

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with selected official Rockwell Automation pages

ALLEN-BRADLEY CONTROLLOGIX

1756-L902TS

5590 SAFETY CONTROLLER

Selected official pages cover safety-controller features, specifications, installation, dimensions, connections and commissioning requirements.

ControlLogix 5590 Standard Controllers

Features - ControlLogix 5590 Standard Controllers

Feature	1756-L902TS	1756-L905TS	1756-L908TS	1756-L915TS	1756-L925TS	1756-L950TS	1756-L980TS	1756-L9SP
Controller tasks	32 tasks, including a combination of one continuous, periodic, and event tasks 1000 programs/task							—
Built-in communication ports ⁽¹⁾	1-port USB ⁽²⁾ 2 Embedded Ethernet ports							—
USB port communication	USB 2.0 Type-C (does not support powering external devices) Full speed (12 Mbps) Programming, configuration, firmware update, and online edits only							—
Ethernet performance	10/100/1000 Mbps							—
I/O Capacity (Class 0/1) - packets/second ⁽³⁾⁽⁴⁾	• 164,000 without CIP Security™ • 60,000 with integrity • 30,000 with integrity and confidentiality							—
Message Rate Capacity HMI/MSG (Class 3) - messages/second ⁽³⁾⁽⁴⁾⁽⁵⁾								
front port without safety partner	• 4000 without CIP Security • 3000 with integrity • 2700 with integrity and confidentiality							—
front port with safety partner	• 2000 without CIP Security • 1500 with integrity • 900 with integrity and confidentiality							—
backplane without safety partner ⁽⁶⁾	7000 with multiple 1756-EN4TR modules							—
backplane with safety partner ⁽⁶⁾	2000							—
backplane in Logix redundancy ⁽⁶⁾	2000							—
Communication options	• EtherNet/IP™ • ControlNet® • DeviceNet® • SERCOS • Third-party process and device networks							—
EtherNet/IP nodes supported max ⁽⁷⁾⁽⁸⁾	30 nodes	100 nodes	200 nodes	300 nodes	400 nodes	500 nodes	600 nodes ⁽⁹⁾	—
OPC UA nodes supported max ⁽¹⁰⁾	300 nodes	1000 nodes	2000 nodes	5000 nodes	20,000 nodes	50,000 nodes	100,000 nodes	—
Network connections per network module located in the local chassis	• ControlLogix 5590 Controllers front EtherNet/IP ports. See 'EtherNet/IP nodes supported, max' in this table. • 1000 I/O; 528 EtherNet/IP; 512 TCP (1756-EN4TR) • 256 EtherNet/IP; 128 TCP (1756-EN2x) • 128 EtherNet/IP; 64 TCP (1756-ENBT) • 128 ControlNet (1756-CN2/B) • 100 ControlNet (1756-CN2/A) • 40 ControlNet (1756-CNB/D, 1756-CNB/E)							—
Integrated motion	• SERCOS interface • Analog options (encoder input, LDT input, SSI input) • Integrated Motion on the EtherNet/IP network							—
Controller redundancy	Full support ⁽¹⁾							—
Programming languages	• Relay ladder logic (RLL) • Structured text • Function Block Diagram • Sequential function chart (SFC)							—

(1) When the controller is enabled for redundancy; the safety partner is not supported, the Ethernet ports are limited to front port crossload, Integrated motion is not supported, and DeviceNet and ControlNet networks are not supported. For more information, see the ControlLogix 5590 High Availability Systems User Manual, publication [1756-UM901](#).

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

(3) I/O numbers are maximums; they assume no HMI/MSG. HMI/MSG numbers are maximums, they assume no I/O. Packet rates vary depending on packet size. For more details, see Troubleshoot EtherNet/IP Application Technique, publication [ENET-AT003](#), and the EDS file for a specific catalog number.

(4) For information on integrity and confidentiality, see the CIP Security with Rockwell Automation Products Application Technique, publication [SECURE-AT001](#).

(5) Maximums assume that the processor is the target, not the originator.

(6) Controller performance not impacted by CIP Security.

(7) An EtherNet/IP node is a device that you add directly to the I/O configuration, and counts toward the node limits of the controller. For more information on EtherNet/IP nodes, see the ControlLogix 5590 Controllers User Manual, publication [1756-UM900](#).

