Thermocouple/mV



Note: The location of the shield termination varies based on the terminal base which is used.

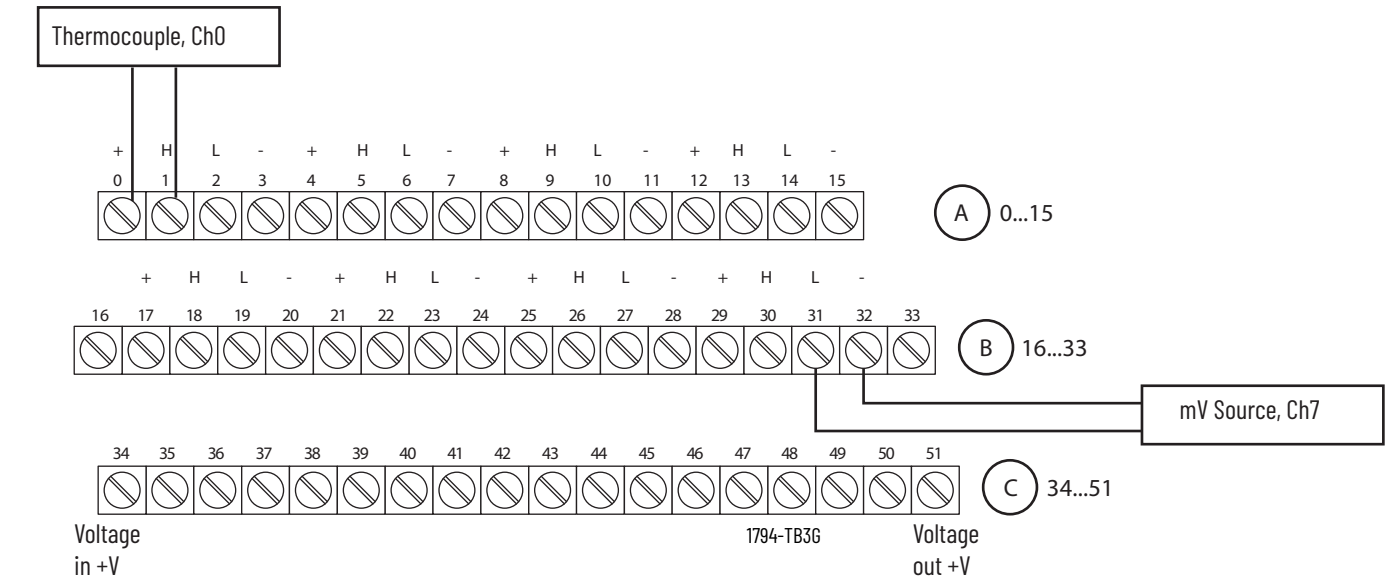
5094-IY8 Thermocouple/mV



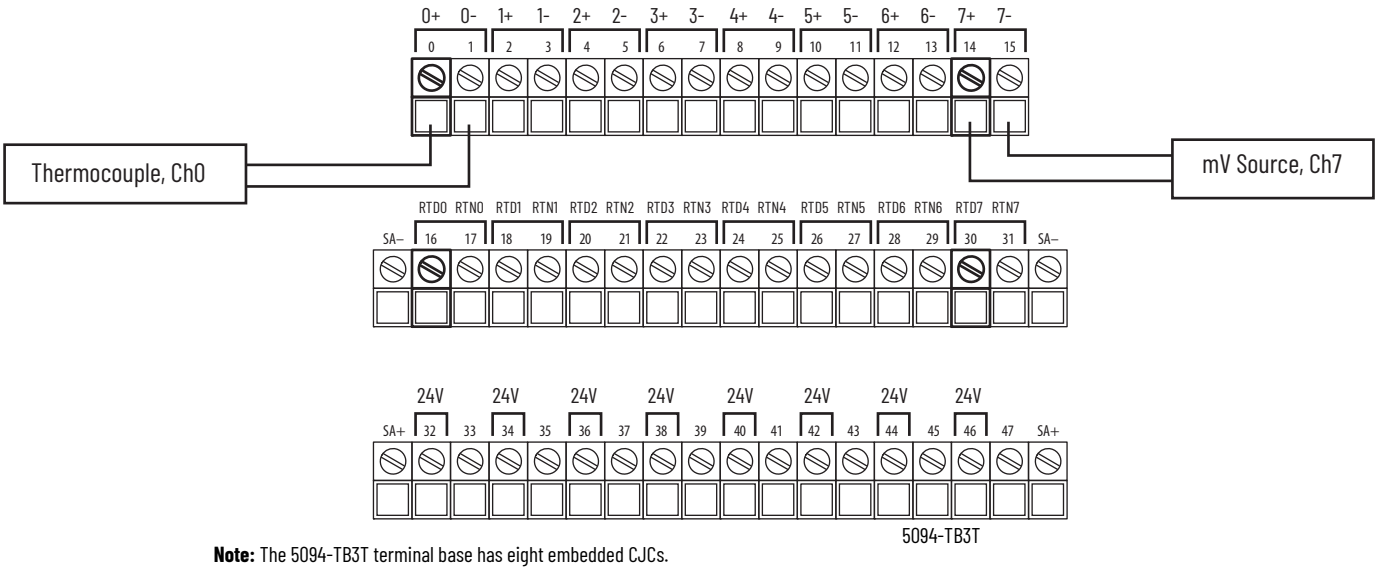
Note: The 5094-TB3T terminal base has eight embedded CJCs.

