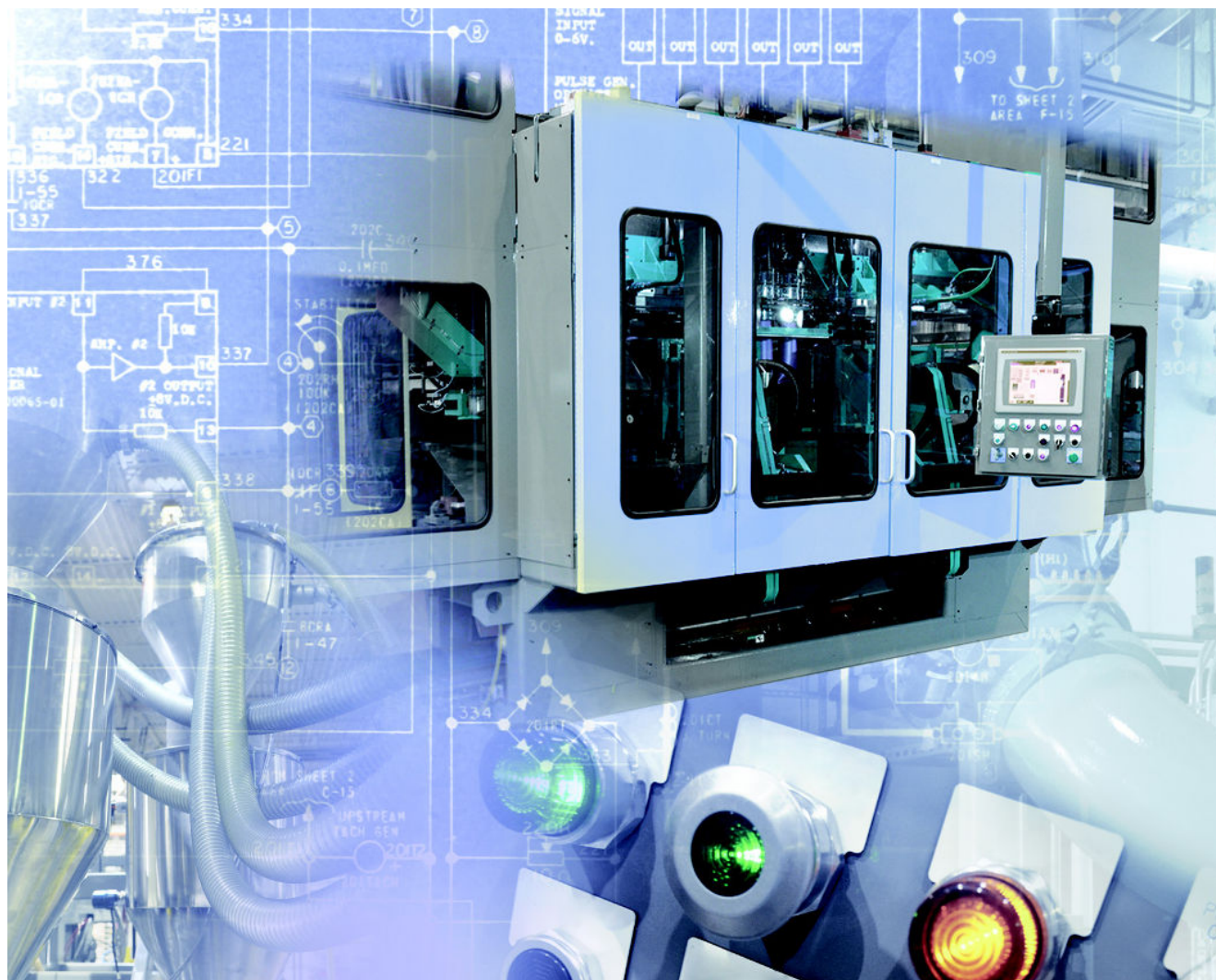


# ControlLogix System

1756 Series Catalog Numbers



LISTEN.  
THINK.  
SOLVE.

# Logix Controllers Comparison

| Characteristic         | ControlLogix® 5580 Controllers<br>GuardLogix® 5580 Controllers                                                                                                                                 | ControlLogix 5570 Controllers<br>GuardLogix 5570 Controllers<br>Armor™ ControlLogix 5570 Controllers<br>Armor GuardLogix 5570 Controllers                                                                  |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Controller tasks:      | <ul style="list-style-type: none"> <li>32</li> <li>1000 programs/task</li> </ul>                                                                                                               | <ul style="list-style-type: none"> <li>32</li> <li>1000 programs/task</li> </ul>                                                                                                                           |
| Event tasks            | Consumed tag, EVENT instruction triggers, Module Input Data changes, and motion events                                                                                                         | Consumed tag, EVENT instruction triggers, Module Input Data changes, and motion events                                                                                                                     |
| User memory            | 1756-L81E 3 MB                                                                                                                                                                                 | 1756-L71, 1756-L71EROM 2 MB                                                                                                                                                                                |
|                        | 1756-L82E 5 MB                                                                                                                                                                                 | 1756-L72, 1756-L72EROM 4 MB                                                                                                                                                                                |
|                        | 1756-L83E 10 MB                                                                                                                                                                                | 1756-L73, 1756-L73XT, 1756-L73EROM 8 MB                                                                                                                                                                    |
|                        | 1756-L84E 20 MB                                                                                                                                                                                | 1756-L74 16 MB                                                                                                                                                                                             |
|                        | 1756-L85E 40 MB                                                                                                                                                                                | 1756-L75 32 MB                                                                                                                                                                                             |
|                        | 1756-L81ES 3 MB + 1.5 MB safety                                                                                                                                                                | 1756-L71S, 1756-L71EROMS 2 MB + 1 MB safety                                                                                                                                                                |
|                        | 1756-L82ES 5 MB + 2.5MB safety                                                                                                                                                                 | 1756-L72S, 1756-L72EROMS 4 MB + 2 MB safety                                                                                                                                                                |
|                        | 1756-L83ES 10 MB + 5 MB safety                                                                                                                                                                 | 1756-L73S, 1756-L73EROMS 8 MB + 4 MB safety                                                                                                                                                                |
|                        | 1756-L84ES 20 MB + 6 MB safety                                                                                                                                                                 |                                                                                                                                                                                                            |
| Built-in ports         | <ul style="list-style-type: none"> <li>Single-port Ethernet port, 10 Mbps/100 Mbps/1 Gbps</li> <li>1 port USB client</li> </ul>                                                                | 1756-L71, 1756-L72, 1756-L73, 1756-L73XT, 1756-L74, 1756-L75, 1756-L71S, 1756-L72S, 1756-L73S 1 port USB Client                                                                                            |
|                        |                                                                                                                                                                                                | 1756-L71EROM, 1756-L71EROMS, 1756-L72EROM, 1756-L72EROMS, 1756-L73EROM, 1756-L73EROMS <ul style="list-style-type: none"> <li>1 port USB client</li> <li>Dual-port EtherNet/IP, 10 Mbps/100 Mbps</li> </ul> |
| Communication options  | <ul style="list-style-type: none"> <li>EtherNet/IP</li> <li>ControlNet™</li> <li>DeviceNet™</li> <li>Data Highway Plus™</li> <li>Remote I/O</li> <li>SynchLink™</li> <li>USB Client</li> </ul> | <ul style="list-style-type: none"> <li>EtherNet/IP</li> <li>ControlNet</li> <li>DeviceNet</li> <li>Data Highway Plus</li> <li>Remote I/O</li> <li>SynchLink</li> <li>USB Client</li> </ul>                 |
| Controller connections | Not applicable                                                                                                                                                                                 | 500 connections                                                                                                                                                                                            |
| Network nodes          | Studio 5000 Logix Designer® application, version 30 or later                                                                                                                                   | Not applicable                                                                                                                                                                                             |
|                        | 1756-L81E, 1756-L81ES 100                                                                                                                                                                      |                                                                                                                                                                                                            |
|                        | 1756-L82E, 1756-L82ES 175                                                                                                                                                                      |                                                                                                                                                                                                            |
|                        | 1756-L83E, 1756-L83ES, 1756-L84E, 1756-L84ES 250                                                                                                                                               |                                                                                                                                                                                                            |
|                        | 1756-L85E 300                                                                                                                                                                                  |                                                                                                                                                                                                            |
| Controller redundancy  | Future                                                                                                                                                                                         | 1756-L71, 1756-L72, 1756-L73, 1756-L73XT, 1756-L74, and 1756-L75 controllers only Full support                                                                                                             |
| Integrated motion      | EtherNet/IP                                                                                                                                                                                    |                                                                                                                                                                                                            |

| Characteristic         | CompactLogix™ 5380 Controllers<br>Compact GuardLogix 5380 Controllers                                                        | CompactLogix 5370 L3 Controllers<br>Compact GuardLogix 5370 L3 Controllers<br>Armor CompactLogix 5370 L3 Controllers<br>Armor Compact GuardLogix 5370 Controllers                                            |
|------------------------|------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Controller tasks:      | <ul style="list-style-type: none"> <li>• 32</li> <li>• 1000 programs/task</li> </ul>                                         | <ul style="list-style-type: none"> <li>• 32</li> <li>• 1000 programs/task</li> </ul>                                                                                                                         |
| Event tasks            | Consumed tag, EVENT instruction triggers, Module Input Data changes, and motion events                                       | Consumed tag, EVENT instruction triggers, and motion events                                                                                                                                                  |
| User memory            | 5069-L306ER, 5069-L306ERM 0.6 MB                                                                                             | 11769-L30ER, 1769-L30ER-NSE, 1769-L30ERM, 1769-L30ERMK 1 MB                                                                                                                                                  |
|                        | 5069-L310ER, 5069-L310ER-NSE, 5069-L310ERM 1 MB                                                                              | 1769-L33ER, 1769-L33ERM, 1769-L33ERMK, 1769-L33ERMO 2 MB                                                                                                                                                     |
|                        | 5069-L320ER, 5069-L320ERM 2 MB                                                                                               | 1769-L36ERM, 1769-L36ERMO, 1769-L37ERM, 1769-L37ERMK, 1769-L37ERMO 3 MB                                                                                                                                      |
|                        |                                                                                                                              | 1769-L37ERM, 1769-L37ERMK, 1769-L37ERMO 4 MB                                                                                                                                                                 |
|                        | 5069-L330ER, 5069-L330ERM 3 MB                                                                                               | 1769-L38ERM, 1769-L38ERMK, 1769-L38ERMO 5 MB                                                                                                                                                                 |
|                        | 5069-L340ER, 5069-L340ERM 4 MB                                                                                               | 1769-L30ERMS 1 MB + 0.5 MB safety                                                                                                                                                                            |
|                        | 5069-L350ERM 5 MB                                                                                                            | 1769-L33ERMS, 1769-L33ERMOS 2 MB + 1 MB safety                                                                                                                                                               |
|                        | 5069-L380ERM 8 MB                                                                                                            | 1769-L36ERMS, 1769-L36ERMOS 3 MB + 1.5 MB safety                                                                                                                                                             |
|                        | 5069-L3100ERM 10 MB                                                                                                          | 1769-L37ERMS, 1769-L37ERMSK, 1769-L37ERMOS 4 MB + 1.5 MB safety                                                                                                                                              |
|                        | 5069-L306ERS2, 5069-L306ERMS2 0.6 MB + 0.3 MB safety                                                                         | 1769-L38ERMS, 1769-L38ERMSK, 1769-L38ERMOS 5 MB + 1.5 MB safety                                                                                                                                              |
|                        | 5069-L310ERMS, 5069-L310ERMS2 1 MB + 0.5 MB safety                                                                           |                                                                                                                                                                                                              |
|                        | 5069-L320ERS2, 5069-L320ERMS2, 5069-L320ERS2K, 5069-L320ERMS2K 2 MB + 1 MB safety                                            |                                                                                                                                                                                                              |
|                        | 5069-L330ERS2, 5069-L330ERMS2, 5069-L330ERS2K, 5069-L330ERMS2K 3 MB + 1.5 MB safety                                          |                                                                                                                                                                                                              |
|                        | 5069-L340ERS2, 5069-L340ERMS2 4 MB + 2 MB safety                                                                             |                                                                                                                                                                                                              |
|                        | 5069-L350ERS2, 5069-L350ERMS2, 5069-L350ERS2K, 5069-L350ERMS2K 5 MB + 2.5 MB safety                                          |                                                                                                                                                                                                              |
|                        | 5069-L380ERS2, 5069-L380ERMS2 8 MB + 4 MB safety                                                                             |                                                                                                                                                                                                              |
|                        | 5069-L3100ERS2, 5069-L3100ERMS2 10 MB + 5 MB safety                                                                          |                                                                                                                                                                                                              |
| Built-in ports         | <ul style="list-style-type: none"> <li>• 2 - Ethernet ports, 10 Mbps/100 Mbps/1 Gbps</li> <li>• 1 port USB client</li> </ul> | <ul style="list-style-type: none"> <li>• Dual-port EtherNet/IP, 10 Mbps/100 Mbps</li> <li>• 1 port USB Client</li> </ul>                                                                                     |
| Communication options  | <ul style="list-style-type: none"> <li>• EtherNet/IP</li> <li>• USB Client</li> </ul>                                        | <ul style="list-style-type: none"> <li>• EtherNet/IP <ul style="list-style-type: none"> <li>— Embedded switch</li> <li>— Single IP address</li> </ul> </li> <li>• DeviceNet</li> <li>• USB Client</li> </ul> |
| Controller connections | Not applicable                                                                                                               | 256 connections                                                                                                                                                                                              |