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

(9) Additional EtherNet/IP nodes may be possible depending on remaining controller resources.

(10) An OPC UA node is a data structure, such as a single tag, that can be exchanged between industrial processes to external resources and applications. For more information on OPC UA nodes, see the OPC UA in 5580 and 5380 Controllers User Manual, publication [1756-UM023](#).

Technical Specifications - ControlLogix 5590 Standard Controllers

Attribute	1756-L902TS	1756-L905TS	1756-L908TS	1756-L915TS	1756-L925TS	1756-L950TS	1756-L980TS	1756-L9SP
Standard memory	2 MB	5 MB	8 MB	15 MB	25 MB	50 MB	80 MB	—
Safety memory	2 MB	5 MB	8 MB	12 MB	12 MB	12 MB	12 MB	Configured to match primary controller
Digital I/O max	128,000							—
Analog I/O max	4000							—
Total I/O max	128,000							—
Nonvolatile memory storage	8 GB microSD™ card (1784-MSD8), ships pre-installed in the controller							—
Energy storage module	Embedded in controller, non-removable							
Current draw @ 1.2V DC	5.0 mA							
Current draw @ 5.1V DC	1.20 A							
Power dissipation	6.2 W							
Thermal dissipation	21.2 BTU/hr							
Isolation voltage	50V (continuous), Basic Insulation type, USB port to backplane, Ethernet port to backplane, and USB port to Ethernet port Compliant and tested according to IEC/UL 61010-1							—
Weight approx	0.394 kg (.868 lb)							
Slot width	1							
Module location	Chassis-based, any slot							Chassis slot immediately to the right of the primary controller
Chassis	1756-A4, 1756-A4K, 1756-A7, 1756-A7K, 1756-A10, 1756-A10K, 1756-A13, 1756-A13K, 1756-A17, 1756-A17 K Series B, Series C							
Power supply, standard	1756-PA50, 1756-PA50K, 1756-PA72, 1756-PA72K, 1756-PA75, 1756-PA75K, 1756-PB50, 1756-PB50K 1756-PB72, 1756-PB72K, 1756-PB75, 1756-PB75K, 1756-PC75, 1756-PH75							
Power supply, redundant	1756-PA75R, 1756-PA75RK, 1756-PB75R, 1756-PB75RK, 1756-PSCA2, 1756-PSCA2K							
Wire category ⁽¹⁾	3 - on USB port 2 - on Ethernet ports							—
Wire size	Ethernet cabling and installation according to IEC 61918 and IEC 61784-5-2							—
Temperature code	T4							
Enclosure type rating	None (Open style)							

(1) Use this conductor category information to plan conductor routing. See Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

Parts List

- The controller ships with these parts:
- 8 GB microSD™ card (1784-MSD8, 1784-MSD8XT), preinstalled in the controller

Required System Components

To use the controller, a chassis and power supply are required. For controller and chassis operating specifications, see the 1756 ControlLogix Controller Specifications Technical Data, publication [1756-T0001](#).

Before you install the controller, make sure to see these ControlLogix Chassis and Power Supply Installation Instructions:

