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MICROLOGIX PROGRAMMABLE CONTROLLERS

SELECTION GUIDE

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MicroLogix 1000

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Rockwell Automation

MicroLogix Programmable Controllers Overview

The MicroLogix family of controllers provides five levels of control. Small on size, big on performance, the MicroLogix 1000 controller offers control capabilities in an affordable, compact package. The MicroLogix 1200 controller is small enough to fit in tight spaces, but powerful enough to accommodate a broad range of applications. Designed to grow as your needs grow, the MicroLogix 1500 controller helps you achieve high-level control in a variety of applications. The MicroLogix family's newest members, the MicroLogix 1100 and 1400 controllers, further enhance the MicroLogix family by expanding the application coverage area while offering great new features at an affordable price.

MicroLogix 1000 Controller

Based on the architecture of the market-leading SLC 500 controller family, the MicroLogix 1000 controller brings high-speed, powerful instructions and flexible communication to applications that demand compact, cost-effective solutions.

The MicroLogix 1000 controller is available in 10-point, 16-point, or 32-point digital I/O versions. Analog versions are also available with 20 digital I/O points, with 4 analog inputs (2 voltage and 2 current) and 1 analog output (configurable for either voltage or current).

The analog I/O circuitry for the MicroLogix 1000 controller is embedded into the base controller, not accomplished through add-on modules: so, it provides very high-speed, cost-effective analog performance.

The MicroLogix 1000 controller uses Rockwell Software RSLogix 500 and RSMicro programming software and shares a common instruction set with the MicroLogix and SLC 500 families of controllers.

Advantages for the MicroLogix 1000 Controllers

- Preconfigured 1 KB program and data memory to ease configuration (for example, preconfigured bit, integer, timers, and counters).
- Fast processing allows for typical throughput time of 1.5 ms for a 500-instruction program.
- Built-in EEPROM memory retains all of your ladder logic and data if the controller loses power, eliminating the need for battery back-up or separate memory module.
- Multiple input commons lets you use the controller for either sinking or sourcing input devices and multiple output commons provide isolation in multi-voltage output applications.
- RS-232 communication channel allows for simple connectivity to a personal computer for program upload, download, and monitoring by using multiple protocols, including DF1 full-duplex.
- RTU slave protocol supports using DF1 half-duplex allows up to 254 slave nodes to communicate with a single master by using radio modems, leased-line modems, or satellite uplinks.
- Peer-to-peer messaging capability that lets you network up to 32 controllers on a DH-485 network by (using a 1761-NET-AIC module).
- Advanced communication network EtherNet/IP, through the 1761-NET-ENI communication module.
- Controllers that have 24V DC inputs include a built-in, high-speed counter (6.6 kHz).
- Adjustable DC input filters let you customize the input response time and noise rejection to meet your application needs.
- Regulatory agency certifications for world-wide market (CE, EAC, RCM, UL, and c-UL, including Class I Division 2 Hazardous Location).

MicroLogix 1100 Controller

The MicroLogix 1100 controller is designed to broaden application coverage through embedded analog inputs, Ethernet communication, and visualization capabilities. MicroLogix 1100 controllers maintain the same critical features you have come to expect from the MicroLogix family, and expand that capability to include true online editing. MicroLogix 1100 controllers complement our low-end controllers for applications that require up to 144 digital I/O.

Each MicroLogix 1100 controller contains 2 embedded analog inputs, with 10 digital inputs and 6 digital outputs. The controller can also expand its I/O capabilities by using the same modules as the MicroLogix 1200 controller. Up to four of the 1762 I/O modules can be used with a single MicroLogix 1100 controller.

Using the latest version of our world-class RSLogix 500 programming software, the MicroLogix 1100 controller can be programmed with an instruction set that is common with the MicroLogix and SLC 500 families of controllers. RSLogix 500 Starter, Standard, and Professional applications all support the MicroLogix 1100 controller, including its online editing capabilities. In addition, the new RSLogix Micro Starter and Developer software provide MicroLogix only programming at a lower cost.

Each controller supports a built-in RS-232/RS-485 combo port for serial and networked communication and a second built-in EtherNet/IP port, which supports Ethernet peer-to-peer messaging.

An embedded LCD screen lets you monitor controller and I/O status, as well as make changes to bit and integer data.

Advantages for the MicroLogix 1100 Controllers

- Large 8 KB memory (4 KB user program with 4 KB user data) to solve a variety of applications.
- True online editing allows tuning of program, including PID, without going offline.
- Support for MicroLogix 1100 controller online editing in all current versions of RSLogix 500 and RSLogix Micro Starter and Developer software.
- Mode switch for Run/Remote/Program.
- Time-based or event-triggered data logging capability stores controller data records with optional time stamp in a separate 128 Kbyte memory area for later analysis (for example, trending and I/O status during alarm condition data).
- Recipe storage (up to 64 KB that is deducted from Data Logging memory) that is accessible by your ladder program, enabling quick and easy batch changes of program data for timers, counters, and other data types.
- High performance expansion I/O options (up to four 1762 I/O modules, in any combination).
- Four high-speed inputs (except 1763-L16AWA controller) that can be used individually as latching (pulse-catch) inputs, event interrupts, or alternately combined as one 40 kHz high-speed counter featuring 8 modes of operation.
- Two built-in 0...10V DC analog inputs with 10-bit resolution (not isolated).

- Two high-speed outputs that can be configured as 40 kHz pulse train output (PTO) or as pulse width modulated (PWM) outputs (catalog number 1763-L16BBB only).
- Multiple input commons let you use the controller for either sinking or sourcing input devices, and multiple output commons provide individual isolation in multi-voltage output applications.
- One, 1 ms, selectable timed interrupt (STI).
- High-resolution, 1 ms timers.
- Communication Channel 0 provides isolated RS-232 or RS-485 electrical compatibility (selectable through the choice of communication cables).
- Through RS-232, we support all serial protocols.
- Through RS-485, we support direct interface to DH-485, DF1 half-duplex master/slave, ASCII, and Modbus RTU master/slave networks (without an external electrical interface converter).
- Communication Channel 1 consists of an embedded RJ45 port that supports EtherNet/IP network for peer-to-peer messaging. This 10/100 Mbps port supports BOOTP and DHCP.
- Communication toggle selection that allows the controller's Channel 0 port to toggle between user-configured communication parameters and factory default settings for an easy way to switch from Modbus RTU or ASCII protocols (which do not support programming) to DF1 full-duplex (to upload/download, monitor, or edit your program). So a programming computer is able to connect to a controller with an unknown or incorrect communication-parameter settings for troubleshooting.
- Embedded real-time clock.
- Embedded web server with email functionality.
- Optional memory module for external program backup, for program transport, and transfer to another controller. Program and data in the controller is also battery backed for secure storage.
- Data file download protection prevents critical user data from being altered via program downloads from programming computers or memory modules.
- Built-in LCD provides access to 48 bits and 48 integers that can be changed, or optionally protected, for monitor only access by an operator.
- LCD instruction allows the controller to output messages to the LCD, and optionally receive user input.
- IP address can be monitored directly through the built-in LCD.
- Two built-in digital trim potentiometers.
- 32-bit signed integer math.
- Floating-point and double-integer data file support.
- Built-in PID capabilities.
- Finger-safe terminal blocks meet global safety standards.
- Regulatory agency certifications for world-wide market (CE, EAC, RCM, UL, and c-UL, including Class 1 Division 2 Hazardous Location).

MicroLogix 1200 Controller

The MicroLogix 1200 controller provides more computing power and flexibility than the MicroLogix 1000 controller to solve a variety of application needs.

Available in 24- and 40-point versions, the I/O count can be expanded by using rackless I/O modules. This results in larger control systems, greater application flexibility and expandability at a lower cost and reduced parts inventory.

A field-upgradable flash operating system that helps to make sure you will always be up-to-date with the latest features, without having to replace hardware. The controller can be easily updated with the latest firmware via a website download.

Advantages for the MicroLogix 1200 Controller

- Large 6 KB memory (4 KB User Program with 2 KB User Data) to solve a variety of applications.
- High performance expansion I/O options (up to six modules depending on current/power budget).
- Four high-speed inputs (for controllers with 24V DC inputs) that can be used individually as latching (pulse-catch) inputs, event interrupts,or alternately combined as one 20 kHz high-speed counter featuring eight modes of operation.
- One high-speed output that can be configured as 20 kHz pulse train output (PTO) or as pulse width modulated (PWM) output (availableon controllers with embedded 24V DC outputs).
- One, 1 ms, selectable timed interrupt (STI).
- High-resolution, 1 ms timers.
- The same advanced communication options as the MicroLogix 1000 controller, including peer-to-peer and SCADA/RTU networks, DF1 full-duplex, DF1 half-duplex slave, DH-485, and EtherNet/IP , plus DF1 half-duplex master, Modbus master and slave, and DF1 radio modem protocols.
- ASCII read/write capability.
- An additional Programming/HMI Port, providing connectivity to a DF1 full-duplex compatible device such as an operator interface or programming terminal (MicroLogix 1200R controllers only, catalog number 1762-L*xxxxx*R).
- Communication toggle pushbutton that allows the controller's Channel 0 port to toggle between user configured communication parameters and factory default settings for an easy means to switch from Modbus RTU or ASCII protocols (which do not support programming) to DF1 full-duplex (to upload/download, monitor, or edit your program), so a programming computer is able to connect to a controller with an unknown or incorrect communication parameter settings for troubleshooting.
- Optional real-time clock, to allow control to be based on actual time of day, day of week, or other calendar related timing.
- Optional memory module, for external program backup, transport and transfer to another controller. Control program and data are securely backed up to internal flash memory when power is not applied.
- Data file download protection prevents critical user data from being altered via program downloads from programming computers or memory modules.
- Two built-in analog trim potentiometers.
- 32-bit signed integer math.
- Floating-point and double integer data file support.
- Built-in PID capabilities.
- Finger-safe terminal blocks meet global safety standards.
- Removable terminal blocks on 40-point controllers allow pre-wiring.
- Regulatory agency certifications for world-wide market (CE, EAC, RCM, UL, c-UL, including Class 1 Division 2 Hazardous Location).

MicroLogix 1400 Controller

The MicroLogix 1400 controller is our newest family of controllers to join the popular MicroLogix 1000, MicroLogix 1100, MicroLogix 1200, and MicroLogix 1500 controllers, and is designed to broaden application coverage through available embedded analog inputs, Ethernet communication, faster high-speed counter (HSC), and pulse train output (PTO) capabilities. MicroLogix 1400 controllers maintain the same critical features you have come to expect from the MicroLogix 1100 controller, and expands that capability with more I/O, faster HSC/PTO, and an additional serial port. MicroLogix 1400 controllers complement our low-end controllers for applications that require up to 256 digital I/O.

Each MicroLogix 1400 controller includes 20 digital inputs and 12 digital outputs. In addition, several models include 4 embedded analog inputs and 2 embedded analog outputs. The controller can also expand its I/O capabilities by using the same modules as the MicroLogix 1100 and 1200 controllers. Up to 7 of the 1762 I/O modules can be used with a single MicroLogix 1400 controller.

Using the latest version of our world-class RSLogix 500 programming software, the MicroLogix 1400 controller can be programmed with an instruction set that is common with the MicroLogix 1000, MicroLogix 1100, MicroLogix 1200, MicroLogix 1500, and SLC 500 families of controllers. RSLogix 500 Starter, Standard, and Professional applications, as well as RSLogix Micro software, all support the MicroLogix 1400 controller, including its online editing capabilities.

Each controller has 2 serial ports with DF1/DH485/Modbus RTU/DNP3/ASCII protocol support and a built-in Ethernet port, which supports EtherNet/IP, Modbus TCP/IP and DNP3 over IP.

An embedded LCD screen lets you monitor controller and I/O status, as well as make changes to bit and integer data.

Advantages for the MicroLogix 1400 Controller

- Large memory (10 KB user program with 10 KB user data) to solve a variety of applications.
- True online editing allows tuning of program, including PID, without going offline.
- Support for MicroLogix 1400 controller online editing in RSLogix 500 Professional, Standard, and Starter software version 8.1 and later, as well as RSLogix Micro.
- Mode switch for Run/Remote/Program through LCD keypad operation.
- Time-based or event-triggered data logging capability stores controller data records with optional time stamp in a separate 128 Kbyte memory area for later analysis (for example, trending and I/O status during alarm condition data).
- Recipe storage (up to 64 KB that is deducted from Data Logging memory) that is accessible by your ladder program, enabling quick and easy batch changes of program data for timers, counters, and other data types.
- High performance expansion I/O options (up to seven 1762 I/O modules, in any combination).
- Twelve high-speed inputs (except 1766-L32AWA and 1766-L32AWAA controllers) that can be used individually as latching (pulse-catch) inputs, event interrupts, or alternately combined as three 100 kHz high-speed counters featuring 10 modes of operation.
- Two available built-in 0...10V DC analog outputs (for controllers with analog I/O options) with 12-bit resolution (not isolated).
- Three high-speed outputs that can be configured as 100 kHz pulse train output (PTO) or 40 kHz as pulse width modulated (PWM) outputs (only on 1766-L32BXB and 1766-L32BXBA controllers).
- Multiple input commons let you use the controller for either sinking or sourcing input devices, and multiple output commons provide individual isolation in multi-voltage output applications.
- One, 1 ms, selectable timed interrupt (STI).
- High-resolution, 1 ms timers.
- Communication Channel 0 provides isolated RS-232 or RS-485 electrical compatibility (selectable through the choice of communication cables).
- Through RS-232, we support all serial protocols.
- Through RS-485, we support direct interface to DH-485, DF1 half-duplex master/slave, ASCII, and Modbus RTU master/slave networks, DNP 3 slave using the 1763-NC interface (1761-NET-AIC interface is not required).
- Communication Channel 1 consists of an embedded RJ45 port that supports EtherNet/IP, Modbus TCP/IP and DNP3 over IP. This 10/100 Mbps port supports BOOTP and DHCP.
- Communication channel 2 provides a 9-pin, non-isolated RS-232 port supporting all serial protocols.
- Communication toggle selection that allows the controller's Channel 0 port to toggle between user-configured communication parameters and factory default settings for an easy way to switch from Modbus RTU or ASCII protocols (which do not support programming) to DF1 full-duplex (to upload/download, monitor, or edit your program). So a programming computer is able to connect to a controller with an unknown or incorrect communication-parameter settings for troubleshooting.
- Embedded real-time clock.
- Embedded web server with email functionality.

- Optional memory module for external program backup, for program transport, and transfer to another controller. Program and data in the controller is also battery backed for secure storage.
- Data file download protection prevents critical user data from being altered via program downloads from programming computers or memory modules.
- Built-in LCD provides access to binary and integer files that can be changed, or optionally protected, for monitor only access by an operator.
- LCD instruction allows the controller to output messages to the LCD, and optionally receive user input.
- IP address can be monitored and configured directly through the built-in LCD.
- Two built-in digital trim potentiometers.
- 32-bit signed integer math.
- Floating-point and double-integer data file support.
- Built-in PID capabilities.
- Finger-safe removable terminal blocks meet global safety standards.
- Customizable OEM logos on the LCD display.
- Regulatory agency certifications for world-wide market (CE, EAC, RCM, cUL, and UL including Class 1 Division 2 Hazardous Location, where product is marked(1)).

(1) See the Product Certification link at http://www.ab.com for Declaration of Conformity, Certificates, and other certification details.

MicroLogix 1500 Controller

The MicroLogix 1500 controller is a world-class programmable logic control platform with even more advanced features and performance than the MicroLogix 1200 controller. Many of these features allow this controller to be used in applications where much larger controllers were required in the past.

MicroLogix 1500 architecture features an innovative two-piece design with a small footprint. The processor and base units slide together to form the complete controller. The processor and base are independently replaceable, allowing you to maximize your embedded I/O, memory, and communication options while minimizing inventory stocking costs.

Bulletin 1769 Compact I/O modules expand the controller's embedded I/O offerings and provide the additional flexibility to cover a wide range of applications. This high-performance modular and rackless I/O platform provides front accessibility for removal and insertion. Removable terminal blocks further lower the total system cost by reducing start-up and maintenance time.

New features are provided with an enhanced user interface that uses function files to consolidate programming parameters. This simplifies the user interface and increases controller performance.

The MicroLogix 1500 controller includes all the features of the MicroLogix 1200 controller, plus more.

Advantages for the MicroLogix 1500 Controller (in addition to MicroLogix 1200 controller features)

- Large memory to solve a variety of applications.
  1764-LSP: 7 KB user program capacity (3.65 KB User Program with 4 KB User Data)
  1764-LRP:14 KB user program capacity (10 KB User Program with 4 KB User Data)
- Mode switch for Run/Remote/Program.
- MicroLogix 1500 controllers using the 1764-LRP processor, can perform time based or event triggered data logging. This allows the controller to store data records with optional time stamp in a separate 48 Kbyte memory area for later analysis (for example, trending and I/O status during alarm condition data).
- Recipe storage (up to 48 KB that is deducted from Data Logging memory), that is accessible by your ladder program, enabling quick and easy batch changes of program data for timers, counters, and other data types.).
- High performance expansion I/O options (up to 16 modules by using an additional bank of expansion I/O and expansion power supply).
- There is an additional Channel 1 configurable isolated RS-232 communication port on the 1764-LRP processor (for peer-to-peer and SCADA/RTU networks, DH-485, DeviceNet and EtherNet/IP).
- Battery for nonvolatile user program and user data (built-in and optional replacement).
- Optional data access tool (1764-DAT) allows a user to change integer and bit values within the controller, or optionally protect these elements for monitor only.
- Eight high-speed inputs (for controllers with 24V DC inputs) that can be used individually as latching (pulse-catch) inputs, event interrupts, or alternately combined in groups of four (0...3, and 4...7) as two 20 kHz high-speed counters featuring eight modes of operation.
- Two high-speed outputs that can be configured as 20 kHz pulse train output (PTO) or as pulse width modulated (PWM) outputs (available on controllers with embedded 24V DC outputs).
- Removable terminal blocks on all MicroLogix 1500 base units and I/O modules enable pre-wiring.

MicroLogix Controller System-selection Checklist

Use the following checklist as a guide to completing your own system specification. Skip any sections that do not apply.

✔	Step	See
	1 **Select Family: MicroLogix 1000, 1200 or 1500 Controller** • controller family - based on memory, I/O, added functionality, programming instructions and dimensions • consider future expansion requirements • consider requirement for online editing • consider the need for networked communication	page 17
	Select Family: MicroLogix 1100 or 1400 Controller • controller family - based on memory, I/O, added functionality, programming instructions and dimensions • consider future expansion requirements • consider requirement for online editing • consider the need for networked communication	page 21
	2 **Select Communication** • communication network - based on application requirementscommunication network - based on application requirements • communication interface device - if required	page 33
	3 **Select Programming Tools and Software** • programming software - the appropriate RSLogix package for your application • programming software - the appropriate RSLogix package for your application	page 38
	4 **Select Network and Programming Cables** cables - review device port identification to find cable in the selection chart)	page 39
	5 **Select MicroLogix 1000 Controllers** controller - review power and I/O configurations to select a controller catalog number; see power supply and I/O specification for more detailed information	page 41
	6 **Select MicroLogix 1100 Controllers** • controller - review power and I/O configurations to select a controller catalog number; see power supply and I/O specification for more detailed information • accessories - memory modules	page 47
	7 **Select MicroLogix 1100 Expansion I/O** I/O modules - digital, analog, and temperature	page 51
	8 **Select MicroLogix 1200 Controllers** • controller - review power and I/O configurations to select a controller catalog number; see power supply and I/O specifications for more detailed information • accessories - memory and real-time clock modules	page 59
	9 **Select MicroLogix 1200 Expansion I/O** • I/O modules - digital, analog, and temperature • perform system expansion calculations	page 62
	10 **Select MicroLogix 1400 Controllers** • I/O modules - digital, analog, and temperature • perform system expansion calculations	page 65
	11 **Select MicroLogix 1400 Expansion I/O** I/O modules - digital, analog, and temperature	page 70
	12 **Select MicroLogix 1500 Controllers** • base unit - review power and I/O configurations to select a catalog number; see power supply and I/O specifications for more detailed information • processor - see notes at Step 1 • accessories - data access tool; real-time clock and memory modules	page 71
	13 **Select MicroLogix 1500 System Expansion Components** • I/O modules - digital, analog, temperature and high-speed counter • communication modules - DPI SCANport and DeviceNet • power supplies, cables and end caps • perform system expansion calculations	page 75

✔	Step	See
	14 **Select Replacement Parts**	page 85
	15 **Select Training Materials** training and promotional products - starter paks, demo units and simulators	page 86
	16 **Fill in Your Selection Listing** all catalog numbers required for your system specification	page 87

Select a MicroLogix Controller

Use this document to complete the following selection steps.

1. Select Family: MicroLogix 1000, 1100, 1200, 1400, or 1500 Controller.
2. Select Communication.
3. Select Programming Tools and Software.
4. Select Network and Programming Cables.
5. Select MicroLogix 1000 Controllers.
6. Select MicroLogix 1100 Controllers.
7. Select MicroLogix 1100 Expansion I/O.
8. Select MicroLogix 1200 Controllers.
9. Select MicroLogix 1200 Expansion I/O.
10. Perform MicroLogix 1200 Controller System Expansion Calculations.
11. Select MicroLogix 1400 Controllers.
12. Select MicroLogix 1400 Expansion I/O.
13. Select MicroLogix 1500 Controllers.
14. Select MicroLogix 1500 System Expansion Components.
15. Perform MicroLogix 1500 System Expansion Calculations.
16. Select Replacement Parts.
17. Select Training Materials.
18. Fill in Your Selection Listing.

Select Family: MicroLogix 1000, 1200 or 1500 Controller

Review the Features, Programming Instructions, Controller Specifications, and Controller Dimensions to determine which level of MicroLogix controller is required.