| Characteristic    | CompactLogix™ 5380 Controllers<br>Compact GuardLogix 5380 Controllers                             | CompactLogix 5370 L3 Controllers<br>Compact GuardLogix 5370 L3 Controllers<br>Armor CompactLogix 5370 L3 Controllers<br>Armor Compact GuardLogix 5370 Controllers |
|-------------------|---------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Network nodes     | Studio 5000 Logix Designer application, version 31 or later <sup>(1)</sup>                        |                                                                                                                                                                   |
|                   | 5069-L306ER, 5069-L306ERM, 16<br>5069-L306ERS2, 5069-L306ERMS2                                    | 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERM, 16<br>1769-L30ERMK, 1769-L30ERMS                                                                                         |
|                   | 5069-L310ER, 5069-L310ER-NSE, 24<br>5069-L310ERM, 5069-L310ERS2, 5069-L310ERMS2                   | 1769-L33ER, 1769-L33ERM, 1769-L33ERMK, 32<br>1769-L33ERMS, 1769-L33ERMSK, 1769-L33ERMO, 1769-L33ERMOS                                                             |
|                   | 5069-L320ER, 5069-L320ERM, 40<br>5069-L320ERS2, 5069-L320ERMS2, 5069-L320ERS2K, 5069-L320ERMS2K   | 1769-L36ERM, 1769-L36ERMS, 1769-L36ERMO, 48<br>1769-L36ERMOS                                                                                                      |
|                   | 5069-L330ER, 5069-L330ERM, 60<br>5069-L330ERS2, 5069-L330ERMS2, 5069-L330ERS2K, 5069-L330ERMS2K   | 1769-L37ERM, 1769-L37ERMS, 1769-L37ERMO, 64<br>1769-L37ERMOS, 1769-L37ERMK, 1769-L37ERMSK                                                                         |
|                   | 5069-L340ER, 5069-L340ERM, 90<br>5069-L340ERS2, 5069-L340ERMS2                                    | 1769-L38ERM, 1769-L38ERMS, 1769-L38ERMO, 80<br>1769-L38ERMOS, 1769-L38ERMK, 1769-L38ERMSK                                                                         |
|                   | 5069-L350ERM, 5069-L350ERS2, 120<br>5069-L350ERMS2, 5069-L350ERS2K, 5069-L350ERMS2K               |                                                                                                                                                                   |
|                   | 5069-L380ERM, 5069-L380ERS2, 150<br>5069-L380ERMS2                                                |                                                                                                                                                                   |
|                   | 5069-L3100ERM, 5069-L3100ERS2, 180<br>5069-L3100ERMS2                                             |                                                                                                                                                                   |
| Integrated motion | EtherNet/IP                                                                                       | EtherNet/IP                                                                                                                                                       |
| Conformal coating | 5069-L320ERS2K, 5069-L320ERMS2K, 5069-L330ERS2K, 5069-L330ERMS2K, 5069-L350ERS2K, 5069-L350ERMS2K | 1769-L30ERMK, 1769-L33ERMK, 1769-L33ERMSK, 1769-L37ERMK, 1769-L37ERMSK, 1769-L38ERMK, 1769-L38ERMSK                                                               |

(1) The maximum number of nodes that are listed represents when the controller is used with the Logix Designer application, version 31 or later. Some controllers can be used with earlier Logix Designer application versions. The maximum number of nodes that a controller supports can be fewer in Logix Designer application, version 30 or earlier.

| Characteristic                                                                                                  | CompactLogix 5370 L2 Controllers                                                                                                                                                                   | CompactLogix 5370 L1 Controllers                                                                                                                                                |
|-----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Controller tasks: <ul style="list-style-type: none"> <li>Continuous</li> <li>Periodic</li> <li>Event</li> </ul> | <ul style="list-style-type: none"> <li>32</li> <li>1000 programs/task</li> </ul>                                                                                                                   | <ul style="list-style-type: none"> <li>32</li> <li>1000 programs/task</li> </ul>                                                                                                |
| Event tasks                                                                                                     | Consumed tag, EVENT instruction triggers, and motion events                                                                                                                                        | Consumed tag, EVENT instruction triggers, and motion events                                                                                                                     |
| User memory                                                                                                     | 1769-L24ER-QB18, 1769-L24ER-QBFC1B      750 KB                                                                                                                                                     | 1769-L16ER      384 KB                                                                                                                                                          |
|                                                                                                                 | 1769-L27ERM      1 MB                                                                                                                                                                              | 1769-L18ER, 1769-L18ERM      512 KB                                                                                                                                             |
|                                                                                                                 |                                                                                                                                                                                                    | 1769-L19ER-BB1B      1 MB                                                                                                                                                       |
| Built-in ports                                                                                                  | <ul style="list-style-type: none"> <li>Dual-port EtherNet/IP</li> <li>1 port USB Client</li> </ul>                                                                                                 | <ul style="list-style-type: none"> <li>Dual-port EtherNet/IP</li> <li>1 port USB Client</li> </ul>                                                                              |
| Communication options                                                                                           | <ul style="list-style-type: none"> <li>EtherNet/IP <ul style="list-style-type: none"> <li>Embedded switch</li> <li>Single IP address</li> </ul> </li> <li>DeviceNet</li> <li>USB Client</li> </ul> | <ul style="list-style-type: none"> <li>EtherNet/IP <ul style="list-style-type: none"> <li>Embedded switch</li> <li>Single IP address</li> </ul> </li> <li>USB Client</li> </ul> |
| Controller connections                                                                                          | 256 connections                                                                                                                                                                                    | 256 connections                                                                                                                                                                 |
| Network nodes                                                                                                   | 1769-L24ER-QB18, 1769-L24ER-QBFC1B      8                                                                                                                                                          | 1769-L16ER      4                                                                                                                                                               |
|                                                                                                                 | 1769-L27ERM      16                                                                                                                                                                                | 1769-L18ER, 1769-L18ERM, 1769-L19ER-BB1B      8                                                                                                                                 |
| Integrated motion                                                                                               | EtherNet/IP                                                                                                                                                                                        |                                                                                                                                                                                 |
| Conformal coating                                                                                               | 1769-L24ER-QBFC1BK                                                                                                                                                                                 | None                                                                                                                                                                            |

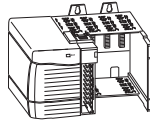
Notes:

# Select a ControlLogix System



## Step 1 [ControlLogix I/O Modules](#)

[Page 14](#)



### Select:

- I/O modules—Some modules have field-side diagnostics, electronic fusing, or individually isolated inputs/outputs
- A removable terminal block (RTB) or wiring system for each I/O module



## Step 2 [ControlLogix Integrated Motion](#)

[Page 24](#)



### Select:

- An EtherNet/IP communication module for Integrated Motion
- Associated cables
- Select drives, motors, and accessories (use the Motion Analyzer software)



## Step 3 [ControlLogix Communication Modules](#)

[Page 25](#)



### Select:

- Networks
- Communication modules
- Associated cables and network equipment
- Sufficient modules and cables if you are planning a redundant system



## Step 4 [ControlLogix Controllers](#)

[Page 30](#)



### Select a controller:

- Standard ControlLogix® controller
- Redundant ControlLogix controller
- Safety GuardLogix® controller
- Extreme environment ControlLogix controller
- Standard Armor™ ControlLogix controller
- Safety Armor GuardLogix controller

## Step 5 [ControlLogix Chassis](#)

[Page 36](#)



### Select:

- A chassis with sufficient slots
- Slot fillers for empty slots

## Step 6 [ControlLogix Power Supplies](#)

[Page 37](#)



### Select:

- One power supply for each chassis, if you are using standard power supplies
- A power supply bundle if you are planning a redundant power supply system

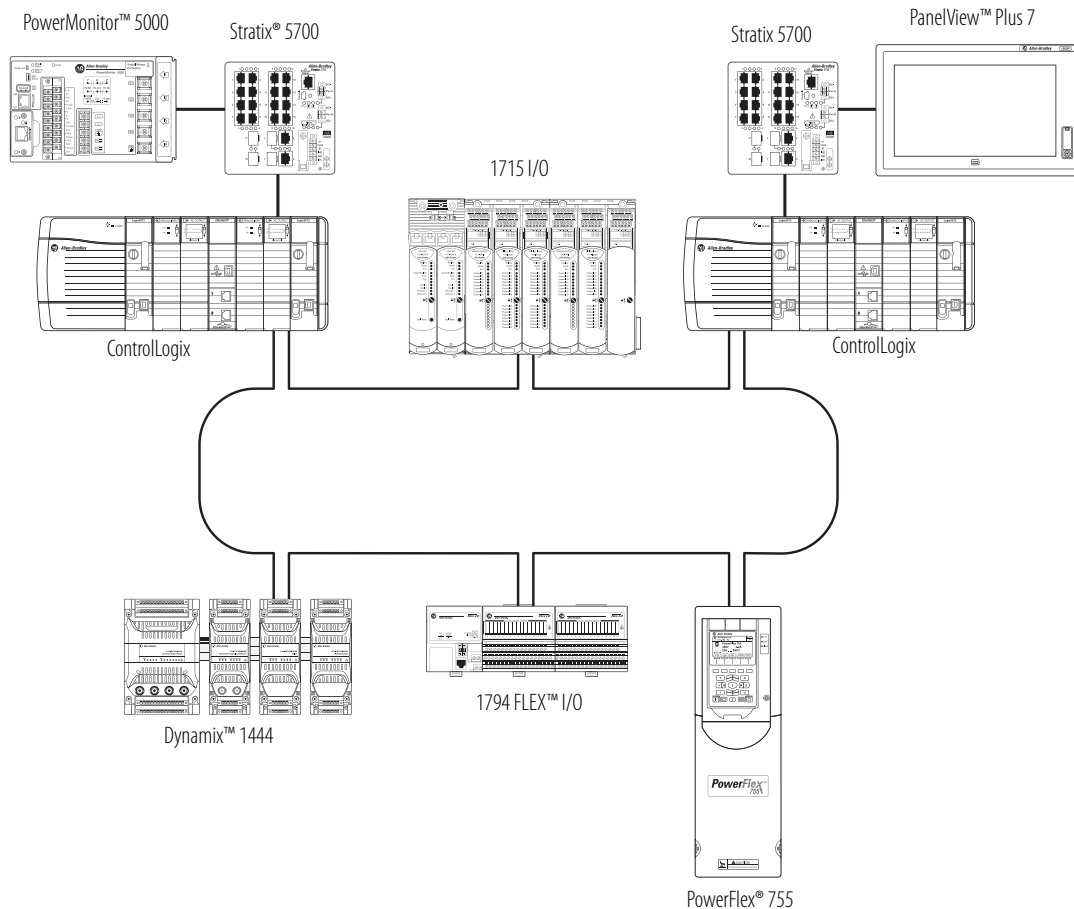
# ControlLogix System Overview

The ControlLogix system provides 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.

## Example Configuration—ControlLogix System

A simple ControlLogix system consists of a standalone controller and I/O modules in one chassis. For a more comprehensive system, use the following:

- 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 I/O links



## Conformal Coating

We offer a conformal coating solution on select ControlLogix products. Conformal coating helps protect the assembly by providing a layer of protection against contaminants and humidity to extend product life in harsh, corrosive environments. Conformally coated products have a 'K' suffix at the end of the catalog number, such as 1756-A4K. Conformally coated Allen-Bradley® products meet or exceed these requirements:

- ANSI/ISA 71.04.2013 G3 Environment (10-year exposure)
- IEC 61086-3-1 Class 2
- IPC-CC-830
- MIL-I-46058C
- EN60068-2-52 salt mist test, severity level 3

Find the most current list of conformally coated products at <http://www.ab.com/en/epub/catalogs/12762/2181376/2416247/360807/ControlLogix-System.html> or by contacting your local Allen-Bradley distributor or sales office.