1794-IRT8 to 5094-IY8 Thermocouple/mV

1794-IRT8 Thermocouple/mV

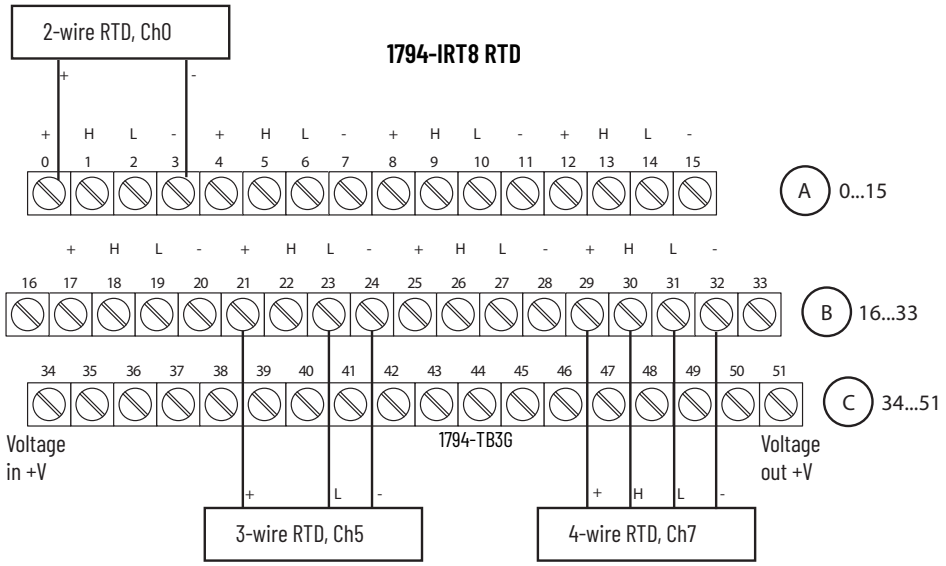


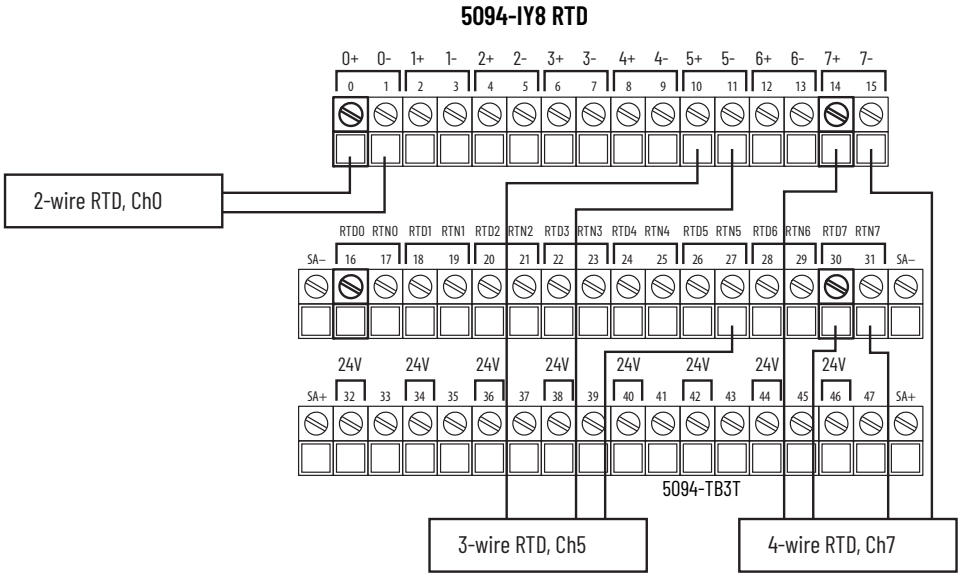
5094-IY8 Thermocouple/mV



Note: The 5094-TB3T terminal base has eight embedded CJCs.

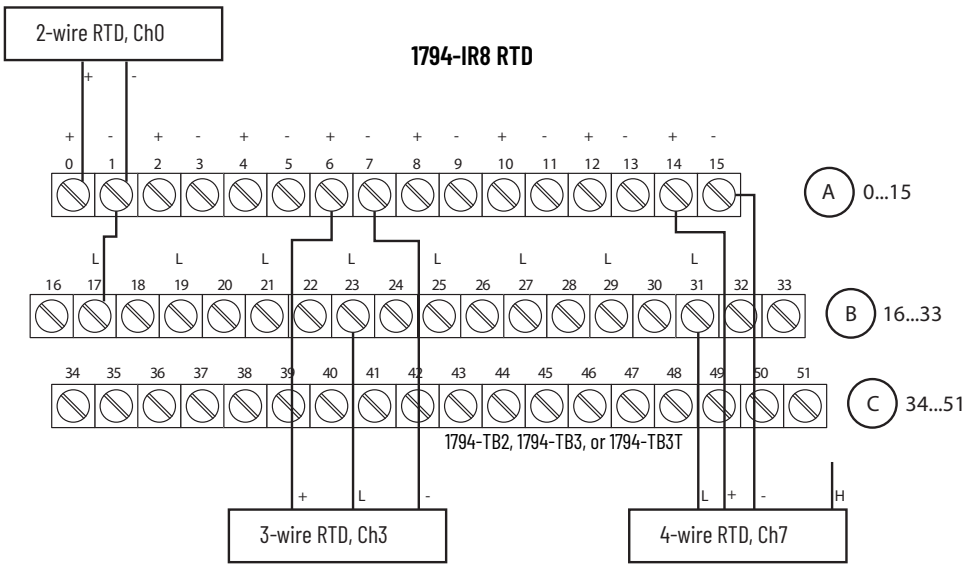
1794-IRT8 to 5094-IY8 RTD





Note: The 5094-TB3T terminal base has eight embedded CJCs.