Step 1 - Select:

- controller family - based on memory, I/O, added functionality, programming instructions and dimensions
- consider future expansion requirements
- consider requirement for online editing
- consider the need for networked communication

Features

MicroLogix Controllers Feature Comparison Chart

Controller	MicroLogix 1000	MicroLogix 1200/1200R	MicroLogix 1500 1764-LSP, 1764-LRP
Bulletin Number	**1761**	**1762**	**1764**
Memory (in user words) User Program/User Data			
Up to 1 KB	1 KB combined (preconfigured)		
Up to 6 KB		4 KB/2 KB	
Up to 7 KB			3.6 KB/4 KB 1764-LSP
Up to 8 KB			
Up to 14 KB			10 KB/4 KB 1764-LRP
Online editing			
Nonvolatile program and data	EEPROM	Flash	Battery back-up static RAM
Memory Module (for program back-up and transport)		Optional	Optional
I/O			
Embedded Digital I/O, max	32	40	28
Embedded Analog I/O	Two current and two voltage inputs with one current or voltage output on 20 pt. controllers		
Local Expansion I/O, max	None	96	512
Thermocouple/RTD	None	Expansion	Expansion
Networked Expansion I/O, max	None	None	DeviceNet network using 1769-SDN scanner can own 63 slave devices (such as a 1769-ADN adapter with up to 30 I/O modules per 1769-ADN adapter)
Added Functionality			
Trim Potentiometers		2	2
PID		✓	✓
High Speed Counters (embedded)	One @ 6.6 kHz	One @ 20 kHz	Two @ 20 kHz
High Speed Counters (expansion)			with 1769-HSC counter With two quadrature or four pulse/count @ 1 MHz
Real Time Clock		Optional	Optional
Motion: Pulse Width Modulated		1 @ 20 kHz	2 @ 20 kHz
Motion: Pulse Train Outputs		1 @ 20 kHz	2 @ 20 kHz
Data Access Tool			Optional
Data Logging			48 KB
Recipe Storage			Uses user program memory or 48 KB data logging memory
Floating Point Math		✓	✓
Programming			
Windows - RSLogix 500/Micro Software	✓	✓	✓
Communication			
RS-232 Ports	(1) 8-pin mini DIN	(1) 8-pin mini DIN (1) 8-pin mini DIN Programming/HMI	(1) 8-pin mini DIN (1) 9-pin D-shell

MicroLogix Controllers Feature Comparison Chart

Controller	MicroLogix 1000	MicroLogix 1200/1200R	MicroLogix 1500 1764-LSP, 1764-LRP
Bulletin Number	**1761**	**1762**	**1764**
DeviceNet Peer-to-Peer Messaging, slave I/O			With 1769-SDN
DeviceNet Scanner			With 1769-SDN
EtherNet/IP	With 1761-NET-ENI or 1761-NET-ENIW	With 1761-NET-ENI or 1761-NET-ENIW	With 1761-NET-ENI or 1761-NET-ENIW
Web Server Capabilities	With 1761-NET-ENIW	With 1761-NET-ENIW	With 1761-NET-ENIW
DH-485	Network with 1761-NET-AIC	Network with 1761-NET-AIC	Network with 1761-NET-AIC
SCADA RTU - DF1 half-duplex slave	✓	✓	✓
SCADA RTU - DF1 radio modem		✓	✓
SCADA RTU - Modbus RTU slave		✓	✓
SCADA RTU - Modbus RTU master		✓	✓
ASCII - Read/Write		✓	✓
Operating Power			
120/240V AC	✓	✓	✓
24V DC	✓	✓	✓
12V DC			
Agency Certifications			
CE, EAC, RCM, UL, and C-UL (including Class I, Division 2 Hazardous Location)	✓	✓	✓

Programming Instructions

MicroLogix controllers have the range of functionality necessary to address diverse applications. The controllers use the following types of instructions:

- Basic instructions (for example, Examine if On, Examine if Off)
- Data Comparison instructions (for example, Equal, Greater than or Equal, Less than or Equal)
- Data Manipulation instructions (for example, Copy, Move)
- Math instructions (for example, Add, Subtract, Multiply)
- Program Flow Control instructions (for example, Jump, Subroutine)
- Application Specific instructions (for example, Programmable Limit Switch, Sequencer)
- High-speed Counter instruction
- High-speed pulse train output (PTO) and pulse width modulated (PWM) instructions (for MicroLogix 1200 and 1500 controllers only)
- Communication instruction (including ASCII for MicroLogix 1200 and 1500 controllers only)
- Recipe instruction (MicroLogix 1500 controllers only)
- Data Logging instruction (MicroLogix 1500 1764-LRP processor only)

Controller Specifications

Controller General Specifications

Attribute	MicroLogix 1000 (Bulletin 1761)	MicroLogix 1200 (Bulletin 1762)	MicroLogix 1500 (Bulletin 1764)
Memory Size and Type	1 KB EEPROM (approximately 737 instruction words, 437 data words)	6 KB flash memory: 4 KB user program, 2 KB user data	1764-LSP processor: 7 KB user memory (total user program plus data) 1764-LRP processor: 14 KB user memory (total user program plus data)
Data Elements	512 internal bits, 40 timers, 32 counters, 16 control files, 105 integer files, 33 diagnostic status	configurable, user-defined file structure, 2 KB max data size	configurable, user-defined file structure, 4 KB max data size
Throughput	1.5 ms (for a typical 500-instruction program)(1)	2 ms (for a typical 1 KB word user program)(2)	1 ms (for a typical 1 KB word user program)(2)

(1) A typical program contains 360 contacts, 125 coils, 7 timers, 3 counters, and 5 comparison instructions.

(2) A typical user program contains bit, timer, counter, math, and file instructions.

Environmental Specifications and Certifications

Attribute	1761 Controllers	1762 Controllers	1764 Controllers
Operating Temperature	Horizontal mounting: 0…55 °C (32…131 °F) Vertical mounting(1): 0 °C…45 °C (32 °F…113 °F) for digital I/O, 0 °C…40 °C (32 °F…104 °F) for analog I/O	0…55 °C (32…131 °F)	0…55 °C (32…131 °F)
Storage Temperature	-40…85 °C (-40…185 °F)	-40…85 °C (-40…185 °F)	-40…85 °C (-40…185 °F)(2)
Relative Humidity	5…95%, noncondensing	5…95%, noncondensing	5…95%, noncondensing
Vibration	Operating: 5 Hz…2 kHz, 0.381 mm (0.015 in.) peak-to-peak, 2.5 g panel mounted(3), 1 hr per axis Nonoperating: 5 Hz…2 kHz, 0.762 mm (0.030 in.) peak-to-peak, 5 g, 1 hr per axis	10…500 Hz, 5 g, 0.030 in. max peak-to-peak, 2 hours each axis (Relay Operation: 1.5 g)	10…500 Hz, 5 g, 0.030 in. max peak-to-peak (Relay Operation: 2 g)
Shock, Operating	10 and 16 Point Controllers: 10 g peak acceleration (7.5 g DIN rail mounted) (11 ± 1 ms duration) 3 times each direction, each axis 32 Point and Analog Controllers: 7.5 g peak acceleration (5.0 g DIN rail mounted) (11 ± 1 ms duration) 3 times each direction, each axis	30 g; 3 pulses each direction, each axis (Relay Operation: 7 g)	without Data Access Tool installed: 30 g panel mounted (15 g DIN Rail mounted) Relay operation: 7.5 g panel mounted (5 g DIN Rail mounted) with Data Access Tool installed: 20 g panel mounted (15 g DIN Rail mounted) Relay operation: 7.5 g panel mounted (5 g DIN Rail mounted)

Environmental Specifications and Certifications

Attribute	1761 Controllers	1762 Controllers	1764 Controllers
Shock, Nonoperating	10 and 16 Point Controllers: 20g peak acceleration (11 ± 1 ms duration), 3 times each direction, each axis 32 Point and Analog Controllers: 20g peak acceleration (11 ± 1 ms duration), 3 times each direction, each axis	50 g panel mounted (40 g DIN Rail mounted); 3 pulses each direction, each axis	without Data Access Tool installed: 40 g panel mounted (30 g DIN Rail mounted) with Data Access Tool installed: 30 g panel mounted (20 g DIN Rail mounted)
Agency Certification	• UL Listed Industrial Control Equipment for use in Class 1, Division 2, Hazardous Locations, Groups A, B, C, D • C-UL Listed Industrial Control Equipment for use in Canada • CE marked for all applicable directives • RCM marked for all applicable acts • EAC certified for all applicable directives		
Electrical/EMC	The controller has passed testing at the following level		
ESD Immunity	EN 61000-4-2 8 kV	EN 61000-4-2 4 kV contact, 8 kV air, 4 kV indirect	
Radiated Immunity			
Radiated RF Immunity	EN 61000-4-3 10 V/m, 27…1000 MHz, 3 V/m, 87…108 MHz, 174…230 MHz, and 470…790 MHz	EN 61000-4-3 10 V/m, 80…1000 MHz, 80% amplitude modulation, +900 MHz keyed carrier	
Electronic Fast Transient/Burst (EFT/B) Immunity	EN 61000-4-4 Power Supply, I/O: 2 kV Communication: 1 kV	EN 61000-4-4 Power Supply, I/O: 2 kV, 5 kHz Communication Cable: 1 kV, 5 kHz	
Surge Transient Immunity	EN 61000-4-5 Communication: 1 kV galvanic gun I/O: 2 kV CM (Common mode), 1 kV DM (Differential mode) AC Power Supply: 4 kV CM (Common mode), 1 kV DM (Differential mode)	EN 61000-4-5 Communication: 1 kV galvanic gun I/O: 2 kV CM (common mode), 1 kV DM (differential mode) AC Power Supply: 4 kV CM (Common mode), 2 kV DM (Differential mode) DC Power Supply: 500V CM (Common mode), 500V DM (Differential mode)	
Conducted RF Immunity	EN 61000-4-6 Power Supply, I/O: 10V, 150 kHz…30 MHz Communication Cable 3V	EN 61000-4-6 Power Supply, I/O: 10V Communication Cable 3V	

(1) DC input voltage derated linearly from 30 °C (86 °F) (30…26.4V).

(2) Recommended storage temperature for maximum battery life (5 years typical with normal operating/storage conditions) of Real-time Clock modules is -40…40 °C (-40…104 °F). Battery life can be significantly shorter at elevated temperatures. Applies to 1762-RTC, 1762-MM1RTC, 1764-RTC, 1764-MM1RTC, and 1764-MM2RTC devices.

(3) DIN rail mounted controller is 1 g.

Select Family: MicroLogix 1100 or 1400 Controller

Step 1 - Select:

- controller family - based on memory, I/O, added functionality, programming instructions and dimensions
- consider future expansion requirements
- consider requirement for online editing
- consider the need for networked communication

Review the Features, Programming Instructions, Controller Specifications, and Controller Dimensions to determine which level of MicroLogix controller is required.

Features

MicroLogix Controllers Feature Comparison Chart

Controller	MicroLogix 1100	MicroLogix 1400
Bulletin Number	**1763**	**1766**
Memory (in user words) User Program/User Data		
Up to 1 KB		
Up to 6 KB		
Up to 7 KB		
Up to 8 KB	4 KB/4 KB	
Up to 14 KB		
Up to 20 KB		10 KB/10 KB
Online editing	✓	✓
Nonvolatile program and data	Battery back-up static RAM	Battery back-up static RAM
Memory Module (for program back-up and transport)	Optional	Optional
I/O		
Embedded Digital I/O, max	16	32
Embedded Analog I/O	Two 0…10V DC inputs on all controllers	Four 0…10V DC inputs on some controllers Two 0...10V DC outputs on some controllers
Local Expansion I/O, max	144	256
Thermocouple/RTD	Expansion	Expansion
Added Functionality		
Trim Potentiometers	Two (digital)	Two (digital)
PID	✓	✓
High Speed Counters (embedded)	One @ 40 kHz	Up to six @ 100 kHz
Real Time Clock	✓	✓
Motion: Pulse Width Modulated	2 @ 40 kHz	3 @ 40 kHz
Motion: Pulse Train Outputs	2 @ 40 kHz	3 @ 100 kHz
Data Access Tool	✓	✓
Data Logging	128 KB	128 KB
Recipe Storage	Uses up to 64 KB data logging memory	Uses up to 64 KB data logging memory
Floating Point Math	✓	✓
Programming		
Windows - RSLogix 500 Software	✓	✓
RSLogix Micro	✓	✓
Communication		
RS-232 Ports	(1) 8-pin mini DIN	(1) 8-pin mini DIN (1) 9-pin D-shell
EtherNet/IP	✓	✓
Web Server Capabilities	✓	✓
DH-485	Network with 1763-NC01	Network with 1763-NC01
SCADA RTU - DF1 half-duplex master/slave	✓	✓

MicroLogix Controllers Feature Comparison Chart

Controller	MicroLogix 1100	MicroLogix 1400
Bulletin Number	**1763**	**1766**
SCADA RTU - DF1 radio modem	✓	✓
SCADA RTU - Modbus RTU slave	✓	✓
SCADA RTU - Modbus RTU master	✓	✓
SCADA RTU - DNP3 slave		✓
ASCII - Read/Write	✓	✓
DNP3 over IP		✓
Modbus TCP/IP		✓
Operating Power		
120/240V AC	✓	✓
24V DC	✓	✓
12V DC	✓	
Agency Certifications		
CE, EAC, RCM, UL, and C-UL (including Class I, Division 2 Hazardous Location)(1)	✓	✓

(1) See the Product Certification link at http://www.ab.com for Declarations of Conformity, Certificates, and other certification details.

Programming Instructions

MicroLogix controllers have the range of functionality necessary to address diverse applications. The controllers use the following types of instructions:

- Basic instructions (for example, Examine if On, Examine if Off)
- Data Comparison instructions (for example, Equal, Greater than or Equal, Less than or Equal)
- Data Manipulation instructions (for example, Copy, Move)
- Math instructions (for example, Add, Subtract, Multiply)
- Program Flow Control instructions (for example, Jump, Subroutine)
- Application Specific instructions (for example, Programmable Limit Switch, Sequencer)
- High-speed Counter instruction
- High-speed pulse train output (PTO) and pulse width modulated (PWM) instructions
- Communication instruction including ASCII
- Recipe instruction
- Data Logging instruction
- LCD instruction
- Trigonometry instructions (MicroLogix 1400 controllers only)
- Advanced math instructions (for example, x^y, compute - MicroLogix 1400 controllers only)
- Advanced timing instructions (for example, Read High-speed clock, compute time difference - MicroLogix 1400 controllers only)

Controller Specifications

Controller General Specifications

Attribute	MicroLogix 1100 (Bulletin 1763)	MicroLogix 1400 (Bulletin 1766)
Memory Size and Type	8 KB battery backed RAM: 4 K user program, 4 K user data	20 KB battery backed RAM: 10 K user program, 10 K user data
Data Elements	configurable, user defined file structure, 4 KB max data size	configurable, user defined file structure, 10 KB max data size
Throughput	1.5 ms (for a typical 1 KB word user program)(1)	0.7 ms (for a typical 1 KB word user program)(1)

(1) A typical user program contains bit, timer, counter, math, and file instructions.

Environmental Specifications and Certifications

Attribute	1763 Controllers	1766 Controllers
Operating Temperature	-20…65 °C (-4…149 °F)	-20…60 °C (-4…140 °F)
Storage Temperature	-40…85 °C (-40…185 °F)	-40…85 °C (-40…185 °F)
Relative Humidity	5…95%, noncondensing	5…95%, noncondensing
Vibration	10…500 Hz, 5 g, 0.015 in. max peak-to-peak, (Relay Operation: 1.5 g)	10…500 Hz, 3 g, 0.015 in. max peak-to-peak
Shock, Operating	30 g; 3 pulses each direction, each axis (Relay Operation: 7 g)	30 g; 3 pulses each direction, each axis
Shock, Nonoperating	50 g panel mounted (40 g Din Rail mounted); 3 pulses each direction, each axis	50 g panel mounted (40 g Din Rail mounted); 3 pulses each direction, each axis
Agency Certification	• UL Listed Industrial Control Equipment for use in Class 1, Division 2, Hazardous Locations, Groups A, B, C, D • C-UL Listed Industrial Control Equipment for use in Canada • CE marked for all applicable directives • RCM marked for all applicable acts • EAC marked for all applicable acts	• UL Listed Industrial Control Equipment for use in Class 1, Division 2, Hazardous Locations, Groups A, B, C, D • C-UL Listed Industrial Control Equipment for use in Canada • CE marked for all applicable directives • RCM marked for all applicable acts • EAC marked for all applicable acts
Electrical/EMC		
ESD Immunity	EN 61000-4-2 4 kV contact, 8 kV air, 4 kV indirect	EN 61000-4-2 4 kV contact, 8 kV air
Radiated Immunity	ENV 50204 10 V/m, 1000 MHz	
Radiated RF Immunity	EN 61000-4-3 10V/m, 26...1000 MHz (alternatively, 80...1000 MHz), 80% amplitude modulation, +900 MHz keyed carrier	EN 61000-4-3 10V/m, 26...1000 MHz (alternatively, 80...1000 MHz), 80% amplitude modulation, +900 MHz keyed carrier

Environmental Specifications and Certifications

Attribute	1763 Controllers	1766 Controllers
Electronic Fast Transient/Burst (EFT/B) Immunity	EN 61000-4-4 2 kV, 5 kHz communication cable such as EtherNet, RS-232, and RS-485: 1 kV, 5 kHz	EN 61000-4-4 2 kV, 5 kHz communication cable such as EtherNet, RS-232, and RS-485: 1 kV, 5 kHz
Surge Transient Immunity	EN 61000-4-5 Unshielded communication cable: 2 kV CM (common mode), 1 kV DM (differential mode) Shielded communication cable: 1 kV galvanic gun I/O: 2 kV CM (common mode), 1 kV DM (differential mode) AC Power Supply Input: 4 kV CM (common mode), 2 kV DM (differential mode) DC Power Supply Input: 500V CM (common mode), 500V DM (differential mode) AC/DC Auxiliary Output: 500V CM (common mode), 500V DM (differential mode)	EN 61000-4-5 ±1 kV line-line (DM) and ±2 kV line-earth (CM) on AC power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports ±1 kV line-earth (CM) on communication ports
Conducted RF Immunity	EN 61000-4-6 10V, 150 kHz...80 MHz	EN 61000-4-6 10V, 150 kHz...80 MHz
Conducted Emissions	EN 55011 AC Power Supply Input: 150 kHz...30 MHz	EN 55011 AC Power Supply Input: 150 kHz...30 MHz
Radiated Emissions	EN 55011 30...1000 MHz	EN 55011 30...1000 MHz
Line Related Tests	EN 61000-4-11 AC Power Supply Input: voltage drop: -30% for 10 ms, -60% for 100 ms voltage interrupt: at voltage greater than -95% for 5 s. voltage fluctuation: +10% for 15 minutes, -10% for 15 minutes DC Power Supply Input: voltage fluctuation: +20% for 15 minutes, -20% for 15 minutes	EN 61000-4-11 60% dip for 10 periods on AC supply ports 30% dips for 25 periods at 0× and 180× on AC supply ports 100% dip for 250 periods at 0× and 180× on AC supply ports 100% dip for 0.5 periods, arbitrary angle, on AC supply ports

Controller Dimensions

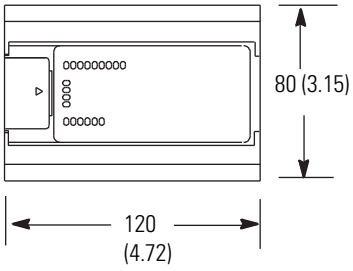
MicroLogix 1000 Controller

Dimensions are in millimeters (inches).

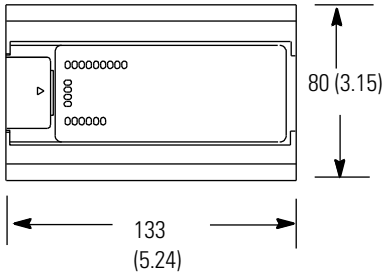
Controller Spacing = 50 mm (2 in.) on all sides for adequate ventilation.

MicroLogix Controller Dimensions

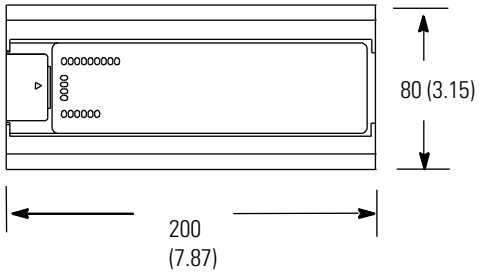
1761-L10BWA, 1761-L10BWB, 1761-L10BXB, 1761-L16BBB, 1761-L16BWA, 1761-L16BWB, 1761-L16NWA, 1761-L16NWB



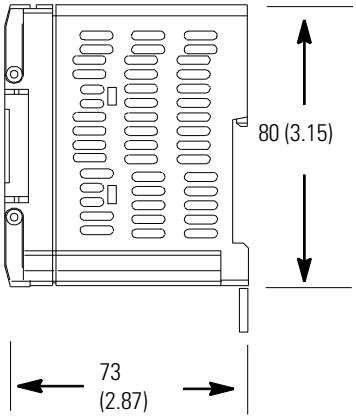
1761-L16AWA



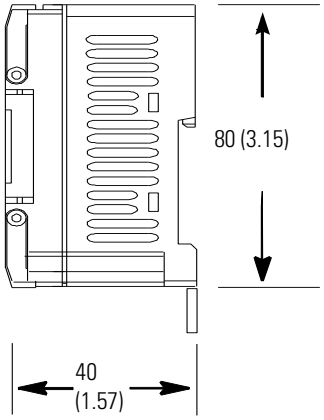
1761-L20AWA,1761 -L20BWA, 1761-L20BWB, 1761-L32AWA,1761 -L32BWA, 1761-L32AAA, 1761-L32BBB, 1761-L32BWB



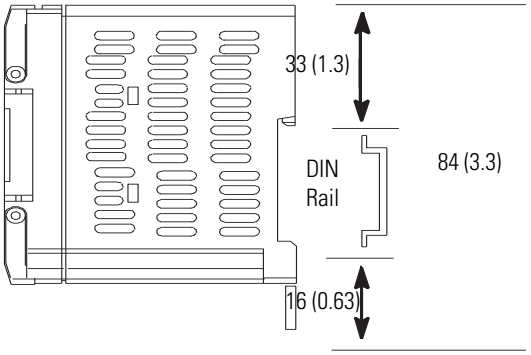
1761-L10BWA, 1761-L16AWA, 1761-L16BWA, 1761-L16NWA, 1761-L20AWA, 1761-L20BWA, 1761-L32AWA, 1761-L32BWA, 1761-L32AAA



1761-L10BWB, 1761-L16BWB, 1761-L16BBB, 1761-L16NWB, 1761-L20BWB, 1761-L32BWB, 1761-L32BBB



MicroLogix 1000 DIN Rail Dimensions

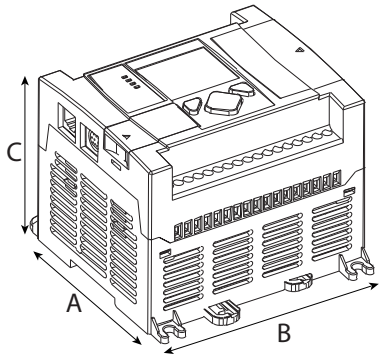


MicroLogix 1100 Controller

Dimensions are in millimeters (inches).

Controller Spacing = 50 mm (2 in.) on all sides for adequate ventilation.

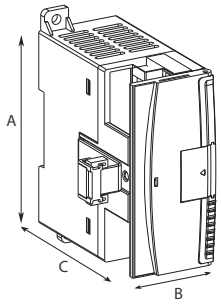
MicroLogix 1100 Controller Dimension Drawing



MicroLogix 1100 Controller Dimensions

Dimension	1763-L16AWA, 1763-L16BWA, 1763-L16BBB, 1763-L16DWD
A	90 mm (3.5 in.)
B	110 mm (4.33 in.)
C	87 mm (3.43 in.)

1762 Expansion I/O Module Dimension Drawing

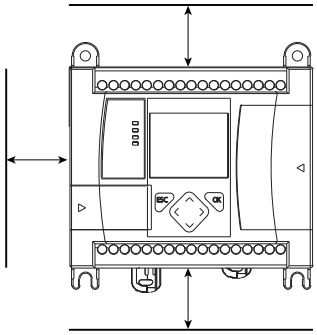


1762 Expansion I/O Dimensions

Dimension	Expansion I/O Module
A	90 mm (3.5 in.)
B	40 mm (1.57 in.)
C	87 mm (3.43 in.)

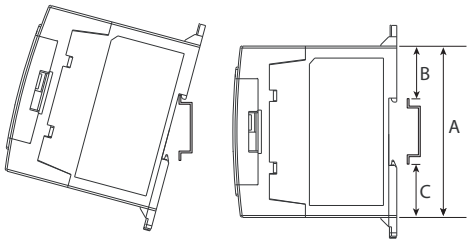
Controller Spacing

The controller mounts horizontally, with the expansion I/O extending to the right of the controller. Allow 50 mm (2 in.) of space on all but the right side for adequate ventilation, as shown below.



DIN Rail Mounting

The maximum extension of the latch is 14 mm (0.55 in.) in the open position. A flat-blade screwdriver is required for removal of the controller. The controller can be mounted to EN50022-35 x 7.5 or EN50022-35 x 15 DIN rails. DIN rail mounting dimensions are shown below.