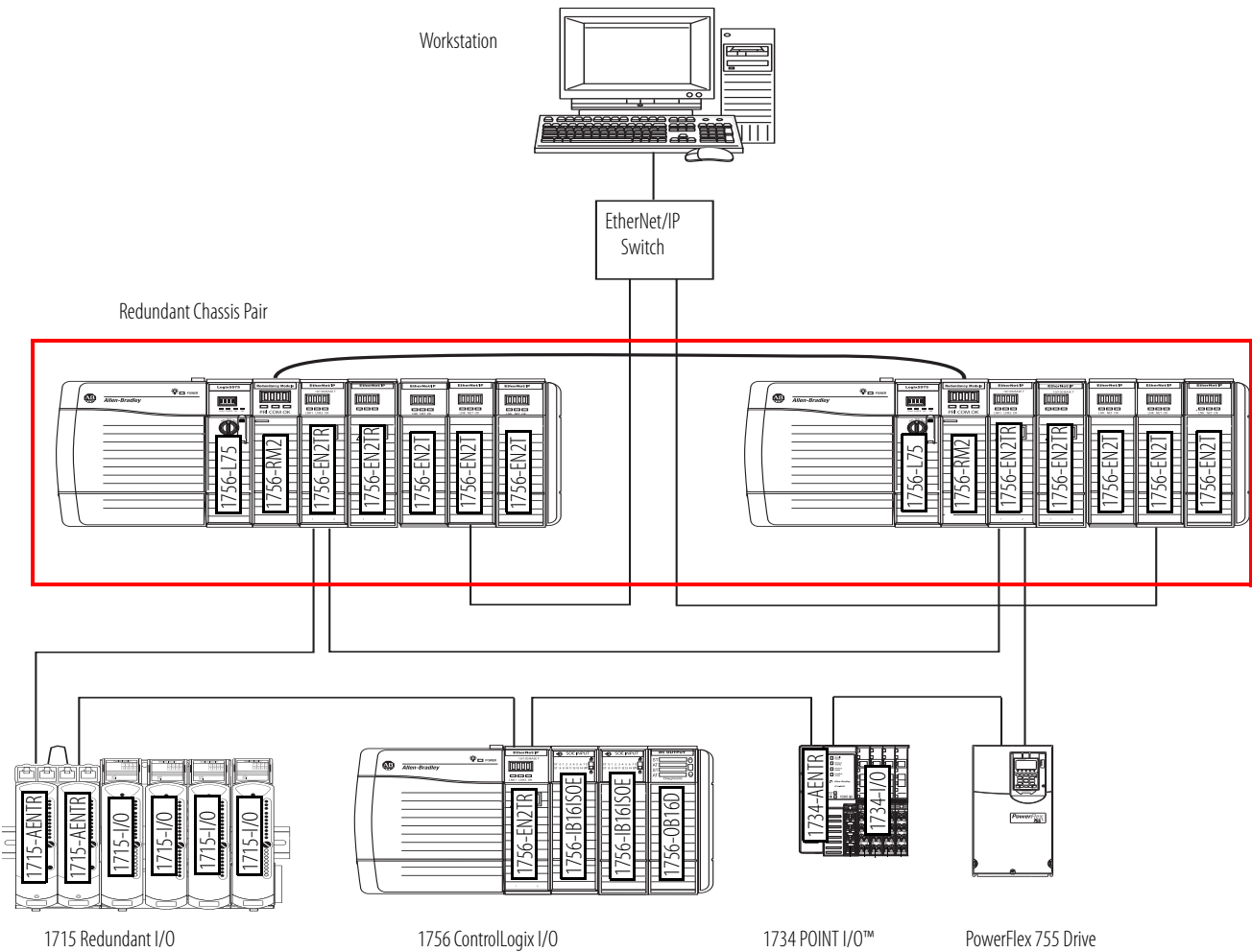
## ControlLogix-XT System

ControlLogix-XT™ (Extended Temperature) controllers function the same way as traditional ControlLogix controllers with an extended temperature range. The ControlLogix-XT products include control and communication system components that are conformally coated to extend product life in harsh, corrosive environments:

- The standard ControlLogix system can withstand temperature ranges from 0...60 °C (33...140 °F).
- When used independently, the ControlLogix-XT system can withstand temperature ranges from -25...+70 °C (-13...+158 °F).

# Example Configuration—Redundant ControlLogix System

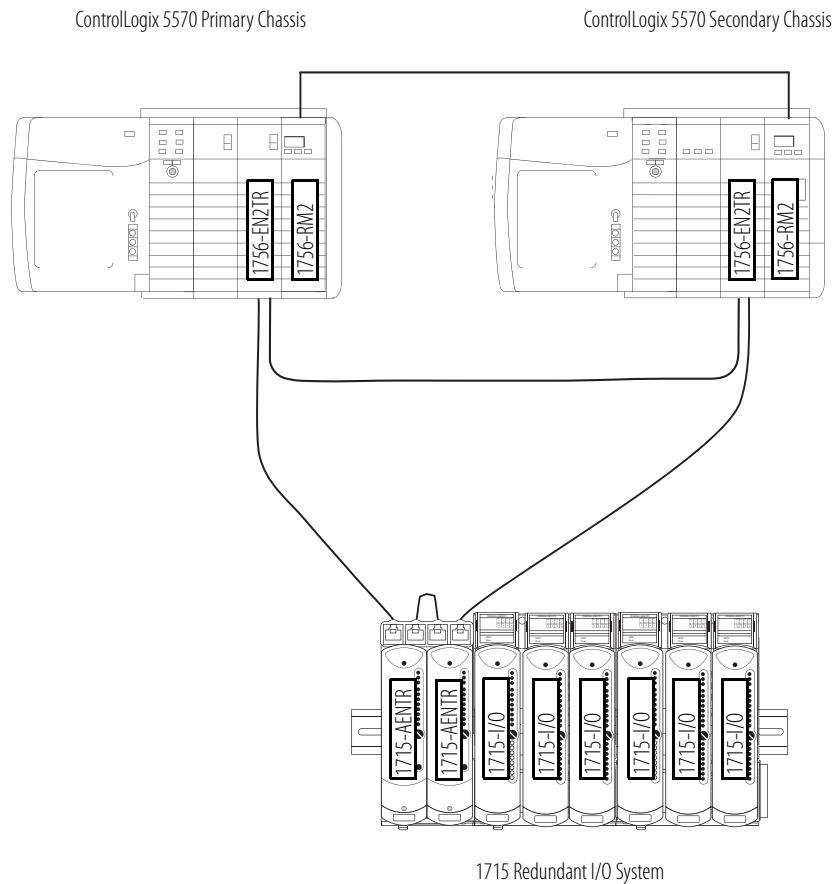
The ControlLogix 5570 controller supports controller redundancy.



## Example Configuration—Redundant I/O System

The 1715 redundant I/O system lets a ControlLogix 5570 controller communicate to a remote, redundant I/O chassis over an EtherNet/IP network. The 1715 redundant I/O system provides fault tolerance and redundancy for critical processes by using a redundant adapter pair and redundant I/O module pairs.

The redundant I/O system must be connected to a ControlLogix 5570 system via an EtherNet/IP network. All connections are established via the Ethernet network by using the topologies that the 1756-EN2TR communication bridge supports.

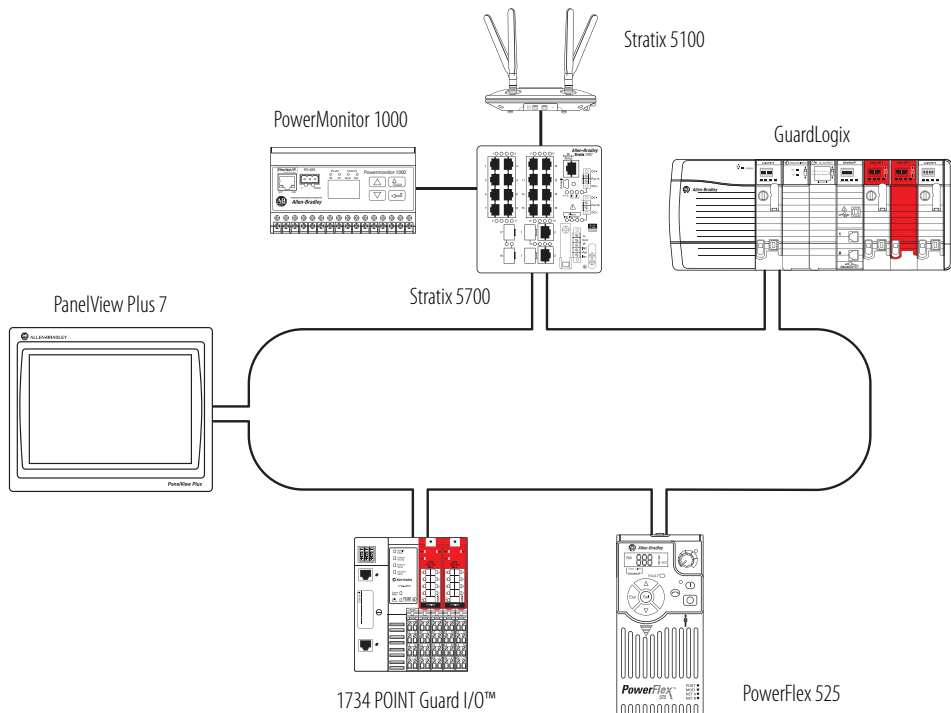


For detailed specifications, see the 1715 Redundant I/O System Specifications Technical Data, publication [1715-TD001](#).

# GuardLogix Safety System

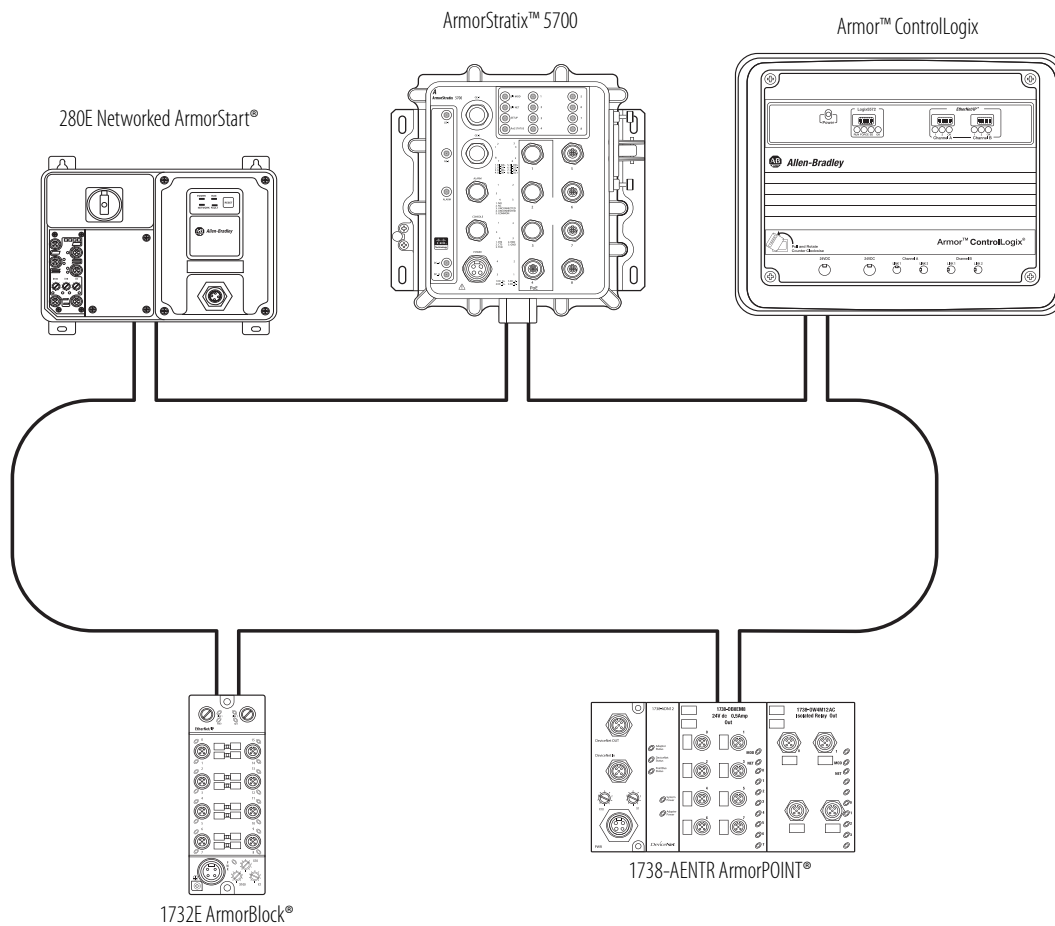
A GuardLogix controller is a ControlLogix controller that also provides safety control. A major benefit of this system is that it is still one project, safety and standard together. The safety partner controller is part of the system, is automatically configured, and requires no user setup.

| Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|-------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SIL 3       | <p>The GuardLogix system is a dual controller solution—you must use a GuardLogix controller with the appropriate safety partner to achieve SIL 3/PLe/Cat. 4.</p> <p>The GuardLogix controller system is type-approved and certified for use in safety applications up to and including SIL 3, according to IEC 61508, and applications up to and including category (PLe/Cat. 4), according to ISO 13849-1.</p> <p>For more information, see the following:</p> <ul style="list-style-type: none"><li>GuardLogix 5570 Controllers User Manual, publication <a href="#">1756-UM022</a>, provides information on how to install, configure, and operate GuardLogix 5570 controllers in the Studio 5000 Automation Engineering &amp; Design Environment™ projects, version 21 or later.</li><li>ControlLogix 5580 and GuardLogix 5580 Controllers User Manual, publication <a href="#">1756-UM543</a>, provides complete information on how to install, configure, select I/O modules, manage communication, develop applications, and troubleshoot the ControlLogix 5580 and GuardLogix 5580 controllers.</li><li>GuardLogix 5570 Controller System Safety Reference Manual, publication <a href="#">1756-RM099</a>, provides information on how to meet safety application requirements for GuardLogix 5570 controllers in Studio 5000® projects, version 21 or later.</li><li>GuardLogix 5580 and Compact GuardLogix 5380 Controller Systems Safety Reference Manual, publication <a href="#">1756-RM012</a>, provides requirements on how to achieve and maintain SIL 2/PLd and SIL 3/PLe with the GuardLogix 5580 controller system, using the Studio 5000 Logix Designer® application.</li><li>GuardLogix Controllers User Manual, publication <a href="#">1756-UM020</a>, provides information on how to install, configure, and operate GuardLogix 5560 and GuardLogix 5570 controllers in RSLogix 5000® projects, version 20 or earlier.</li><li>GuardLogix Controller Systems Safety Reference Manual, publication <a href="#">1756-RM093</a>, provides information on how to meet safety application requirements for GuardLogix 5560 and GuardLogix 5570 controllers in RSLogix 5000® projects, version 20 or earlier.</li><li>GuardLogix Safety Application Instruction Set Safety Reference Manual, publication <a href="#">1756-RM095</a>, provides programmers with details about the GuardLogix safety application instruction set.</li></ul> |
| SIL 2       | <p>For GuardLogix 5560 and 5570 controllers:</p> <ul style="list-style-type: none"><li>Components of the ControlLogix system are type-approved and certified for use in SIL 2 applications, according to IEC 61508.</li><li>For a list of ControlLogix system components that meet SIL 2 requirements, see the Using ControlLogix in SIL 2 Applications Safety Reference Manual, publication <a href="#">1756-RM001</a>.</li></ul> <p>For GuardLogix 5580 controllers:</p> <ul style="list-style-type: none"><li>Without a safety partner installed, you can achieve SIL 2/PLd (Category 3) with the use of the safety task and safety I/O.</li><li>For requirements on how to achieve and maintain SIL 2/PLd (Category 3) with the GuardLogix 5580 controller system using the Studio 5000 Logix Designer application, see the GuardLogix 5580 and Compact GuardLogix 5380 Controller Systems Safety Reference Manual, publication <a href="#">1756-RM012</a>.</li></ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |



## Armor ControlLogix and Armor GuardLogix Systems

On-Machine™ standard and safety controllers support the same temperature range of ControlLogix, while offering global certifications and ratings, and Ingress Protection (IP67) for dust and wash-down protection for immersion between 15 cm...1 m (5.91...393.70 in.) in harsher environments.



# 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.

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

## AC Digital Input Modules

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

## AC Digital Output Modules

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

## DC Digital Input Modules

| Cat. No.      | Inputs/Outputs                                      | Voltage Category              | Operating Voltage Range                                      | Removable Terminal Block |
|---------------|-----------------------------------------------------|-------------------------------|--------------------------------------------------------------|--------------------------|
| 1756-IB16     | 16 inputs<br>(8 points/group)                       | 12/24V DC sink                | 10...31.2V DC                                                | 1756-TBNH<br>1756-TBSH   |
| 1756-IB16D    | 16 diagnostic inputs<br>(4 points/group)            | 12/24V DC sink                | 10...30V DC                                                  | 1756-TBCH<br>1756-TBS6H  |
| 1756-IB16I    | 16 individually isolated inputs                     | 12/24V DC sink/source         | 10...30V DC                                                  | 1756-TBCH<br>1756-TBS6H  |
| 1756-IB16IF   | 16 high-speed, individually isolated inputs         | 12/24V DC sink/source         | 10...30V DC                                                  | 1756-TBCH<br>1756-TBS6H  |
| 1756-IB16ISOE | 16 individually isolated, sequence of events inputs | 24/48V DC sink/source         | 10...55V DC                                                  | 1756-TBCH<br>1756-TBS6H  |
| 1756-IB32     | 32 inputs<br>(16 points/group)                      | 12/24V DC sink                | 10...31.2V DC                                                | 1756-TBCH<br>1756-TBS6H  |
| 1756-IC16     | 16 inputs<br>(8 points/group)                       | 48V DC sink                   | 30...55V DC @ 60 °C (140 °F)<br>30...60V DC @ 55 °C (131 °F) | 1756-TBNH<br>1756-TBSH   |
| 1756-IG16     | 16 inputs<br>(8 points/group)                       | 5V DC TTL source (Low = True) | 4.5...5.5V DC                                                | 1756-TBNH<br>1756-TBSH   |
| 1756-IH16I    | 16 individually isolated inputs                     | 125V DC sink/source           | 90...146V DC                                                 | 1756-TBCH<br>1756-TBS6H  |
| 1756-IH16ISOE | 16 individually isolated, sequence of events inputs | 125V DC sink/source           | 90...140V DC                                                 | 1756-TBCH<br>1756-TBS6H  |
| 1756-IV16     | 16 inputs<br>(8 points/group)                       | 12/24V DC source              | 10...30V DC                                                  | 1756-TBNH<br>1756-TBSH   |
| 1756-IV32     | 32 inputs<br>(16 points/group)                      | 12/24V DC source              | 10...30V DC                                                  | 1756-TBCH<br>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<br>1756-TBSH   |
| 1756-OB8EI    | 8 electronically fused, individually isolated outputs                         | 12/24V DC source            | 10...30V DC             | 1756-TBCH<br>1756-TBS6H  |
| 1756-OB8I     | 8 individually isolated outputs                                               | 12/24V DC source            | 10...30V DC             | 1756-TBCH<br>1756-TBS6H  |
| 1756-OB16D    | 16 diagnostic outputs<br>(8 points/group)                                     | 24V DC source               | 19.2...30V DC           | 1756-TBCH<br>1756-TBS6H  |
| 1756-OB16E    | 16 electronically fused outputs<br>(8 points/group)                           | 12/24V DC source            | 10...31.2V DC           | 1756-TBNH<br>1756-TBSH   |
| 1756-OB16I    | 16 individually isolated outputs                                              | 12/24V DC sink/source       | 10...30V DC             | 1756-TBCH<br>1756-TBS6H  |
| 1756-OB16IEF  | 16 high-speed, individually isolated, electronically-fused outputs            | 24V DC sink/source          | 10...30V DC             | 1756-TBCH<br>1756-TBS6H  |
| 1756-OB16IEFS | 16 scheduled, high-speed, individually isolated, electronically-fused outputs | 24V DC sink/source          | 10...30V DC             | 1756-TBCH<br>1756-TBS6H  |
| 1756-OB16IS   | 16 individually isolated outputs<br>8 scheduled outputs                       | 12/24V DC sink/source       | 10...30V DC             | 1756-TBCH<br>1756-TBS6H  |
| 1756-OB32     | 32 outputs<br>(16 points/group)                                               | 12/24V DC source            | 10...31.2V DC           | 1756-TBCH<br>1756-TBS6H  |
| 1756-OC8      | 8 outputs<br>(4 points/group)                                                 | 48V DC source               | 30...60V DC             | 1756-TBNH<br>1756-TBSH   |
| 1756-OG16     | 16 (8 points/group)                                                           | 5V DC TTL source (Low=True) | 4.5...5.5V DC           | 1756-TBNH<br>1756-TBSH   |
| 1756-OH8I     | 8 individually isolated outputs                                               | 120V DC                     | 90...146V DC            | 1756-TBCH<br>1756-TBS6H  |
| 1756-OV16E    | 16 electronically fused outputs<br>(8 points/group)                           | 12/24V DC sink              | 10...30V DC             | 1756-TBNH<br>1756-TBSH   |
| 1756-OV32E    | 32 electronically fused outputs<br>(16 points/group)                          | 12/24V DC sink              | 10...30V DC             | 1756-TBCH<br>1756-TBS6H  |

## Contact Output Modules

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

## Analog Input Modules

| Cat. No.    | Inputs/Outputs                                                                     | Range                                                               | Resolution                                                                                                                                                                             | Removable Terminal Block |
|-------------|------------------------------------------------------------------------------------|---------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1756-IF6CIS | 6 individually isolated inputs, current sourcing                                   | 0...20 mA (overrange indication when exceeded)                      | 16 bits<br>0.34 $\mu$ A/bit                                                                                                                                                            | 1756-TBNH<br>1756-TBSH   |
| 1756-IF6I   | 6 individually isolated inputs                                                     | $\pm 10.5$ V<br>0...10.5V<br>0...5.25V<br>0...21 mA                 | 16 bits<br>10.5V: 343 $\mu$ V/bit<br>0...10.5V: 171 $\mu$ V/bit<br>0...5.25V: 86 $\mu$ V/bit<br>0...21 mA: 0.34 $\mu$ A/bit                                                            | 1756-TBNH<br>1756-TBSH   |
| 1756-IF8    | 8 single-ended inputs<br>4 differential inputs<br>2 high-speed differential inputs | $\pm 10$ V<br>0...10V<br>0...5V<br>0...20 mA                        | $\pm 10.25$ V: 320 $\mu$ V/cnt (15 bits plus sign bipolar)<br>0...10.25V: 160 $\mu$ V/cnt (16 bits)<br>0...5.125V: 80 $\mu$ V/cnt (16 bits)<br>0...20.5 mA: 0.32 $\mu$ A/cnt (16 bits) | 1756-TBCH<br>1756-TBS6H  |
| 1756-IF8H   | 8 differential voltage or current inputs, HART interface                           | $\pm 10$ V<br>0...5V<br>1...5V<br>0...10V<br>0...20 mA<br>4...20 mA | 16...21 bits                                                                                                                                                                           | 1756-TBCH<br>1756-TBS6H  |
| 1756-IF8I   | 8 individually isolated inputs, current or voltage                                 | $\pm 10$ V<br>0...10V<br>0...5V<br>0...20 mA                        | 24 bits<br>$\pm 10.5$ V (1.49 $\mu$ V/count)<br>0...10.5V (1.49 $\mu$ V/count)<br>0...5.25V (1.49 $\mu$ V/count)<br>0...21 mA (2.99 nA/count)                                          | 1756-TBCH<br>1756-TBS6H  |
| 1756-IF8IH  | 8 individually isolated current inputs, HART interface                             | 0...20 mA<br>4...20 mA                                              | 16...21 bits                                                                                                                                                                           | 1756-TBCH<br>1756-TBS6H  |
| 1756-IF16   | 16 single-ended inputs<br>8 differential or 4 differential (high speed) inputs     | $\pm 10$ V<br>0...10V<br>0...5V<br>0...20 mA                        | 16 bits<br>10.5V: 343 $\mu$ V/bit<br>0...10.5V: 171 $\mu$ V/bit<br>0...5.25V: 86 $\mu$ V/bit<br>0...21 mA: 0.34 $\mu$ A/bit                                                            | 1756-TBCH<br>1756-TBS6H  |
| 1756-IF16H  | 16 differential current inputs, HART interface                                     | 0...20 mA<br>4...20 mA                                              | 16...21 bits                                                                                                                                                                           | 1756-TBCH<br>1756-TBS6H  |
| 1756-IF16IH | 16 individually isolated current inputs, HART interface                            | 0...20 mA<br>4...20 mA                                              | 16...21 bits                                                                                                                                                                           | 1756-TBCH<br>1756-TBS6H  |