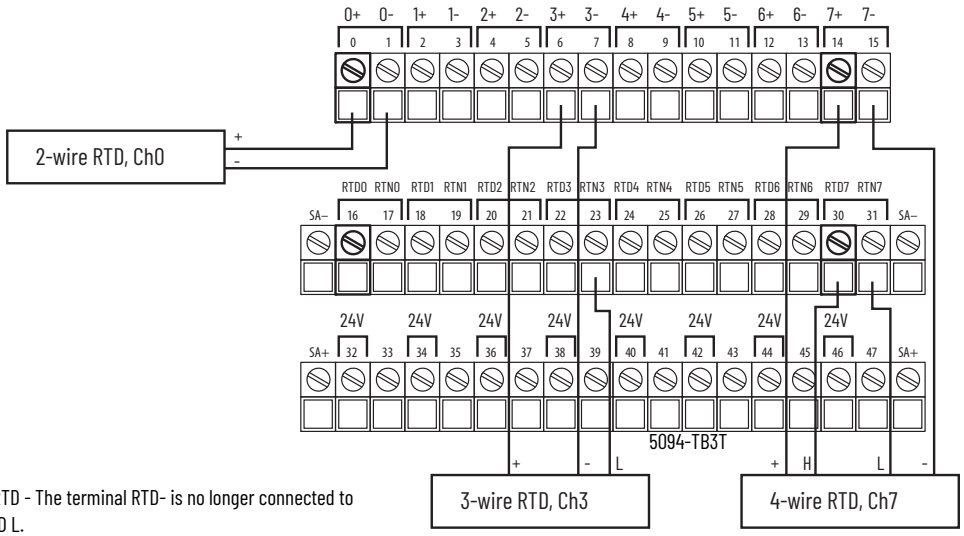
1794-IR8 to 5094-IY8 RTD



Note:

- For 3-wire RTD, the terminal RTD- is connected to terminal RTD L.
- For 4-wire RTD, the terminal RTD H is clipped or tied back and not used.
- Location of shield termination varies based on terminal base used.

5094-IY8 RTD

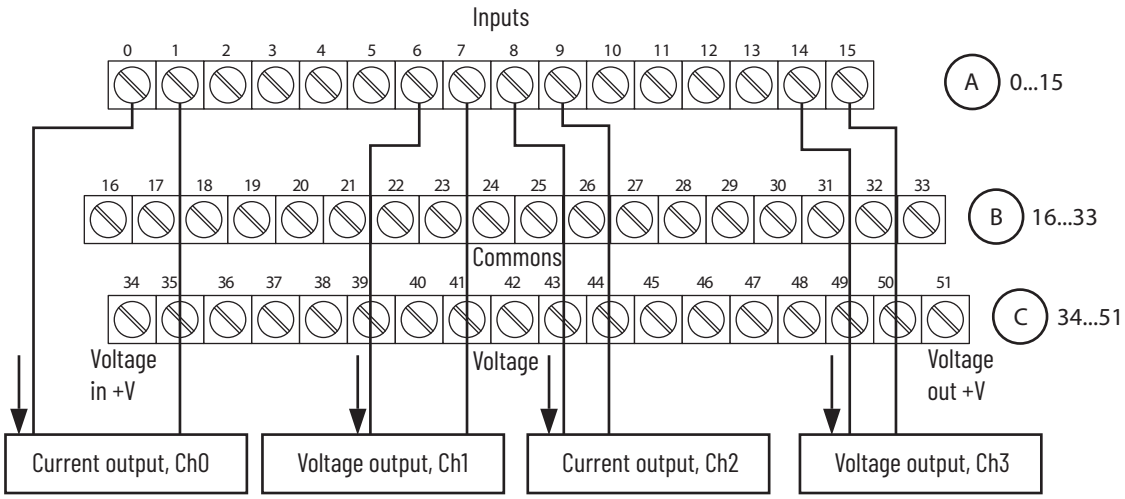


Note:

- For 3-wire RTD - The terminal RTD- is no longer connected to terminal RTD L.
- For 4-wire RTD - You can reconnect the terminal RTD H now.
- The 5094-TB3T terminal base has eight embedded CJCs.

