



ControlLogix 5590 System

Catalog Numbers 1756-L902TS, 1756-L905TS, 1756-L908TS, 1756-L915TS, 1756-L925TS, 1756-L950TS, 1756-L980TS, 1756-L902TSXT, 1756-L905TSXT, 1756-L908TSXT, 1756-L915TSXT, 1756-L925TSXT, 1756-L950TSXT, 1756-L980TSXT, 1756-L905TPSXT, 1756-L915TPSXT, 1756-L950TPSXT, 1756-L980TPSXT, 1756-L9SP, 1756-L9SPXT



Allen-Bradley

by ROCKWELL AUTOMATION

Selection Guide

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What's New

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes. Translated versions are not always available for each revision.

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ControlLogix 5590 Systems

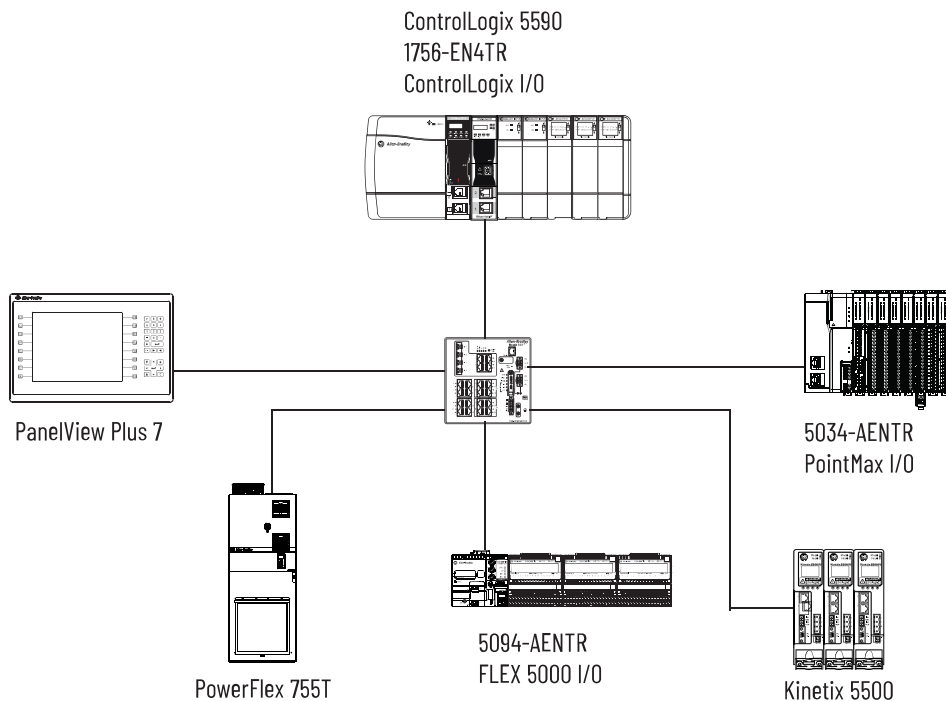
ControlLogix® 5590 systems provide discrete, drives, motion, process, and safety control together with communication and state-of-the-art I/O in a small, cost-competitive package. The system is modular, so you can design, build, and modify it efficiently with significant savings in training and engineering.

A ControlLogix 5590 system consists of the following:

- A ControlLogix 5590 controller
- Studio 5000® environment
- ControlLogix I/O modules
- Network communication modules
- A 1756 chassis in which the system resides

A more comprehensive system could also include:

- Multiple controllers in one chassis
- Multiple controllers joined across networks
- I/O in multiple platforms that are distributed in many locations and connected over multiple networks
- Products with an 'XT' in the catalog number have extended protection in harsh, corrosive gas environments
- Some ControlLogix-XT™ products that feature extended temperature limits



IMPORTANT

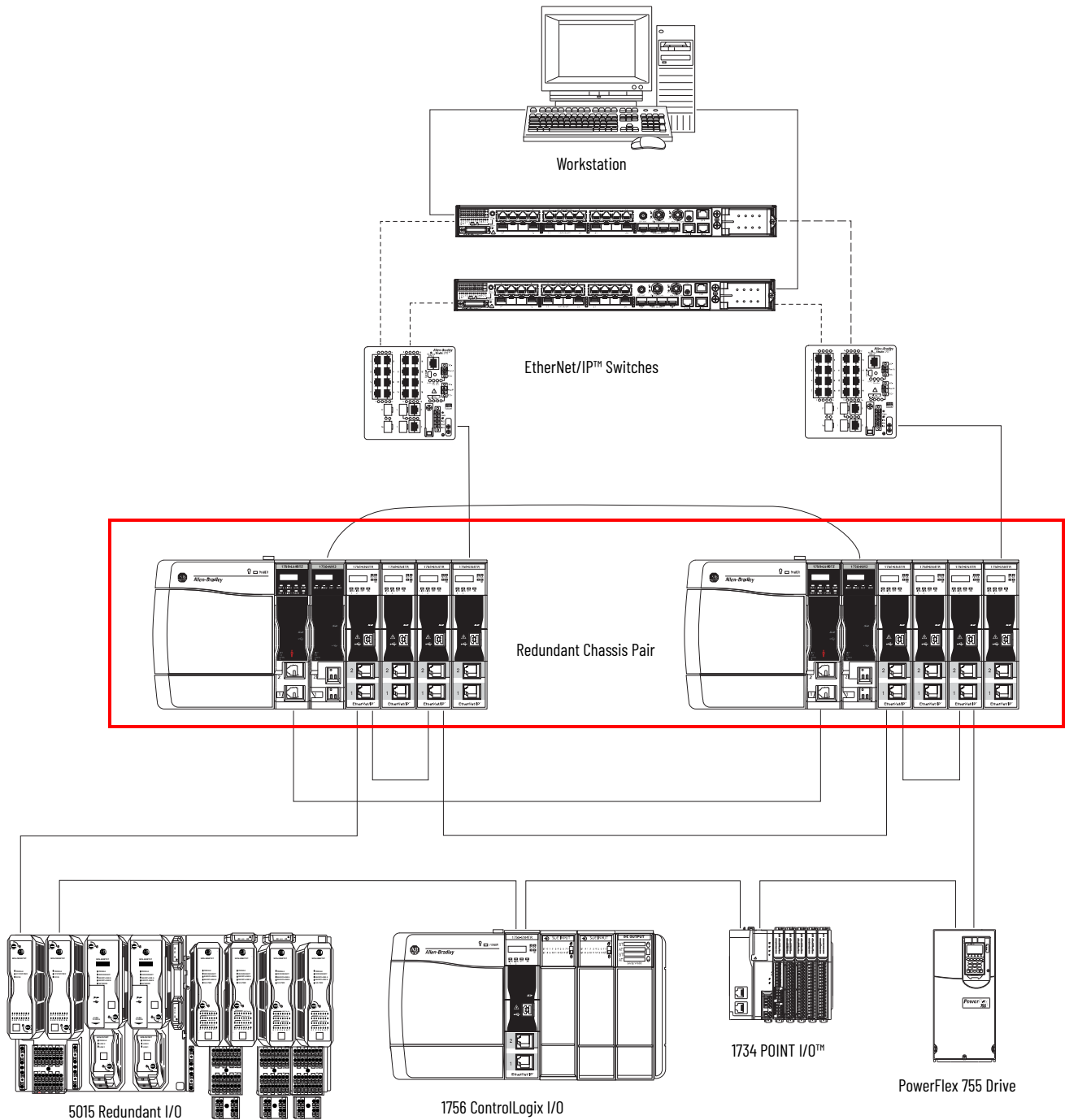
When a ControlLogix product that is rated for harsh environments (corrosive atmosphere, extended temperature, etc.) is used in a system with other ControlLogix products that have lower specification values, the system is derated to the lowest common value.