## Analog RTD and Thermocouple Modules

| Cat. No.   | Inputs/Outputs                                                     | Range                                                                                             | Resolution                                                                                                                                                                                                                           | Removable Terminal Block |
|------------|--------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1756-IR6I  | 6 individually isolated RTD inputs                                 | 1...487 $\Omega$<br>2...1000 $\Omega$<br>4...2000 $\Omega$<br>8...4000 $\Omega$                   | 16 bits<br>1...487 $\Omega$ : 7.7 m $\Omega$ /bit<br>2...1000 $\Omega$ : 15 m $\Omega$ /bit<br>4...2000 $\Omega$ : 30 m $\Omega$ /bit<br>8...4020 $\Omega$ : 60 m $\Omega$ /bit                                                      | 1756-TBNH<br>1756-TBSH   |
| 1756-IRT8I | 8 individually isolated inputs, RTD or thermocouple inputs (2 CJC) | 1...500 $\Omega$<br>2...1000 $\Omega$<br>4...2000 $\Omega$<br>8...4000 $\Omega$<br>-100...+100 mV | 24 bits<br>0...510 $\Omega$ : 0.06 m $\Omega$ /count<br>0...1020 $\Omega$ : 0.12 m $\Omega$ /count<br>0...2040 $\Omega$ : 0.25 m $\Omega$ /count<br>0...4080 $\Omega$ : 0.50 m $\Omega$ /count<br>-101...+101 mV: 0.01 $\mu$ V/count | 1756-TBCH<br>1756-TBS6H  |
| 1756-IR12  | 12 channels RTD mode                                               | 1...500 $\Omega$<br>2...1000 $\Omega$<br>4...2000 $\Omega$<br>8...4000 $\Omega$                   | 24 bits<br>0...510 $\Omega$ : 0.06 m $\Omega$ /count<br>0...1020 $\Omega$ : 0.12 m $\Omega$ /count<br>0...2040 $\Omega$ : 0.25 m $\Omega$ /count<br>0...4080 $\Omega$ : 0.50 m $\Omega$ /count                                       | 1756-TBCH<br>1756-TBS6H  |
| 1756-IT16  | 16 channels, thermocouple mode<br>2 CJC                            | -100...+100 mV                                                                                    | 24 bits<br>-101...+101 mV: 0.01 $\mu$ V/count                                                                                                                                                                                        | 1756-TBCH<br>1756-TBS6H  |
| 1756-IT6I  | 6 individually isolated thermocouple inputs<br>1 CJC               | -12...+78 mV<br>-12...+30 mV                                                                      | 16 bits<br>-12...+78 mV: 1.4 $\mu$ V/bit<br>-12...+30 mV: 0.7 $\mu$ V/bit                                                                                                                                                            | 1756-TBNH<br>1756-TBSH   |
| 1756-IT6I2 | 6 individually isolated thermocouple inputs<br>2 CJC               | -12...+78 mV<br>(1.4 $\mu$ V per bit)<br>-12...+30 mV<br>(0.7 $\mu$ V per bit)                    | 16 bits<br>-12...+78 mV: 1.4 $\mu$ V/bit<br>-12...+30 mV: 0.7 $\mu$ V/bit                                                                                                                                                            | 1756-TBNH<br>1756-TBSH   |

## Analog Output Modules

| Cat. No.   | Inputs/Outputs                           | Range                  | Resolution                                                                                        | Removable Terminal Block |
|------------|------------------------------------------|------------------------|---------------------------------------------------------------------------------------------------|--------------------------|
| 1756-OF4   | 4 voltage or current outputs             | $\pm$ 10V<br>0...20 mA | Voltage:<br>15 bits across 10.5V, 320 $\mu$ V/bit<br>Current:<br>15 bits across 21 mA, 650 nA/bit | 1756-TBNH<br>1756-TBSH   |
| 1756-OF6CI | 6 individually isolated outputs, current | 0...21 mA              | 13 bits across 21 mA (2.7 $\mu$ A)                                                                | 1756-TBNH<br>1756-TBSH   |
| 1756-OF6VI | 6 individually isolated outputs, voltage | $\pm$ 10.5V            | 14 bits across 21V (1.3 mV)<br>(13 bits across 10.5V +sign bit)                                   | 1756-TBNH<br>1756-TBSH   |
| 1756-OF8   | 8 voltage or current outputs             | $\pm$ 10V<br>0...20 mA | 15 bits across 21 mA - 650 nA/bit<br>15 bits across 10.4V - 320 $\mu$ V/bit                       | 1756-TBNH<br>1756-TBSH   |

| Cat. No.   | Inputs/Outputs                                      | Range                                  | Resolution                                                                                                              | Removable Terminal Block |
|------------|-----------------------------------------------------|----------------------------------------|-------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1756-OF8H  | 8 voltage or current outputs, HART interface        | ±10V<br>0...20 mA<br>4...20 mA         | 15...16 bits                                                                                                            | 1756-TBNH<br>1756-TBSH   |
| 1756-OF8I  | 8 individually isolated outputs, current or voltage | ±10V<br>0...10V<br>0...5V<br>0...20 mA | 16 bit<br>±10.5V (0.32 mV/count)<br>0...10.5V (0.16 mV/count)<br>0...5.25V (0.08 mV/count)<br>0...21 mA (0.32 µA/count) | 1756-TBCH<br>1756-TBS6H  |
| 1756-OF8IH | 8 individually isolated current outputs             | 0...20 mA<br>4...20 mA                 | 15 bits across 24 mA, 732 nA per bit                                                                                    | 1756-TBCH<br>1756-TBS6H  |

## Analog Combination Input and Output Module

| Cat. No.       | Inputs/Outputs                                                                               | Range                                                                            | Resolution                                                                                                                                                                                                                                                                                                                    | Removable Terminal Block |
|----------------|----------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| 1756-IF4FXOF2F | 4 high-speed, submillisecond, differential inputs<br>2 high-speed voltage or current outputs | Input:<br>±10V<br>0...10V<br>0...5V<br>0...20 mA<br>Output:<br>±10V<br>0...20 mA | Input:<br>Approx 14 bits across ±10V DC (21V total)<br>±10V: 1.3 mV/bit, 14-bit effective<br>0...10.5V: 1.3 mV/bit, 13-bit effective<br>0...5.25V: 1.3 mV/bit, 12-bit effective<br>Approx 12 bits across 21 mA<br>0...21 mA: 5.25 µA/bit<br>Output:<br>13 bits across 21 mA = 2.8 µA/bit<br>14 bits across 21.8V = 1.3 mV/bit | 1756-TBCH<br>1756-TBS6H  |

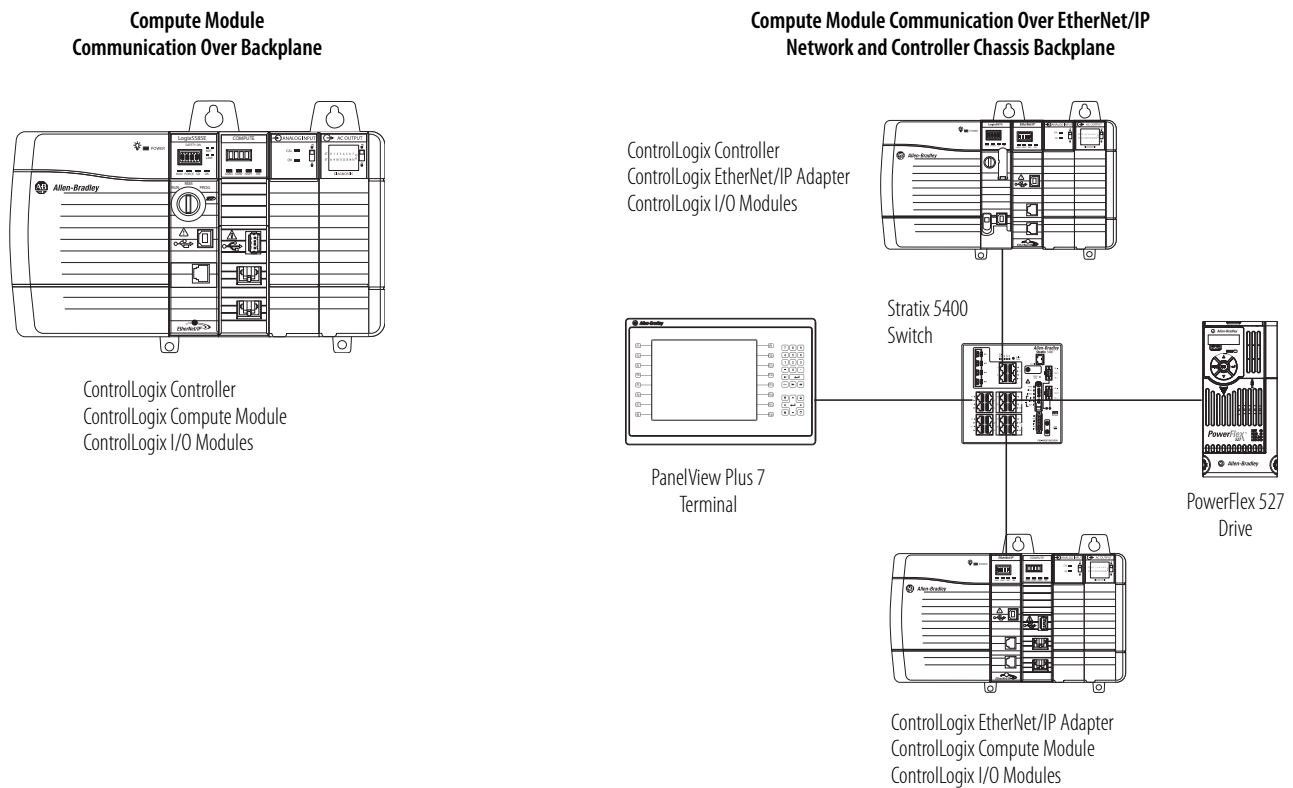
## Specialty I/O Modules

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

# ControlLogix Compute Modules

ControlLogix Compute modules are chassis-based modules that let you communicate directly with a ControlLogix 5570 or ControlLogix 5580 controller via the system backplane and over a network.

## Example Control Systems with Compute Module



The Compute modules offer an embedded operating system (OS), including one of the following on them:

- Windows 10 IoT Enterprise LTSB 64-bit
- Linux 32-bit (Debian 8.9)

You use an application programming interface (API) on the OS to read and write data over the 1756 ControlLogix backplane. The presence of a ControlLogix Compute module is similar to installing a security hardened computer in a ControlLogix chassis.

The ControlLogix Compute module offers the following:

- Two GbE ports
- One USB 3.0 device port for OS peripheral connections
- An integrated DisplayPort for high definition monitor connectivity

## Catalog Number Explanation

ControlLogix Compute module catalog numbers indicate specific information about the module. All modules use the same format, that is, **1756-CMwxyz**, where the following apply:

- 1756 is the Bulletin number.
- CM = Compute Module
- w represents the Performance Level and CPU core type
- x represents the Solid State Drive (SSD) capacity
- y represents the embedded OS that is installed on the module
- z represents the application that is shipped on the module

This table describes the variables in a ControlLogix Compute module catalog number.

| Variable | Attribute                                 | Possible Value                                                                                                                         |
|----------|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| w        | Performance and core                      | <ul style="list-style-type: none"> <li>• S = Standard performance (Dual core)</li> </ul>                                               |
| x        | SSD capacity                              | <ul style="list-style-type: none"> <li>• 1 = 32 GB</li> </ul>                                                                          |
| y        | Operating system                          | <ul style="list-style-type: none"> <li>• B = Windows 10 IoT Enterprise LTSB 64-bit</li> <li>• C = Linux 32-bit (Debian 8.9)</li> </ul> |
| z        | Application that is shipped on the module | 1 = No application                                                                                                                     |

This table includes example Compute module descriptions.

| Cat. Nos    | Description                                                                                                                                                                                                                                            |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1756-CMS1B1 | Compute module with: <ul style="list-style-type: none"> <li>• Standard performance (dual-core CPU)</li> <li>• 32 GB SSD</li> <li>• Embedded Windows 10 IoT Enterprise LTSB 64-bit OS</li> </ul> This module does not include a pre-loaded application. |
| 1756-CMS1C1 | Compute module with: <ul style="list-style-type: none"> <li>• Standard performance (dual-core)</li> <li>• 32 GB SSD</li> <li>• Embedded Linux 32-bit (Debian 8.9) OS.</li> </ul> This module does not include a pre-loaded application.                |

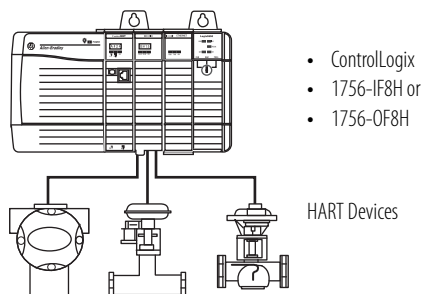
For a complete list of available ControlLogix Compute modules, the product pages available via the Product Directory at:

<http://ab.rockwellautomation.com/allenbradley/productdirectory.page?>

# HART Smart Instrumentation

HART (Highway Addressable Remote Transducer) is an open protocol that is designed to connect analog devices. For HART connectivity, select products available from Rockwell Automation and our Encompass™ Partners in the Rockwell Automation® PartnerNetwork™ program.