DIN Rail Mounting Dimensions

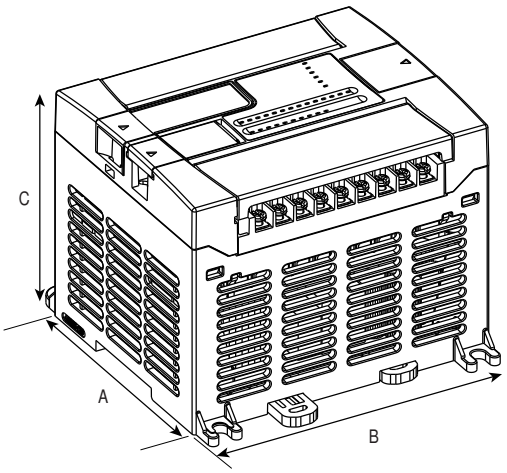
Dimension	Height
A	90 mm (3.5 in.)
B	27.5 mm (1.08 in.)
C	27.5 mm (1.08 in.)

MicroLogix 1200 Controller

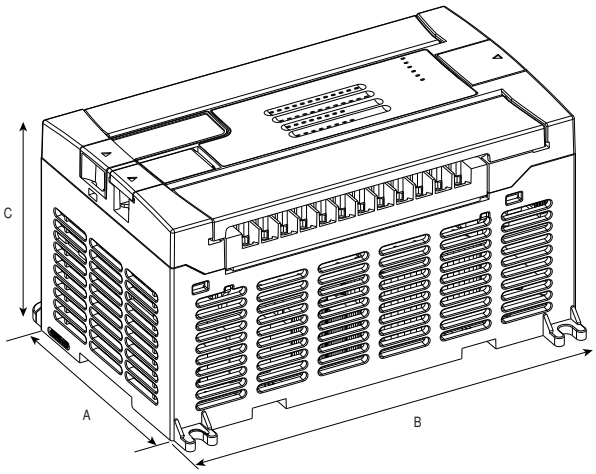
Dimensions are in millimeters (inches).

Controller Spacing = 50 mm (2 in.) on all sides for adequate ventilation.

MicroLogix 1200 Controller Dimension Drawing



1762-L24AWA, 1762-L24BWA, 1762-L24BXB
1762-L24AWAR, 1762-L24BWAR, 1762-L24BXBR

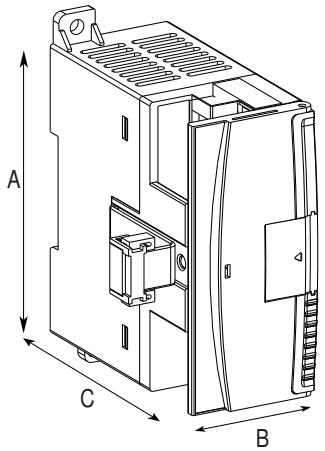


1762-L40AWA, 1762-L40BWA, 1762-L40BXB
1762-L24AWAR, 1762-L24BWAR, 1762-L24BXBR

Controller Dimensions

Dimension	1762-L24AWA 1762-L24AWAR	1762-L24BWA 1762-L24BWAR	1762-L24BXB 1762-L24BXBR	1762-L40AWA 1762-L40AWAR	1762-L40BWA 1762-L40BWAR	1762-L40BXB 1762-L40BXBR
A	90 mm (3.5 in.)			90 mm (3.5 in.)		
B	110 mm (4.33 in.)			160 mm (6.30 in.)		
C	87 mm (3.43 in.)			87 mm (3.43 in.)		

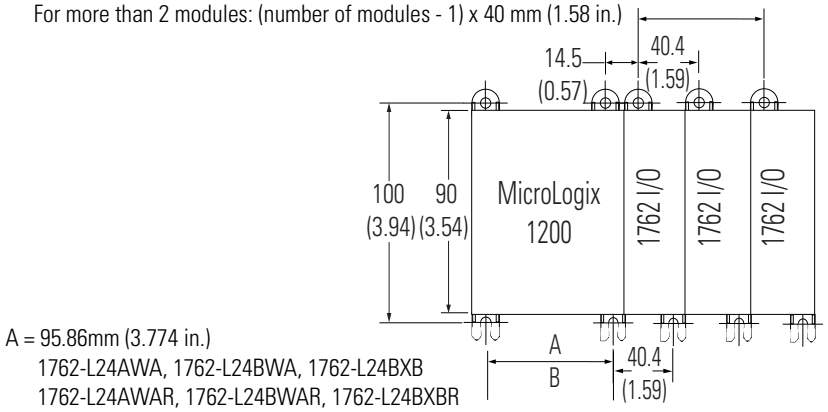
1762 Expansion I/O Dimensions



1762 I/O Dimensions

Dimension	Expansion I/O Module
A	90 mm (3.5 in.)
B	40 mm (1.57 in.)
C	87 mm (3.43 in.)

MicroLogix 1200 System Mounting Dimensions



A = 95.86mm (3.774 in.)
1762-L24AWA, 1762-L24BWA, 1762-L24BXB
1762-L24AWAR, 1762-L24BWAR, 1762-L24BXBR

B = 145.8 mm (5.739 in.)
1762-L40AWA, 1762-L40BWA, 1762-L40BXB
1762-L40AWAR, 1762-L40BWAR, 1762-L40BXBR

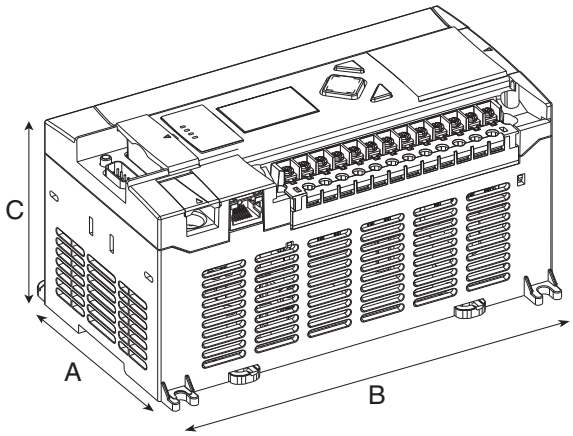
Important: All dimensions are in mm (inches). Hole spacing tolerance: ±0.4 mm (0.016 in.).

MicroLogix 1400 Controller

Dimensions are in millimeters (inches).

Controller Spacing = 50 mm (2 in.) on all sides for adequate ventilation. Refer to page 27 for DIN rail mounting dimensions.

MicroLogix 1400 Controller Dimension Drawing

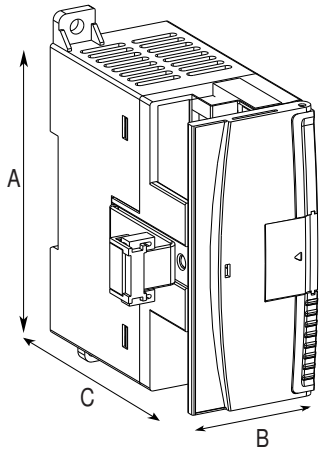


1766-L32BWA, 1766-L32AWA, 1766-L32BXB,
1766-L32BWAA, 1766-L32AWAA, 1766-L32BXBA

Controller Dimensions

Dimension	Height
A	90 mm (3.5 in.)
B	180 mm (7.08 in.)
C	87 mm (3.43 in.)

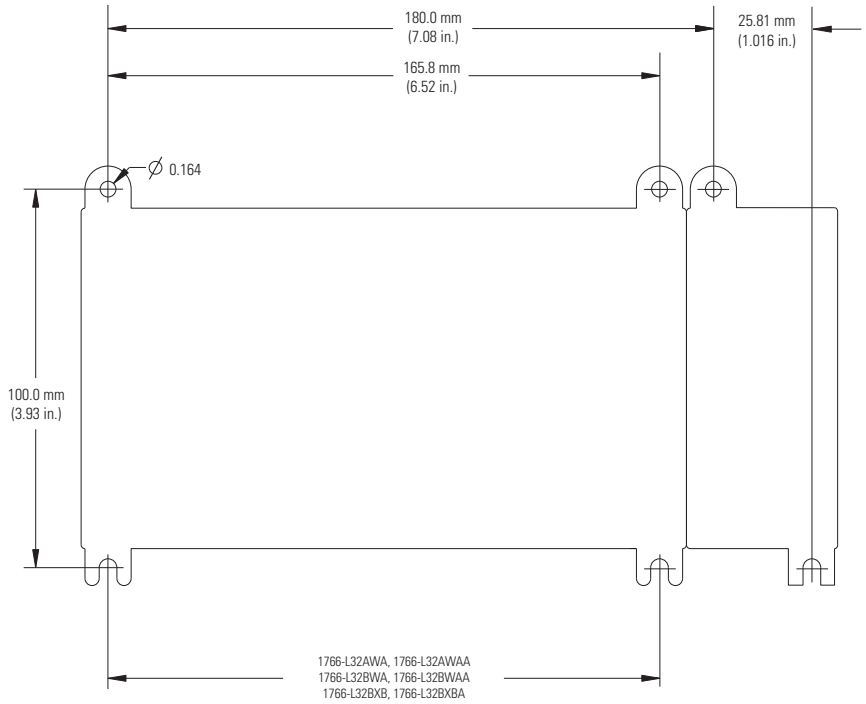
1762 Expansion I/O Dimensions



1762 I/O Dimensions

Dimension	Expansion I/O Module
A	90 mm (3.5 in.)
B	40 mm (1.57 in.)
C	87 mm (3.43 in.)

MicroLogix 1400 System Mounting Dimension



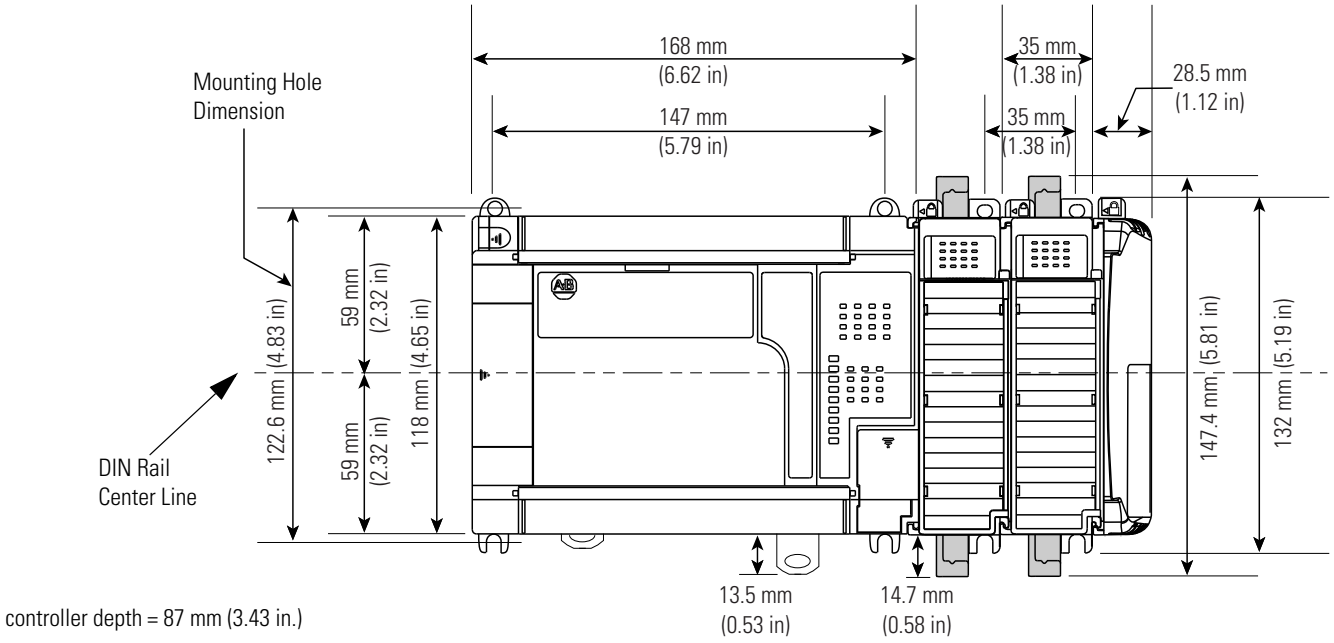
MicroLogix 1500 Controller

Dimensions are in millimeters (inches).

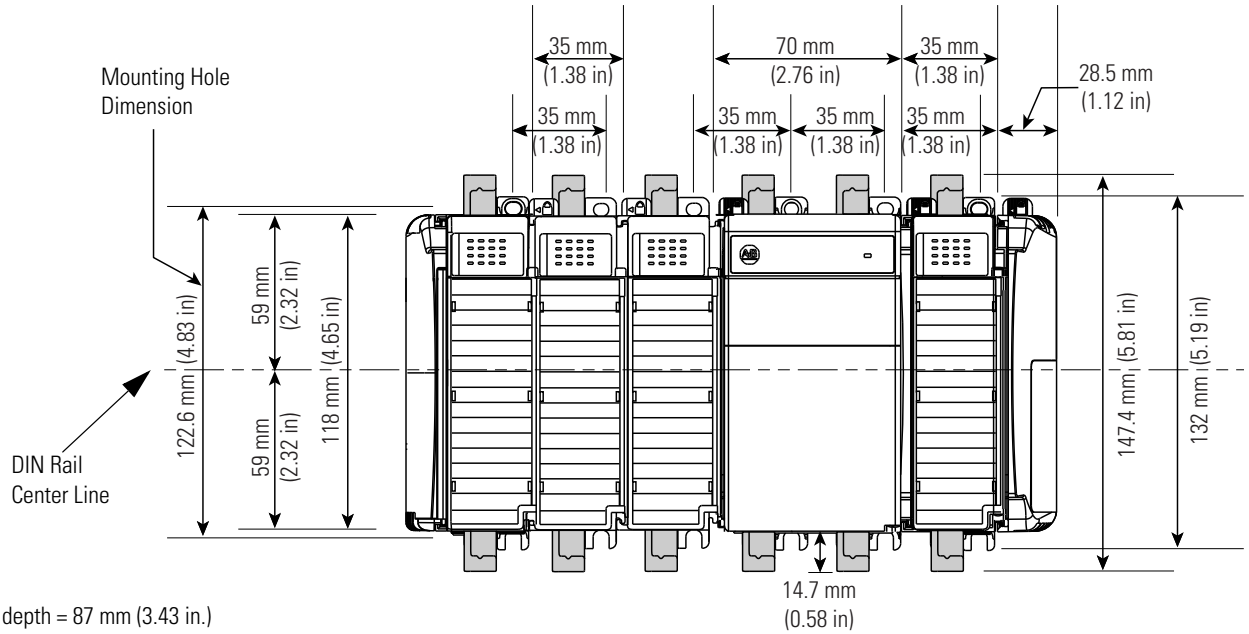
Hole spacing tolerance: ±0.04 mm (0.016 in.).

Controller Spacing = 50 mm (2 in.) on all sides for adequate ventilation.

Compact I/O System with MicroLogix 1500 Base Unit and Processor



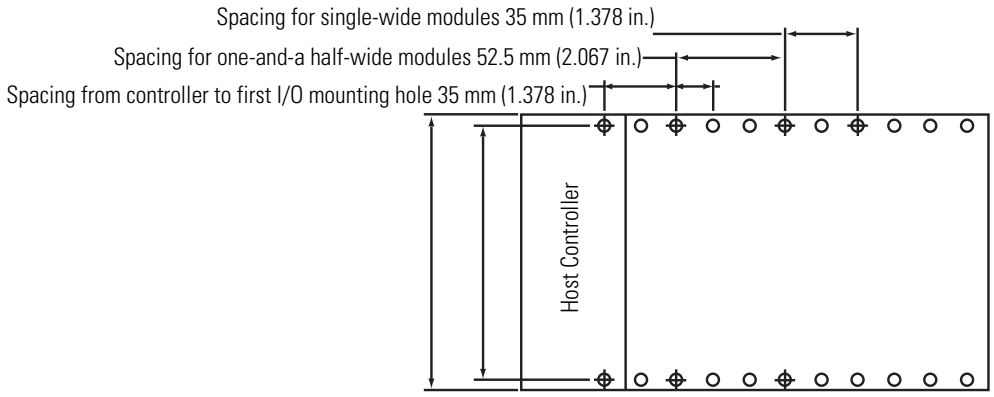
Expansion Bank with Power Supply, Expansion Cable, and End Cap



controller depth = 87 mm (3.43 in.)
Expansion Cable connector and End Cap have identical dimensions.

Spacing for Single-wide and One and One-half-wide Modules

Panel Mounting Using the Dimensional Template:



Important: Overall hole spacing tolerance: ±0.4 mm (0.016 in.).

Locate holes every 17.5 mm (0.689 in.) to allow for a mix of single-wide (for example 1769-IQ16 module) and one-and-one-half-wide modules (for example 1769-OA16 module).

Select Communication

Step 2 - Select:

- communication network - based on application requirements
- communication interface device - if required
- record your selection in the Selection Record (starts on page 87)

Communication Networks

MicroLogix controllers allow you to choose the network that best meets your needs.

- Channel 0 Isolated RS-232/RS-485 Combo port (MicroLogix 1100 and 1400 controllers only)
- EtherNet/IP port (MicroLogix 1100 and 1400 controllers only)
- DNP3 over IP (MicroLogix 1400 controller only)
- Modbus TCP/IP (MicroLogix 1400 controller only)
- For RS-232 communication:
  - 300, 600, 1200, 4800, 9600 bps; 19.2 and 38.4 Kbps
  - RTS/CTS hardware handshake signals
  - Connection to DH-485 and Ethernet networks through the 1761-NET-AIC and 1761-NET-ENI interface modules, respectively (MicroLogix 1500 controllers connect to DeviceNet network via the 1769-SDN DeviceNet Scanner Module)
  - Connection to modems for remote communication
  - ASCII messaging provides dial-out capability (except MicroLogix 1000 controller)
  - DF1 half-duplex slave
  - DF1 half-duplex master (except MicroLogix 1000 controller)
  - DNP3 slave (MicroLogix 1400 controller only)
  - Modbus RTU master/slave through the 1761-NET-AIC module (MicroLogix 1100 and 1400 controllers also connect to Modbus RTU master/slave directly through 1763-NC01 cable to Channel 0)

Important: The MicroLogix 1100 and 1400 controllers do not provide 24V DC power for network interface whereas all other MicroLogix controllers do. The 24V DC comms power must be provided externally when 1761-NET-AIC or 1761-NET-ENI or 1761-NET-ENIW modules are used with a MicroLogix 1100 and 1400 controller. MicroLogix 1100 and 1400 controllers provide direct connection to RS-485 networks by using the same pins used by other MicroLogix controllers for 24V DC communication power.

MicroLogix Controller Network Options
(RS-232 unless otherwise noted)

If your application requires	Use this network
• Connection to dial-up modems for remote program maintenance or data collection • Connection to leased-line or radio modems for use in SCADA systems • Remote Terminal Unit (RTU) functions • Program upload, download, and monitoring	DF1 full-duplex DF1 half-duplex slave/master DF1 radio modem
• Plant-wide and cell-level data sharing with program maintenance • Data sharing between 32 controllers • Peer-to-peer communication • Program upload, download, and monitoring • Compatibility with multiple Allen-Bradley HMI devices	DH-485 directly through channel 0 RS-485 port using 1763-NC01 cable(1) DH-485 via the 1761-NET-AIC Advanced Interface Converter(2)
• Program upload, download, and monitoring • Peer-to-peer communication • E-mail communication • 10/100 Base-T port with embedded status indicators • Web server capability via the 1761-NET-ENIW module	EtherNet/IP network directly through Channel 1 10/100 Mbps communication port(3) EtherNet/IP network via the 1761-NET-ENI Ethernet Interface or 1761-NET-ENIW Web-Enabled Ethernet Interface(2)
• Connection to third party devices for remote data collection in a SCADA system (for example, telephone modems, radio modems, and leased lines.) • Remote Terminal Unit (RTU) functions	Modbus RTU master/slave directly through channel) RS-485 port using 1763-NC01 cable(2) Modbus RTU slave via the 1761-NET-AIC Advanced Interface Converter(2) Modbus RTU master via the 1761-NET-AIC Advanced Interface Converter(2) DNP3 slave via RS-232(4) DNP3 over IP(4) Modbus TCP/IP(4)

(1) MicroLogix 1100 and 1400 controllers only.

(2) MicroLogix 1100 and 1400 controllers do not provide 24V DC power for network interface devices. External 24V DC module power must be supplied.

(3) Direct EtherNet/IP connections through MicroLogix 1100 and 1400 controllers provide web server capabilities as well as support for email communication.

(4) MicroLogix 1400 controllers only.

MicroLogix Network Interface Devices

The following information describes the functionality of the MicroLogix interface modules. For most applications, the embedded RS-485 and Ethernet/IP functionality of the MicroLogix 1100 and 1400 communication ports replaces the 1761-NET-AIC, 1761-NET-ENI, and the 1761-NET ENIW (or AIC+, ENI, and ENIW) modules.

The network interface devices can be mounted on a panel or DIN rail.

AIC+ Advanced Interface Converter (Catalog Number 1761-NET-AIC)

The AIC+ is an isolated, RS-232 to RS-485 electrical signal converter for supporting serial, half-duplex, multi-drop protocols, such as:

- DH-485.
- DF1 half-duplex master/slave.
- Modbus RTU (a single master can communicate with a maximum of 31 slave devices).

Since RS-232 ports can only be connected point-to-point between two devices, an AIC+ (or similar device) is required whenever a MicroLogix controller is configured for one of these protocols and needs to communicate with more than one other device at a time. The AIC+ also provides electrical isolation between each of its three ports for a more stable network and protection for connected devices.

When using the 1763-NC01 cable, the MicroLogix 1100 and 1400 controller provides isolated connection to RS-485 networks directly from the Channel 0 combo port.

Any MicroLogix controller can connect to either of the two RS-232 ports on the AIC+. When Channel 0 on a MicroLogix controller is connected to Port 2 (RS-232 8-pin mini-DIN) of the AIC+, the interface module can draw its power from the MicroLogix controller. In all other cases, including using MicroLogix 1100 and 1400 controllers, the AIC+ must be powered from an external, 24V DC power supply. The AIC+ can also be used as an RS-232 to RS-485 converter and port isolator for any other Allen-Bradley controller or terminal with an RS-232 port.

Since the AIC+ is not a protocol converter, all devices connected to a single AIC+ (or a network of AIC+s) must be configured for the same communication protocol.

DH-485 Network Specifications

Attribute	1761-NET-AIC
Number of Nodes, max	32 per multidrop network
Length, max	1219 m (4000 ft) per multidrop network

ENI Ethernet Interface (1761-NET-ENI) and ENIW Ethernet Interface with Web Server Capabilities (1761-NET-ENIW)

The ENI provides EtherNet/IP connectivity for all MicroLogix controllers and other DF1 full-duplex devices. The ENI lets you easily connect a MicroLogix controller to a new or existing Ethernet network to update/download programs, communicate between controllers, and generate e-mail messages via SMTP (simple mail transport protocol).

The ENIW adds web server capabilities, enabling the display of 4 standard data web pages with user-configurable data descriptions, and 10 user-configurable web-page links on the ENIW home page.

MicroLogix 1100 and 1400 controllers also provide EtherNet/IP connectivity, web server, and email capabilities directly through Channel 1.