EXAMPLE: If the maximum operating temperature specification found in the Technical Data for your ControlLogix-XT module is 70 °C (158 °F) and you pair it with a ControlLogix chassis that is temperature rated to 60 °C (140 °F), your system is derated to 60 °C (140 °F).

To ensure that your system is equipped for harsh environments, compare the corrosive atmosphere, temperature, and other specifications found in the Technical Data publication for each product.

ControlLogix 5590 Redundancy Systems

ControlLogix redundancy is designed for non-safety applications that require high availability. In ControlLogix redundancy, redundant controllers are configured to transition from a primary to a secondary controller if there is a fault. The redundant controllers can communicate with only standard I/O modules.



For redundancy system requirements, see the ControlLogix 5590 High Availability Systems User Manual, publication [1756-UM901](#).

ControlLogix 5590 Safety Systems

As the attributes that define machine safety and process safety solutions become more common, there are multiple ControlLogix 5590 controller systems that meet safety requirements.

Controller Redundancy Required? Increases controller availability	SIL 3 Required? Relates to PFD	Redundant I/O Required? Increases I/O availability and Energize to Trip action is more easily enabled	Recommended Solution	
Yes	Yes	Yes	AADvance® safety system	Process Safety
		No	Logix SIS with 5094 FLEX 5000® safety I/O	
	No	Yes	ControlLogix 5590 with 1715 redundant I/O	
		No	Logix SIS with 5094 FLEX 5000 safety I/O	
No	Yes	Yes	AADvance safety system	Hybrid Safety
		No	ControlLogix 5590 controller with a safety partner and safety I/O	
	No	Yes	ControlLogix 5590 controller with 1715 redundant I/O	
		No	ControlLogix 5590 controller with safety I/O	

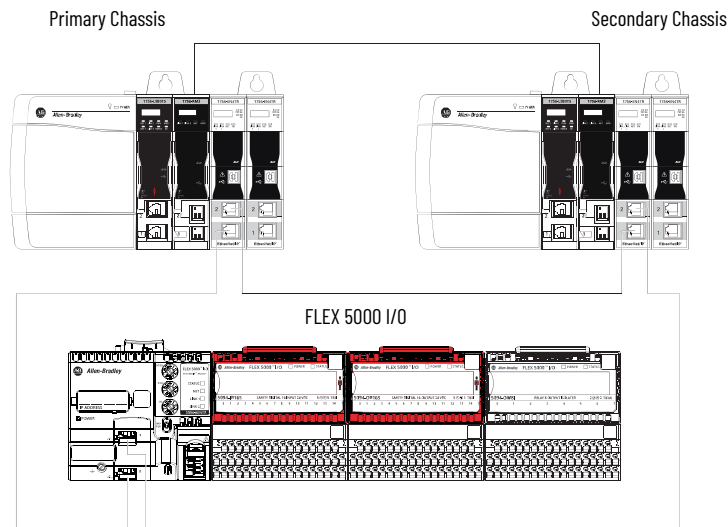
For information about achieving and maintaining SIL 2/PLd and SIL 3/PLe with the ControlLogix 5590 controller system, see the ControlLogix 5590 Controller Systems Safety Reference Manual, publication [1756-UM900](#).

For information about how to safely apply AADvance controllers for a Safety Instrumented Function, see the AADvance Safety Manual, publication [1CSTI-RM446](#).

For information on using ControlLogix 5590 controllers in SIL 2 applications, see the Using ControlLogix in SIL 2 Applications Safety Reference Manual, publication [1756-RM001](#).

ControlLogix 5590 Logix SIS

Logix SIS redundancy is designed for safety applications that require high availability. With Logix SIS, redundant ControlLogix 5590 controllers simultaneously execute the safety task to maintain operation but only one controller executes standard tasks.



For more information about Logix SIS, which are type-approved and certified for use in safety applications, see the ControlLogix 5590 High Availability Systems User Manual, publication [1756-UM901](#).

ControlLogix 5590 Controllers

The ControlLogix 5590 controllers are part of the Logix 5000® family of controllers:

- ControlLogix controllers can monitor and control I/O across the ControlLogix backplane, and over networks. ControlLogix controllers can communicate over EtherNet/IP, ControlNet®, DeviceNet®, and many third-party process and device networks.
- The controller can be placed into any slot of a ControlLogix chassis and multiple controllers can be installed in the same chassis. Multiple controllers in the same chassis communicate with each other over the backplane but operate independently.
- ControlLogix 5590 controllers have two built-in EtherNet/IP ports, but you can also use communication interface modules in the chassis.
- The QR Code printed under the vertical lift door that provides direct access to manuals, Knowledgebase Technotes, downloads, security advisories, or technical support.
- An 8GB MicroSD card ships with any ControlLogix 5590 controller.
- All ControlLogix 5590 controllers feature a USB-C port for firmware flashing, configuration, uploading and downloading information, and edits while the system is online.