## Typical HART Configuration



## HART Interfaces

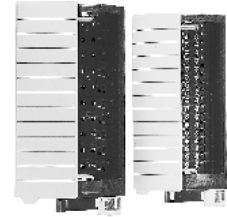
| If your application has the following                                                                                                                                                                                                               | Select                                  | Description                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------|
| Analog and HART connectivity in one module<br>No external hardware is required to access HART signal<br>HART commands can be transmitted as unscheduled messages<br>Supports asset management software to HART device                               | 1756-IF8H<br>1756-IF16H<br>1756-OF8H    | Allen-Bradley® analog I/O modules                                                                                                |
| Analog and HART connectivity in one module<br>No external hardware is required to access HART signal<br>HART commands can be transmitted as unscheduled messages<br>Supports asset management software to HART device<br>Provides current isolation | 1756-IF8IH<br>1756-OF8IH<br>1756-IF16IH | Allen-Bradley isolated analog I/O modules                                                                                        |
| Data acquisition or control application with slow update requirements (such as a tank farm)<br>No external hardware is required to access HART signal<br>Does not connect directly to asset management software                                     | MVI56-HART                              | ProSoft interface                                                                                                                |
| Analog and HART in one module<br>Instrumentation in hazardous locations (FLEX Ex™ modules)<br>HART commands can be transmitted as unscheduled messages<br>Directly connects asset management software to HART devices                               | 1794 FLEX™ I/O<br>1797 FLEX Ex I/O      | There are FLEX I/O and FLEX Ex modules that are designed for HART systems. These catalog numbers end in an H, such as 1797-IE8H. |

## 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 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 mm<sup>2</sup> (14 AWG) wiring. If you plan to use 2.5 mm<sup>2</sup> (14 AWG) wiring, also order the extended housing. For more information on Extended-Depth Housing, see Rockwell Automation® Knowledgebase article #41488, Use of the 1756-TBE Extended Terminal Housing. You can access the article at: <https://rockwellautomation.custhelp.com/> (login is required).

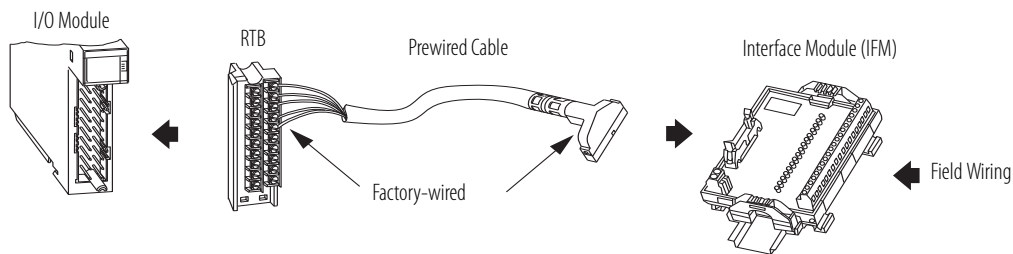


| Attribute    | 1756-TBNH                                    | 1756-TBSH                                                          | 1756-TBCH                                                        | 1756-TBS6H                                                         | 1756-TBE                              |
|--------------|----------------------------------------------|--------------------------------------------------------------------|------------------------------------------------------------------|--------------------------------------------------------------------|---------------------------------------|
| 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 | 0.8...1 N•m<br>7...9 lb•in                   |                                                                    | 0.4 N•m<br>4.4 lb•in                                             |                                                                    | Not applicable                        |

## 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.



# 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 a SERCOS or 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.

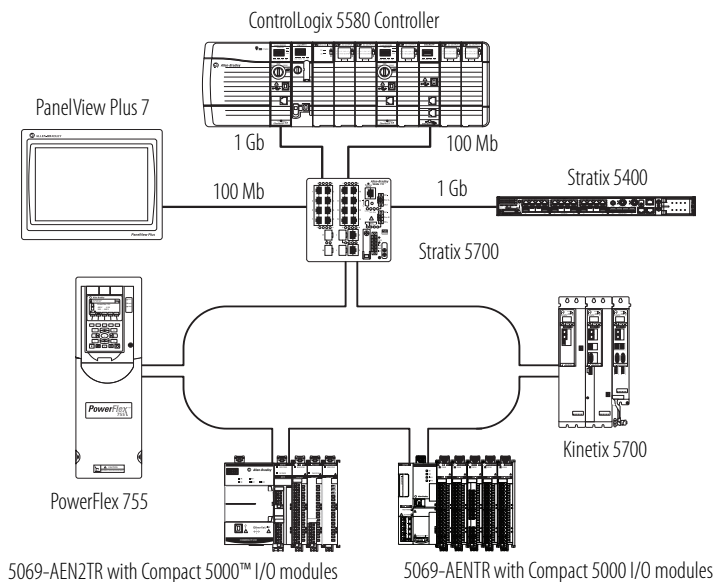
For detailed specifications on motion interface modules, see the 1756 ControlLogix Integrated Motion Modules Specifications Technical Data, publication [1756-TD004](#).

For more information, see these publications:

- Motion Analyzer CD to size your motion application and to make final component selection  
Download the software from <https://motionanalyzer.rockwellautomation.com/>
- Kinetix Motion Control Selection Guide, publication [GMC-SG001](#), to verify drive, motor, and accessory specifications

## Integrated Motion on an EtherNet/IP Network

| Product                                       | Consideration                                                                                                                                                                                                                                                                       |
|-----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Drive that supports EtherNet/IP connections   | Unlimited velocity, torque, and VHz configured drives: <ul style="list-style-type: none"><li>• Kinetix 6500 drives</li><li>• Kinetix 5700 drives</li><li>• Kinetix 5500 drives</li><li>• Kinetix 350 drives</li><li>• PowerFlex 755 drives</li><li>• PowerFlex 527 drives</li></ul> |
| ControlLogix controller                       | <ul style="list-style-type: none"><li>• ControlLogix 5570 controller: as many as 100 drives per controller</li><li>• ControlLogix 5580 controller: as many as 256 drives per controller</li></ul>                                                                                   |
| ControlLogix EtherNet/IP communication module | <ul style="list-style-type: none"><li>• 1 . . . 8 position loop axes that are configured with the 1756-EN2T or 1756-EN2TR modules</li><li>• 1 . . . 128 position loop axes that are configured with the 1756-EN3TR module</li></ul>                                                 |



# 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.

| Application                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      | Network             | Page |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|------|
| <ul style="list-style-type: none"> <li>Plant management (material handling)</li> <li>Configuration, data collection, and control on one high-speed network</li> <li>Time-critical applications with no established schedule</li> <li>Inclusion of commercial technologies (such as video over IP)</li> <li>Internet/Intranet connection</li> <li>High-speed transfer of time-critical data between controllers and I/O devices</li> <li>Integrated motion on the EtherNet/IP network and safety</li> <li>Redundant controller systems</li> </ul> | EtherNet/IP         | 26   |
| <ul style="list-style-type: none"> <li>High-speed transfer of time-critical data between controllers and I/O devices</li> <li>Deterministic and repeatable data delivery</li> <li>Media redundancy</li> <li>Intrinsic safety</li> <li>Redundant controller systems</li> </ul>                                                                                                                                                                                                                                                                    | ControlNet          | 26   |
| <ul style="list-style-type: none"> <li>Connections of low-level devices directly to plant floor controllers, without interfacing them through I/O modules</li> <li>Data sent as needed</li> <li>More diagnostics for improved data collection and fault detection</li> <li>Less wiring and reduced start-up time than a traditional, hard-wired system</li> </ul>                                                                                                                                                                                | DeviceNet           | 26   |
| <ul style="list-style-type: none"> <li>Plant-wide and cell-level data sharing with program maintenance</li> <li>Data sent regularly</li> <li>Transfer of information between controllers</li> </ul>                                                                                                                                                                                                                                                                                                                                              | Data Highway Plus™  | 27   |
| <ul style="list-style-type: none"> <li>Connections between controllers and I/O adapters</li> <li>Data sent regularly</li> <li>Distributed control so that each controller has its own I/O and communicates with a supervisory controller</li> </ul>                                                                                                                                                                                                                                                                                              | Remote I/O          | 27   |
| <ul style="list-style-type: none"> <li>Fieldbus transmitters and actuators</li> <li>Closed-loop control</li> <li>Process automation</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                   | Foundation Fieldbus | 28   |

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

## EtherNet/IP Communication Modules

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-EN2TR   | EtherNet/IP bridge, 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-EN2TXT  | ControlLogix-XT, extended temperature EtherNet/IP bridge, copper for extreme environments | Copper      | 10/100 Mbps        | 8                                                      | 128                | 256               |
| 1756-EN2TRXT | ControlLogix-XT, extended temperature EtherNet/IP bridge, embedded switch, copper         | Dual copper | 10/100 Mbps        | 8                                                      | 128                | 256               |
| 1756-EN2TSC  | EtherNet/IP secure communication module                                                   | Copper      | 10/100 Mbps        | —                                                      | 128                | 256               |
| 1756-ENBT    | EtherNet/IP bridge, copper                                                                | Copper      | 10/100 Mbps        | —                                                      | 64                 | 128               |
| 1756-EWEB    | Ethernet web server module                                                                | Copper      | 10/100 Mbps        | —                                                      | 64                 | 128               |

## ControlNet Communication Modules

The ControlNet network combines the functionality of an I/O network and a peer-to-peer network, providing high-speed performance. The ControlNet network provides deterministic, repeatable transfers of critical control data.

| Cat. No.    | Description                                                              | Communication Rate | Logix Connections  | Number of Nodes |
|-------------|--------------------------------------------------------------------------|--------------------|--------------------|-----------------|
| 1756-CN2    | ControlNet bridge, standard media                                        | 5 Mbps             | 128 <sup>(1)</sup> | 99              |
| 1756-CN2R   | ControlNet bridge, redundant media                                       | 5 Mbps             | 128 <sup>(1)</sup> | 99              |
| 1756-CNB    | ControlNet bridge, standard media                                        | 5 Mbps             | 64 <sup>(2)</sup>  | 99              |
| 1756-CNBR   | ControlNet bridge, redundant media                                       | 5 Mbps             | 64 <sup>(2)</sup>  | 99              |
| 1756-CN2RXT | ControlLogix-XT, extended temperature ControlNet bridge, redundant media | 5 Mbps             | 128 <sup>(1)</sup> | 99              |

(1) 128 connections are available for standard use. An extra three connections are reserved for redundant control.

(2) Recommend using only 40...48 Logix connections for I/O.

## DeviceNet Communication Module

The DeviceNet network provides connections between simple, industrial devices (such as sensors and actuators) and higher-level devices (such as controllers and computers).

| Cat. No. | Description      | Communication Rate                                                   | Number of Nodes |
|----------|------------------|----------------------------------------------------------------------|-----------------|
| 1756-DNB | DeviceNet bridge | 125 Kbps (500 m max)<br>250 Kbps (250 m max)<br>500 Kbps (100 m max) | 64              |

## Data Highway Plus and Remote I/O Communication Modules

The Data Highway Plus network supports messaging between devices. The remote I/O link connects to remote I/O chassis and other intelligent devices.

The 1756-DHRIO module supports messaging between devices on DH+™ networks. The remote I/O functionality enables the module to act as a scanner for transferring digital and block transfer data to and from remote I/O devices.

The 1756-RIO module can act as a scanner or adapter on a remote I/O network. The 1756-RIO transfers digital, block transfer, analog, and specialty data without message instructions.

| Cat. No.     | Description                                                                                         | Communication Rate                | DH+ Connections                | RIO Connections                                                                                                                       | Maximum Recommended Logix Connections |
|--------------|-----------------------------------------------------------------------------------------------------|-----------------------------------|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------|
| 1756-DHRIO   | Data Highway Plus/Remote I/O two-channel communication module                                       | 57.6 Kbps, 115.2 Kbps, 230.4 Kbps | 32 DH+ messages per DH+ module | Remote I/O scanner only<br>32 logical rack connections per remote I/O channel<br>16 block transfer connections per remote I/O channel | 32                                    |
| 1756-RIO     | Remote I/O communication module                                                                     | 57.6 Kbps, 115.2 Kbps, 230.4 Kbps | —                              | Remote I/O scanner or adapter<br>32 physical racks (0...76), any combination of rack size and block transfers                         | 10 scheduled I/O                      |
| 1756-DHRIOXT | ControlLogix-XT, extended temperature Data Highway Plus/Remote I/O two-channel communication module | 57.6 Kbps, 115.2 Kbps, 230.4 Kbps | 32 DH+ messages per DH+ module | Remote I/O scanner only<br>32 logical rack connections per remote I/O channel<br>16 block transfer connections per remote I/O channel | 32                                    |