Ethernet Specifications

Attribute	1761-NET-ENI
Communication Rate	100 MHz (series C and D), 10 MHz (series A and B)
Connector	100Base-T (series C and D), 10Base-T (series A and B)

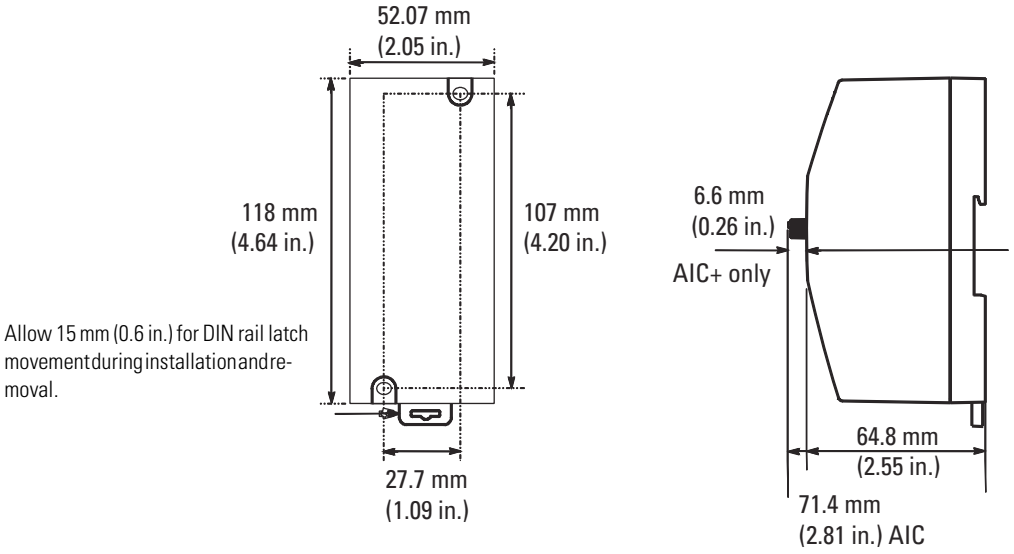
AIC+ and ENI /ENIW Specifications

Network Modules Specifications

Attribute	1761-NET-AIC	1761-NET-ENI, 1761-NET-ENIW
Power Supply DC Voltage Range(1)	20.4…28.8V DC	20.4…26.4V DC
Backplane Current (mA) at 24V	120 mA	50 mA
Inrush Current, max	200 mA	200 mA
Isolation Voltage	500V DC for 1 minute	710V DC for one minute
Operating Temperature	0…60 °C (32…140 °F)	
Storage Temperature	-40…85 °C (-40…185 °F)	
Relative Humidity	5…95% noncondensing	
Vibration	operating: 10…500 Hz, 5.0 g, 0.030 in. peak-to-peak, 2 hour each axis	operating: 10…500 Hz, 5.0 g, 0.030 in. peak-to-peak, 2 hour each axis
Shock, Operating	30 g, ±3 times each axis	30 g, ±3 times each axis
Shock, Nonoperating	50 g, ±3 times each axis	35 g (DIN rail mount) 50 g (panel mount) ±3 times each axis
Certifications	• UL Listed Industrial Control Equipment for use in Class 1, Division 2, Hazardous Locations, Groups A, B, C, D • C-UL Listed Industrial Control Equipment for use in Canada • CE marked for all applicable directives • C-Tick marked for all applicable acts	

(1) When the device is connected to a MicroLogix 1000, 1200, or 1500 controller, power is provided by the MicroLogix controller's communication port. Power is not supplied by the MicroLogix 1100 and 1400 controllers. External 24V DC module power must be supplied.

Network Interface Devices Dimensions



Select Programming Tools and Software

Step 3 - Select:

- programming software - the appropriate RSLogix package for your application
- record your selection in the Selection Record (starts on page 87)

Programming Software

The RSLogix 500 and RSLogix Micro ladder-logic programming packages help you maximize performance, save project development time, and improve productivity. These products have been developed to operate on Windows operating systems. RSLogix 500 software can be used for programming both the SLC 500 and MicroLogix controller families. RSLogix Micro software is for programming MicroLogix controller families only.

RSLogix 500 and RSLogix Micro Selection Chart

Cat. No.	Description
9324-RL0100ENE	RSLogix 500 Starter Edition Programming Software for MicroLogix controller families. (CD-ROM)
9324-RL0300ENE	RSLogix 500 Standard Edition Programming Software for SLC 500 and MicroLogix controller families. (CD-ROM)
9324-RL0700NXENE	RSLogix 500 Professional Edition. CD-ROM also includes RSLogix Emulate 500, RSNetworx for DeviceNet and RSNetworx for ControlNet software.
9324-RLM0100ENE	RSLogix Micro Starter software
9324-RLM0800ENE	RSLogix Micro Developer software

TIP

Download Free Lite Version of RSLogix Micro Starter Software

Now you can download free RSLogix Micro Starter Lite software and RSLinx Lite software to program, upload, and download all MicroLogix 1000 and MicroLogix 1100 controllers.

RSLogix Micro Starter Lite software, when used together with RSLinx Lite software, is fully-functional with all MicroLogix 1000 and MicroLogix 1100 controllers.

Go to http://www.rockwellautomation.com/global/support/plc/micrologix.page? for details.

Select Network and Programming Cables

Cables come in several lengths and connector styles to provide connectivity between MicroLogix controllers and other devices. MicroLogix 1200 controllers require series C versions of all 1761 cables.

Step 4 - Select:

- cables - review device port identification to find cable in the selection chart)
  - record your selection in the Selection Record (starts on page 87)

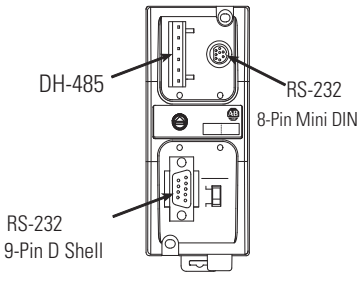
Network Cable Selection

Controller and PC Port Identification

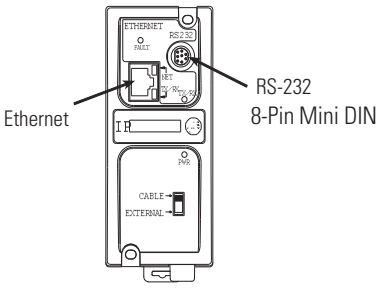
Device	Communication Port Description	Connector Type
MicroLogix 1000	RS-232 Communication Port (Channel 0) with 24V DC power for communication device	8-pin Mini DIN
MicroLogix 1100	RS-232/RS-485 Communication Port (Channel 0, no 24V DC power for communication Interface Modules)	8-pin Mini DIN (isolated)
	10/100Mbps EtherNet/IP Communication Port (Channel 1)	RJ-45
MicroLogix 1200	RS-232 Communication Port (Channel 0) with 24V DC power for communication device	8-pin Mini DIN
MicroLogix 1200R	RS-232 Programming/HMI Port (no 24V DC power)	8-pin Mini DIN
MicroLogix 1400	RS-232/RS-485 Communication Port (Channel 0, no 24V DC power for communication Interface Modules)	8-pin Mini DIN (isolated)
	10/100Mbps EtherNet/IP Communication Port (Channel 1)	RJ-45
	Communication Port (Channel 2)	9-pin D Shell
MicroLogix 1500	Base Unit RS-232 Communication Port (Channel 0) with 24V DC power for communication device	8-pin Mini DIN
MicroLogix 1500 with 1764-LRP Processor	Processor RS-232 Communication Port (Channel 1)	9-Pin D Shell (isolated)
Personal Computer	Personal Computer Serial Communication Port	9-Pin D Shell
	Personal Computer Ethernet Communication Port	RJ-45

Network Interface Devices Communication Port Identification

AIC+



ENI/ENIW



Important: The AIC+ is recommended for isolation purposes when the controller and an operator interface device are not using the same power supply.

Network Cable Selection Chart

Connectors	Length	Cat. No.		Connectors	Length	Cat. No.
8-pin Mini DIN to 8-pin Mini DIN	0.5 m (1.5 ft)	1761-CBL-AM00(1)		8-pin Mini DIN to 9-pin D Shell	2 m (6.5 ft)	1761-CBL-PM02(1)
8-pin Mini DIN to 8-pin Mini DIN	2 m (6.5 ft)	1761-CBL-HM02(1)		8-pin Mini DIN to 9-pin D Shell	5 m (16 ft)	2711-CBL-PM05
8-pin Mini DIN to 8-pin Mini DIN	5 m (16 ft)	2711-CBL-HM05		8-pin Mini DIN to 9-pin D Shell	10 m (32 ft)	2711-CBL-PM10
8-pin Mini DIN to 8-pin Mini DIN	10 m (32 ft)	2711-CBL-HM10		6-pin Phoenix to RJ45 (DH-485)	3 m (10 ft)	1761-CBL-AS03
9-pin D Shell to 9-pin D Shell	0.5 m (1.5 ft)	1761-CBL-AC00		6-pin Phoenix to RJ45 (DH-485)	9 m (30 ft)	1761-CBL-AS09
9-pin D Shell to 9-pin D Shell	3 m (10 ft)	1747-CP3		8-pin Mini DIN to 8-pin Mini DIN	15 m (49.2 ft)	2707-NC9(1)
8-pin Mini DIN with lock mechanism to 9-pin D Shell	2 m (6.5 ft)	1761-CBL-PH02(2)		8-pin Mini DIN to 6-pin DH-485 terminal	30 cm (11.8in.)	1763-NC01 series A
8-pin Mini DIN with lock mechanism to 8-pin Mini DIN with lock mechanism	2 m (6.5 ft)	1761-CBL-AH02(2)		RJ-45 to RJ-45	100 m (328 ft), max	Ethernet Cable(3)
8-pin Mini DIN to 9-pin D Shell	0.5 m (1.5 ft)	1761-CBL-AP00(1)				

(1) Series C or later for Class 1 Div 2 applications.

(2) Series A for Class 1 Div 2 applications.

(3) Commercially available.

Programming Cable Selection

Programming Cable Selection Chart - Programming Device to Controller

Programming Device	MicroLogix 1000, 1100, 1200, 1400, and 1500 Channel 0 (8-pin Mini DIN) MicroLogix 1200 Programming/HMI Port (8-pin Mini DIN)		MicroLogix 1100 and 1400 Channel 1 (RJ-45)		MicroLogix 1400 Channel 2 MicroLogix 1500 with 1764-LRP Processor Channel 1 (9-pin RS-232)	
	Cat. No.	Length	Cat. No.	Length	Cat. No.	Length
Personal Computer (9-pin D Shell)	1761-CBL-PM02	2 m (6.5 ft)	---		1747-CP3	3m (10 ft)
	1761-CBL-PH02(1)	2 m (6.5 ft)	---		---	
Personal Computer (RJ-45)	---		Ethernet Cable(2)	100 m (328 ft), max	---	

(1) Do not use with MicroLogix 1100 and 1400.

(2) Commercially available.

1747-UIC Universal Serial Bus to DH-485 Interface Converter

This device allows a computer with a USB port to interface to DH-485 ports on an SLC 500, MicroLogix, or other Rockwell Automation controllers and on PanelView terminals. The 1747-UIC features a USB connector as well as both an RS-232 and an RS-485 port. Use the RS-232 port to connect to SLC 5/03, 5/04, 5/05 (Channel 0), MicroLogix, CompactLogix, FlexLogix, ControlLogix controllers, PanelView 300 or higher terminals, or the AIC+ interface. Use the RS-485 port to connect to SLC 5/01, 5/02, 5/03 controllers (Channel 1), PanelView 300 or higher terminals, or the 1747-AIC isolated link coupler.

USB to DH-485 Interface Converter Specifications

Cat. No.	1747-UIC
USB Power Consumption	<100 mA (low power)
USB Speed	USB 1.1 (12 Mbps)
DH-485 Baud Rate	19.2 Kbps

Programming Cable Selection Chart - Programming Device to AIC+ (DH-485 only)

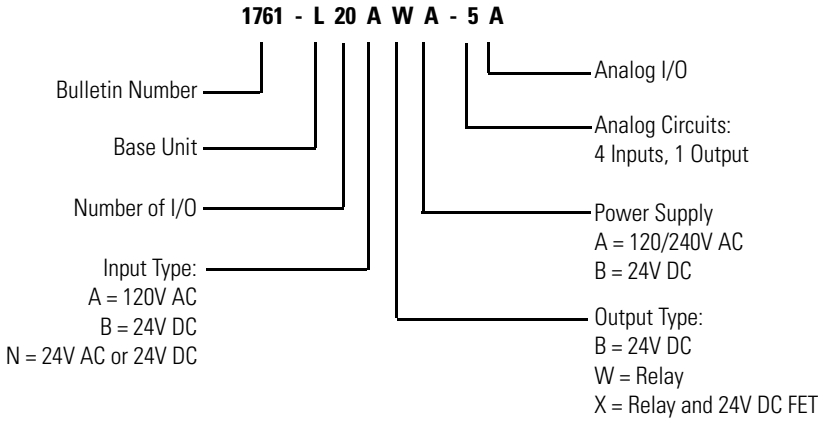
Programming Device	1761-NET-AIC (8-pin Mini DIN) to PC via 1747-UIC Universal Serial Bus to DH-485 Interface Converter		1761-NET-AIC (9-pin D Shell) to PC via 1747-UIC Universal Serial Bus to DH-485 Interface Converter	
	Cat. No.	Length	Cat. No.	Length
Personal Computer (USB Port)	1761-CBL-PM02	2 m (6.5 ft)	1747-CP3	3 m (10 ft)
	1761-CBL-PH02	2 m (6.5 ft)	---	

Select MicroLogix 1000 Controllers

Step 5 - Select:

- controller - review power and I/O configurations to select a controller catalog number; see power supply and I/O specification for more detailed information
- record your selection in the Selection Record (start on page 87)

MicroLogix 1000 Controller Catalog Number Detail



MicroLogix 1000 Controller Power and I/O Configuration

Cat. No.	Line Voltage	Number of Inputs	Number of Outputs(1)	High Speed I/O
1761-L16AWA	120/240V AC	(10) 120V AC	(6) Relay	N/A
1761-L32AWA	120/240V AC	(20) 120V AC	(12) Relay	N/A
1761-L20AWA-5A	120/240V AC	(12) 120V AC, (4) Analog	(8) Relay, (1) Analog	N/A
1761-L32AAA	120/240V AC	(20) 120V AC	(10) Triac, (2) Relay	N/A
1761-L16NWA	120/240V AC	(10) 24V AC or DC	(6) Relay	N/A
1761-L10BWA	120/240V AC	(6) 24V DC	(4) Relay	(1) 6.6 kHz input
1761-L16BWA	120/240V AC	(10) 24V DC	(6) Relay	(1) 6.6 kHz input
1761-L20BWA-5A	120/240V AC	(12) 24V DC, (4) Analog	(8) Relay, (1) Analog	(1) 6.6 kHz input
1761-L32BWA	120/240V AC	(20) 24V DC	(12) Relay	(1) 6.6 kHz input
1761-L10BWB	24V DC	(6) 24V DC	(4) Relay	(1) 6.6 kHz input
1761-L16BWB	24V DC	(10) 24V DC	(6) Relay	(1) 6.6 kHz input

MicroLogix 1000 Controller Power and I/O Configuration

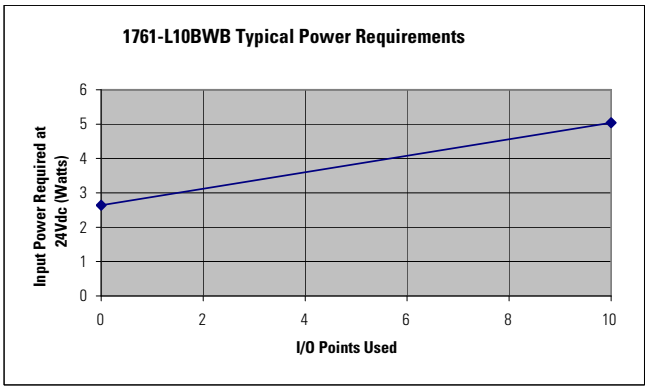
Cat. No.	Line Voltage	Number of Inputs	Number of Outputs[1]	High Speed I/O
1761-L20BWB-5A	24V DC	(12) 24V DC	(8) Relay	(1) 6.6 kHz input
1761-L32BWB	24V DC	(20) 24V DC	(12) Relay	(1) 6.6 kHz input
1761-L10BXB	24V DC	(6) 24V DC	(2) MOSFET sourcing, (2) relay	(1) 6.6 kHz input
1761-L16BBB	24V DC	(10) 24V DC	(4) MOSFET sourcing, (2) relay	(1) 6.6 kHz input
1761-L32BBB	24V DC	(20) 24V DC	(10) MOSFET sourcing, (2) relay	(1) 6.6 kHz input
1761-L16NWB	24V DC	(10) 24V AC or DC	(6) Relay	N/A

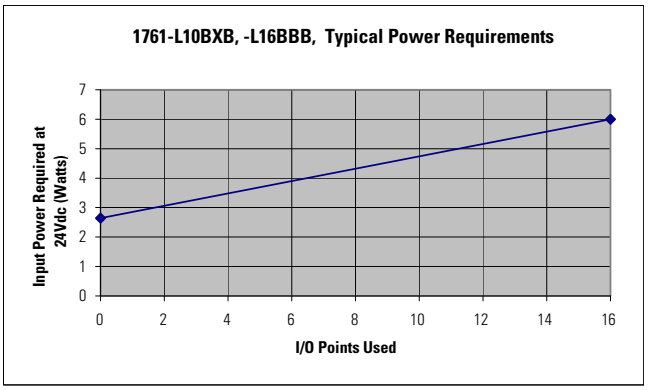
(1) Two individually isolated relays per unit.

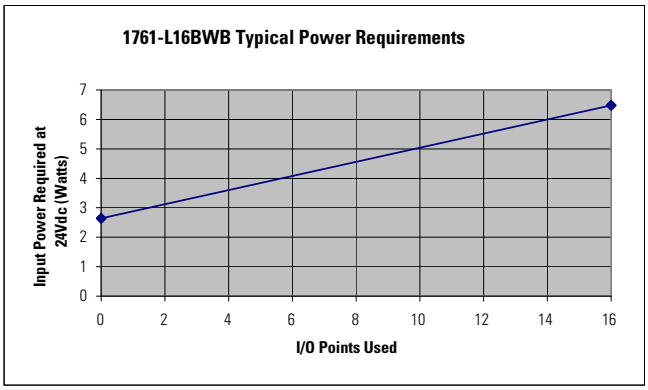
MicroLogix 1000 Controller Power Supply Specifications

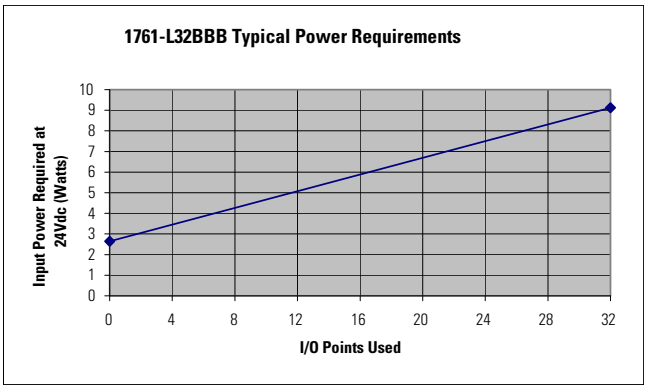
Cat. No.	Power Supply Voltage	Power Consumption			Power Supply Inrush Current (max)	24V DC Sensor Power
1761-		120V AC	240V AC	24V DC		
L16AWA	85…264V AC at 47…63 Hz	15 VA	21 VA	---	30 A for 8 ms	---
L20AWA-5A		20 VA	27 VA	---	30 A for 8 ms	---
L32AWA		19 VA	25 VA	---	30 A for 8 ms	---
L32AAA		16 VA	22 VA	---	30 A for 8 ms	---
L16NWA		26 VA	33 VA	---	30 A for 8 ms	---
L10BWA		24 VA	32 VA	---	30 A for 8 ms	200 mA, 200 µF capacitance, max
L16BWA		26 VA	33 VA	---	30 A for 8 ms	200 mA, 200 µF capacitance, max
L20BWA-5A		30 VA	36 VA	---	30 A for 8 ms	200 mA, 200 µF capacitance, max
L32BWA		29 VA	36 VA	---	30 A for 8 ms	200 mA, 200 µF capacitance, max
L16NWB	20.4…26.4V DC	---	---	5 W	30 A for 4 ms	---
L10BXB		---	---	5 W	30 A for 4 ms	---
L16BBB		---	---	5 W	30 A for 4 ms	---
L10BWB		---	---	5 W	30 A for 4 ms	---
L16BWB		---	---	5 W	30 A for 4 ms	---
L20BWB-5A		---	---	10 W	50 A for 4 ms	---
L32BWB		---	---	7 W	30 A for 4 ms	---
L32BBB		---	---	7 W	30 A for 4 ms	---
L16NWB		---	---	5 W	30 A for 4 ms	---

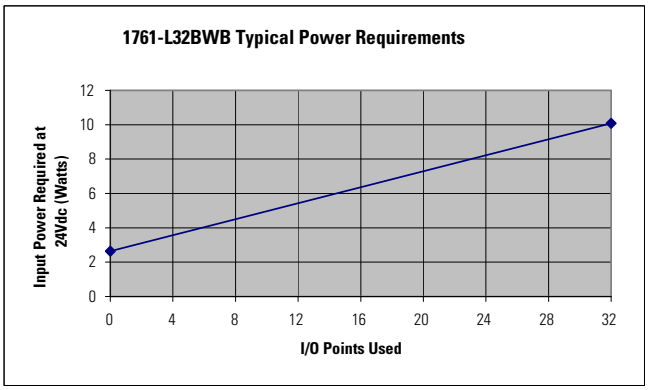
MicroLogix 1000 Controller DC Input Power Requirements Based on I/O Usage

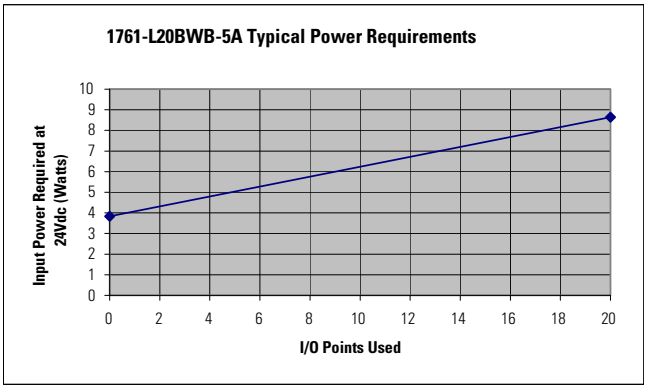












MicroLogix 1000 Controller Digital Input Specifications

Attribute	120/240V AC Controllers	24V DC Controllers	24V AC Controllers
On-state Voltage Range	79…132V AC	14…26.4V DC max @ 55 °C (131 °F) 14…30.0V DC max @ 30 °C (86 °F)	18…26.4V AC @ 55 °C (131 °F) 18…30V AC @ 30 °C (86 °F)
Off-state Voltage Range	0…20V AC	0…5V DC	0…3V AC
Operating Frequency(1)	47…63 Hz	standard inputs: 1.0 kHz, max high-speed inputs: 6.6 kHz, max	47…63 Hz
Signal Delay, max	ON Delay = 20 ms OFF Delay = 20 ms	standard inputs: selectable from 0.5 to 16 ms high-speed inputs: selectable from 0.075 to 16 ms	ON Delay = 20 ms, max OFF Delay = 20 ms, max
On-state Current, min	5.0 mA at 79V AC @ 47 Hz	2.5 mA @ 14V DC	3.0 mA @ 18V AC
On-state Current, nom	12.0 mA at 120V AC @ 60 Hz	8.0 mA @ 24V DC	8.0 mA @ 24V AC
On-state Current, max	16.0 mA at 132V AC @ 63 Hz	12.0 mA @ 30V DC	12 mA @ 30V AC
Off-state Leakage Current, max	2.5 mA	1.5 mA	1.0 mA
Impedance, nom	12 kΩ at 50 Hz, 10 kΩ at 60 Hz	3 kΩ	3 kΩ
Inrush Current, max	250 mA, max(2)	---	---

(1) 1761-L16NWA and 1761-L16NWB controllers do not support high-speed inputs even when using 24V DC inputs.