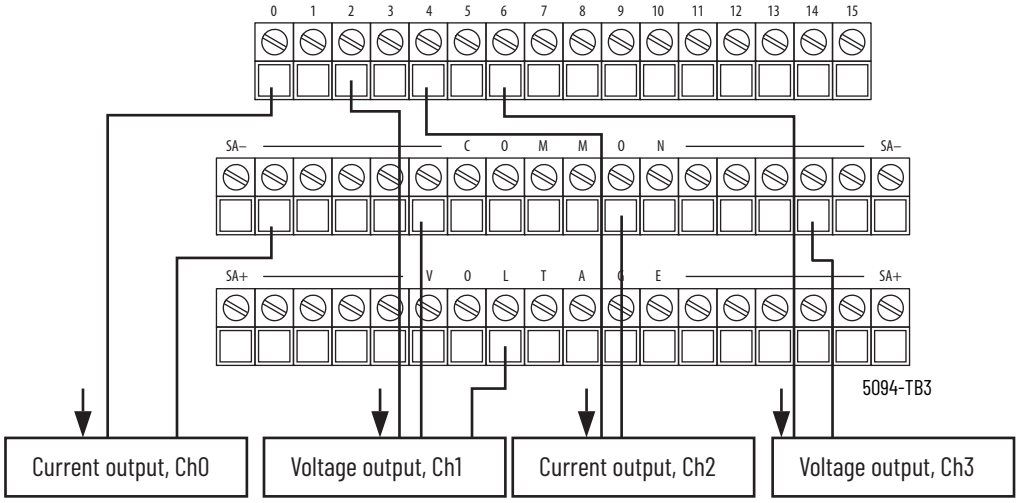
1794-OE4 to 5094-OF8

1794-OE4



All common terminals B16...B33 are internally connected together.
All power terminals C34...C51 are internally connected together.