## Accessories: DH+ and Remote I/O Networks

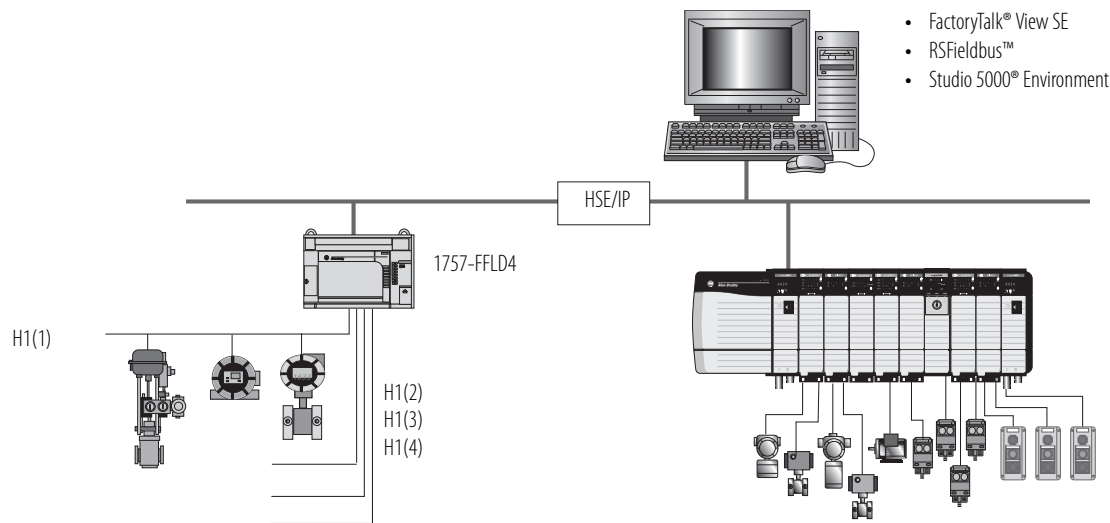
| Cat. No.    | Description                                          | Specifications                                                                                                                                                                                                                                           |
|-------------|------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1770-CD     | Cable to connect communication module to DH+ network | Belden 9463 twinaxial                                                                                                                                                                                                                                    |
| 9300-RADKIT | Remote access dial-in kit                            | 56 Kbps modem connection to devices on a DH+ network includes the following: <ul style="list-style-type: none"> <li>• Pre-configured modem</li> <li>• Communication module</li> <li>• DIN rail mounting hardware</li> <li>• Associated cables</li> </ul> |

# FOUNDATION Fieldbus Linking Devices

The FOUNDATION Fieldbus protocol is a network that is designed for distributed control of process applications.

| Cat. No.    | Description                                        | Communication Rate                                          | Number of H1 Ports | Devices per H1 Link            | Devices per Linking Device |
|-------------|----------------------------------------------------|-------------------------------------------------------------|--------------------|--------------------------------|----------------------------|
| 1757-FFLD2  | FOUNDATION Fieldbus bridge to an Ethernet network  | FOUNDATION Fieldbus: 31.25 Kbps<br>EtherNet/IP: 10/100 Mbps | 2                  | 16<br>(8 . . . 10 recommended) | 32                         |
| 1757-FFLD4  |                                                    |                                                             | 4                  |                                | 64                         |
| 1757-FFLDC2 | FOUNDATION Fieldbus bridge to a ControlNet network | FOUNDATION Fieldbus: 31.25 Kbps<br>ControlNet: 5 Mbps       | 2                  | 16<br>(8 . . . 10 recommended) | 32                         |
| 1757-FFLDC4 |                                                    |                                                             | 4                  |                                | 64                         |

## Example Configuration—Bridge to EtherNet/IP Network



## Other Connectivity Options

| Option             | Consideration                                                                                                                                                                                                                                                                                    |
|--------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| USB connection     | The ControlLogix controllers have a USB port in place of the serial port. <sup>(1)</sup> If your application requires RS-232 functionality, see the many Encompass Partners' products at <a href="http://www.rockwellautomation.com/encompass">http://www.rockwellautomation.com/encompass</a> . |
| DH-485 network     | The controller serial port is compatible with DH-485 communication. The DH-485 connection does support remote programming and monitoring via the Studio 5000 Logix Designer application.<br>Or, add a 1756-DH485 communication module.                                                           |
| 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.

## Modbus Support

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

- Connect through the 1756-EN2T, 1756-EN2TR, 1756-EN2F, or 1756-EN3TR modules, with firmware revision 5.007 or later and execute a ladder-logic routine.
- Connect through the 1756-EWEB module, with firmware revision 4.006 or later and execute a ladder-logic routine.

For more information, see Knowledgebase document 470365 at <http://www.rockwellautomation.com/knowledgebase/>.

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 Controllers

The ControlLogix controller provides a scalable controller solution capable of addressing many I/O points.

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 (just as controllers can communicate over networks) but operate independently.

ControlLogix controllers can monitor and control I/O across the ControlLogix backplane, and over I/O links. ControlLogix controllers can communicate over EtherNet/IP, ControlNet, DeviceNet, DH+, Remote I/O, and RS-232-C (DF1/DH-485 protocol) networks and many third-party process and device networks. To provide communication for a ControlLogix controller, install the appropriate communication interface module into the chassis.

| Cat. No.      | Description                                                                                                           | User Memory                    |
|---------------|-----------------------------------------------------------------------------------------------------------------------|--------------------------------|
| 1756-L81E     | ControlLogix controller, 1 built-in USB port <sup>(1)</sup> , single port EtherNet/IP                                 | 3 MB                           |
| 1756-L82E     |                                                                                                                       | 5 MB                           |
| 1756-L83E     |                                                                                                                       | 10 MB                          |
| 1756-L84E     |                                                                                                                       | 20 MB                          |
| 1756-L85E     |                                                                                                                       | 40 MB                          |
| 1756-L81ES    | GuardLogix safety controllers                                                                                         | 3 MB standard<br>1.5 MB safety |
| 1756-L82ES    |                                                                                                                       | 5 MB standard<br>2.5 MB safety |
| 1756-L83ES    |                                                                                                                       | 10 MB standard<br>5 MB safety  |
| 1756-L84ES    |                                                                                                                       | 20 MB standard<br>6 MB safety  |
| 1756-L8SP     | GuardLogix safety partner (in SIL 3 applications, one safety partner is required for each GuardLogix 5580 controller) | Not applicable                 |
| 1756-L71      | ControlLogix controller, 1 built-in USB port <sup>(1)</sup>                                                           | 2 MB                           |
| 1756-L72      |                                                                                                                       | 4 MB                           |
| 1756-L73      |                                                                                                                       | 8 MB                           |
| 1756-L74      |                                                                                                                       | 16 MB                          |
| 1756-L75      |                                                                                                                       | 32 MB                          |
| 1756-L73XT    | ControlLogix-XT controller, extreme environment                                                                       | 8 MB                           |
| 1756-L71S     | GuardLogix safety controllers                                                                                         | 2 MB standard<br>1 MB safety   |
| 1756-L72S     |                                                                                                                       | 4 MB standard<br>2 MB safety   |
| 1756-L73S     |                                                                                                                       | 8 MB standard<br>4 MB safety   |
| 1756-L7SP     | GuardLogix safety partner (one is required for each GuardLogix L7 controller)                                         | Not applicable                 |
| 1756-L72EROM  | Armor ControlLogix controllers, EtherNet/IP dual-port                                                                 | 4 MB                           |
| 1756-L73EROM  |                                                                                                                       | 8 MB                           |
| 1756-L72EROMS | Armor GuardLogix controllers, EtherNet/IP dual-port                                                                   | 4 MB standard<br>2 MB safety   |
| 1756-L73EROMS |                                                                                                                       | 8 MB standard<br>4 MB safety   |

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

## Standard ControlLogix Controllers

The ControlLogix controller is part of the Logix 5000™ family of controllers. A ControlLogix system includes the following:

- The ControlLogix controller, available in different combinations of user memory
- Studio 5000® environment
- 1756 ControlLogix I/O modules that reside in a 1756 chassis
- Separate communication modules for network communication



| Feature                                                | 1756-L71, 1756-L72, 1756-L73, 1756-L74, 1756-L75                                                                                                                                                                                                                        | 1756-L81E, 1756-L82E, 1756-L83E, 1756-L84E, 1756-L85E                                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Controller tasks                                       | <ul style="list-style-type: none"> <li>• 32 tasks</li> <li>• 1000 programs/task<sup>(2)</sup></li> <li>• Event tasks: all event triggers</li> </ul>                                                                                                                     | <ul style="list-style-type: none"> <li>• 32 tasks</li> <li>• 1000 programs/task</li> <li>• Event tasks: all event triggers</li> </ul>                                                                                                                                                                                                                                                       |
| Built-in communication ports                           | 1 port USB Client                                                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>• 1 port USB client</li> <li>• Single-port EtherNet/IP</li> </ul>                                                                                                                                                                                                                                                                                    |
| Communication options                                  | <ul style="list-style-type: none"> <li>• EtherNet/IP</li> <li>• ControlNet</li> <li>• DeviceNet</li> <li>• Data Highway Plus</li> <li>• Remote I/O</li> <li>• SynchLink</li> <li>• Third-party process and device networks</li> </ul>                                   | <ul style="list-style-type: none"> <li>• EtherNet/IP</li> <li>• ControlNet</li> <li>• DeviceNet</li> <li>• Data Highway Plus</li> <li>• Remote I/O</li> <li>• SynchLink</li> <li>• Third-party process and device networks</li> </ul>                                                                                                                                                       |
| Controller connections                                 | 500 connections                                                                                                                                                                                                                                                         | Not applicable                                                                                                                                                                                                                                                                                                                                                                              |
| Node capacity                                          | Not applicable                                                                                                                                                                                                                                                          | Logix Designer application, version 30 or later: <ul style="list-style-type: none"> <li>• 1756-L81E: 100 EtherNet/IP nodes<sup>(3)</sup></li> <li>• 1756-L82E: 175 EtherNet/IP nodes<sup>(3)</sup></li> <li>• 1756-L83E: 250 EtherNet/IP nodes<sup>(3)</sup></li> <li>• 1756-L84E: 250 EtherNet/IP nodes<sup>(3)</sup></li> <li>• 1756-L85E: 300 EtherNet/IP nodes<sup>(3)</sup></li> </ul> |
| Network connections, per network module <sup>(1)</sup> | <ul style="list-style-type: none"> <li>• 256 EtherNet/IP; 128 TCP (1756-EN2x, 1756-ENxT(R))</li> <li>• 128 EtherNet/IP; 64 TCP (1756-ENBT)</li> <li>• 128 ControlNet (1756-CN2/B)</li> <li>• 100 ControlNet (1756-CN2/A)</li> <li>• 40 ControlNet (1756-CNB)</li> </ul> | Not applicable <sup>(4)</sup>                                                                                                                                                                                                                                                                                                                                                               |
| Controller redundancy                                  | Full support                                                                                                                                                                                                                                                            | Future                                                                                                                                                                                                                                                                                                                                                                                      |
| Integrated motion                                      | <ul style="list-style-type: none"> <li>• EtherNet/IP connection</li> <li>• SERCOS interface</li> <li>• Analog options (encoder input, LDT input, SSI input)</li> </ul>                                                                                                  | <ul style="list-style-type: none"> <li>• EtherNet/IP connection</li> <li>• With Logix Designer application, version 31 or later:               <ul style="list-style-type: none"> <li>– SERCOS interface</li> <li>– Analog options (encoder input, LDT input, SSI input)</li> </ul> </li> </ul>                                                                                             |
| Programming languages                                  | <ul style="list-style-type: none"> <li>• Relay ladder</li> <li>• Structured text</li> <li>• Function block</li> <li>• Sequential function chart (SFC)</li> </ul>                                                                                                        | <ul style="list-style-type: none"> <li>• Relay ladder</li> <li>• Structured text</li> <li>• Function block</li> <li>• Sequential function chart (SFC)</li> </ul>                                                                                                                                                                                                                            |

(1) For the ControlLogix 5580 controllers, the total number of devices cannot exceed the total number of devices that the controller supports. The number of connections per network module shown is the maximum designed capacity of the modules. The device data size and requested data rate determine the actual device capacity.

(2) Studio 5000, version 23 and earlier, is limited to 100 Programs/Task.

(3) This value is the maximum number of EtherNet/IP nodes that the controller supports. Use the Integrated Architecture® Builder design tool to lay out and validate your system design and additional node options. For further information on nodes on an EtherNet/IP network, see the ControlLogix 5580 and GuardLogix 5580 Controllers User Manual, publication [1756-UM543](#).

(4) This value is determined by the node capacity for the ControlLogix 5580 controllers. See the node capacity feature for more information.

## ControlLogix-XT Controllers

The ControlLogix-XT controllers function in the same way as the traditional ControlLogix controllers, with an extended temperature range, and have the same features as the ControlLogix L7 controllers.

The ControlLogix-XT products include control and communication system components that are conformally coated to extend product life in harsh, corrosive environments:

While the standard ControlLogix system can withstand temperatures from 0...60 °C (33...140 °F), the ControlLogix-XT system can withstand temperatures from -25...+70 °C (-13...+158 °F).



## Redundant ControlLogix 5570 Controllers

The ControlLogix 5570 controllers support controller redundancy. In a redundant controller system, you need these components:

- Two 1756 chassis, each with the same of the following:
  - Number of slots
  - Modules in the same slots
  - Redundancy firmware revisions in each module
  - Approved module firmware revisions for use within ControlLogix Redundancy systems.
- One 1756-RM2 or 1756-RM2XT module per chassis that supports the following:
  - One or two ControlLogix 5570 or ControlLogix-XT controllers of the same family
  - As many as seven ControlNet or EtherNet/IP communication modules in any combination
- One or two 1756-RMCx cables

For additional redundancy rules and restrictions, see the ControlLogix Enhanced Redundancy System User Manual, publication [1756-UM535](#).