(2) To reduce the inrush maximum to 35 mA, apply a 6.8 kΩ, 5 W resistor in series with the input. The on-state voltage increases to 92V AC as a result.

MicroLogix 1000 Controller Digital Output Specifications

Attribute	Relay	FET	Triac
Operating Voltage Range	5…125V DC 5…264V AC	20.4…26.4V DC	85…264V AC
Continuous Current per Point, max	See MicroLogix 1500 Controller Relay Contact Rating on page 73.	1.0 A @ 55 °C (131 °F) 1.5 A @ 30 °C (86 °F)	0.5 A @ 55 °C (131 °F) 1.0 A @ 30 °C (86 °F)
Continuous Current per Common, max	8.0 A	3 A for L10BBB and L16BBB 6 A for L32BBB	6 A
Continuous Current per Controller, max	1440 VA	3 A for L10BBB and L16BBB 6 A for L32BBB	1440 VA
On-state Current, min	10.0 mA	1 mA	10.0 mA
Off-state Leakage Current, max	0 mA	1 mA	2 mA at 132V AC 4.5 mA at 264V AC
Signal Delay, max - resistive load	ON Delay = 10 ms OFF Delay = 10 ms	ON Delay = 0.1 ms OFF Delay = 1 ms	ON Delay = 8.8 ms at 60 Hz ON Delay = 10.6 ms at 50 Hz OFF Delay = 11.0 ms
Surge Current per Point (peak)	N/A	4 A for 10 ms(1)	10 A for 25 ms(1)

(1) Repeatability is once every 2 seconds @ 55 °C (131 °F).

MicroLogix 1000 Controller Relay Contact Rating

Voltage, max	Amperes		Amperes Continuous	Voltamperes	
	Make	Break		Make	Break
240V AC	7.5 A	0.75 A	2.5 A	1800 VA	180 VA
120V AC	15 A	1.5 A			
125V DC	0.22 A(1)		1.0 A	28 VA	
24V DC	1.2 A(1)		2.0 A		

(1) For DC voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28 VA by the applied DC voltage. For example, 28 VA/48V DC = 0.58 A. For DC voltage applications less than 48V, the make/break ratings for relay contacts cannot exceed 2 A. For DC voltage applications greater than 48V, the make/break ratings for relay contact cannot exceed 1 A.

MicroLogix 1000 Controller Analog Input Specifications

Attribute	1761-L20*xxx*-5A
Voltage Input Range[1]	-10.5…10.5V DC
Current Input Range[1]	-21…21 mA
Input Coding (-21…21 mA, -10.5…10.5V DC)	-32,768…32,767
Voltage Input Impedance	210 kΩ
Current Input Impedance	160 Ω
Input Resolution[2]	16-bit
Non-linearity	< 0.002%
Overall Accuracy 0…55 °C (32…131 °F)	±0.7% of full scale
Overall Accuracy Drift 0…55 °C (32…131 °F), max	±0.176%
Overall Accuracy at 25 °C (77 °F), max	±0.525%
Update Time	selectable from 4…100 ms
Voltage Input Overvoltage Protection	24V DC
Current Input Overcurrent Protection	±50 mA
Input to Output Isolation and Field Wiring to Logic Isolation	30V rated working voltage, 500V isolation (test 60 Hz for 1 s)

(1) The two voltage inputs accept ±10.5V DC. The two current inputs accept ±21 mA.

(2) The analog input update rate and input resolution are a function of the input filter selection.

MicroLogix 1000 Controller Analog Output Specifications

Attribute	Value
Voltage Output Range[1]	0…10V DC
Current Output Range[1]	4…20 mA
Non-linearity	0.02%
Step Response	2.5 ms (at 95%)
Load Range - Voltage Output	1 kΩ…∞ Ω
Load Range - Current Output	0…500 Ω
Output Coding (4…20 mA, 0…10V DC)	0…32,767
Voltage Output Miswiring and Current Output Miswiring	can withstand short circuit
Output Resolution	15-bit
Analog Output Settling Time	3 msec, max
Overall Accuracy 0…55°C	±1.0% of full scale
Overall Accuracy Drift 0…55 °C, max	±0.28%
Overall Accuracy at +25 °C (+77 °F), max - Current Output	0.2%
Field Wiring to Logic Isolation	30V rated working/500V isolation

(1) The analog output can be configured for either voltage (0V DC...10V DC) or current (4...20 mA).

Select MicroLogix 1100 Controllers

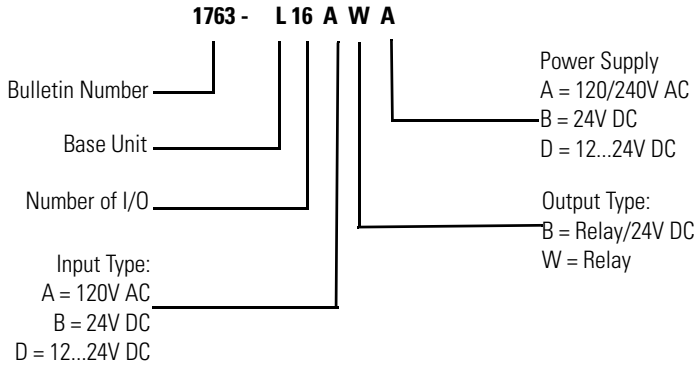
Step 6 - Select:

- controller - review power and I/O configurations to select a controller catalog number; see power supply and I/O specification for more detailed information
- accessories - memory modules
- record your selection in the Selection Record (starts on page 87)

MicroLogix 1100 Base Units

The base unit houses embedded inputs, outputs, power supply, and communication ports. The base unit also provides the interface to expansion I/O when required by an application.

MicroLogix 1100 Controller Catalog Number Detail



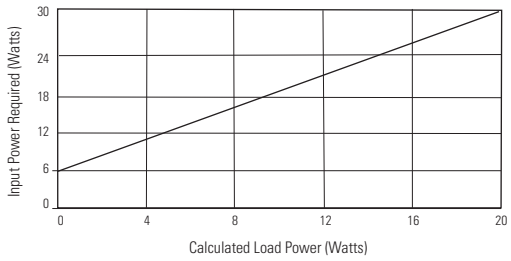
MicroLogix 1100 Controller Power and I/O Configuration

Cat. No.	Line Voltage	Number of Inputs	Number of Outputs	High Speed I/O
1763-L16AWA	120/240V AC	(10) 120V AC (2) Analog Voltage	(6) Individually Isolated Relay	None
1763-L16BWA	120/240V AC	(6) 24V DC (4) Fast 24V DC (2) Analog Voltage	(6) Individually Isolated Relay	(4) 40 kHZ input
1763-L16BBB	24V DC	(6) 24V DC (4) Fast 24V DC (2) Analog Voltage	(2) Individually Isolated Relay (2) 24V DC FET (2) Fast 24V DC FET	(4) 40 kHZ input (2) 40 kHZ output
1763-L16DWD	12...24V DC	(6) 12V DC/24V DC (4) Fast 12V DC/24V DC (2) Analog Voltage	(6) Individually Isolated Relay	(4) 40 kHZ input

MicroLogix 1100 Controller Power Supply Specifications

Attribute	1763-L16AWA	1763-L16BWA	1763-L16BBB	1763-L16DWD
Power Supply Voltage	85…264V AC @ 47…63 Hz		20.4…26.4V DC Class 2 SELV	12…24V DC (-15%, 10%) Class 2 SELV
Power Consumption	46 VA	52 VA	6...30 W	6...30 W
Power Supply Inrush Current, max	120V AC: 25 A for 8 ms 240V AC: 40 A for 4 ms		24V DC: 15 A for 20 ms	24V DC: 15 A for 20 ms
24V DC Sensor Power	---	250 mA, 400µF capacitance, max	---	---

MicroLogix 1100 Controller DC Input Power Requirements for 1763-L16BBB and 1763-L16DWD Units



MicroLogix 1100 Controller Digital Input Specifications

Attribute	1763-L16AWA	1763-L16BWA and 1763-L16BBB		1763-L16DWD	
		Inputs 0...3	Inputs 4 and higher	Inputs 0...3	Inputs 4 and higher
On-state Voltage Range	79…132V AC @ 47…63 Hz	14…26.4V DC @ 65 °C (149 °F) 14…30.0V DC @ 30 °C (86 °F)	10…26.4V DC @ 65 °C (149 °F) 10…30.0V DC @ 30 °C (86 °F)	10…24V DC @ 65 °C (149 °F) 10…30V DC @ 30 °C (86 °F)	
Off-state Voltage Range	0…20V AC	0…5V DC		0…5V DC	
Operating Frequency	47…63 Hz	0 Hz…40 kHz(1)	0 Hz…1 kHz	0 Hz…40 kHz	0 Hz…1 kHz
Signal Delay, max	On Delay = 20 ms Off Delay = 20 ms	standard inputs: selectable from 0.5…16 ms high-speed inputs: selectable from 0.0125…16 ms		standard inputs: selectable from 0.5…16 ms high-speed inputs: selectable from 0.0125…16 ms	
On-state Current min nom max	 5.0 mA @ 79V AC 12 mA @ 120V AC 16.0 mA @ 132V AC	 2.5 mA @ 14V DC 8.8 mA @ 24V DC 12.0 mA @ 30V DC	 2.0 mA @ 10V DC 8.5 mA @ 24V DC 12.0 mA @ 30V DC	 2.0 mA @ 10V DC 8.5 mA @ 24V DC 12.0 mA @ 30V DC	
Off-state Leakage Current, max	2.5 mA, max	1.5 mA, min		1.5 mA, min	
Impedance, nom	12 kΩ @ 50 Hz 10 kΩ @ 60 Hz	3.1 kΩ		2.61 kΩ	3.1 kΩ
Inrush Current, max	250 mA @ 120V AC	---		---	

(1) OS series B FRN 4 or later.

MicroLogix 1100 Controller Digital Output Specifications

Attribute	1763-L16AWA, 1763-L16BWA, and 1763-L16DWD	1763-L16BBB	
	Relay	FET Standard Operation	FET High-speed Operation (Output 2 and 3 only)
Operating Voltage Range	5…125V DC 5…264V AC	20.4…26.4V DC	
Continuous Current per Point, max	See MicroLogix 1100 Controller Relay Contact Rating For Ordinary (Non-Hazardous) Locations only on page 50.	See MicroLogix 1100 Controller FET Standard Outputs Continuous Current per Point, max on page 50	100 mA
Continuous Current per Common, max	5 A/3 A		

MicroLogix 1100 Controller Digital Output Specifications

Attribute	1763-L16AWA, 1763-L16BWA, and 1763-L16DWD	1763-L16BBB	
	Relay	FET Standard Operation	FET High-speed Operation (Output 2 and 3 only)
Continuous Current per Controller, max	30 A or total of per-point loads, whichever is less at 150V, max 20 A or total of per-point loads, whichever is less at 240V, max		
On-state Current, min	10.0 mA	1 mA	10.0 mA
Off-state Leakage Current, max	0 mA	1 mA	
Signal Delay, max - resistive load	On Delay = 10 ms Off Delay = 10 ms	On Delay = 0.1 ms Off Delay = 1.0 ms	On Delay = 6 µs Off Delay = 18 µs
Surge Current per Point (peak)	---	4 A for 10 ms (repeatability is once every 2 s @ 65 °C (149 °F), once every 1 s @ 30 °C (86 °F)	

MicroLogix 1100 Controller Analog Input Specifications

Attribute	1763-L16AWA, 1763-L16BWA, 1763-L16BBB, 1763-L16DWD
Voltage Input Range	0…10V DC
Input Coding (0…10V DC)	0…1023
Voltage Impedance	210 kΩ
Input Resolution	10-bit
Non-linearity (in percent full scale)	±0.5%
Overall Accuracy	±0.5% full scale at -20…65 °C (-4…149 °F)
Update Time	100/20/16.67/4 ms (selectable)
Voltage Input Overvoltage Protection	10.5V DC
Field Wiring to Logic Isolation	Non-isolated with logic

MicroLogix 1100 Controller Relay Contact Rating For Hazardous Locations Applications (Class I, Division 2, Groups A, B, C, D)(1)

Voltage, max	Amperes		Amperes Continuous	Voltamperes	
	Make	Break		Make	Break
240V AC(2)	7.5 A	0.75 A	2.5 A	1800 VA	180 VA
120V AC(3)	15.0 A	1.5 A	2.5 A	1800 VA	180 VA
125V DC(4)	0.22 A		1.0 A	28 VA	

(1) Pilot Duty Rating: (ordinary location) – B300, R150. (hazardous location) – C300, R150.

(2) For AC voltage applications lower than 240V AC but higher than 120V AC, the maximum make and break ratings are to be obtained by dividing the volt-amperes rating by the application voltage.

(3) For AC voltage applications lower than 120V AC, the maximum make current is to be the same as for 120V AC, and the maximum break current is to be obtained by dividing the break volt-amperes rating by the application voltage, but the currents are not to exceed the thermal continuous current.

(4) For DC voltage applications lower than 125V DC, the make/break ampere rating for relay contacts can be determined by dividing the volt-ampere rating by the applied DC voltage but the current values are not to exceed the thermal continuous current.

MicroLogix 1100 Controller Relay Contact Rating For Ordinary (Non-Hazardous) Locations only(1)

Voltage, max	Amperes		Amperes Continuous	Voltamperes	
	Make	Break		Make	Break
240V AC(2)	15.0 A	1.5 A	5.0 A(3)	3600 VA	360 VA
120V AC(4)	30 A	3.0 A			
125V DC(5)	0.22 A		1.0 A	28 VA	

(1) Pilot Duty Rating: (ordinary location) – B300, R150. (hazardous location) – C300, R150.

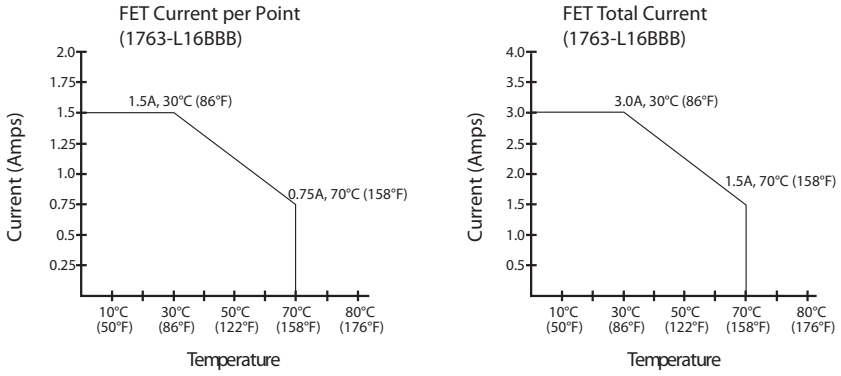
(2) For AC voltage applications lower than 240V AC but higher than 120V AC, the maximum make and break ratings are to be obtained by dividing the volt-amperes rating by the application voltage.

(3) 3.0 A above 40 °C.

(4) For AC voltage applications lower than 120V AC, the maximum make current is to be the same as for 120V AC, and the maximum break current is to be obtained by dividing the break volt-amperes rating by the application voltage, but the currents are not to exceed the thermal continuous current.

(5) For DC voltage applications lower than 125V DC, the make/break ampere rating for relay contacts can be determined by dividing the volt-ampere rating by the applied DC voltage but the current values are not to exceed the thermal continuous current.

MicroLogix 1100 Controller FET Standard Outputs Continuous Current per Point, max



MicroLogix 1100 Memory Module (1763-MM1)

The controller is shipped with a memory module port cover in place. You can order the memory module to provide removable backup of your User Program and User Data, or to transport your program between controllers.

Memory modules allow:

- user programs and data to be store as backup.
- transport programs for use with other controllers.
- special safety/security features for press control and other critical applications.
- auto-recovery, through a power cycle, after a controller fault.
- comparison of programs.
- data file and memory module write protection.
- removal/insertion under power.

Select MicroLogix 1100 Expansion I/O

Step 7 - Select:

- I/O modules - digital, analog, and temperature
- record your selections in the Selection Record (start on page 87)

MicroLogix 1100 controllers expand by using the same 1762 I/O platform as MicroLogix 1200 controllers. The 1762 I/O expansion modules provide superior functionality in a small sized low-cost package. A variety of modules complement and extend the capabilities of MicroLogix 1100 controllers by maximizing the flexibility of I/O count and type.

The MicroLogix 1100 system design allows modules to be either DIN-rail or panel mounted. The DIN latches and screw mounting holes are an integral part of the package design.

Controller I/O can be expanded by using up to four 1762 I/O modules.

Advantages

- Rackless design, eliminating added system costs and inventory
- Small footprint with high density I/O, minimizing panel space requirements
- Integral high-performance I/O bus
- Software keying to prevent incorrect positioning within the system
- Feature-rich I/O functionality addresses a wide range of applications
- AC/DC relay, 24V DC, 120V AC and 240V AC voltages
- Thermocouple/mV and RTD/Resistance temperature input modules

Available Modules

1762 Expansion I/O Modules

Cat. No.	Description
Digital	
1762-IA8	8-Point 120V AC Input Module
1762-IQ8	8-Point Sink/Source 24V DC Input Module
1762-IQ8OW6	8 Point Sink/Source 24V DC Input/6-Point AC/DC Relay Output Combination Module
1762-IQ16	16-Point Sink/Source 24V DC Input Module
1762-OA8	8-Point 120/240V AC Triac Output Module
1762-OB8	8-Point Sourcing 24V DC Output Module
1762-OB16	16-Point Sourcing 24V DC Output Module
1762-OW8	8-Point AC/DC Relay Output Module
1762-OW16	16-Point AC/DC Relay Output Module
1762-OX6I	6-Point Isolated AC/DC Relay Output Module
1762-OV32T	32-Point Solid State 24V DC Sink Output Module
1762-OB32T	32-Point Solid State 24V DC Source Output Module
1762-IQ32T	32-Point DC Input Module
Analog	
1762-IF4	4-Channel Voltage/Current Analog Input Module
1762-OF4	4-Channel Voltage/Current Analog Output Module
1762-IF2OF2	Combination 2-Channel Input 2-Channel Output Voltage/Current Analog Module
Specialty	
1762-IR4	4-Channel RTD/Resistance Input Module
1762-IT4	4-Channel Thermocouple/mV Input Module

1762 Digital I/O

1762 Digital Expansion Input Modules Specifications

Attribute	1762-IA8	1762-IQ8	1762-IQ8OW6 (inputs)	1762-IQ16	1762-IQ32T
Voltage Category	100/120V AC	24V DC (sink/source)(1)	24V DC (sink/source)(1)	24V DC (sink/source)(1)	24V DC sink/source(1)
Operating Voltage Range	79…132V AC @ 47…63 Hz	10…26.4V DC @ 55 °C (131 °F) 10…30V DC @ 30 °C (86 °F)	10…26.4V DC @ 65 °C (149 °F) 10…30V DC @ 30 °C (86 °F)	10…26.4V DC 10…30V DC (3)(2)	10...26.4V DC 10...30V DC
Number of Inputs	8	8	8	16	32
Number of Commons	1	1	inputs: 2 outputs: 1	2	4
Bus Current Draw, max	50 mA @ 5V DC (0.25 W)	50 mA @ 5V DC (0.25 W)	110 mA @ 5V DC (0.55 W) 80 mA @ 24V DC (1.92 W)	70 mA @ 5V DC (0.35 W) (3)	170 mA @ 5V DC 0 mA @ 24V DC
Heat Dissipation, max	2.0 Total Watts	3.7 Total Watts	5.0 Total Watts @ 30V 4.4 Total Watts @ 26.4V	5.4 Total Watts @ 30V 4.3 Total Watts @ 26.4V (3)	5.4 Total Watts @ 26.4V 6.8 Total Watts @ 30.0V
Signal Delay, max	On Delay: 20.0 ms Off Delay: 20.0 ms	On Delay: 8.0 ms Off Delay: 8.0 ms	On Delay: 8.0 ms Off Delay: 8.0 ms	On Delay: 8.0 ms Off Delay: 8.0 ms	On Delay: 8.0 ms Off Delay: 8.0 ms
Off-state Voltage, max	20V AC	5V DC	5V DC	5V DC	5V DC
Off-state Leakage Current, max	2.5 mA	1.5 mA	1.5 mA	1.5 mA	1.0 mA
On-state Voltage, min	79V AC, min, 132V AC, max	10V DC	10V DC	10V DC	10V DC
On-state Current min nom max	 5.0 mA @ 79V AC 47 Hz 12.0 mA @ 120V AC 60 Hz 16.0 mA @ 132V AC 63 Hz	 2.0 mA @ 10V DC 8.0 mA @ 24V DC 12.0 mA @ 30V DC	 2.0 mA @ 10V DC 8.0 mA @ 24V DC 12.0 mA @ 30V DC	 2.0 mA @ 10V DC 8.0 mA @ 24V DC 12.0 mA @ 30V DC	 1.6 mA @ 10V DC (min) 2 mA @ 15V DC (min) 5.7 mA @ 26.4V DC (max) 6.5 mA @ 30.0V DC (max)
Inrush Current, max	250 mA	---	250 mA	---	--

Attribute	1762-IA8	1762-IQ8	1762-IQ8OW6 (inputs)	1762-IQ16	1762-IQ32T
Impedance, nom	12 kΩ @ 50 Hz 10 kΩ @ 60 Hz	3 kΩ	3 kΩ	3 kΩ	4.7 kΩ
Isolated Groups	Group 1: inputs 0…7 (internally connected commons)	Group 1: inputs 0…7 (internally connected commons)	Group 1: inputs 0…3 Group 2: inputs 4…7 Group 3: outputs 0…5	Group 1: inputs 0…7 Group 2: inputs 8…15	Group 1: Inputs 0...7 Group 2 : Inputs 8...15 Group 3 : Inputs 16...23 Group 4 : Inputs 24...31
Input Group to Backplane Isolation	Verified by one of the following dielectric tests: 1517V AC for 1 s or 2145V DC for 1 s 132V AC working voltage (IEC Class 2 reinforced insulation)	Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s 75V DC working voltage (IEC Class 2 reinforced insulation)	Verified by one of the following dielectric tests: Input Group to Backplane isolation - 1200V AC for 1 s or 1697V DC for 1 s 75V DC working voltage (IEC Class 2 reinforced insulation) Output Group to Backplane isolation - 1836V AC for 1 s or 2596V DC for 1 s 265V AC working voltage (IEC Class 2 reinforced insulation) Input Group to Output Group isolation - 1836V AC for 1 s or 2596V DC for 1 s 265V AC working voltage (basic insulation) 150V AC working voltage (IEC Class 2 reinforced insulation)	Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s 75V DC working voltage (IEC Class 2 reinforced insulation)	Verified by one of the following dielectric tests: 1,200V AC for 2 s or 1,697V DC for 2 s 75V DC working voltage (IEC Class 2 reinforced insulation)

(1) Sinking/Sourcing Inputs - Sourcing/sinking describes the current flow between the I/O module and the field device. Sourcing I/O circuits supply (source) current to sinking field devices. Sinking I/O circuits are driven by a current sourcing field device. Field devices connected to the negative side (DC Common) of the field power supply are sinking field devices. Field devices connected to the positive side (+V) of the field supply are sourcing field devices.

(2) Refer to Publication 1762-IN10, MicroLogix 1762-IQ16 DC Input Module Installation Instructions, for the derating chart.