Controller Comparison

ControlLogix 5590 and ControlLogix 5580 Performance and Features

Feature	ControlLogix 5590	ControlLogix 5580
Performance	2x ControlLogix 5580 controllers	5...20x ControlLogix 5570 controllers
User memory	2...80 MB	3...40 MB
Axis per controller	512 (Performance 2x for 256 axis)	256
Number of EtherNet/IP nodes ⁽¹⁾	30...600	100...300
Number of connections for MSG instructions	384	256 In
Total number of messaging/HMI connections (inbound and outbound)	768	520
Tag based alarms	20,000	10,000
Embedded ethernet port(s)	2	1
TCP connections	1024	512
Ethernet I/O (Class 0/1) packets/sec	164,000 without CIP Security™ 60,000 with integrity 30,000 with integrity and confidentiality	128,000 without CIP Security 40,000 with integrity 20,000 with integrity and confidentiality
Ethernet messaging (Class 3) messages/sec	4000 without CIP Security 3000 with integrity 2700 with integrity and confidentiality	2000 without CIP Security 1500 with integrity 900 with integrity and confidentiality
Studio 5000 Logix Designer® version	Version 38 and later	Version 29 and later

(1) Includes any or all nodes connected using the embedded Ethernet port or via 1756-ENxT modules

ControlLogix 5590 Capacity

User Memory	Safety Memory	EtherNet/IP Nodes ⁽¹⁾	OPC/UA Nodes ⁽²⁾	ControlLogix 5590 Standard	ControlLogix 5590-XT	ControlLogix 5590 Process
2 MB	2 MB	30	300	1756-L902TS	1756-L902TSXT	—
5 MB	5 MB	100	1000	1756-L905TS	1756-L905TSXT	1756-L905TPSXT
8 MB	8 MB	200	2000	1756-L908TS	1756-L908TSXT	—
15 MB	12 MB	300	5000	1756-L915TS	1756-L915TSXT	1756-L915TPSXT
25 MB	12 MB	400	20,000	1756-L925TS	1756-L925TSXT	—
50 MB	12 MB	500	50,000	1756-L950TS	1756-L950TSXT	1756-L950TPSXT
80 MB	12 MB	600	100,000	1756-L980TS	1756-L980TSXT	1756-L980TPSXT

(1) Includes any or all nodes connected using the embedded Ethernet port or via 1756-ENxT modules

(2) The total number of EtherNet/IP nodes is dependent upon which controller is used and the number of available controller resources remaining

For detailed specifications, see the ControlLogix and GuardLogix Controllers Technical Data, publication [1756-TD001](#).

ControlLogix 5590 Standard Controllers

The ControlLogix 5590 standard controllers are configurable for standard, safety, redundancy, or Logix SIS applications. They're chassis-based, which provides options for configuring various communications and I/O capabilities. The ControlLogix 5590 standard controllers support multiple programming languages that enable sequential, process, motion, and drive control.



ControlLogix-XT 5590 Controllers

The ControlLogix-XT 5590 controllers function in the same way and have the same features as ControlLogix 5590 standard controllers. They include control and communication system components that have an extra degree of protection when exposed to harsh, corrosive gas environments. While ControlLogix 5590 standard controllers can withstand temperatures from 0...60 °C (33...140 °F), ControlLogix-XT 5590 controllers can withstand temperatures from -25...+70 °C (-13...+158 °F).



ControlLogix-XT 5590 Process Controllers

The ControlLogix-XT 5590 process controller is an extension of the Logix 5000 controller family that focuses on plant-wide process control. The process controller comes configured with a default process-tasking model and dedicated PlantPAx® process instructions optimized for process applications and that improve design and deployment efforts.

ControlLogix-XT 5590 process controller hardware has an extra degree of protection when exposed to harsh, corrosive gas environments, and can be used in temperature extremes from -25...+70 °C (-13...+158 °F) when deployed as part of a Logix-XT system.



Controller Accessories

Safety Partners

All ControlLogix 5590 controllers are SIL2 safety capable, and can achieve SIL3 ratings when paired with a 5590 safety partner. ControlLogix 5590 controllers are compatible with the 1756-L9SP safety partner. ControlLogix 5590-XT and ControlLogix 5590 process controllers are compatible with the 1756-L9SPXT safety partner. In SIL 3 applications, one safety partner is required for each ControlLogix 5590 controller.



Memory Cards

Memory cards offer nonvolatile memory to store a user program and tag data on a controller. The ControlLogix 5590 controllers ship with an 8 GB microSD™ Card (catalog numbers 1784-MSD8 or 1784-MSD8XT) installed in a slot on the controller. Through custom application code in the Logix Designer application, you can manually trigger the controller to save to or load tag data from nonvolatile memory or configure the controller to load from nonvolatile memory on powerup.

ControlLogix I/O Modules

The ControlLogix architecture provides a wide range of input and output modules to span many applications, from high-speed digital to process control. The ControlLogix architecture uses a Producer/Consumer model so that input information and output status can be shared among multiple controllers.

Each ControlLogix I/O module mounts in a ControlLogix chassis and **requires** a removable terminal block (RTB) or a 1492 interface module (IFM) to connect all field-side wiring. RTBs and IFMs are not included with the I/O modules. They must be ordered separately.

AC Digital Input Modules

Cat. No.	Inputs/Outputs	Voltage Category	Operating Voltage Range	Removable Terminal Block
1756-IA8D	8 diagnostic inputs (4 points/group)	120V AC	79...132V AC	1756-TBNH 1756-TBSH
1756-IA16	16 inputs (8 points/group)	120V AC	74...132V AC	1756-TBNH 1756-TBSH
1756-IA16I	16 individually isolated inputs	120V AC	74...132V AC	1756-TBCH 1756-TBS6H
1756-IA32	32 inputs (16 points/group)	120V AC	74...132V AC	1756-TBCH 1756-TBS6H
1756-IM16I	16 individually isolated inputs	240V AC	159...265V AC	1756-TBCH 1756-TBS6H
1756-IN16	16 inputs (8 points/group)	24V AC	10...30V AC	1756-TBNH 1756-TBSH

AC Digital Output Modules

Cat. No.	Inputs/Outputs	Voltage Category	Operating Voltage Range	Removable Terminal Block
1756-OA8	8 outputs (4 points/group)	120/240V AC	79...265V AC	1756-TBNH 1756-TBSH
1756-OA8D	8 diagnostic, electronically fused outputs (4 points/group)	120V AC	74...132V AC	1756-TBNH 1756-TBSH
1756-OA8E	8 electronically fused outputs (4 points/group)	120V AC	74...132V AC	1756-TBNH 1756-TBSH
1756-OA16	16 mechanically fused/group outputs (8 points/group)	120/240V AC	74...265V AC	1756-TBNH 1756-TBSH
1756-OA16I	16 individually isolated outputs	120/240V AC	74...265V AC	1756-TBCH 1756-TBS6H
1756-ON8	8 outputs (4 points/group)	24V AC	10...30V AC, current > 50 mA 16...30V AC, current < 50 mA	1756-TBNH 1756-TBSH

For detailed specifications, see 1756 ControlLogix I/O Modules Specifications Technical Data, publication [1756-TD002](#).