## GuardLogix Controllers

A GuardLogix controller is a ControlLogix controller that also provides safety control.



| Application | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Up to SIL 3 | <p>The GuardLogix controller system is type-approved and certified for use in safety applications up to and including SIL 3 according to IEC 61508, and applications up to and including PLe/Cat.4 according to ISO 13849-1. For more information, see the following:</p> <ul style="list-style-type: none"> <li>GuardLogix 5570 Controllers User Manual, publication <a href="#">1756-UM022</a>. Provides information on how to install, configure, and operate GuardLogix 5570 Controllers in Studio 5000, Version 21 or later projects.</li> <li>GuardLogix 5570 Controller Systems Safety Reference Manual, publication <a href="#">1756-RM099</a>. Provides information on how to meet safety application requirements for GuardLogix 5570 Controllers in Studio 5000, Version 21 or later projects.</li> <li>ControlLogix 5580 and GuardLogix 5580 Controllers User Manual, publication <a href="#">1756-UM543</a>. Provides information on how to install, configure, and operate GuardLogix 5580 Controllers in Studio 5000, Version 31 or later projects.</li> <li>GuardLogix 5580 and Compact GuardLogix 5380 Controller Systems Safety Reference Manual, publication <a href="#">1756-RM012</a>. Provides information on how to meet safety application requirements for GuardLogix 5580 Controllers in Studio 5000, Version 31 or later projects.</li> </ul> |

| Primary Controller                              | Safety Partner                                                                                        |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| 1756-L81ES, 1756-L82ES, 11756-L83ES, 1756-L84ES | 1756-L8SP (in SIL 3 applications, one safety partner is required for each GuardLogix 5580 controller) |
| 1756-L71S, 1756-L72S, 1756-L73S                 | 1756-L7SP                                                                                             |
| 1756-L73SXT                                     | 1756-L7SPXT                                                                                           |



During development, safety and standard have the same rules; multiple programmers, online editing, and forcing are all allowed. Once the safety system is validated and the safety signature applied, safety memory is protected, the safety logic cannot be modified, and all safety functions operate with SIL integrity. If the safety partner is present, the safety integrity will be SIL3. If no safety partner is present, the safety integrity will be SIL2. On the standard side of the GuardLogix controller, all functions operate like a regular Logix controller.

With the introduction of the GuardLogix 5580 controller, you can achieve up to SIL 2/PLd (Category 3) with one controller and the use of the safety task and safety I/O. You must use a primary controller and a safety partner to achieve SIL 3/PLe (Category 4).

Use Guard I/O™ modules for field device connectivity on Ethernet or DeviceNet networks, and for safety interlocking between GuardLogix controllers use Ethernet or ControlNet networks. Multiple GuardLogix controllers can share safety data for zone to zone interlocking, or one GuardLogix controller can use distributed safety I/O between different cells/areas.

The GuardLogix controller has the standard features of a ControlLogix controller and these safety-related features.

| Feature                                         | 1756-L71S, 1756-L72S, 1756-L73S, 1756-L73SXT,                                                                                                                                                                                     | 1756-L81ES, 1756-L82ES, 11756-L83ES, 1756-L84ES                                                  |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------|
| Safety communication options                    | Standard and safety <ul style="list-style-type: none"> <li>EtherNet/IP</li> <li>ControlNet</li> <li>DeviceNet</li> </ul>                                                                                                          |                                                                                                  |
| Network connections, per network module         | <ul style="list-style-type: none"> <li>256 EtherNet/IP; 128 TCP (1756-EN2x, 1756-EN3x)</li> <li>128 EtherNet/IP; 64 TCP (1756-ENBT)</li> <li>128 ControlNet (1756-CN2/B, 1756-CN2R/B)</li> <li>64 DeviceNet (1756-DNB)</li> </ul> | Not applicable                                                                                   |
| EtherNet/IP nodes supported, max <sup>(1)</sup> | Not applicable                                                                                                                                                                                                                    | 1756-L81ES: 100 nodes<br>1756-L82ES: 175 nodes<br>1756-L83ES: 250 nodes<br>1756-L84ES: 250 nodes |
| Controller redundancy                           | Not supported                                                                                                                                                                                                                     |                                                                                                  |
| Safety Task Programming languages               | Relay ladder                                                                                                                                                                                                                      |                                                                                                  |

(1) A node is an EtherNet/IP 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 5580 and GuardLogix 5580 Controllers User Manual, publication [1756-UM543](#).

## Armor ControlLogix and Armor GuardLogix Controllers

The Armor ControlLogix controller, extends the standard ControlLogix platform to the On-Machine™ space.  
The Armor GuardLogix controller delivers safety control up to SIL 3, PLe, CAT 4.

Both controllers have the equivalent of two embedded 1756-EN3TR modules, which offer dual independent Ethernet ports that support a DLR network topology.

| Feature               | 1756-L72EROM, 1756-L73EROM                                                                                                                    | 1756-L72EROMS, 1756-L73EROMS                                                    |
|-----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------|
| Communication options | Standard <ul style="list-style-type: none"><li>EtherNet/IP</li></ul>                                                                          | Standard and safety <ul style="list-style-type: none"><li>EtherNet/IP</li></ul> |
| Controller redundancy | Not supported                                                                                                                                 |                                                                                 |
| Programming languages | <ul style="list-style-type: none"><li>Relay ladder</li><li>Structured Text</li><li>Function block</li><li>Sequential Function Chart</li></ul> | <ul style="list-style-type: none"><li>Relay ladder</li></ul>                    |

## Accessories—Controllers

### Memory Cards

Memory cards offer nonvolatile memory to store a user program and tag data on a controller. The controllers ship with a Secure Digital (SD) card installed. The memory card installs in a socket 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.

| Attribute             | 1784-SD1                                                               | 1784-SD2 |
|-----------------------|------------------------------------------------------------------------|----------|
| Memory                | 1 GB                                                                   | 2 GB     |
| Supported controllers | ControlLogix 5570, GuardLogix 5570, ControlLogix 5580, GuardLogix 5580 |          |
| Weight, approx        | 1.76 g (0.062 oz)                                                      |          |

### 1756 Energy Storage Modules

Important: Energy storage modules apply to only ControlLogix 5570 controllers.

Instead of a battery, the ControlLogix and GuardLogix controllers ship with a 1756-ESMCAP energy storage module (ESM) installed.

| Cat No.     | Description                                                                                                                                                                                                                                                                                                            |
|-------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1756-ESMCAP | Capacitor-based ESM included with the controller.                                                                                                                                                                                                                                                                      |
| 1756-ESMNSE | ESM without WallClockTime back-up power. Additionally, you can use this ESM only with a 1756-L73 (8 MB) or smaller memory-sized controller. Use this ESM if your application requires that the installed ESM deplete its residual energy to 40 $\mu$ J or less before transporting it into or out of your application. |
| 1756-ESMNRM | ESM that secures the controller by permanently preventing the USB connection and SD card use. This ESM provides your application an enhanced degree of security.                                                                                                                                                       |

The ControlLogix-XT extreme temperature controller ships with a 1756-ESMNCAPXT energy storage module installed.

| Cat No.       | Description                                                                                                                                                                                                                                                                                                              |
|---------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1756-ESMCAPXT | Capacitor-based ESM included with the controller.                                                                                                                                                                                                                                                                        |
| 1756-ESMNSEXT | ESM without WallClockTime back-up power. Additionally, you can use this ESM only with a 1756-L73XT (8 MB) or smaller memory-sized controller. Use this ESM if your application requires that the installed ESM deplete its residual energy to 40 $\mu$ J or less before transporting it into or out of your application. |
| 1756-ESMNRMXT | ESM that secures the controller by permanently preventing the USB connection and SD card use. This ESM provides your application an enhanced degree of security.                                                                                                                                                         |

The 1756-L7SP safety partner for a GuardLogix system has the following modules available.

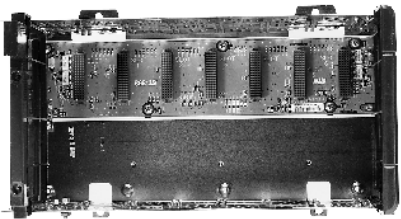
| Cat No.       | Description                                                                                                                       |
|---------------|-----------------------------------------------------------------------------------------------------------------------------------|
| 1756-SPESMNSE | Capacitor-based ESM for a GuardLogix safety partner.                                                                              |
| 1756-SPESMNRM | ESM for a GuardLogix safety partner that secures the safety partner by permanently preventing the USB connection and SD card use. |

# 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



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

## 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.

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

# ControlLogix Power Supplies

ControlLogix power supplies are used with the 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

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              |
| 1756-PA72 | Standard AC power supply | 120V/240V AC     | 85...265V AC            | Standard, series A and series B |
| 1756-PA75 |                          | 120V/240V AC     | 85...265V AC            | Standard, series B              |
| 1756-PB50 | Slim DC power supply     | 24V DC           | 18...32V DC             | Standard, series A              |
| 1756-PB72 | Standard DC power supply | 24V DC           | 18...32V DC             | Standard, series A and series B |
| 1756-PB75 |                          | 24V DC           | 18...32V DC             | Standard, series B              |
| 1756-PC75 |                          | 48V DC           | 30...60V DC             | Standard, series B              |
| 1756-PH75 |                          | 125V DC          | 90...143V DC            | Standard, series B              |

## ControlLogix-XT Power Supplies

The ControlLogix-XT power supplies support extreme temperature environments.

| Cat. No.    | Description                          | Voltage Category | Operating Voltage Range | Chassis |
|-------------|--------------------------------------|------------------|-------------------------|---------|
| 1756-PAXT   | ControlLogix-XT AC power supply      | 120V/240V AC     | 85...265V AC            | XT      |
| 1756-PA30XT | ControlLogix-XT slim 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 B chassis backplane. To build a redundant power supply system, you need the following components.

| Cat. No.                              | Amount | Description                                                                                                                                                                           | Voltage Category | Operating Voltage Range | Chassis            |  |
|---------------------------------------|--------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|-------------------------|--------------------|--|
| 1756-PAR2                             | Kit    | Bundled system contains: <ul style="list-style-type: none"><li>Two 1756-PA75R power supplies</li><li>Two 1756-CPR2 cables</li><li>One 1756-PSCA2 chassis adapter</li></ul>            | 110V AC          | —                       | Standard, series B |  |
| 1756-PAR2XT                           | Kit    | Bundled system contains: <ul style="list-style-type: none"><li>Two 1756-PAXTR power supplies</li><li>Two 1756-CPR2 cables</li><li>One 1756-PSCA2 chassis adapter</li></ul>            | 110V AC          | —                       |                    |  |
| 1756-PBR2                             | Kit    | Bundled system contains: <ul style="list-style-type: none"><li>Two 1756-PB75R power supplies</li><li>Two 1756-CPR2 cables</li><li>One 1756-PSCA2 chassis adapter</li></ul>            | 24V DC           | —                       |                    |  |
| 1756-PBR2XT                           | Kit    | Bundled system contains: <ul style="list-style-type: none"><li>Two 1756-PBXTR power supplies</li><li>Two 1756-CPR2 cables</li><li>One 1756-PSCA2 chassis adapter</li></ul>            | 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:<br>Connector angle = straight, length = 0.91 m (3 ft)<br>Connector angle = down, length = 0.91 m (3 ft)<br>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 <sup>(1)</sup><br>(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:

# Rockwell Automation Support

Use the following resources to access support information.

|                                                         |                                                                                                                       |                                                                                                                                                    |
|---------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Technical Support Center</b>                         | Knowledgebase Articles, How-to Videos, FAQs, Chat, User Forums, and Product Notification Updates.                     | <a href="http://www.rockwellautomation.com/knowledgebase">www.rockwellautomation.com/knowledgebase</a>                                             |
| <b>Local Technical Support Phone Numbers</b>            | Locate the phone number for your country.                                                                             | <a href="http://www.rockwellautomation.com/global/support/get-support-now.page">www.rockwellautomation.com/global/support/get-support-now.page</a> |
| <b>Direct Dial Codes</b>                                | Find the Direct Dial Code for your product. Use the code to route your call directly to a technical support engineer. | <a href="http://www.rockwellautomation.com/global/support/direct-dial.page">www.rockwellautomation.com/global/support/direct-dial.page</a>         |
| <b>Literature Library</b>                               | Installation Instructions, Manuals, Brochures, and Technical Data.                                                    | <a href="http://www.rockwellautomation.com/literature">www.rockwellautomation.com/literature</a>                                                   |
| <b>Product Compatibility and Download Center (PCDC)</b> | Get help determining how products interact, check features and capabilities, and find associated firmware.            | <a href="http://www.rockwellautomation.com/global/support/pcdc.page">www.rockwellautomation.com/global/support/pcdc.page</a>                       |

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Publication 1756-SG001X-EN-P - June 2018

Supersedes Publication 1756-SG001W-EN-P - February 2018

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