(3) Only applicable to Series B I/O modules

1762 Digital Expansion Output Modules Specifications

Attribute	1762-OA8	1762-OB8	1762-OB16	1762-OB32T	1762-OV32T
Voltage Category	100…240V AC	24V DC	24V DC	24V DC source	24V DC sink
Operating Voltage Range	85…265V AC @ 47…63 Hz	20.4…26.4V DC	20.4…26.4V DC	10.2...26.4V DC	
Number of Outputs	8	8	16	32	
Number of Commons	2	1	1	2	
Bus Current Draw, max	115 mA @ 5V DC (0.575 W)	115 mA @ 5V DC (0.575 W)	175 mA @ 5V DC (0.88 W)	175 mA @ 5V DC 0 mA @ 24V DC	
Heat Dissipation, max	2.9 Total Watts	1.61 Total Watts	2.9 Total watts @ 30 °C (86 °F) 2.1 Total watts at 55 °C (131 °F)	3.4W @ 26.4V DC	2.7 W @ 26.4 V DC
Signal Delay, max - resistive load	On Delay: 1/2 cycle Off Delay: 1/2 cycle	On Delay: 0.1 ms Off Delay: 1.0 ms	On Delay: 0.1 ms Off Delay: 1.0 ms	On Delay: 0.5 ms Off Delay: 4.0 ms	
Off-state Leakage, max	2 mA @ 132V 2.5 mA @ 265V	1.0 mA	1.0 mA	0.1 mA @ 26.4V DC	
On-state Current, min	10 mA	1.0 mA	1.0 mA	1.0 mA	
On-state Voltage Drop, max	1.5V @ 0.5 A	1.0V DC	1.0Vdc	0.3V DC @ 0.5 A	
Continuous Current per Point, max	0.25 A @ 55 °C (131 °F) 0.5 A @ 30 °C (86 °F)	0.5 A @ 55 °C (131 °F) 1.0 A @ 30 °C (86 °F)	0.5 A @ 55 °C (131 °F) 1.0 A @ 30 °C (86 °F)	0.5 A @ 60 °C (140 °F)	
Continuous Current per Common, max	1.0 A @ 55° (131 °F) 2.0 A @ 30 °C (86 °F)	4.0 A @ 55 °C (131 °F) 8.0 A @ 30 °C (86 °F)	4.0 A @ 55 °C (131 °F) 8.0 A @ 30 °C (86 °F)	2.0 A @ 60 °C (140 °F)	
Continuous Current per Module, max	2.0 A @ 55 °C (131 °F) 4.0 A @ 30 °C (86 °F)	4.0 A @ 55 °C (131 °F) 8.0 A @ 30 °C (86 °F)	4.0 A @ 55 °C (131 °F) 8.0 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F)	
Surge Current, max	5.0 A(1)	2.0 A(2)	2.0(2)	2.0 A (Repeatable every 2 s @ 60 °C (140 °F) for 10 ms)	

(1) Repeatability is once every 2 seconds for a durations of 25 ms.

(2) Repeatability is once every 2 seconds @ 55 °C (131 °F), once every second @ 30 °C (86 °F) for a duration of 10 ms.

1762 Digital Expansion Relay Output Modules Specifications

Attribute	1762-IQ8OW6 (outputs)	1762-OW8	1762-OW16	1762-OX6I
Voltage Category	AC/DC normally open relay	AC/DC normally open relay	AC/DC normally open relay	AC/DC Type C Relay
Operating Voltage Range	5…265V AC 5…125V DC	5…265V AC 5…125V DC	5…265V AC 5…125V DC	5…265V AC 5…125V DC
Number of Outputs	6	8	16	6 (N.C., N.O.)
Number of Commons	inputs: 2 outputs: 1	2	2	6
Bus Current Draw, max	110 mA @ 5V DC (0.55 W) 80 mA @ 24V DC (1.92 W)	80 mA @ 5V DC (0.40 W) 90 mA @ 24V DC (2.16 W)	140 mA @ 5V DC (0.70 W) 180 mA @ 24V DC (4.32 W) (1)	110 mA @ 5V DC (0.55 W) 110 mA @ 24V DC (2.64 W)
Heat Dissipation, max	5.0 Total Watts @ 30V 4.4 Total Watts @ 26.4V	2.9 Total Watts	6.1 Watts (1)	2.8 Watts
Signal Delay, max - resistive load	On Delay: 10 ms Off Delay: 10 ms	On Delay: 10 ms Off Delay: 10 ms	On Delay: 10 ms Off Delay: 10 ms	On Delay: 10 ms Off Delay: 20 ms
Off-state Leakage, max	0 mA	0 mA	0 mA	0 mA
On-state Current, min	10 mA @ 5V DC	10 mA @ 5V DC	10 mA	100 mA
On-state Voltage Drop, max	N/A	N/A	N/A	N/A
Continuous Current per Point, max	2.5 A (Also see MicroLogix 1500 Controller Relay Contact Rating on page 73.)			7 A (Also see MicroLogix 1500 Controller Relay Contact Rating on page 73.)
Continuous Current per Common, max	8 A	8 A	8 A	7 A (Also see MicroLogix 1500 Controller Relay Contact Rating on page 73.)
Continuous Current per Module, max	8 A	16 A	16 A	30 A
Surge Current, max	See MicroLogix 1500 Controller Relay Contact Rating on page 73.			

(1) Only applicable to Series B I/O modules

1762 Analog Modules

1762 Analog Expansion Modules Common Specifications

Attribute	1762-IF4	1762-IF2OF2	1762-OF4
Bus Current Draw, max	40 mA @ 5V DC 50 mA @ 24V DC	40 mA @ 5V DC 105 mA @ 24V DC	40 mA @ 5V DC 165 mA @ 24V DC
Analog Normal Operating Range	Voltage: -10…10V DC Current: 4…20 mA	Voltage: 0…10V DC Current: 4…20 mA	Voltage: 0…0V DC Current: 4…20 mA
Full Scale(1) Analog Ranges	Voltage: -10.5…10.5V DC Current: -21…21 mA	Voltage: 0…0.5V DC Current: 0…21 mA	Voltage: 0…0.5V DC Current: 0…21 mA
Resolution	15 bits (bipolar) (2)	12 bits (unipolar)	12 bits (unipolar)
Repeatability(3)	±0.12% (2)	±0.12% (2)	±0.12% (2)
Input and Output Group to System Isolation	30V AC/30V DC rated working voltage(4) (N.E.C. Class 2 required) (IEC Class 2 reinforced insulation) type test: 500V AC or 707V DC for 1 minute		30V AC/30V DC rated working voltage (IEC Class 2 reinforced insulation) type test: 500V AC or 707V DC for 1 minute

(1) The over- or under-range flag is set when the normal operating range is exceeded. The module continues to convert the analog input up to the maximum full scale range.

(2) Only applicable to Series B I/O modules.

(3) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

(4) Rated working voltage is the maximum continuous voltage that can be applied at the terminals with respect to Earth ground.

1762 Analog Expansion Input Modules Specifications

Attribute	1762-IF4	1762-IF2OF2
Number of Inputs	4 differential (bipolar)	2 differential (unipolar)
Update Time (typical)	130, 250, 290, 450, 530 ms (selectable)	2.5 ms
A/D Converter Type	Successive approximation	Successive approximation
Common Mode Voltage Range(1)	±27V	±27V
Common Mode Rejection(2)	> 55 dB @ 50 and 60 Hz	> 55 dB @ 50 and 60 Hz
Non-linearity (in percent full scale)	±0.12% (2)	±0.12% (2)
Typical Overall Accuracy(3)	±0.32% full scale @ -20…65 °C (-4…149 °F)(4) ±0.24% full scale @ 25 °C (77 °F)	±0.55% full scale @ -20…65 °C (-4…149 °F)(4) ±0.3% full scale @ 25 °C (77 °F)
Input Impedance	Voltage Terminal: 200 kΩ, Current Terminal: 275 Ω	Voltage Terminal: 200 kΩ, Current Terminal: 250 Ω
Current Input Protection	±32 mA	±32 mA
Voltage Input Protection	±30V	±30V
Channel Diagnostics	Over or under range or open circuit condition by bit reporting for analog inputs.	

(1) For proper operation, both the plus and minus input terminals must be within ±27V of analog common.

(2) V_{cm} = 1 V_{pk-pk} AC.

(3) V_{cm} = 0 (includes offset, gain, non-linearity and repeatability error terms).

(4) Only applicable to Series B I/O modules

1762 Analog Expansion Output Modules Specifications

Attribute	1762-IF2OF2	1762-OF4
Number of Outputs	2 single-ended (unipolar)	4 single-ended (unipolar)(2)
Update Time (typical)	4.5 ms	2.5 ms
D/A Converter Type	Resistor string	R-2R Ladder Voltage Switching
Resistive Load on Current Output	0…500 Ω (includes wire resistance)	0…500 Ω (includes wire resistance)
Load Range on Voltage Output	> 1 kΩ	> 1 kΩ
Reactive Load, Current Output	< 0.1 mH	< 0.1 mH
Reactive Load, Voltage Output	< 1 µF	< 1 µF
Typical Overall Accuracy(1)	±1.17% full scale @ -20…65 °C (-4…149 °F) (2), ±0.5% full scale @ 25 °C (77 °F)	±1.17% full scale @ -20…65 °C (-4…149 °F)(2) ±0.5% full scale @ 25°C
Output Ripple, range 0…500 Hz (referred to output range)	< ±0.1%	< ±0.1%
Non-linearity (in percent full scale)	< ±0.59%(2)	< ±0.59%(2)
Open and Short-circuit Protection	Continuous	Continuous
Output Protection	±32 mA	±32 mA

(1) Includes offset, gain, non-linearity and repeatability error terms.

(2) Only applicable to Series B I/O modules.

1762 Temperature Input Modules

Use these modules as a cost effective means of addressing process applications that require temperature measurement and control. Each channel can be individually configured by using RSLogix 500 programming software. On-screen configuration lets you choose the input type, filtering frequency, data format, and status data. On-board scaling is also provided.

1762 Temperature Expansion Input Modules Specifications

Attribute	1762-IT4	1762-IR4
Bus Current Draw, max	40 mA @ 5V DC 50 mA @ 24V DC	40 mA @ 5V DC 50 mA @ 24V DC
Number of Channels	4 input channels plus a CJC sensor	4 input channels
Accepted Inputs	Thermocouples Types: J, K, T, E, R, S, B, N, C Millivolt Input Ranges: ±50 mV and ±100 mV	RTDs: Platinum (385 and 3916), Copper (426), Nickel (672 and 618), Nickel-Iron (518) Resistance Ranges: 0…3000 Ω
Filter Frequency	10 Hz…1 kHz	10 Hz…1 kHz
Temperature Units	°C or °F	°C or °F
Data Formats	Raw/Proportional, Engineering Units, Engineering Units x 10, Scaled-for-PID, Percent Range	
Accuracy at 25 °C (77 °F)	Thermocouple Inputs: ±0.5…±3.0 °C (±0.9…±5.4 °F) depending on thermocouple type Millivolt Inputs: ±15…±20 mV	With Autocalibration enabled… RTD Inputs: ±0.2…±0.6 °C (±0.36…±1.08 °F) depending on RTD type Resistance Inputs: ±0.5…±1.5 Ω depending on resistance value
Accuracy at 0…55 °C (32…131 °F)	±0.8…±10 °C (±1.5…±18 °F) depending on thermocouple type Millivolt Inputs: ±25…±30 mV	With Autocalibration enabled… RTD Inputs: ±0.4…±1.1 °C (±0.72…±1.98 °F) depending on RTD type Resistance Inputs: ±0.25…±2.5 Ω depending on resistance value
Channel Update Time (typical)	7…303 ms per enabled channel + CJC update time, depending on filter selection (CJC update time is equal to the largest enabled channel's update time.)	6…303 ms per enabled channel, depending on filter selection
Channel Diagnostics	Over- or under-range and open-circuit by bit reporting	Over- or under-range or broken input by bit reporting
Calibration	The module performs autocalibration on channel enable and on a configuration change between channels. You can also program the module to calibrate every five minutes.	
Common Mode Noise Rejection	115 dB min @ 50 Hz (with 10 Hz or 50 Hz filter) 115 dB min @ 60 Hz (with 10 Hz or 60 Hz filter)	110 dB min @ 50 Hz (with 10 or 50 Hz filter) 110 dB min @ 60 Hz (with 10 or 60 Hz filter)
Normal Mode Noise Rejection	85 dB min @ 50 Hz (with 10 Hz or 50 Hz filter) 85 dB min @ 60 Hz (with 10 Hz or 60 Hz filter)	70 dB min @ 50 Hz (with 10 or 50 Hz filter) 70 dB min @ 60 Hz (with 10 or 60 Hz filter)
Input Group to System Isolation	720V DC for 1 minute	707V DC for 1 minute
Channel-to-Channel Isolation	±10V DC	±10V DC
Repeatability(1)	Thermocouples at 25 °C (77 °F) and 10 Hz filter selected: ±0.1…±2.0 °C (±0.18…±3.6 °F) depending on thermocouple type Millivolt Inputs: ±6 µV	±0.1 °C (±0.18 °F) for Nickel and Nickel-Iron ±0.2 °C (±0.36 °F) for other RTD inputs ±0.04 Ω for 150 Ω resistances ±0.2 Ω for other resistances
Input Impedance	>10 MΩ	>10 MΩ

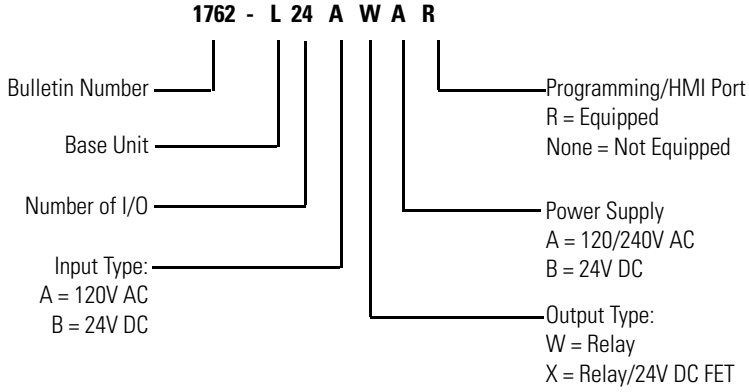
(1) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

Select MicroLogix 1200 Controllers

Step 8 - Select:

- controller - review power and I/O configurations to select a controller catalog number; see power supply and I/O specifications for more detailed information
- accessories - memory and real-time clock modules
- record your selections in the Selection Record (start on page 87)

MicroLogix 1200 Controllers Catalog Number Detail



MicroLogix 1200 Controller Power and I/O Configuration

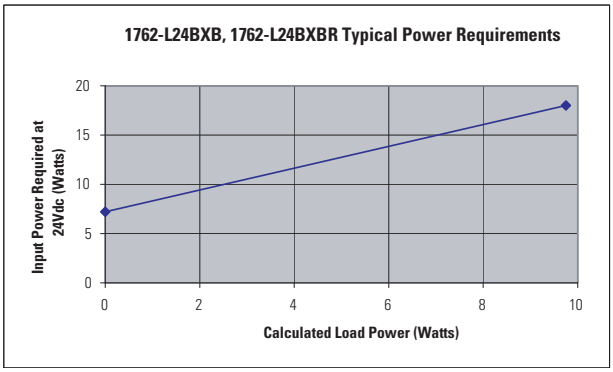
Cat. No.	Line Voltage	Number of Inputs	Number of Outputs	High Speed I/O
1762-L24AWA, -L24AWAR	120/240V AC	(14) 120V AC	(10) Relay	N/A
1762-L40AWA, -L40AWAR	120/240V AC	(24) 120V AC	(16) Relay	N/A
1762-L24BWA, -L24BWAR	120/240V AC	(10) Standard 24V DC (4) Fast 24V DC	(10) Relay	(4) 20 kHz input
1762-L40BWA, -L40BWAR	120/240V AC	(20) Standard 24V DC (4) Fast 24V DC	(16) Relay	(4) 20 kHz input
1762-L24BXB, -L24BXBR	24V DC	(10) Standard 24V DC (4) Fast 24V DC	(5) Relay (4) Standard 24V DC FET (1) Fast 24V DC FET	(4) 20 kHz input (1) 20 kHz output
1762-L40BXB, -L40BXBR	24V DC	(20) Standard 24V DC (4) Fast 24V DC	(8) Relay (7) Standard 24V DC FET (1) Fast 24V DC FET	(4) 20 kHz input (1) 20 kHz output

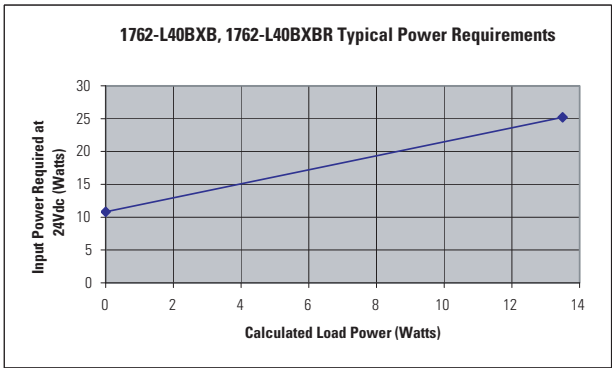
MicroLogix 1200 Controller Power Supply Specifications

Attribute		1762-					
		L24AWA, L24AWAR	L40AWA, L40AWAR	L24BWA, L24BWAR	L40BWA, L40BWAR	L24BXB, L24BXBR	L40BXB, L40BXBR
Power Supply Voltage		85…265V AC @ 47…63 Hz				20.4…26.4V DC Class 2 SELV	
Power Consumption		68 VA	80 VA	70 VA	82 VA	27 W	40 W
Power Supply Inrush Current, max		120V AC: 25 A for 8 ms 240V AC: 40 A for 4 ms				24V DC: 15 A for 20 ms	24V DC: 15 A for 30 ms
Load Current(1), max	5V DC	400 mA	600 mA	400 mA	600 mA	400 mA	600 mA
	24V DC	350 mA	500 mA	350 mA	500 mA	350 mA	500 mA
Load Power, max		10.4 W	15 W	12 W	16 W	10.4 W	15 W
24V DC Sensor Power		---	---	250 mA, 400 µF capacitance, max	400 mA, 400 µF capacitance, max	---	---

(1) See Perform MicroLogix 1200 Controller System Expansion Calculations on page 63 for an example system validation worksheet to calculate expansion I/O power usage.

MicroLogix 1200 Controller DC Input Power Requirements for BXB Units





MicroLogix 1200 Controller Input Specifications

Attribute	1762-L24AWA, 1762-L24AWAR 1762-L40AWA, 1762-L40AWAR	1762-L24BWA, 1762-L24BXB, 1762-L40BWA, 1762-L40BXB 1762-L24BWAR, 1762-L24BXBR, 1762-L40BWAR, 1762-L40BXBR	
		Inputs 0 through 3	Inputs 4 and higher
On-state Voltage Range	79…132V AC @ 47 Hz…63 Hz	14…26.4V DC @ 55 °C (131 °F) 14…30.0V DC @ 30 °C (86 °F)	10…26.4V DC @ 55 °C (131 °F) 10…30.0V DC @ 30 °C (86 °F)
Off-state Voltage Range	0…20V AC	0…5V DC	
Operating Frequency	N/A	0 Hz…20 kHz	0 Hz…1 kHz (scan time dependent)
Signal Delay, max	ON Delay = 20 ms OFF Delay = 20 ms	Standard inputs: selectable from 0.5…16 ms high-speed inputs: selectable from 0.025…16 ms	
On-state Current: min nom max	 5.0 mA @ 79V AC 12 mA @ 120V AC 16.0 mA @ 132V AC	 2.5 mA @ 14V DC 7.3 mA @ 24V DC 12.0 mA @ 30V DC	 2.0 mA @ 10V DC 8.9 mA @ 24V DC 12.0 mA @ 30V DC
Off-state Leakage Current, max	2.5 mA, max	1.5 mA, min	
Impedance, nom	12 kΩ @ 50 Hz 10 kΩ @ 60 Hz	3.3 kΩ	2.7 kΩ
Inrush Current, max	250 mA at 120V AC	---	

MicroLogix 1200 Controller Digital Output Specifications

Attribute	1762-		
	L24AWA, L24BWA, L24BXB, L40AWA, L40BWA, L40BXB, L24AWAR, L24BWAR, L24BXBR, L40AWAR, L40BWAR, L40BXBR	L24BXB, L40BXB L24BXBR, L40BXBR	
	Relay	FET Standard Operation	FET High-speed Operation (Output 2 only)
Operating Voltage Range	5…125V DC 5…264V AC	21.6…27.6V DC	21.6…27.6V DC
Continuous Current per Point, max	See MicroLogix 1500 Controller Relay Contact Rating on page 73.	See below, MicroLogix 1200 Controller FET Standard Outputs Continuous Current per Point, max.	100 mA
Continuous Current per Common, max	8.0 A	7.5 A for L24BXB, L24BXBR 8.0 A for L40BXB, L40BXBR	
Continuous Current per Controller, max	30 A or total of per-point loads, whichever is less at 150V max 20 A or total of per-point loads, whichever is less at 240V max		
On-state Current, min	10.0 mA	1 mA	10.0 mA
Off-state Leakage Current, max	0 mA	1 mA	
Signal Delay, max - resistive load	ON Delay = 10 ms OFF Delay = 10 ms	ON Delay = 0.1 ms OFF Delay = 1.0 ms	ON Delay = 6 µs OFF Delay = 18 µs
Surge Current per Point (peak)	---	4 A for 10 ms(1)	

(1) Repeatability is once every 2 seconds @ 55 °C (131 °F), once every 1 second @ 30 °C (86 °F).

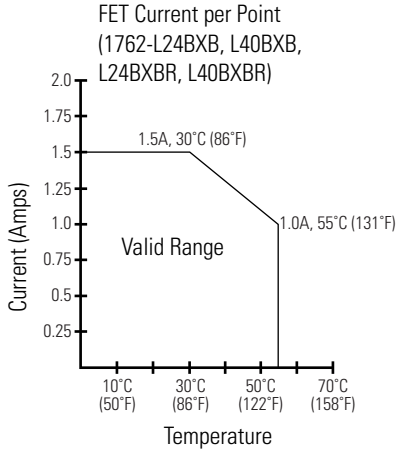
MicroLogix 1200 Controller Relay Contact Rating

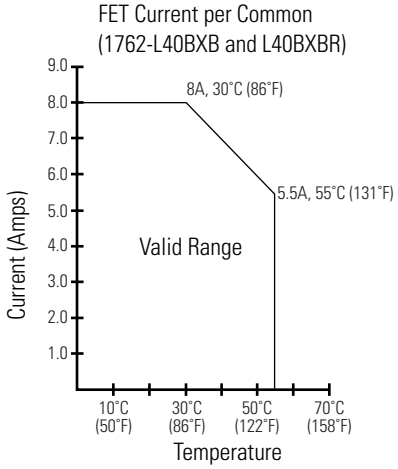
Voltage, max	Amperes		Amperes Continuous	Voltamperes	
	Make	Break		Make	Break
240V AC	7.5 A	0.75 A	2.5 A(1)	1800 VA	180 VA
120V AC	15 A	1.5 A			
125V DC	0.22 A(2)		1.0 A	28 VA	
24V DC	1.2 A(1)		2.0 A		

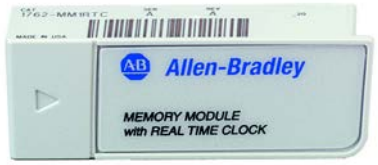
(1) 1.5 A above 40°C.

(2) For DC voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28 VA by the applied DC voltage. For example, 28 VA/48V DC = 0.58 A. For DC voltage applications less than 48V, the make/break ratings for relay contacts cannot exceed 2 A. For DC voltage applications greater than 48V, the make/break ratings for relay contact cannot exceed 1 A.