DC Digital Input Modules

Cat. No.	Inputs/Outputs	Voltage Category	Operating Voltage Range	Removable Terminal Block
1756-IB16	16 inputs (8 points/group)	12/24V DC sink	10...31.2V DC	1756-TBNH 1756-TBSH
1756-IB16XT	16 inputs (8 points/group)	12/24V DC sink	10...31.2V DC	1756-TBNHXT 1756-TBSHXT
1756-IB16D	16 diagnostic inputs (4 points/group)	12/24V DC sink	10...30V DC	1756-TBCH 1756-TBS6H
1756-IB16I	16 individually isolated inputs	12/24V DC sink/source	10...30V DC	1756-TBCH 1756-TBS6H
1756-IB16IF	16 high-speed, individually isolated inputs	12/24V DC sink/source	10...30V DC	1756-TBCH 1756-TBS6H
1756-IB16ISOE	16 individually isolated, sequence of events inputs	24/48V DC sink/source	10...55V DC	1756-TBCH 1756-TBS6H
1756-IB32	32 inputs (16 points/group)	12/24V DC sink	10...31.2V DC	1756-TBCH 1756-TBS6H
1756-IB32XT	32 inputs (16 points/group)	12/24V DC sink	10...31.2V DC	1756-TBCHXT 1756-TBS6HXT
1756-IC16	16 inputs (8 points/group)	48V DC sink	30...55V DC @ 60 °C (140 °F) 30...60V DC @ 55 °C (131 °F)	1756-TBNH 1756-TBSH
1756-IG16	16 inputs (8 points/group)	5V DC TTL source (Low = True)	4.5...5.5V DC	1756-TBNH 1756-TBSH
1756-IH16I	16 individually isolated inputs	125V DC sink/source	90...146V DC	1756-TBCH 1756-TBS6H
1756-IH16ISOE	16 individually isolated, sequence of events inputs	125V DC sink/source	90...140V DC	1756-TBCH 1756-TBS6H
1756-IV16	16 inputs (8 points/group)	12/24V DC source	10...30V DC	1756-TBNH 1756-TBSH
1756-IV32	32 inputs (16 points/group)	12/24V DC source	10...30V DC	1756-TBCH 1756-TBS6H

DC Digital Output Modules

Cat. No.	Inputs/Outputs	Voltage Category	Operating Voltage Range	Removable Terminal Block
1756-OB8	8 outputs	12/24V DC source	10...30V DC	1756-TBNH 1756-TBSH
1756-OB8EI	8 electronically fused, individually isolated outputs	12/24V DC source	10...30V DC	1756-TBCH 1756-TBS6H
1756-OB16D	16 diagnostic outputs (8 points/group)	24V DC source	19.2...30V DC	1756-TBCH 1756-TBS6H
1756-OB16E	16 electronically fused outputs (8 points/group)	12/24V DC source	10...31.2V DC	1756-TBNH 1756-TBSH
1756-OB16I	16 individually isolated outputs	12/24V DC sink/source	10...30V DC	1756-TBCH 1756-TBS6H
1756-OB16IEF	16 high-speed, individually isolated, electronically fused outputs	24V DC sink/source	10...30V DC	1756-TBCH 1756-TBS6H
1756-OB16IEFS	16 scheduled, high-speed, individually isolated, electronically-fused outputs	24V DC sink/source	10...30V DC	1756-TBCH 1756-TBS6H
1756-OB16IS	16 individually isolated outputs 8 scheduled outputs	12/24V DC sink/source	10...30V DC	1756-TBCH 1756-TBS6H
1756-OB32	32 outputs (16 points/group)	12/24V DC source	10...31.2V DC	1756-TBCH 1756-TBS6H
1756-OB32XT	32 outputs (16 points/group)	12/24V DC source	10...31.2V DC	1756-TBCHXT 1756-TBS6HXT
1756-OC8	8 outputs (4 points/group)	48V DC source	30...60V DC	1756-TBNH 1756-TBSH
1756-OG16	16 (8 points/group)	5V DC TTL source (Low=True)	4.5...5.5V DC	1756-TBNH 1756-TBSH
1756-OH8I	8 individually isolated outputs	120V DC	90...146V DC	1756-TBCH 1756-TBS6H
1756-OV16E	16 electronically fused outputs (8 points/group)	12/24V DC sink	10...30V DC	1756-TBNH 1756-TBSH
1756-OV32E	32 electronically fused outputs (16 points/group)	12/24V DC sink	10...30V DC	1756-TBCH 1756-TBS6H

DC Digital Safety Modules

Cat. No.	Inputs/Outputs	Voltage Category	Operating Voltage Range	Removable Terminal Block
1756-IB16S	16 channels (1 group of 16), sinking	12/24V DC sink	10...32V AC	1756-TBCHS 1756-TBS6HS
1756-OBV8S	8 outputs	24V DC source	18...32V DC	1756-TBNHS 1756-TBSHS

IMPORTANT

- 1756-IB16S and 1756-OBV8S modules are compatible with ControlLogix 5590 controllers as local or remote I/O.
- The 1756-IB16S and 1756-OBV8S modules are compatible only with a 1756 ControlLogix Chassis, Series C.

Contact Output Modules

Cat. No.	Inputs/Outputs	Operating Voltage Range	Removable Terminal Block
1756-OW16I	16 normally open, individually isolated outputs	5...125V DC 10...240V AC	1756-TBCH 1756-TBS6H
1756-OX8I	8 normally open 8 normally closed, individually isolated outputs (2 points/group)	5...125V DC 10...240V AC	1756-TBCH 1756-TBS6H

Analog Input Modules

Cat. No.	Inputs/Outputs	Range	Resolution	Removable Terminal Block
1756-IF8	8 single-ended inputs 4 differential inputs 2 high-speed differential inputs	$\pm 10\text{V}$ 0...10V 0...5V 0...20 mA	$\pm 10.25\text{V}$: 320 $\mu\text{V}/\text{count}$ (15 bits plus sign bipolar) 0...10.25V: 160 $\mu\text{V}/\text{count}$ (16 bits) 0...5.125V: 80 $\mu\text{V}/\text{count}$ (16 bits) 0...20.5 mA: 0.32 $\mu\text{A}/\text{count}$ (16 bits)	1756-TBCH 1756-TBS6H
1756-IF8I	8 individually isolated inputs, current or voltage	$\pm 10\text{V}$ 0...10V 0...5V 0...20 mA	24 bits $\pm 10.5\text{V}$ (1.49 $\mu\text{V}/\text{count}$) 0...10.5V (1.49 $\mu\text{V}/\text{count}$) 0...5.25V (1.49 $\mu\text{V}/\text{count}$) 0...21 mA (2.99 nA/count)	1756-TBCH 1756-TBS6H
1756-IF16	16 single-ended inputs 8 differential or 4 differential (high speed) inputs	$\pm 10\text{V}$ 0...10V 0...5V 0...20 mA	16 bits $\pm 10.25\text{V}$: 320 $\mu\text{V}/\text{count}$ (15 bits plus sign bipolar) 0...10.25V: 160 $\mu\text{V}/\text{count}$ (16 bits) 0...5.125V: 80 $\mu\text{V}/\text{count}$ (16 bits) 0...20.5 mA: 0.32 $\mu\text{A}/\text{count}$ (16 bits)	1756-TBCH 1756-TBS6H