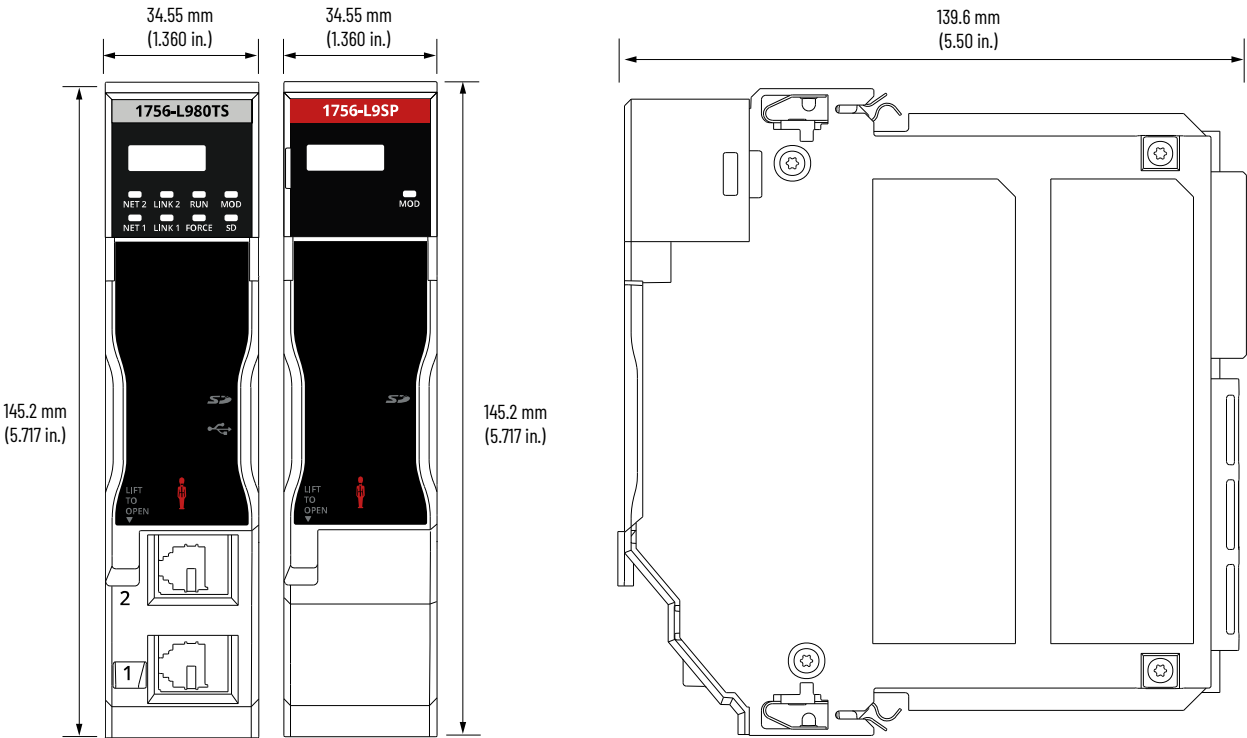
- ControlLogix Chassis Installation Instructions, publication [1756-IN621](#)
- ControlLogix Power Supply Installation Instructions, publication [1756-IN619](#)
- ControlLogix Redundant Power Supply Installation Instructions, publication [1756-IN620](#)

Component	Catalog Number
ControlLogix Chassis, series C and series B	1756-A4, 1756-A4K, 1756-A7, 1756-A7K, 1756-A10, 1756-A10K, 1756-A13, 1756-A13K, 1756-A17, 1756-A17K
ControlLogix Power Supply	1756-PA72, 1756-PA72K, 1756-PA75, 1756-PA75K, 1756-PB72, 1756-PB72K, 1756-PB75, 1756-PB75K, 1756-PC75, 1756-PH75 1756-PA50, 1756-PA50K, 1756-PB50, 1756-PB50K 1756-PA75R, 1756-PA75RK, 1756-PB75R, 1756-PB75RK, 1756-PSCA2, 1756-PSCA2K
ControlLogix-ZXT Chassis or ControlLogix-XT Chassis, series C	1756-A7ZXT, 1756-A10ZXT 1756-A7XT, 1756-A10XT
ControlLogix-XT Power Supply	1756-PAXT, 1756-PBXT 1756-PA30XT, 1756-PB30XT 1756-PAXTR, 1756-PBXTTR 1756-PA75XT, 1756-PB75XT



ATTENTION: If you are using a ControlLogix 5590 standard controller to the maximum temperature of 60 °C (140 °F), you must use a ControlLogix chassis, series C. If you are using a ControlLogix-XT 5590 or ControlLogix-XT 5590 Process controller to the maximum temperature of 70 °C (158 °F), you must use a ControlLogix-ZXT chassis or a ControlLogix-XT chassis, series C.