MicroLogix 1200 Controller FET Standard Outputs Continuous Current per Point, max







MicroLogix 1200 Memory and Real-Time Clock Modules

The controller is shipped with a memory module port cover in place. You can order the memory module, real-time clock, or combination module to suit your needs.

Real-time Clock (1762-RTC)

- Allows for time/date scheduling
- Self-contained battery provides long-term time base

Memory Module (1762-MM1)

- User program and data back-up
- Program compare
- Data file protection
- Memory module write protection
- Removal/insertion under power

Combination Memory and Real-time Clock Module (1762-MM1RTC)

Provides all real-time clock and memory back-up functions of the 1762-RTC and 1762-MM1 modules

Select MicroLogix 1200 Expansion I/O

Step 9 - Select:

- I/O modules - digital, analog, and temperature
- perform system expansion calculations
- record your selections in the Selection Record (start on page 87)

MicroLogix 1200 controllers expand by using the same 1762 I/O platform as MicroLogix 1100 controllers. The 1762 I/O expansion modules provide superior functionality in a small sized low-cost package. A variety of modules complement and extend the capabilities of MicroLogix 1200 controllers by maximizing the flexibility of I/O count and type.

The MicroLogix 1200 system design allows modules to be either DIN rail or panel mounted. The DIN latches and screw mounting holes are an integral part of the package design.

Controller I/O can be expanded by using up to six expansion modules per controller (depending on power budget).

See Select MicroLogix 1100 Expansion I/O on page 51 for available modules and specifications.

1762 Expansion I/O Modules Connected to a MicroLogix 1200 Controller

Perform MicroLogix 1200 Controller System Expansion Calculations

A download is also available for system validation. On the Internet, go to http://www.ab.com/micrologix.

To have a valid system, both current and power requirements must be satisfied. Use the following worksheets to make your calculations.

Follow these steps to verify the controller power supply loading.

1. Use the following table to select the components for your system. Do not exceed the MAXIMUM LIMIT for the number of I/O modules.
2. Fill in the current amounts and add up the TOTAL CALCULATED CURRENT.

MicroLogix 1200 Controller Power Supply Loading - Calculate System Current

Cat. No.		Bus Current Draw Attribute		Calculated Current for System	
		at 5V DC (mA)	at 24V DC (mA)	at 5V DC (mA)	at 24V DC (mA)
1761-NET-AIC(1)(2)		0	120(2)		
1761-NET-ENI, 1761-NET-ENIW(1)(2)		0	100(2)		
2707-MVH232 or 2707-MVP232(1)(2)		0	80(2)		
Cat. No.	**n = Number of Modules (6 max)**	**A**	**B**	**n x A**	**n x B**
1762-IA8		50	0		
1762-IQ8		50	0		
1762-IQ8OW6		110	80		
1762-IQ16 (Series A)		60	0		
1762-OA8		115	0		
1762-OB8		115	0		
1762-OB16		175	0		
1762-OW8		80	90		
1762-OW16 (Series A)		120	140		
1762-OX6I		110	110		
1762-IF2OF2		40	105		
1762-IF4		40	50		
1762-OF4		40	165		
1762-IR4		40	50		
1762-IT4		40	50		
1762-OV32T		175	0		
1762-OB32T		175	0		
1762-IQ32T		170	0		
1762-IQ16 (Series B)		70	0		
1762-OW16 (Series B)		140	180		
TOTAL MODULES:		**TOTAL CALCULATED CURRENT:**		**(C)**	**(D)**
For 1762-L24BWA, 1762-L40BWA, 1762-L24BWAR, and 1762-L40BWAR only, add sum of any User 24V DC Sensor Current				**(E)**	

(1) These are optional accessories. Current is consumed only if the accessory is installed.

(2) Current for the 1761-NET-AIC or 1761-NET-ENI(W) can be supplied by the controller's communication port or from an external 24V DC source. No current is consumed from the controller when a user-suppled, external source is used. If an external source is to be used, do not select the device here. The current for a 2707-MVH232 or 2707-MVP232 MicroView Operator Interface is supplied from the controller's communication port, if directly connected.

3. Using the table below, verify that (C), (D), and (E) do not exceed the MAXIMUM LIMITS. If the MAXIMUM LIMIT is exceeded, you will need to adjust your selections.

MicroLogix 1200 Controller Maximum Load Current

Cat. No.	Load Current	5V DC	24V DC	User 24V DC Sensor Current
1762-L24AWA 1762-L24AWAR 1762-L24BXB, 1762-L24BXBR	Calculated Value	(C)	(D)	N/A
	MAXIMUM LIMIT	400 mA	350 mA	
1762-L24BWA 1762-L24BWAR	Calculated Value	(C)	(D)	(E)
	MAXIMUM LIMIT	400 mA	350 mA	250 mA
1762-L40AWA 1762-L40AWAR 1762-L40BXB, 1762-L40BXBR	Calculated Value	(C)	(D)	N/A
	MAXIMUM LIMIT	600 mA	500 mA	
1762-L40BWA 1762-L40BWAR	Calculated Value	(C)	(D)	(E)
	MAXIMUM LIMIT	600 mA	500 mA	400 mA

4. Use the table below to verify that the system is within the power loading limits of the controller.

Fill in the (C), (D), and (E) values where indicated. Then calculate Watts and add up the Total Watts. Verify that Total Watts does not exceed the MAXIMUM POWER LIMIT. If the MAXIMUM POWER LIMIT is exceeded, you will need to adjust your selections.

MicroLogix 1200 Controller Maximum Load Power

Cat. No.	5V Power Consumption Calculated Watts			24V Power Consumption Calculated Watts			Calculated Watts (sum of 5V and 24V)	MAXIMUM POWER LIMIT
1762-L24AWA 1762-L24AWAR	**(C)**	x 5V	= W	**(D)**	x 24V	= W	W	10.4 W
1762-L24BXB 1762-L24BXBR	**(C)**	x 5V	= W	**(D)**	x 24V	= W	W	10.4 W
1762-L24BWA 1762-L24BWAR	**(C)**	x 5V	= W	**(D)+(E)**	x 24V	= W	W	12 W
1762-L40AWA 1762-L40AWAR	**(C)**	x 5V	= W	**(D)**	x 24V	= W	W	15 W
1762-L40BXB 1762-L40BXBR	**(C)**	x 5V	= W	**(D)**	x 24V	= W	W	15 W
1762-L40BWA 1762-L40BWAR	**(C)**	x 5V	= W	**(D)+(E)**	x 24V	= W	W	16 W

Select MicroLogix 1400 Controllers

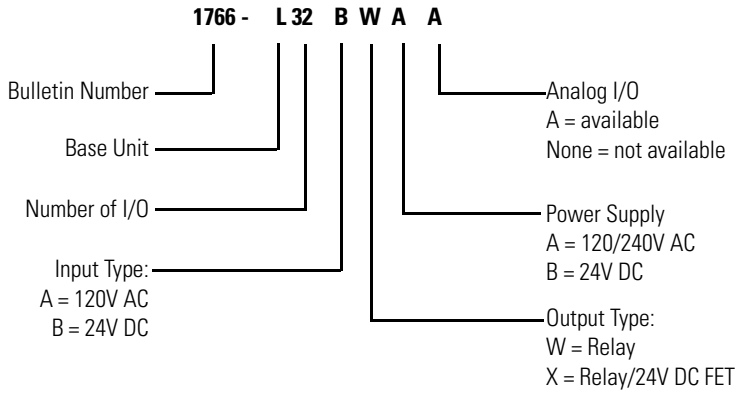
Step 10 - Select:

- controller - review power and I/O configurations to select a controller catalog number; see power supply and I/O specification for more detailed information
- accessories - memory modules
- record your selection in the Selection Record (starts on page 87)

MicroLogix 1400 Base Units

The base unit houses embedded inputs, outputs, power supply, and communication ports. The base unit also provides the interface to expansion I/O when required by an application.

MicroLogix 1400 Controller Catalog Number Detail



MicroLogix 1400 Controller Power and I/O Configuration

Cat. No.	Line Voltage	Number of Inputs	Number of Outputs	Embedded Analog I/O
1766-L32BWA	120/240V AC	(12) Fast 24V DC (8) Normal 24V DC	(12) Relay	---
1766-L32AWA	120/240V AC	(20) 120V AC	(12) Relay	---
1766-L32BXB	24V DC	(12) Fast 24V DC (8) Normal 24V DC	(6) Relay (3) Fast 24V DC (3) Normal 24V DC	---
1766-L32BWAA	120/240V AC	(12) Fast 24V DC (8) Normal 24V DC	(12) Relay	(4) Voltage Inputs (2) Voltage Outputs
1766-L32AWAA	120/240V AC	(20) 120V AC	(12) Relay	(4) Voltage Inputs (2) Voltage Outputs
1766-L32BXBA	24V DC	(12) Fast 24V DC (8) Normal 24V DC	(6) Relay (3) Fast 24V DC (3) Normal 24V DC	(4) Voltage Inputs (2) Voltage Outputs

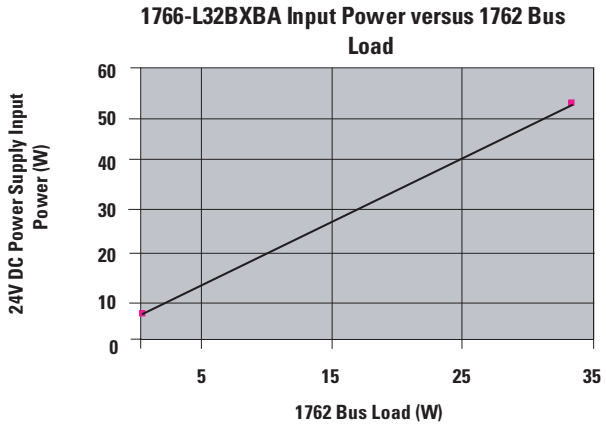
MicroLogix 1400 Controller Power Supply Specifications

Attribute	1766-L32AWA, 1766-L32AWAA	1766-L32BWA, 1766-L32BWAA	1766-L32BXB, 1766-L32BXBA
Power Supply Voltage	100...240V AC (-15%, 10%) at 47...63 Hz		24V DC (-15%, 10%) Class 2 SELV

MicroLogix 1400 Controller Power Supply Specifications

Attribute	1766-L32AWA, 1766-L32AWAA	1766-L32BWA, 1766-L32BWAA	1766-L32BXB, 1766-L32BXBA
Power Consumption	100 VA	120 VA	7.5...53 W
Power Supply Inrush Current, max	120V AC: 25 A for 8 ms 240V AC: 40 A for 4 ms		24V DC: 15 A for 20 ms
24V DC Sensor Power	---	24V DC at 250 mA, 400µF capacitance, max	---

MicroLogix 1400 Controller DC Input Power Requirements for 1766-L32BXB and 1766-L32BXBA Units



MicroLogix 1400 Controller Digital Input Specifications

Attribute	1766-L32AWA, 1766-L32AWAA	1766-L32BWA, 1766-L32BWAA, 1766-L32BXB, 1766-L32BXBA	
		Inputs 0...11 (12 high-speed DC inputs)	Inputs 12 and above (8 standard DC inputs)
On-state Voltage Range	79...132V AC	4.5...24V DC 4.5...26.4V DC at 60 °C (140 °F) 4.5...30V DC at 30 °C (86 °F)	10...24V DC 10...26.4V DC at 60 °C (140 °F) 10...30V DC at 30 °C (86 °F)
Off-state Voltage Range	0...20V AC	0...1.5V DC	0...5V DC
Operating Frequency	47...63 Hz	0 Hz...100 kHz	0 Hz...1 kHz (scan time dependent)
On-state Current min nom max	 5.0 mA @ 79 V AC 12 mA @ 120 V AC 16.0 mA @ 132 V AC	 7.1 mA @ 4.5V DC 9.9 mA @ 24V DC 10.5 mA @ 30V DC	 3.2 mA @ 10V DC 5.3 mA @ 24V DC 5.5 mA @ 30V DC
Off-state Leakage Current, max	2.5 mA, max	0.2 mA, max	1.5 mA, max
Impedance, nom	12 kΩ at 50 Hz 10 kΩ at 60 Hz	2.4 kΩ	4.5 kΩ
Inrush Current, max	250 mA		

MicroLogix 1400 Controller Analog Input Specifications

Attribute	Value
Voltage Input Range	0...10.0V DC - 1 LSB
Type of Data	12-bit unsigned integer
Input Coding (0…10V DC)	0...4095
Voltage Impedance	>199 kΩ
Input Resolution	12 bit
Non-linearity (in percent full scale)	±0.5% of full scale
Overall Accuracy	±1.0% of full scale
Update Time	100/20/16.67/4 ms (selectable)
Voltage Input Overvoltage Protection	10.5 V DC
Field Wiring to Logic Isolation	Non-isolated with internal logic

MicroLogix 1400 Controller Analog Output Specifications

Attribute	Value
Voltage Output Range	0...10.0V DC - 1 LSB
Type of Data	12-bit unsigned integer
Step Response	2.5 ms @ 95%
Output Coding (0...10V DC)	0...4095
Load Range Voltage Output	>1 kΩ
Output Resolution	12 bit
Analog Output Setting Time	3 ms, max
Overall Accuracy	±1.0% of full scale
Electrical Isolation	Non-isolated with internal logic
Cable Length	30 m (98 ft) shielded cable

Specifications for MicroLogix 1400 Controller Outputs

Relay and FET Outputs

Attribute		1766-L32AWA, 1766-L32AWAA, 1766-L32BWA, 1766-L32BWAA	1766-L32BXB, 1766-L32BXBA
Controlled Load, max		1440 VA	1080 VA
Continuous Current, max			
Current per Channel and Group Common		2.5 A per channel 8 A max channel 8...11 common	2.5 A per channel
Current per Controller	@ 150V, max	28 A or total of per-point loads, whichever is less	
	@ 240V, max	20 A or total of per-point loads, whichever is less	

Relay Outputs

Attribute	Value
Turn On Time/Turn Off Time	10 ms, max(1)
Load Current	10 mA

(1) Scan time dependent.

Relay Contact Rating(1)

	Amperes		Amperes	Voltamperes	
Voltage, max	Make	Break	Continuous	Make	Break
240V AC	7.5 A	0.75 A	2.5 A	1800 VA	180 VA
120V AC	15 A	1.5 A			
250V DC	0.11 A		1.0 A	28 VA	
125V DC	0.22 A		1.0 A	28 VA	

(1) Pilot Duty Rating (at Relay ContactRatings): C300, R300.

1766-L32BXB, 1766-L32BXBA FET Outputs

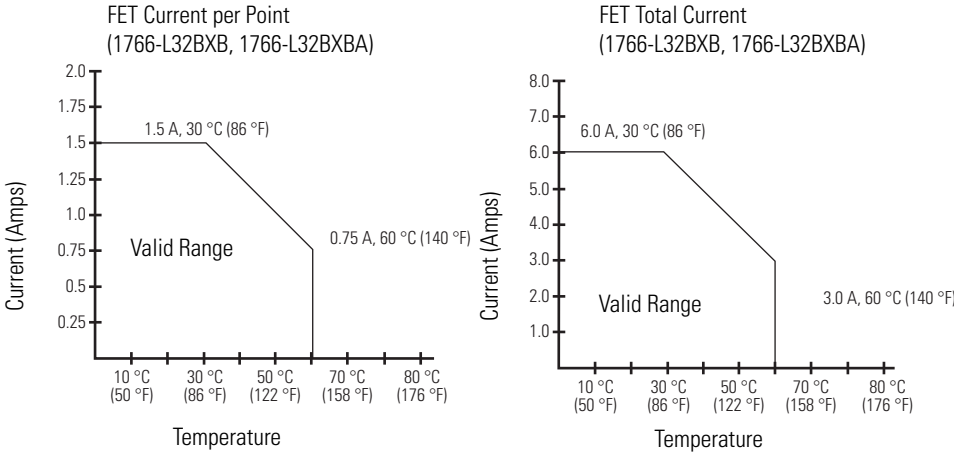
Attribute	General Operation	High-speed Operation (outputs 2, 3, and 4 only)(1)
Power Supply Voltage (Class 2)	24V DC (-15%, +10%)	
On-state Voltage Drop at maximum load current at maximum surge current	 1V DC 2.5V DC	 Not Applicable Not Applicable
Current Rating per Point maximum load minimum load maximum leakage	 See chart 1.0 mA 1.0 mA	 100 mA 20 mA 1.0 mA

1766-L32BXB, 1766-L32BXBA FET Outputs

Attribute	General Operation	High-speed Operation (outputs 2, 3, and 4 only)(1)
Surge Current per Point		
peak current	4.0 A	Not Applicable
maximum surge duration	10 ms	Not Applicable
maximum rate of repetition at 30 °C (86 °F)	once every second	Not Applicable
maximum rate of repetition at 65 °C (149 °F)	once every 2 seconds	Not Applicable
Turn-on Time, max	11 µs	28 ns
Turn-off Time, max	89 µs	2.3 µs

(1) Output 2, 3, and 4 are designed to provide increased functionality over the other FET outputs. Outputs 2, 3, and 4 may be used like the other FET transistor outputs, but in addition, within a limited current range, they may be operated at a higher speed. Outputs 2, 3, and 4 also provide a pulse train output (PTO) or pulse width modulation output (PWM) function.

MicroLogix 1400 Controller FET Standard Outputs



MicroLogix 1400 Memory Module (1766-MM1)

The controller is shipped with a memory module port cover in place. You can order the memory module to provide removable backup of your User Program and User Data, or to transport your program between controllers.

Memory modules allow:

- user programs and data to be store as backup.
- transport programs for use with other controllers.
- special safety/security features for press control and other critical applications.
- auto-recovery, through a power cycle, after a controller fault.
- comparison of programs.
- data file and memory module write protection.
- removal/insertion under power.

Select MicroLogix 1400 Expansion I/O

Step 11 - Select:

- I/O modules - digital, analog, and temperature
- record your selections in the Selection Record (start on page 87)

MicroLogix 1400 controllers expand by using the same 1762 I/O platform as MicroLogix 1100 controllers. The 1762 I/O expansion modules provide superior functionality in a small sized low-cost package. A variety of modules complement and extend the capabilities of MicroLogix 1400 controllers by maximizing the flexibility of I/O count and type.

The MicroLogix 1400 system design allows modules to be either DIN rail or panel mounted. The DIN latches and screw mounting holes are an integral part of the package design.

Controller I/O can be expanded by using up to seven expansion modules per controller.

See Select MicroLogix 1100 Expansion I/O on page 51 for available modules and specifications.

1762 Expansion I/O Modules Connected to a MicroLogix 1400 Controller

Select MicroLogix 1500 Controllers

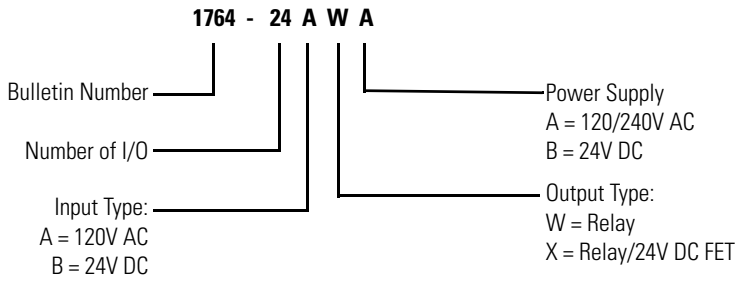
Step 12 - Select:

- base unit - review power and I/O configurations to select a catalog number; see power supply and I/O specifications for more detailed information
- processor - see notes at Step 1
- accessories - data access tool; real-time clock and memory modules
- record your selections in the Selection Record (start on page 87)

MicroLogix 1500 Base Units

The base unit houses embedded inputs, outputs, power supply, and the channel 0 communication port. The base unit also provides the interface to expansion I/O when required by an application.

MicroLogix 1500 Controller Catalog Number Detail



MicroLogix 1500 Controller Power and I/O Configuration

Cat. No.	Line Voltage	Number of Inputs	Number of Outputs	High Speed I/O
1764-24AWA	120/240V AC	(12) 120V AC	(12) Relay, 2 isolated relays per unit	N/A
1764-24BWA	120/240V AC	(8) Standard 24V DC (4) Fast 24V DC	(12) Relay, 2 isolated relays per unit	(4) 20 kHz input
1764-28BXB	24V DC	(8) Standard 24V DC (8) Fast 24V DC	(6) Relay, 2 isolated relays per unit (4) Standard 24V DC FET (2) Fast 24V DC FET	(8) 20 kHz input (2) 20 kHz output

MicroLogix 1500 Base Unit Power Supply Specifications

Attribute		1764-24AWA	1764-24BWA	1764-28BXB
Power Supply Voltage		85…265V AC at 47…63 Hz	85…265V AC at 47…63 Hz	20.4…30V DC
Power Consumption		70 VA	88 VA	30 W
Power Supply Inrush Current, max		120V AC: 25 A for 8 ms 240V AC: 40 A for 4 ms	120V AC: 25 A for 8 ms 240V AC: 40 A for 4 ms	24V DC: 4 A for 150 ms
Load Current(1), max	5V DC	2250 mA	2250 mA(2)	2250 mA
	24V DC	400 mA	400 mA(2)	400 mA
Load Power, max		16 W	22 W	16 W
24V DC Sensor Power		N/A	400 mA(2), 400 µF capacitance, max	N/A

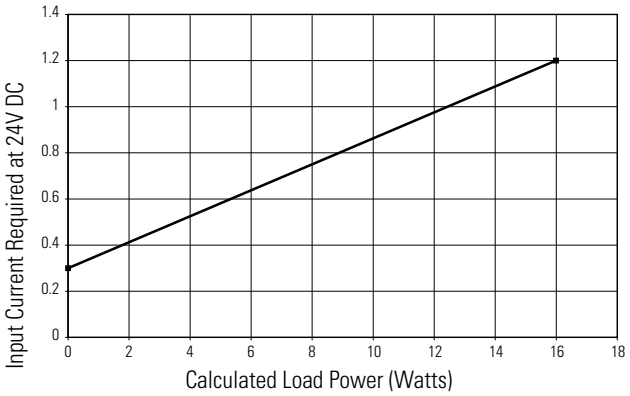
(1) See Perform MicroLogix 1500 System Expansion Calculations on page 79 for an example system validation worksheet to calculate expansion I/O power usage.

(2) Do not allow the total load power consumed by the 5V DC, 24V DC, and sensor power outputs to exceed 22 W.

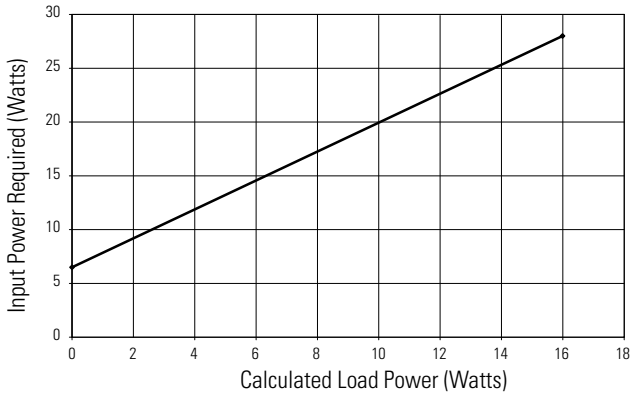
Choosing a Power Supply for the 1764-28BXB

This figure contains information for selecting a power supply for applications using a 1764-28BXB base unit. Use the worksheets on page 79 to calculate the total power (Watts) consumed by the system. With that information, use the graphs below to choose a power supply. You can use either current or power, depending on how the power supply is rated.