Analog RTD and Thermocouple Modules

Cat. No.	Inputs/Outputs	Range	Resolution	Removable Terminal Block
1756-IRT8I	8 individually isolated inputs, RTD or thermocouple inputs (2 CJC)	1...500 Ω 2...1000 Ω 4...2000 Ω 8...4000 Ω -100...+100 mV	24 bits 0...510 Ω : 0.06 m Ω/count 0...1020 Ω : 0.12 m Ω/count 0...2040 Ω : 0.25 m Ω/count 0...4080 Ω : 0.50 m Ω/count -101...+101 mV: 0.01 $\mu\text{V}/\text{count}$	1756-TBCH 1756-TBS6H
1756-IRT12	12 channels RTD mode	1...500 Ω 2...1000 Ω 4...2000 Ω 8...4000 Ω	24 bits 0...510 Ω : 0.06 m Ω/count 0...1020 Ω : 0.12 m Ω/count 0...2040 Ω : 0.25 m Ω/count 0...4080 Ω : 0.50 m Ω/count	1756-TBCH 1756-TBS6H
1756-IT16	16 channels, thermocouple mode 2 CJC	-100...+100 mV	24 bits -101...+101 mV: 0.01 $\mu\text{V}/\text{count}$	1756-TBCH 1756-TBS6H

Analog Output Modules

Cat. No.	Inputs/Outputs	Range	Resolution	Removable Terminal Block
1756-OF4	4 voltage or current outputs	$\pm 10\text{V}$ 0...20 mA	15 bits across 10.5V - 320 $\mu\text{V}/\text{bit}$ 16 bits across 21 mA - 325 nA/bit	1756-TBNH 1756-TBSH
1756-OF8	8 voltage or current outputs	$\pm 10\text{V}$ 0...20 mA	15 bits across 10.5V - 320 $\mu\text{V}/\text{bit}$ 16 bits across 21 mA - 325 nA/bit	1756-TBNH 1756-TBSH
1756-OF8I	8 individually isolated outputs, current or voltage	$\pm 10\text{V}$ 0...10V 0...5V 0...20 mA	16 bit $\pm 10.5\text{V}$ (0.32 mV/count) 0...10.5V (0.16 mV/count) 0...5.25V (0.08 mV/count) 0...21 mA (0.32 $\mu\text{A}/\text{count}$)	1756-TBCH 1756-TBS6H

Analog Combination Input and Output Module

Cat. No.	Inputs/Outputs	Range	Resolution	Removable Terminal Block
1756-IF4FX0F2F	4 high-speed, submillisecond, differential inputs 2 high-speed voltage or current outputs	Input: $\pm 10\text{V}$ 0...10V 0...5V 0...20 mA	Input: Approx 14 bits across $\pm 10\text{V}$ DC (21V total) $\pm 10\text{V}$: 1.3 mV/bit, 14-bit effective 0...10.5V: 1.3 mV/bit, 13-bit effective 0...5.25V: 1.3 mV/bit, 12-bit effective Approx 12 bits across 21 mA 0...21 mA: 5.25 $\mu\text{A}/\text{bit}$	1756-TBCH 1756-TBS6H
		Output: $\pm 10\text{V}$ 0...20 mA	Output: 13 bits across 21 mA = 2.8 $\mu\text{A}/\text{bit}$ 14 bits across 21.8V = 1.3 mV/bit	

HART I/O Modules

HART (Highway Addressable Remote Transducer) is an open protocol designed to connect analog devices. HART I/O modules offer:

- Analog and HART connectivity in one module
- No external hardware is required to access HART signal
- HART commands can be transmitted as unscheduled messages
- Supports asset management software to HART devices

Cat. No.	Inputs/Outputs	Range	Resolution	Removable Terminal Block
1756-IF8H	8 differential voltage or current inputs, HART interface	±10V 0...5V 0...10V 0...20 mA 4...20 mA	16...21 bits	1756-TBCH 1756-TBS6H
1756-IF8IH	8 individually isolated current inputs, HART interface	0...20 mA 4...20 mA	16...21 bits	1756-TBCH 1756-TBS6H
1756-IF16H	16 differential current inputs, HART interface	0...20 mA 4...20 mA	16...21 bits	1756-TBCH 1756-TBS6H
1756-IF16IH	16 individually isolated current inputs, HART interface	0...20 mA 4...20 mA	16...21 bits	1756-TBCH 1756-TBS6H
1756-OF8H	8 voltage or current outputs, HART interface	±10V 0...20 mA 4...20 mA	15...16 bits	1756-TBNH 1756-TBSH
1756-OF8IH	8 individually isolated current outputs, HART interface	0...20 mA 4...20 mA	15 bits across 24 mA, 732 nA per bit	1756-TBCH 1756-TBS6H

Specialty I/O Modules

Cat. No.	Inputs/Outputs	Description	Removable Terminal Block
1756-CFM	4 inputs (2 per channel) 2 outputs, current sourcing	Configurable flowmeter module 2 Flowmeter (F) inputs used for all modes 2 Gate inputs used in Totalizer mode for prover/store count	1756-TBNH 1756-TBSH
1756-HSC	2 counters, each with 3 inputs (A, B, Z for gate/reset) 4 outputs (2 points/group)	High-speed counter module 5V operation: 4.5...5.5V DC 12/24V operation: 10...26.4V DC	1756-TBCH 1756-TBS6H
1756-LSC8XIB8I	8...24V DC counters 8 individually isolated, standard inputs, or counters	Low-speed counter module 8...40 kHz 24V DC counters 8 individually isolated 12/24V DC low speed (max frequency 40 kHz) counters 8 individually isolated high-speed 12/24V DC sink/source standard- or counter-control inputs	1756-TBCH 1756-TBS6H
1756-PLS	Left section: 2 groups of 4 outputs and 4 inputs each Center section: resolver interface and I/O control Right section: 2 groups of 4 outputs and 4 inputs each	Programmable limit switch module	Requires 3 RTBs: 1756-TBNH or 1756-TBSH

Accessories - I/O Modules

1756 Removable Terminal Blocks

Removable terminal blocks (RTBs) provide a flexible interconnection between your plant wiring and 1756 I/O modules. The RTB plugs into the front of the I/O module. The type of module determines the RTB that you need. You can choose screw-clamp or spring-clamp RTBs.



RTBs are not shipped with I/O modules. You must order them separately.

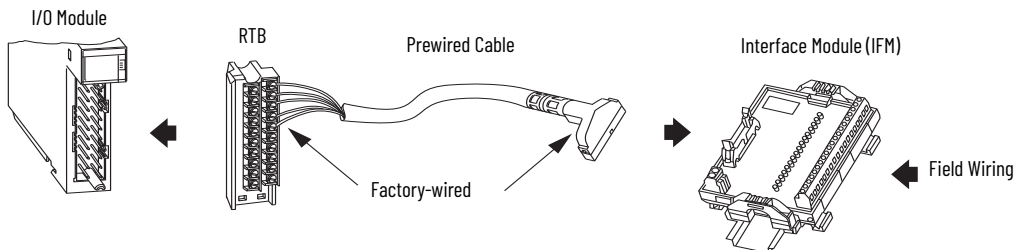
The standard housing on the front of the wiring arm is not necessarily deep enough for 2.5 mm² (14 AWG) wiring. If you plan to use 2.5 mm² (14 AWG) wiring, also order the extended housing. For more information on Extended-Depth Housing, see Knowledgebase Technote [Use of the 1756-TBE Extended Terminal Housing](#).