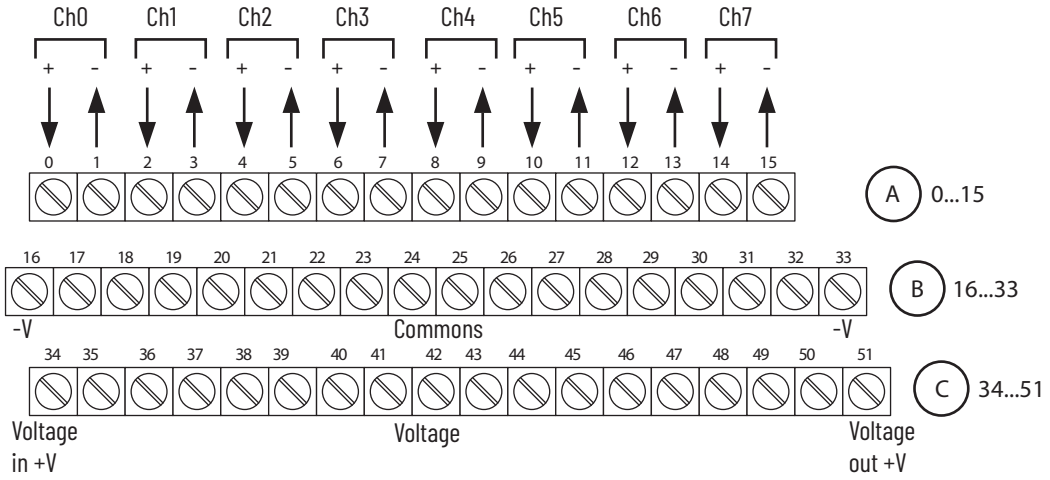
5094-OF8



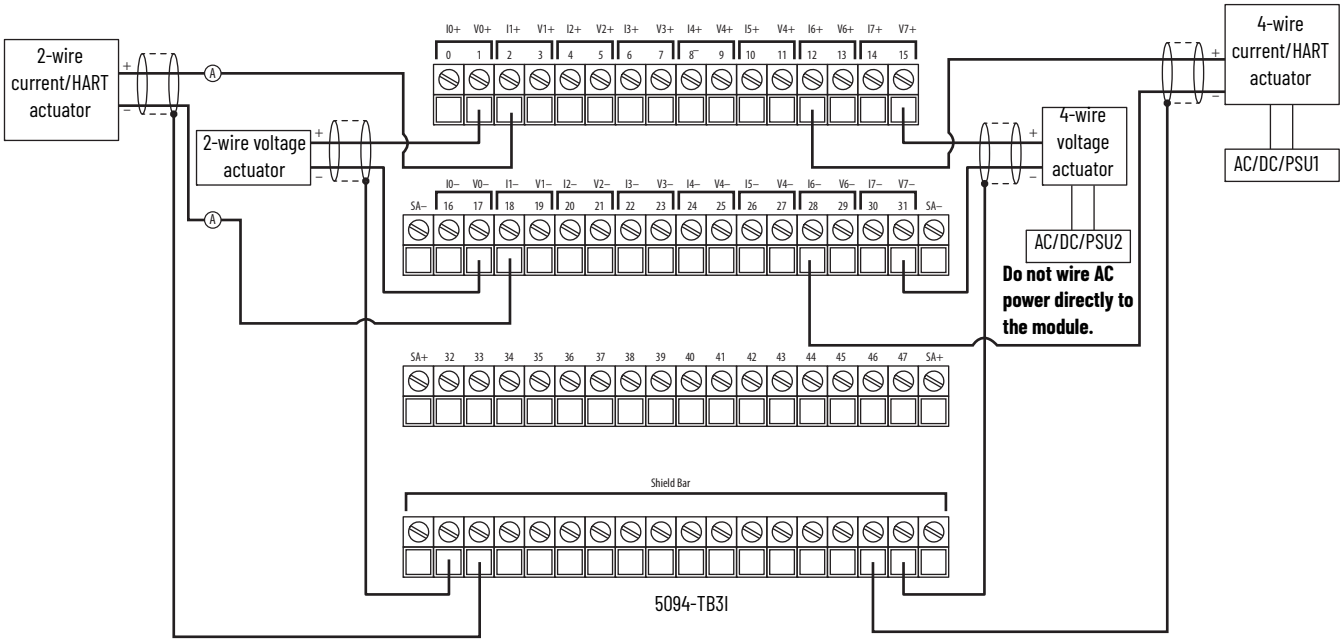
All SA- terminals are internally connected together.
All SA+ terminals are internally connected together.