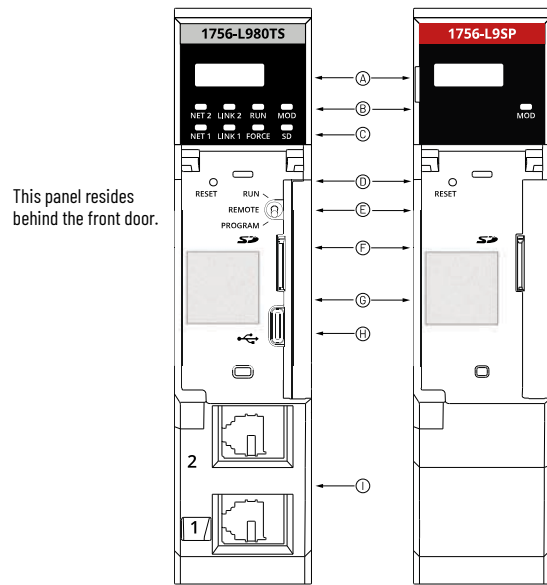
Product Dimensions



Front view: ControlLogix 5590 Controller, ControlLogix 5590 Safety Partner

Side view: ControlLogix 5590 Controller, ControlLogix 5590 Safety Partner

Connectors and Status Indicators



Letter	Item	Description
A	4-character display	Scrolls information about the module.
B	Module Status Indicators	Indicates the current state of the module (MOD, RUN, FORCE, SD).
C	Ethernet Status Indicators	Indicates the current state of transmission of data on the EtherNet/IP™ network (LINK, NET).
D	Reset Button	ControlLogix 5590 controller: Stage 1 reset clears the application program and memory, retains the IP address, and retains all network settings. Stage 2 reset returns the controller to out-of-box settings (including firmware). ControlLogix 5590 safety partner: Returns the safety partner to out-of-box settings (including firmware).
E	Mode switch (Remote, Run, Program)	3-position toggle switch.
F	microSD card slot	8 GB microSD Card (1784-MSD8, 1784-MSD8XT) included.
G	QR Code	Scan to access product information and support.
H	USB-C Port	Connect a USB-C cable or dongle.
I	Ethernet Ports 1 and 2	Dual, 1Gb embedded Ethernet ports. Configurable for Dual-IP Addresses or DLR.

QR Code

IMPORTANT

- Verify the QR Code: Before scanning, check that the QR Code is laser-etched directly onto the device. This ensures it is the original and has not been tampered with.
- Avoid Modified QR Codes: If you see any labels, stickers, or other materials covering or altering the QR Code, do not use it. These modifications could lead to unsafe or incorrect links.
- Report Suspicious QR Codes: If you encounter a QR Code that looks tampered with, report it to your support team for further investigation.
- Use Trusted Scanning Apps: Ensure you use a reliable QR Code scanning app to avoid potential security risks.

Install the Controller



ATTENTION: Select products that are rated for corrosive atmospheres ship with port plugs, covers, or memory cards installed which provide connectors with a degree of protection in corrosive gas environments. Once the factory packaging seal is broken, plugs or covers must remain installed in all unoccupied ports and memory cards must remain installed for the product to maintain its corrosive atmosphere rating. If temporary access is required, port plugs, covers, memory cards, and so on can be removed, but must be reinstalled after temporary access is complete.



WARNING: When you insert or remove the controller while backplane power is on, an electric arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding. Repeated electrical arcing causes excessive wear to contacts on both the controller and its mating connector. Worn contacts can create electrical resistance that can affect controller operation.



WARNING: When you press the reset button while power is on, an electric arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

When installing a controller, you can do the following:

- Place the controller in any slot.
- Use multiple controllers in the same chassis.
- For redundancy or Logix SIS applications, place the controllers in the same slot in each chassis.
- For SIL 3/PL safety applications, install the safety partner in the slot immediately to the right of the primary controller.

You can install or remove a controller while chassis power is on and the system is operating.



ATTENTION: This equipment is sensitive to electrostatic discharge, which can cause internal damage and affect normal operation.

Follow these guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wriststrap.
- Do not touch connectors or pins on component boards.
- Do not touch circuit components inside the equipment.
- Use a static-safe workstation, if available.
- Store the equipment in appropriate static-safe packaging when not in use.

- If you are using a ControlLogix-ZXT chassis, remove the backplane connector cover from the slot into which you're installing the controller.



ATTENTION: Select ControlLogix chassis are shipped with backplane connector covers installed to provide a degree of protection from corrosive atmospheres. Once the factory packaging seal is broken, these covers must remain installed in unused slots at all times for the chassis to maintain its corrosive atmosphere rating. If components installed into the chassis are later removed, reinstall a backplane connector cover in the vacated slot to maintain the corrosive atmosphere rating of the chassis.