Attribute	1756-TBNH 1756-TBNHS 1756-TBNHXT	1756-TBSH 1756-TBSHS 1756-TBSHXT	1756-TBCH 1756-TBCHS 1756-TBCHXT	1756-TBS6H 1756-TBS6HS 1756-TBS6HXT	1756-TBE 1756-TBES 1756-TBEXT
Description	20-position NEMA screw-clamp removable block	20-pin spring-clamp removable terminal block with standard housing	36-pin cage-clamp removable terminal block with standard housing	36-pin spring-clamp removable terminal block with standard housing	Extended-depth terminal block housing
Screw torque	1.36 N•m (12 lb•in)	—	0.5 N•m (4.4 lb•in)	—	—

Wiring Systems

As an alternative to buying RTBs and connecting the wires yourself, you can buy a wiring system of the following:

- Interface modules (IFMs) that provide the I/O terminal blocks for Digital I/O modules. Use the prewired cables that match the I/O module to the IFM.
- Analog interface modules (AIFMs) that provide the I/O terminal blocks for analog I/O modules. Use the prewired cables that match the I/O module to the AIFM.
- I/O module-ready cables. One end of the cable assembly is an RTB that plugs into the front of the I/O module. The other end has individually color-coded conductors that connect to a standard terminal block.



IMPORTANT IFMs and prewired cables are not rated for harsh environments (corrosive atmosphere, extended temperature, etc.). When they are used in a system with products that are rated for harsh environments, the system is derated to the specification values of the IFMs and cables.

ControlLogix Compute Modules

ControlLogix Compute modules are chassis-based modules that let you communicate directly with a ControlLogix controller via the system backplane and over a network. The presence of a ControlLogix Compute module is similar to installing a security hardened computer in a ControlLogix chassis.

- 1756 ControlLogix Compute Modules are Industrial PCs with Windows® and Linux Operating Systems, and C++ backplane API for custom applications.
- 1756 Embedded Edge Compute Module is an Embedded Edge Computing device shipped with FactoryTalk® Optix Studio™ and FactoryTalk® Remote Access™ to enable IT/OT convergence via web-based content and alternative communications at the Logix level.

Cat. Nos	Description	Application Support
1756-CMS1B1	Compute module with: • Standard performance (dual-core CPU) • 32 GB SSD • Embedded Windows 10 IoT Enterprise LTSC 64-bit OS	Pre-loaded application not included C++ backplane API for custom applications
1756-CMS1C1	Compute module with: • Standard performance (dual-core CPU) • 32 GB SSD • Embedded Linux Debian 32-bit OS	
1756-CMS1D1	Compute module with: • Standard performance (dual-core CPU) • 32 GB SSD • Embedded Linux Debian 64-bit OS	
1756-CMS1H1	Compute module with: • Standard performance (dual-core CPU) • 32 GB SSD • Embedded Linux Red Hat 64-bit OS	
1756-CMEE1Y1	Embedded Edge Compute module with: • Embedded Edge performance (quad-core CPU) • 32 GB microSD™ card and 20 GB eMMC memory • Embedded Linux Yocto 64-bit OS	Pre-loaded with FactoryTalk® Optix™ XS and FactoryTalk Remote Access Runtime Pro

For detailed specifications, see the 1756 ControlLogix I/O Specifications Technical Data, publication [1756-TD002](#).

ControlLogix Redundancy Modules

In a ControlLogix 5590 controller redundancy system, a pair of redundancy modules is required to link the redundancy chassis pair. The redundancy modules must have the same catalog number. The redundancy modules monitor events in each chassis and initiate system responses as required.

For redundancy system requirements, see the ControlLogix 5590 High Availability Systems User Manual, publication [1756-UM901](#).

Cat. Nos	Description
1756-RM3	Redundancy module
1756-RM3-2SFP	1756-RM3 module shipped with two 1783-SFP1GLX singlemode SFP transceivers
1756-RM3XT	Redundancy module that is rated for harsh environments

For detailed specifications, see the ControlLogix and GuardLogix Controllers Technical Data, publication [1756-TD001](#).

ControlLogix Communication Modules

Separate communication modules are available for different networks. Install multiple communication modules into the ControlLogix backplane to bridge or route control and information data between networks. You can route a message through a maximum of four chassis (eight communication hops). You do not need a ControlLogix controller in the chassis.

EtherNet/IP (Ethernet Industrial Protocol) is an open industrial-networking standard that supports real-time I/O messaging and message exchange. The EtherNet/IP network uses off-the-shelf Ethernet communication chips and physical media.

Cat. No.	Description	Media	Communication Rate	Integrated Motion on the EtherNet/IP Network Axes, max	TCP/IP Connections	Logix Connections
1756-EN2F	EtherNet/IP bridge, fiber	Fiber	100 Mbps	8	128	256
1756-EN2T	EtherNet/IP bridge, copper	Copper	10/100 Mbps	8	128	256
1756-EN2TXT	ControlLogix-XT extended temperature EtherNet/IP bridge for harsh environments, copper	Copper	10/100 Mbps	8	128	256
1756-EN2TP	EtherNet/IP bridge, copper	Dual copper	10/100 Mbps	8	128	256
1756-EN2TPXT	ControlLogix-XT extended temperature EtherNet/IP bridge for harsh environments, copper	Dual copper	10/100 Mbps	8	128	256
1756-EN2TR	EtherNet/IP bridge, embedded switch, copper	Dual copper	10/100 Mbps	8	128	256
1756-EN2TRXT	ControlLogix-XT extended temperature EtherNet/IP bridge for harsh environments, embedded switch, copper	Dual copper	10/100 Mbps	8	128	256
1756-EN3TR	EtherNet/IP bridge, embedded switch, copper	Dual copper	10/100 Mbps	128	128	256
1756-EN4TR	EtherNet/IP bridge with CIP Security™, embedded switch, copper	Dual copper	10/100 Mbps, 1 Gbps	256	512	1000 I/O 528 Messaging
1756-EN4TRXT	ControlLogix-XT EtherNet/IP bridge for harsh environments, CIP Security, embedded switch, copper	Dual copper	10/100 Mbps, 1 Gbps	256	512	1000 I/O 528 Messaging

For detailed specifications, see the 1756 ControlLogix Communication Modules Specifications Technical Data, publication [1756-TD003](#).