1794-OF8IH to 5094-OF8IH

1794-OF8IH



5094-OF8IH



IMPORTANT:

- The 5094-STB shield bar accessory is required to wire the shields for all HART modules using the 5094-TB3I, 5094-TB3IS, 5094-TB3IXT, or 5094-TB3ISXT terminal base assemblies. The 5094-STB shield bar accessory is available separately.
- To ensure proper operation and high immunity to electrical noise, always use Belden 8761 (shielded, twisted-pair) or equivalent wire.
- Place a HART handheld or sniffer at locations labeled A in the current loop.

Technical Specification Main Differences

IMPORTANT The specification comparison tables in this section are only meant to highlight the main differences between the FLEX I/O and recommended replacement FLEX 5000 I/O module. For a full list of specifications and detailed wiring instructions, see the installation instructions and technical data publications of the associated catalogs.

1794-IB16 vs. 5094-IB16

Attribute	1794-IB16	5094-IB16
Operating temperature	-20...+55 °C (-4...+131 °F)	-40...+70 °C (-40...+158 °F)
Isolation voltage	50V	250V
Input impedance	4.6 kΩ	4 kΩ

1794-IB32 vs. 5094-IB32

Attribute	1794-IB32	5094-IB32(1)
Operating temperature	-20...+55 °C (-4...+131 °F)	-40...+70 °C (-40...+158 °F)
Isolation voltage	50V	250V
Input impedance	10 kΩ	22.2 kΩ

(1) You must purchase a 5094-STB shield bar that attaches to the 5094-TB32V to land the shields.

1794-IM8 vs. 5094-IM8

Attribute	1794-IM8	5094-IM8
Operating temperature	0...55 °C (32...131 °F)	-40...+70 °C (-40...+158 °F)
Input impedance	10 kΩ	22 kΩ

1794-OB8 vs. 5094-OB8

Attribute	1794-OB8	5094-OB8(1)
Operating temperature	-20...+55 °C (-4...+131 °F)	-40...+70 °C (-40...+158 °F)
Isolation voltage	50V	250V
Surge current rating	2 A	4.8 A
Output signal delay	Off-to-On: 0.5 ms On-to-Off: 1.0 ms	Off-to-On: 100 µs On-to-Off: 100 µs

(1) The 5094-OB8 module has enhanced Fault Mode features compared to the 1794-OB8 module.

1794-OB16 vs. 5094-OB16

Attribute	1794-OB16	5094-OB16(1)
Operating temperature	-20...+55 °C (-4...+131 °F)	-40...+70 °C (-40...+158 °F)
Isolation voltage	50V	250V
Surge current rating	2 A	1 A
Output signal delay	Off-to-On: 0.5 ms On-to-Off: 1.0 ms	Off-to-On: 100 µs On-to-Off: 100 µs

(1) The 5094-OB16 module has enhanced Fault Mode features compared to 1794-OB16 module.