Specifications - ControlLogix 5590 Standard Controllers

Attribute	1756-L902TS, 1756-L905TS, 1756-L908TS, 1756-L915TS, 1756-L925TS, 1756-L950TS, 1756-L980TS, 1756-L9SP
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	0 °C ≤ Ta ≤ +60 °C (+32 °F ≤ Ta ≤ +140 °F) Standard Chassis, Series C 0 °C ≤ Ta ≤ +50 °C (+32 °F ≤ Ta ≤ +122 °F) Standard Chassis, Series B
Conformal coated	No
Enclosure type rating	None (open-style)
Voltage and current ratings	1.2 A @ 5.1V DC 5 mA @ 1.2V DC
Isolation voltage	50V (continuous), Basic Insulation type, USB port to Backplane, Ethernet port to Backplane, and USB Port to Ethernet port.
Wire size	Ethernet cabling and installation according to IEC 61918 and IEC 61784-5-2
Temperature code	T4

Specifications - ControlLogix-XT 5590 Controllers

Attribute	1756-L902TSXT, 1756-L905TSXT, 1756-L908TSXT, 1756-L915TSXT, 1756-L925TSXT, 1756-L950TSXT, 1756-L980TSXT, 1756-L9SPXT
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25 °C ≤ Ta ≤ +70 °C (-13°F ≤ Ta ≤ +158 °F)
Conformal coated	Yes
Corrosive atmosphere - ASTM B845-97 Method K Accelerated Test (30-Day Exposure) - Plus additional Rockwell Automation proprietary accelerated corrosive environment test protocol for specific industries with sources of gaseous sulfur compounds.	Severity Level GX ⁽¹⁾⁽²⁾ per ANSI/ISA 71.04-2013, Airborne Contaminants—Gases Severity Level CX ⁽¹⁾ per IEC 60721-3-3:2019, Chemically Active Substances
Enclosure type rating	None (open-style)
Voltage and current ratings	1.2 A @ 5.1V DC 5 mA @ 1.2V DC
Isolation voltage	50V (continuous), Basic Insulation type, USB port to Backplane, Ethernet port to Backplane, and USB Port to Ethernet port.
Wire size	Ethernet cabling and installation according to IEC 61918 and IEC 61784-5-2. Where the operating temperature exceeds 60 °C, the maximum cable length is 20 meters.
Temperature code	T4

(1) Once the factory packaging seal is broken, plugs or covers must remain installed in all unoccupied ports and memory cards must remain installed for the product to maintain its corrosive atmosphere rating.

(2) Up to 2100 angstroms of film growth per 30 days of copper and/or silver reactivity.

Specifications - ControlLogix-XT 5590 Process Controllers

Attribute	1756-L905TPSXT, 1756-L915TPSXT, 1756-L950TPSXT, 1756-L980TPSXT
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25 °C ≤ Ta ≤ +70 °C (-13°F ≤ Ta ≤ +158 °F)
Conformal coated	Yes
Corrosive atmosphere - ASTM B845-97 Method K Accelerated Test (30-Day Exposure) - Plus additional Rockwell Automation proprietary accelerated corrosive environment test protocol for specific industries with sources of gaseous sulfur compounds.	Severity Level GX ⁽¹⁾⁽²⁾ per ANSI/ISA 71.04-2013, Airborne Contaminants—Gases Severity Level CX ⁽¹⁾ per IEC 60721-3-3:2019, Chemically Active Substances
Enclosure type rating	None (open-style)
Voltage and current ratings	1.2 A @ 5.1V DC 5 mA @ 1.2V DC
Isolation voltage	50V (continuous), Basic Insulation type, USB port to Backplane, Ethernet port to Backplane, and USB Port to Ethernet port.
Wire size	Ethernet cabling and installation according to IEC 61918 and IEC 61784-5-2. Where the operating temperature exceeds 60 °C, the maximum cable length is 20 meters.
Temperature code	T4

(1) Once the factory packaging seal is broken, plugs or covers must remain installed in all unoccupied ports and memory cards must remain installed for the product to maintain its corrosive atmosphere rating.

(2) Up to 2100 angstroms of film growth per 30 days of copper and/or silver reactivity.