Other Connectivity Options

Option	Consideration
ControlNet network	The ControlNet communication modules (1756-CN2, 1756-CN2R, and 1756-CN2RXT) combine the functionality of an I/O network and a peer-to-peer network, providing high-speed performance and deterministic, repeatable transfers of critical control data. For more information, see the ControlNet to EtherNet/IP Migration Reference Manual, publication CNET-RM001 .
DeviceNet network	The DeviceNet communication module (1756-DNB) provides connections between simple, industrial devices (such as sensors and actuators) and higher-level devices (such as controllers and computers).
USB connection	The ControlLogix controllers have a USB port in place of the serial port. ⁽¹⁾ If your application requires RS-232 functionality, see the many partners at https://www.rockwellautomation.com/en-us/sales/partner-locator.html .
SynchLink network	The SynchLink™ communication module (1756-SYNCH) provides time synchronization and data broadcasting capabilities for distributed motion and coordinated drive control. The module connects a ControlLogix chassis to a SynchLink fiber-optic communication link.

(1) The USB port is intended only for temporary local programming purposes and not intended for permanent connection. Do not use the USB port in hazardous locations.

For web server migration options, see the EtherNet/IP Web Server Module Migration Reference Manual, publication [1756-RM013](#).

Modbus Support

To access a Modbus TCP network, use one of the following methods:

- Connect through 1756 EtherNet/IP communication modules, with firmware revision 5.007 or later, and execute a ladder-logic routine.
- Connect through the 5069-SERIAL module, with firmware revision 2.011 or later and execute a ladder-logic routine.

For more information, see Knowledgebase Technote [Sample Code for Modbus TCP Server and Client Applications](#).

To access a Modbus RTU network, connect through the serial port (if available) and execute a ladder-logic routine. For more information, see Using Logix 5000 Controllers as Masters or Slaves on Modbus Application Solution, publication [CIG-AP129](#).

ControlLogix Integrated Motion

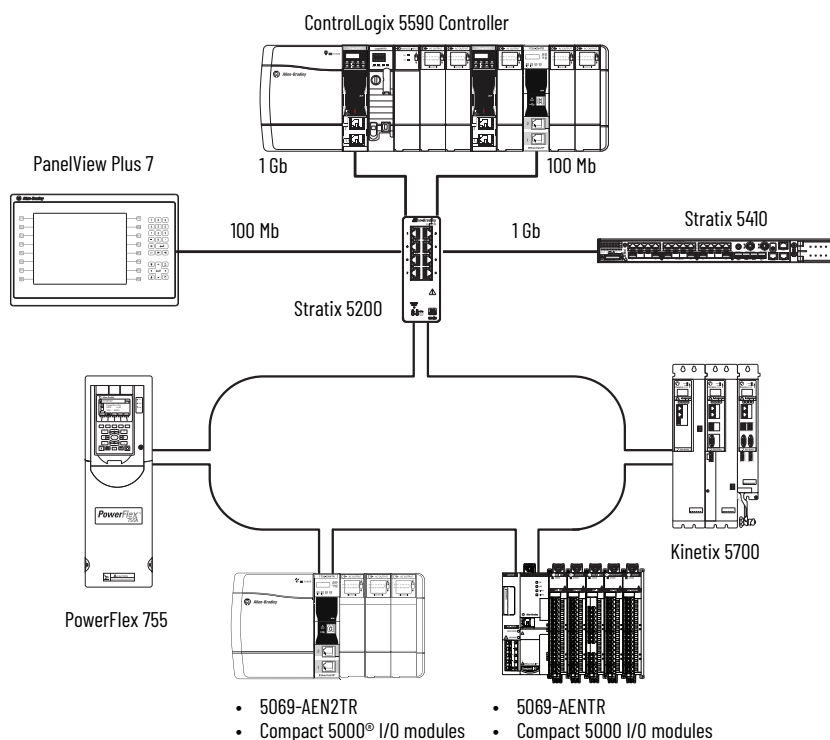
The Logix architecture supports motion control components that work in a wide variety of machine architectures:

- Integrated motion on the EtherNet/IP network supports a connection to Ethernet drives.
- The Kinetix® integrated-motion solution uses an EtherNet/IP interface to perform multi-axis, synchronized motion.
- Logix integrated motion supports the analog family of servo modules for controlling drives/actuators.
- Networked motion provides connection via the DeviceNet network to one axis drive to perform point-to-point indexing.
- 1...8 position loop axes that are configured with the 1756-EN2T or 1756-EN2TR modules
- 1...128 position loop axes that are configured with the 1756-EN3TR module
- 1...256 position loop axes that are configured with the 1756-EN4TR module

For detailed specifications on motion interface modules, see the 1756 ControlLogix Integrated Motion Modules Specifications Technical Data, publication [1756-TD004](#).

For more information, see:

- FactoryTalk Motion Analyzer at <https://motionanalyzer.rockwellautomation.com/>
- Kinetix Motion Control Selection Guide, publication [KNX-SG001](#), to verify drive, motor, and accessory specifications

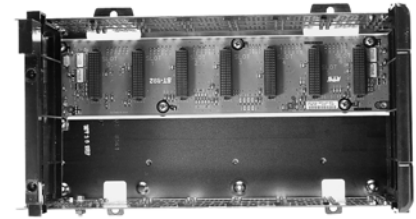


ControlLogix Chassis

The ControlLogix system is a modular system that requires a 1756 I/O chassis. Place any module into any slot. The backplane provides a high-speed communication path between modules.

The chassis are designed for horizontal-only, back-panel mounting. The chassis are available in these options:

- Standard chassis
- ControlLogix-XT chassis
- ControlLogix-ZXT chassis



Standard Chassis

The chassis backplane provides a high-speed communication path between modules and distributes power to each of the modules within the chassis.

Cat. No.	Description	Slots
1756-A4	Standard chassis	4
1756-A7		7
1756-A10		10
1756-A13		13
1756-A17		17

ControlLogix-XT Chassis

The ControlLogix-XT chassis support extreme temperature environments. Series C XT chassis are conformally coated for increased survivability in ISA G3 environments. ControlLogix-ZXT chassis are conformally coated to resist corrosion in ISA GX environments.

Cat. No.	Description	Slots	Temperature Range
1756-A7XT/C	ControlLogix-XT chassis	7	-25...+70 °C (-13...+158 °F)
1756-A10XT/C		10	
1756-A7ZXT	ControlLogix-ZXT chassis	7	
1756-A10ZXT		10	

Accessories - Chassis

Use a slot filler module to fill empty slots.

Cat. No.	Description
1756-N2	Slot filler module for empty slots in standard ControlLogix chassis
1756-N2XT	Slot filler module for empty slots in ControlLogix-XT and ControlLogix-ZXT chassis

For detailed specifications, see the 1756 ControlLogix Chassis Specifications Technical Data, publication [1756-TD006](#).