1794-OB32P vs. 5094-OB32

Attribute	1794-OB32P	5094-OB32(1)
Operating temperature	0...55 °C (32...131 °F)	-40...+70 °C (-40...+158 °F)
Isolation voltage	50V	250V
Surge current rating	2 A	1.4 A
Output signal delay	Off-to-On: 0.5 ms On-to-Off: 1.0 ms	Off-to-On: 100 µs On-to-Off: 100 µs

(1) The 5094-OB32 module has enhanced Fault Mode features compared to 1794-OB32P module.

1794-OA16 vs. 5094-OA16

Attribute	1794-OA16	5094-OA16(1)
Operating temperature	0…55 °C (32…131 °F)	-40…+70 °C (-40…+158 °F)
Isolation voltage	120V	250V
External AC power supply voltage	120V AC nominal	120/240V AC

(1) The 5094-OA16 module has enhanced Fault Mode features compared to 1794-OA16 module.

1794-OW8 vs. 5094-OW8I

Attribute	1794-OW8	5094-OW8I(1)
Operating temperature	-20…+55 °C (-4…+131 °F)	-40…+70 °C (-40…+158 °F)
Isolation voltage	50V	250V
Leakage current	1 mA (A minimal snubber circuit included)	0 mA (no included snubbers)
External AC power supply voltage	120V AC nominal	120/240V AC

(1) The 5094-OW8I module has enhanced Fault Mode features compared to 1794-OW8 module.

1794-IE8 vs. 5094-IF8

Attribute	1794-IE8(1)	5094-IF8(2)
Operating temperature	-20…+55 °C (-4…+131 °F)	-40…+70 °C (-40…+158 °F)
Resolution	12 bit	15…16 bit
Open wire detection feature	No	Yes
Channel data reporting format	Integer	Floating point
Notch filter and digital filter features	No	Yes

(1) 1794-IE8 module has dedicated pins on the 1794-TB3 terminal base to land the shields.

(2) For 5094-IF8, you must purchase a 5094-STB shield bar that attaches to the 5094-TB3 terminal base to land the shields.

1794-IF8IH/1794-IF8IHNFXT vs. 5094-IF8IH

Attribute	1794-IF8IH/1794-IF8IHNFXT(1)	5094-IF8IH(2)
Operating temperature	0…55 °C (32…131 °F)	-40…+70 °C (-40…+158 °F)
Resolution	15…16 bit	17 bit
Internal loop power	No	Yes
Absolute accuracy	0.1%	0.05%
Open wire detection feature	No	Yes
Short circuit detection feature	No	Yes
Channel data reporting format	Integer	Floating point
Notch filter feature	No	Yes
Digital channel support	No	Yes

(1) The 1794-IF8IH and 1794-IF8IHNFXT modules have dedicated pins on the 1794-TB3 terminal base to land the shields.

(2) The 5094-IF8IH module supports additional input modes including voltage and digital input. See FLEX 5000 I/O Analog Isolated Current/Voltage/HART Standard and Safety Modules User Manual, publication 5094-UM007 for all options and wiring details. You must purchase a 5094-STB shield bar that attaches to the 5094-TB3 terminal base to land the shields.

1794-IT8 vs. 5094-IY8 (Thermocouple/mV)

Attribute	1794-IT8(1)	5094-IY8(2)
Operating temperature	0…55 °C (32…131 °F)	-40…+70 °C (-40…+158 °F)
Isolation voltage	850V	250V
Open wire detection	No	Yes
Channel data reporting format	Integer	Floating point
Notch filter	Yes	Yes

1794-IT8 vs. 5094-IY8 (Thermocouple/mV) (Continued)

Attribute	1794-IT8(1)	5094-IY8(2)
Digital filter	No	Yes
CJCs	1794-TB3T uses 2 external CJCs	5094-TB3T has 8 built-in CJCs, one for each channel
Support 3-wire current/voltage devices	Yes	No

(1) The 1794-IT8 module has dedicated pins on the 1794-TB2, 1794-TB3, or 1794-TB3T terminal base to land the shields.

(2) For 5094-IY8 module, you must purchase a 5094-STB shield bar that attaches to the 5094-TB3T terminal base to land the shields. The 5094-TB3T must be used with 5094-IY8 even if not using thermocouples.

1794-IRT8 vs. 5094-IY8 (Thermocouple/mV and RTD)

Attribute	1794-IRT8(1)	5094-IY8(2)
Operating temperature	-20…+55 °C (-4…+131 °F)	-40…+70 °C (-40…+158 °F)
Resolution	14 bit	15…16 bit
Isolation voltage	50V	250V
Open wire detection	No	Yes
Channel data reporting format	Integer	Floating point
Notch filter	Yes	Yes
Digital filter	No	Yes
CJCs	1794-TB3T uses 2 external CJCs	5094-TB3T has 8 built-in CJCs one for each channel
Support 3-wire current/voltage devices	Yes	No

(1) The 1794-IRT8 module has dedicated pins on the 1794-TB3G terminal base to land the shields.

(2) For 5094-IY8 module, you must purchase a 5094-STB shield bar that attaches to the 5094-TB3T terminal base to land the shields. The 5094-TB3T must be used with 5094-IY8 even if not using thermocouples.

1794-IR8 vs. 5094-IY8 (RTD)

Attribute	1794-IR8(1)	5094-IY8(2)
Operating temperature	0…55 °C (32…131 °F)	-40…+70 °C (-40…+158 °F)
Isolation voltage	850V	250V
Open wire detection	No	Yes
Channel data reporting format	Integer	Floating point
Notch filter	Yes	Yes
Digital filter	No	Yes
CJCs	1794-TB3T uses 2 external CJCs	5094-TB3T has 8 built-in CJCs, one for each channel
Support 3-wire current/voltage devices	Yes	No

(1) The 1794-IR8 module has dedicated pins on the 1794-TB2, 1794-TB3, or 1794-TB3T terminal base to land the shields.

(2) For 5094-IY8 module, you must purchase a 5094-STB shield bar that attaches to the 5094-TB3T terminal base to land the shields. The 5094-TB3T must be used with 5094-IY8 even if not using thermocouples.

1794-OE4 vs. 5094-OF8

Attribute	1794-OE4(1)	5094-OF8(2)
Operating temperature	-20…+55 °C (-4…+131 °F)	-40…+70 °C (-40…+158 °F)
Isolation voltage	50V	250V
Channel data reporting format	Integer	Floating point
Number of channels	4	8

(1) The 1794-OE4 module has dedicated pins on the 1794-TB3 terminal base to land the shields.

(2) For 5094-OF8 module, you must purchase a 5094-STB shield bar that attaches to the 5094-TB3 terminal base to land the shields.

1794-OF8IH vs. 5094-OF8IH

Attribute	1794-OF8IH[1]	5094-OF8IH[2]
Operating temperature	0…55 °C (32…131 °F)	-40…+70 °C (-40…+158 °F)
Isolation voltage	120V	250V
Channel data reporting format	Integer	Floating point
Signal types	Current	Current and voltage
Support digital output mode	Yes	No

(1) The 1794-OF8IH module has dedicated pins on the 1794-TB3 terminal base to land the shields.

(2) For 5094-OF8IH module, you must purchase a 5094-STB shield bar that attaches to the 5094-TB3 terminal base to land the shields.

1794-VHSC vs. 5094-HSC

Attribute	1794-VHSC[1]	5094-HSC[2] [3]
Operating temperature	0…55 °C (32…131 °F)	-40…+70 °C (-40…+158 °F)
Isolation voltage	50V	250V
Channel data reporting format	Integer	Floating point
Voltage, on-state, min	2.6V	3V
Output voltage[4]	5V DC or 12…24V DC	18…24V DC

(1) The 1794-VHSC module has dedicated pins on the 1794-TB3 terminal base to land the shields.

(2) For 5094-HSC module, you must purchase a 5094-STB shield bar that attaches to the 5094-TB3 terminal base to land the shields.

(3) Both modules have similar functionality and 5094-VHS modules have plenty of matching features to do a FLEX I/O to FLEX 5000 I/O program migration. However, you can consider to start over to take full advantage of the 5094-HSC feature.

(4) The 5094-HSC module output voltage is supplied by SA power.

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Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
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