ControlLogix Power Supplies

ControlLogix power supplies are used with a 1756 chassis to provide 1.2V, 3.3V, 5V, and 24V DC power directly to the chassis backplane. Select from these configurations:

- Standard power supplies
- ControlLogix-XT power supplies
- Redundant power supplies



IMPORTANT Make sure not to exceed the power supply capacity on any of the voltage/current limits by taking into account the modules that are used in the chassis. For additional information, see the Knowledgebase Technote [Sizing the ControlLogix Power Supply](#).

For detailed specifications, see the 1756 ControlLogix Power Supplies Specifications Technical Data, publication [1756-TD005](#).

Standard Power Supplies

You mount a standard power supply directly on the left end of the chassis, where it plugs directly into the backplane.

Cat. No.	Description	Voltage Category	Operating Voltage Range	Chassis
1756-PA50	Slim AC power supply	120V/240V AC	85...265V AC	Standard, series A, B, or C
1756-PA72	Standard AC power supply	120V/240V AC	85...265V AC	Standard, series A, B, or C
1756-PA75		120V/240V AC	85...265V AC	Standard, series B or C
1756-PB50	Slim DC power supply	24V DC	18...32V DC	Standard, series A, B, or C
1756-PB72	Standard DC power supply	24V DC	18...32V DC	Standard, series A, B, or C
1756-PB75		24V DC	18...32V DC	Standard, series B or C
1756-PC75		48V DC	30...60V DC	Standard, series B or C
1756-PH75		125V DC	90...143V DC	Standard, series B or C

ControlLogix-XT Power Supplies

The ControlLogix-XT power supplies support harsh environments.

Cat. No.	Description	Voltage Category	Operating Voltage Range	Chassis
1756-PAXT	ControlLogix-XT AC power supply	120V/240V AC	85...265V AC	ControlLogix-XT ControlLogix-ZXT
1756-PA30XT	ControlLogix-XT slim AC power supply	120V/240V AC	85...265V AC	
1756-PA75XT	ControlLogix-XT AC power supply	120V/240V AC	85...265V AC	
1756-PBXT	ControlLogix-XT DC power supply	24V DC	18...32V DC	
1756-PB30XT	ControlLogix-XT slim DC power supply	24V DC	18...32V DC	

Redundant Power Supplies

A redundant power supply system provides extra uptime protection for chassis that are used in critical applications. The redundant power supplies funnel power through the chassis adapter to the ControlLogix series C chassis backplane. To build a redundant power supply system, you need the following.

Cat. No.	Amount	Description	Voltage Category	Operating Voltage Range	Chassis
1756-PAR2	Kit	Bundled system contains: • Two1756-PA75R power supplies • Two 1756-CPR2 cables • One 1756-PSCA2 chassis adapter	110V AC	—	Standard, series C
1756-PAR2XT	Kit	Bundled system contains: • Two1756-PAXTR power supplies • Two 1756-CPR2 cables • One 1756-PSCA2 chassis adapter	110V AC	—	
1756-PBR2	Kit	Bundled system contains: • Two 1756-PB75R power suppl • Two 1756-CPR2 cables • One 1756-PSCA2 chassis adapter	24V DC	—	
1756-PBR2XT	Kit	Bundled system contains: • Two 1756-PBXTR power suppl • Two 1756-CPR2 cables • One 1756-PSCA2 chassis adapter	24V DC	—	
1756-PA75R/A or 1756-PAXTR	2	Redundant AC power supply	120V/240V AC	85...265V AC	
1756-PB75R/A or 1756-PBXTR	2	Redundant DC power supply	24V DC	18...32V DC	
1756-CPR2 or 1756-CPR2D or 1756-CPR2U	2	Redundant power supply cable: • Connector angle = straight, length = 0.91 m (3 ft) • Connector angle = down, length = 0.91 m (3 ft) • Connector angle = up, length = 0.91 m (3 ft)	—	—	
1756-PSCA2 or 1756-PSCA2XT	1	Redundant power supply chassis adapter			
N/A (user-supplied)	2	Annunciator wiring ⁽¹⁾ (Maximum length = 10 m [32.8 ft])			

(1) Optional user-supplied annunciator wiring can be connected to the solid-state relay input for status and troubleshooting purposes.

Notes:

Additional Resources

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

Resource	Description
1756 ControlLogix Controllers Technical Data, publication 1756-TD001	Provides specifications for ControlLogix controllers.
1756 ControlLogix I/O Specifications Technical Data, publication 1756-TD002	Provides specifications for ControlLogix I/O modules.
1756 ControlLogix Communications Modules Specifications Technical Data, publication 1756-TD003	Provides specifications for ControlLogix Communications Modules.
1756 ControlLogix Integrated Motion Modules Specifications Technical Data, publication 1756-TD004	Provides specifications for ControlLogix Integrated Motion Modules.
1756 ControlLogix Power Supplies Specifications Technical Data, publication 1756-TD005	Provides specifications for ControlLogix Power Supplies.
1756 ControlLogix Chassis Specifications Technical Data, publication 1756-TD006	Provides specifications for ControlLogix Chassis.
ControlLogix 5590 Controllers User Manual, publication 1756-UM900	Provides information on how to configure, select I/O modules, manage communication, develop applications, and troubleshoot the ControlLogix 5590 controllers.
ControlLogix 5590 High Availability Systems User Manual, publication 1756-UM901	Describes how to set up, configure, program, monitor, and troubleshoot ControlLogix 5590 redundancy and Logix SIS.
Using ControlLogix in SIL2 Applications Safety Reference Manual, publication 1756-RM001	Provides specific configuration and programming considerations.
AADvance Controller Safety Manual, publication ICSTT-RM446	Defines how to safely apply AADvance controllers for a Safety Instrumented Function. It sets out standards (which are mandatory) and makes recommendations to make sure that installations satisfy and maintain their required safety integrity level.
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 Selection and Configuration tools, rok.auto/systemtools	Helps configure complete, valid catalog numbers and build complete quotes based on detailed product information.
Rockwell Automation Global SCCR tool, rok.auto/sccr	Provides coordinated high-fault branch circuit solutions for motor starters, soft starters, and component drives.
Product Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.
Technical Documentation Center, rok.auto/techdocs	Quickly access and download technical specifications, installation instructions, and user manuals.

Rockwell Automation Support

Use these resources to access support information.

Technical Support Center	Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates.	rok.auto/support
Local Technical Support Phone Numbers	Locate the telephone number for your country.	rok.auto/phonesupport
Technical Documentation Center	Quickly access and download technical specifications, installation instructions, and user manuals.	rok.auto/techdocs
Literature Library	Find installation instructions, manuals, brochures, and technical data publications.	rok.auto/literature
Product Compatibility and Download Center (PCDC)	Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes.	rok.auto/pcdc

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