Input Current Required



Input Power Required



MicroLogix 1500 Base Unit Input Specifications

Attribute	1764-24AWA	1764-24BWA and 1764-28BXB	
		Inputs 0...7	Inputs 8 and Higher
On-state Voltage Range	79…132V AC at 47 Hz…63 Hz	14…30.0 V DC at 30 °C (86 °F) 14…26.4 V DC at 55 °C (131 °F)	10…30.0 V DC at 30 °C (86 °F) 10…26.4 V DC at 55 °C (131 °F)
Off-state Voltage Range	0…20V AC	0 to 5V DC	0…5V DC
Operating Frequency	N/A	1 kHz…20 kHz	1 Hz…500 Hz
Signal Delay	ON Delay = 20 ms OFF Delay = 20 ms	standard inputs: selectable from 0.5 to 16 ms high-speed inputs: selectable from 0.025 to 16 ms	
On-state Current min nom max	 5.0 mA at 79V AC 12.0 mA at 120V AC 16.0 mA at 132V AC	 2.5 mA at 14V DC 7.3 mA at 24V DC 12.0 mA at 30V DC	 2.0 mA at 10V DC 8.9 mA at 24V DC 12.0 mA at 30V DC
Off-state Leakage Current	2.5 mA, min	1.5 mA, min	1.5 mA, min
Impedance, nom	12 kΩ at 50 hZ 10 kΩ at 60 Hz	3.3 kΩ	2.7 kΩ
Inrush Current, max	250 mA at 120V AC	N/A	N/A

MicroLogix 1500 Base Unit Output Specifications

Attribute	1764-24AWA,1764 -24BWA, 1764-28BXB	1764-28BXB	
	Relay	FET Standard Operation	FET High-speed Operation (Outputs 2 and 3 only)
Operating Voltage Range	5…125V DC 5…264V AC	20.4…26.4V DC	
Continuous Current per Point, max	See MicroLogix 1500 Controller Relay Contact Rating on page 73.	1 A @ 55 °C (131 °F) 1.5 A @ 30 °C (86 °F)	100 mA
Continuous Current per Common, max	8.0 A	6.0 A	
Continuous Current per Controller, max	24 A @ 150V 20 A @ 240V	18 A @ 150V 18 A @ 240V	
On-state Current, min	5.0 mA @ 79V AC	2.5 mA @ 14V DC	2.0 mA at 10V DC
Off-state Leakage Current, max	0 mA	1 mA	
Signal Delay, max - resistive load	ON Delay = 10 ms OFF Delay = 10 ms	ON Delay = 0.1 ms OFF Delay = 1.0 ms	ON Delay = 6 µs OFF Delay = 18 µs
Surge Current per Point (peak)	N/A	4 A for 10 ms(1)	

(1) Repeatability is once every 2 seconds at 55 °C (131 °F), once every 1 second at 30 °C (86 °F).

MicroLogix 1500 Controller Relay Contact Rating

Voltage, max	Amperes		Amperes Continuous	Voltamperes	
	Make	Break		Make	Break
240V AC	7.5 A	0.75 A	2.5 A	1800 VA	180 VA
120V AC	15 A	1.5 A			
125V DC	0.22 A(1)		1.0 A	28 VA	
24V DC	1.2 A(1)		2.0 A		

(1) For DC voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28 VA by the applied DC voltage. For example, 28 VA/48V DC = 0.58 A. For DC voltage applications less than 48V, the make/break ratings for relay contacts cannot exceed 2 A. For DC voltage applications greater than 48V, the make/break ratings for relay contact cannot exceed 1 A.

MicroLogix 1500 Processors

In the controller system, the processor unit provides logic processing, trim potentiometers, Run/Remote/Program mode switch, communication toggle push button and (using the 1764-LRP processor) an electrically isolated RS-232 port. The processor also provides the interface to the DAT, real-time clock, and memory modules.

There are two processor units: 1764-LSP and 1764-LRP.

MicroLogix 1500 Data Access Tool (1764-DAT)

The DAT plug-in tool provides an interface for on-the-fly data monitoring and adjustments. The DAT has five primary features:

- Direct access to 48 bit elements
- Direct access to 48 integer elements
- Two function keys
- Display of controller faults
- Removal and insertion under power

MicroLogix 1500 Real-Time Clock and Memory Modules

These optional modules attach to the processor unit. Both types of modules can be inserted or removed while the unit is under power.

1764 Real-Time Clock Modules

Real-time clock modules establish a time-base for controller functions that need to be coordinated with real-time events. They provide year, month, day of month, day of week, hour, minute, and second information to the controller by using the RTC function file.

1764 Memory Modules

Memory modules allow:

- user programs and data to be stored as backup.
- transport programs for use with other controllers.
- safety/security for press control and other critical applications.
- auto recovery, through a power cycle, after a controller fault.
- comparison of programs.
- data file and memory module write protection.

MicroLogix 1500 Memory and Real-Time Clock Modules

Cat. No.	Description
1764-RTC	MicroLogix 1500 Real-Time Clock Module
1764-MM1	MicroLogix 1500 8 KB Memory Module
1764-MM1RTC	MicroLogix 1500 8 KB Memory Module with Real-Time Clock
1764-MM2(1)	MicroLogix 1500 16 KB Memory Module
1764-MM2RTC(1)	MicroLogix 1500 16 KB Memory Module with Real-Time Clock
1764-MM3(2)	MicroLogix 1500 16 KB Memory Module
1764-MM3RTC(2)	MicroLogix 1500 16 KB Memory Module with Real-Time Clock

(1) Use with the 1764-LRP processor to support larger program and data requirements.

(2) The 1764-MM3*xxx* modules have the same user memory as the 1764-MM2*xxx* modules except recipe data size. Recipe data which was stored to the Data Log Queue are in the MicroLogix 1500 LRP can be stored to the 1764-MM3*xxx* modules. There is no difference in functionality between the 1764-MM2*xxx* and 1764-MM3*xxx* modules except the 1764-MM3*xxx* modules can save recipe data from the Data Log Queue area.

Select MicroLogix 1500 System Expansion Components

Step 13 - Select:

- I/O modules - digital, analog, temperature and high-speed counter
- communication modules - DPI SCANport and DeviceNet
- power supplies, cables and end caps
- perform system expansion calculations
- record your selections in the Selection Record (start on page 87)

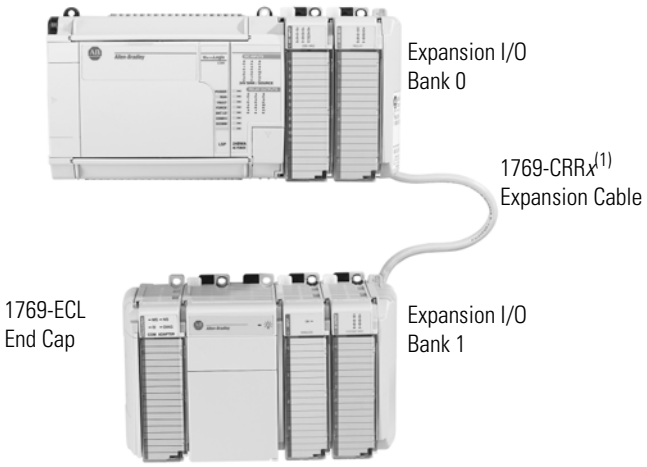
To increase your I/O options, you can connect an additional bank of I/O to your MicroLogix 1500 controller. An I/O bank is a group of I/O modules connected directly to one another. Banks are separated by cables.

In a MicroLogix 1500 system, a maximum of one 1769 Expansion cable can be used, allowing for two banks of I/O modules (one connected directly to the controller and the other connected via the cable). Each I/O bank requires its own power supply (Bank 0 uses the controller's embedded power supply).

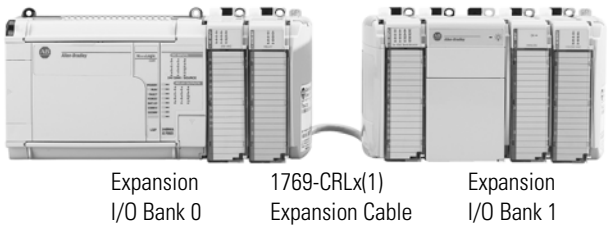
Only one power supply (embedded or expansion) can be used on an I/O bank. The expansion power supply cannot be connected directly to a controller. It must be connected by using one of the expansion cables.

Refer to the Compact I/O Selection Guide, publication 1769-SG002, to select the 1769 I/O modules and communication modules that you need. On the Internet, go to http://www.ab.com/micrologix and navigate to MicroLogix 1500 downloads.

Vertical Orientation



Horizontal Orientation



(1) The *x* in this catalog number can be either a 1 or a 3 representing the length of the cable: 1 = 1 ft (305 mm) and 3 = 3.28 ft (1 m).

The following section of this document, 1769 Compact Expansion I/O and Communication Modules, provides information for choosing Compact I/O expansion options.

Basically, you select the I/O options you need and then verify that the selections do not exceed the available power in the system. As shown above, the power can be provided from the Base Unit or an expansion power supply.

After reviewing the I/O options, use the worksheets in the Perform MicroLogix 1500 System Expansion Calculations section on page 79 to list your I/O choices and determine the system power requirements. The worksheets will let you know if the system is within allowable limits.

A download is also available for system validation. On the Internet, go to http://www.ab.com/micrologix and navigate to MicroLogix 1500 downloads.

1769 Compact Expansion I/O and Communication Modules

High-density Bulletin 1769 Compact I/O rackless expansion modules offer superior functionality and high value at a competitive price. With a variety of modules, they complement and extend the capabilities of the MicroLogix 1500 controller by maximizing flexibility of the I/O count and type.

Up to 16 modules can be used in a MicroLogix 1500 system when using a series B Base Unit (up to 8 for series A) dependent on power requirements. In addition to staying within the power limits, the modules must be distributed within the system by using the following limitations:

- a maximum of 8 modules can be connected directly to the Base Unit
- a maximum of 8 modules can be connected to each side of the Expansion Power Supply

The compact I/O system provides an excellent platform for future enhancements, so you can easily choose the level of control as your application needs grow.

Advantages

- Modular system
- Feature-rich I/O to address a wide range of applications
- Rackless design reduces system components
- Small footprint shrinks panel space requirements
- Front insertion and removal reduces assembly and replacement time
- Unique tongue-and-groove interlocking case design in order to have a strong, mechanical connection between modules
- Software keying prevents incorrect module placement within a system
- Digital I/O modules available with AC/DC relay, 24V DC, and 120/240V AC voltages
- Analog I/O modules configurable for voltage or current
- Thermocouple, RTD, and High-speed Counter input modules
- DPI/SCANport Module provides connection to PowerFlex 7 Class drives, other DPI-based Host devices, and SCANport-based Host devices such as 1305 and 1336 PLUS II drives.
- DeviceNet adapter and scanner communication modules

1769 Compact Power Supplies, Expansion Cables, and End Caps

Power Supplies

Using an expansion I/O power supply increases the system's capacity for adding expansion I/O modules.

1769 Compact Power Supplies Specifications

Attribute	1769-PA2	1769-PB2	1769-PA4	1769-PB4
Input Voltage, nom	120V AC or 240V AC	24V DC	120V AC or 240V AC	24V DC
Input Voltage Range	85…265V AC	19.2…31.2V DC	85…265V AC	19.2…32V DC
Line Requirement, max	100 VA @ 120V AC 130 VA @ 240V AC	50 VA @ 24V DC	200 VA @ 120V AC 240 VA @ 240V AC	100 VA @ 24V DC
Output Bus Current Capacity (0°...55 °C) (32°...131 °F)	2 A @ 5V DC 0.8 A @ 24V DC		4 A @ 5V DC 2 A @ 24V DC	
24V DC User Power Capacity (0°...55 °C) (32°...131 °F)	250 mA	N/A	N/A	N/A
Inrush, max	25 A at 132V AC, 10 Ω source impedance 40 A at 265V AC, 10 Ω source impedance	30 A at 31.2V DC	25 A at 132V AC, 10 Ω source impedance 40 A at 265V AC, 10 Ω source impedance	30 A at 31.2V DC
Line Loss Ride Through	10 ms, min...10 s, max		5 ms, min,...10 s, max	
Load Current, min	0 mA at 5V DC; 0 mA at 24V DC			
Short Circuit Protection	Front Access Fuse (replacement part number: Wickmann 19195-3.15A, Wickmann 19343-1.6A, or Wickmann 19181-4A)	Front Access Fuse (replacement part number: Wickmann 19193-6.3A)	Front Access Fuse (replacement part number: Wickmann 19195-3.15A or Wickmann 19181-4A)	Front Access Fuse (replacement part number: Wickmann 19193-6.3A)
Bus Overvoltage Protection	for both +5V DC and for +24V DC			
Isolation Voltage (input power to 1769 bus) Verified by one of these dielectric tests	1836V AC for 1 s or 2596V DC for 1 s or 265V Working Voltage (IEC Class 1 - grounding required)	1200V AC for 1 s or 1697V DC for 1 s or 75V Working Voltage (IEC Class 1 - grounding required)	1836V AC for 1 s or 2596V DC for 1 s or 265V Working Voltage (IEC Class 1 - grounding required)	1200V AC for 1 s or 1697V DC for 1 s or 75V Working Voltage (IEC Class 1 - grounding required)
Power Supply Distance Rating	8 (up to eight I/O modules can be connected on either side of the power supply for a maximum of 16 modules)			
Certifications	UL 508, CSA (Class I, Division 2, Group A, B, C, D), CE			

Expansion Cables

Expansion cables are required when adding a second bank of I/O modules. They are connected from the right side of the controller bank to either the left or right side of the expansion bank.

1769 Compact Expansion Cables Selection Chart

Cable Type	Length	Cat. No.
right bank-to-right bank	305 mm (1 ft)	1769-CRR1
right bank-to-right bank	1 m (3.28 ft)	1769-CRR3
right bank-to-left bank	305 mm (1 ft)	1769-CRL1
right bank-to-left bank	1 m (3.28 ft)	1769-CRL3

End Caps

In every expansion I/O system, an end cap must be used to terminate the end of the serial communication bus. The end cap is connected to the last I/O module in the system.

1769 Compact End Caps Selection Chart

End Cap	Cat. No.
right end cap	1769-ECR
left end cap	1769-ECL

Perform MicroLogix 1500 System Expansion Calculations

A download is also available for system validation. On the Internet, go to http://www.ab.com/micrologix and navigate to MicroLogix 1500.

The procedure in this publication consists of:

- Select System Devices
- Verifying the System Loading
- Selecting Expansion Cables and End Caps

Select System Devices

1. Use the table below to select the processor and optional communication or display devices. Enter a 1 in the Select Devices column.

2. Enter the current draw values in the Calculated Current for System columns. If an external power supply will be used to power communication devices, do not include their current draw values in this calculation. Add up the current draw values to determine the SUBTOTAL1 values.

Selecting Hardware: MicroLogix 1500 Base Unit and Communication/Display Devices

Cat. No.	Select Device(s)	Bus Current Draw Attribute		Calculated Current for System	
		at 5V DC (mA)	at 24V DC (mA)	at 5V DC (mA)	at 24V DC (mA)
Choose a Processor, LSP or LRP:					
1764-LSP		300	0		
1764-LRP		380	0		
1764-DAT(1) optional		350	0		
Communication/Display Devices, optional, one only max:					
1761-NET-AIC(1)(2)		0	120		
1761-NET-ENI, 1761-NET-ENIW(1)(2)		0	100		
2707-MVH232, 2707-MVP232(1)(2)		0	80		
SUBTOTAL1				**(A1)**	**(B1)**

(1) These are optional accessories. Current is consumed only if the accessory is installed.

(2) Current for the 1761-NET-AIC and 1761-NET-ENI(W) devices can be supplied by controller communication port or from an external 24V DC source. No current is consumed from the controller when a user-supplied, external source is used. If an external source is to be used, do not select the device here. The current for a 2707-MVH232 or 2707-MVP232 MicroView Operator Interface is supplied from the controller communication port, when directly connected.

3. Use the table on page 81 to select the I/O modules. Enter the number of modules in either the Base Unit Expansion or the Bank 1 column.

IMPORTANT When planning the system layout, keep in mind that each module has a Power Supply Distance Rating. This is the maximum distance an I/O module can be located from the power supply. For most modules, the rating is 8. For the 1769-HSC and 1769-SDN, the rating is 4. For the 1769-SM1, the rating is 6

Depending on its configuration, the 1769-SDN can transfer large amounts of data into and out of the controller I/O image tables. Care should be taken when using more than three of these modules to verify that they are optimally configured. This will allow for the maximum available 4 KB data table size will not be exceeded. Refer to the 1769-SDN User Manual for more details.

4. Enter the current draw values in the Calculated Current columns. Add up the current draw values to determine the SUBTOTAL2 values.

5. Verify that the total number of modules does not exceed the system limits.

Selecting Hardware: 1769 Compact Expansion I/O

Select I/O Modules for Each Bank			Bus Current Draw Attribute (mA)		Calculate Current Draw			
Expansion I/O Modules	**Base Unit Expansion**	**Bank 1**			**Calculated Current for Base Unit Expansion (mA)**		**Calculated Current for Bank 1 Power Supply (mA)**	
	n1	**n2**	**X**	**Y**	**n1 x X**	**n1 x Y**	**n2 x X**	**n2 x Y**
Cat. No.	**Number of Modules[1]**		**at 5V DC**	**at 24V DC**	**at 5V DC**	**at 24V DC**	**at 5V DC**	**at 24V DC**
1769-ASCII			500	0				
1769-BOOLEAN			220	0				
1769-IA16			115	0				
1769-IA8I			90	0				
1769-IF4 (series A)			120	150				
1769-IF4 (series B)			120	60				
1769-IF4I			145	125				
1769-IF4XOF2			120	160				
1769-IF4FX0F2F			220	120				
1769-IF8			120	70				
1769-IF16C			190	70				
1769-IF16V			190	70				
1769-IG16			120	0				
1769-IM12			100	0				
1769-IQ16			115	0				
1769-IQ16F			110	0				
1769-IQ32			170	0				
1769-IQ32T			170	0				
1769-IQ6XOW4			105	50				
1769-IR6			100	45				
1769-IT6			100	40				
1769-OA8			145	0				
1769-OA16			225	0				
1769-OB8			145	0				
1769-OB16			200	0				
1769-OB16P			160	0				
1769-OB32			300	0				
1769-OB32T			220	0				
1769-OF2 (series A)			120	200				
1769-OF2 (series B)			120	120				
1769-OF4			120	170				
1769-OF4CI			145	140				
1769-OF4VI			145	75				
1769-OF8C			145	160				
1769-OF8V			145	125				
1769-OG16			200	0				
1769-OV16			200	0				
1769-OV32T			200	0				
1769-OW8			125	100				
1769-OW8I			125	100				
1769-OW16			205	180				

Selecting Hardware: 1769 Compact Expansion I/O

Select I/O Modules for Each Bank			**Bus Current Draw Attribute (mA)**		Calculate Current Draw			
Expansion I/O Modules	**Base Unit Expansion**	**Bank 1**			**Calculated Current for Base Unit Expansion (mA)**		**Calculated Current for Bank 1 Power Supply (mA)**	
	n1	**n2**	**X**	**Y**	**n1 x X**	**n1 x Y**	**n2 x X**	**n2 x Y**
Cat. No.	**Number of Modules(1)**		**at 5V DC**	**at 24V DC**	**at 5V DC**	**at 24V DC**	**at 5V DC**	**at 24V DC**
1769-HSC(2)			425	0				
1769-SDN(2)			440	0				
1769-SM1(3)			280	0				
1769-SM2(2)			350	0				
TOTAL MODULES:			**SUBTOTAL2:**		**(A2)**	**(B2)**	**(C)**	**(D)**

(1) Up to 16 modules can be used in a MicroLogix 1500 system when using a series B Base Unit and series C processor (up to 8 for series A base units).
A maximum of 8 modules can be connected directly to the Base Unit.
A maximum of 8 modules can be connected to each side of the Expansion Power Supply.

(2) The 1769-ASCII, 1769-HSC, 1769-SDN, and 1769-SM2 modules have a power supply distance rating of 4. They can have no more than 3 modules between them and the MicroLogix 1500 Base Unit or Expansion Power Supply.

(3) The 1769-SM1 module has a power supply distance rating of 6. They can have no more than 5 modules between it and the MicroLogix 1500 Base Unit or Expansion Power Supply.

Verifying the System Loading

To have a valid system, both current and power requirements must be satisfied.

Verify the Base Unit Loading

1. Enter the SUBTOTAL values from the tables on pages 79 and 81.
2. Add the total current draw for the Base Unit.
3. Verify the values are within the maximum limits.

MicroLogix 1500 Base Unit Power Supply Loading - Verify the Current Limits

	Calculated Current for System	
Current from	**at 5V DC (mA)**	**at 24V DC (mA)**
For the 1764-24BWA module only, enter sum of any User 24V DC Sensor Current		(E)
MAXIMUM LIMIT	**400 mA User 24V DC**	
Values from SUBTOTAL1	(A1)	(B1)
Values from SUBTOTAL2	(A2)	(B2)
TOTAL BASE UNIT CURRENT LOADING	(F)	(G)
MAXIMUM LIMIT	**2250 mA at 5V DC**	**400 mA at 24V DC**

4. Using the table below, verify that the MAXIMUM POWER LIMIT is not exceeded.

MicroLogix 1500 Base Unit Power Supply Loading - Verify the Required Power

Cat. No.	**1764-24AWA, 1764-28BXB**			**1764-24BWA**		
5V Power Calculation	(F)	x 5V	= W	(F)	x 5V	= W
24V Power Calculation	(G)	x 24V	= W	(G)	x 24V	= W
				(E)	x 24V	= W
Add up Total Watts			W			W
MAXIMUM POWER LIMIT	**16 W**			**22 W**		

Verifying the Expansion Power Supply Loading

Using the values from SUBTOTAL2, verify that the system loading and I/O distribution are within the limits shown below. Consider future expansion when selecting a power supply.

Bank 1 Power Supply Loading - Verify the Current Limits

Attribute	Cat. No.	Calculated Current for System		24V DC User Output Capacity
		at 5V DC (mA)	at 24V DC (mA)	
Values from SUBTOTAL2 (on page 82):		(C)	(D)	
MAXIMUM CURRENT LIMIT	**1769-PA2**	**2000**	**800**	**250 mA**
	1769-PA4	**4000**	**2000**	**N/A**
	1769-PB2	**2000**	**800**	
	1769-PB4	**4000**	**2000**	
I/O Distribution - Distribute I/O modules such that the current consumed from either the left side or the right side of the power supply never exceeds the following values:	1769-PA2	2000	800	**250 mA**
	1769-PA4	2000	1000	
	1769-PB2	2000	800	
	1769-PB4	2000	1000	

Selecting Expansion Cables and End Caps

Any system using Compact I/O components must have an end cap. If I/O Bank 1 is used, an expansion cable is also required. Use the information on page 78 to make your selection from the table below.

Select End Cap and Expansion Cable

Type of System	Requirement	Cat. No. Selected
Base Unit with Compact I/O only	right end cap	1769-ECR
Base Unit with Compact I/O and Bank 1, horizontal orientation	right-to-left expansion cable	1769-CRL1, 1769-CRL3
	right end cap	1769-ECR
Base Unit with Compact I/O and Bank 1, vertical orientation	right-to-right expansion cable	1769-CRL1, 1769-CRL3
	left end cap	1769-ECL

Select Replacement Parts

Step 14 - Select:

- replacement parts
- record your selections in the Selection Record (start on page 87)

MicroLogix 1000 Replacement Parts

Description	Cat. No.
Terminal Cover Doors for 1761-L32AWA, -L32BWA, or -L32AAA (2 doors per package)	1761-RPL-T32X
Replacement Terminal Block — 6-position DH-485 plug/connector used with the 1761-NET-AIC.	1746-RT30
Replacement Terminal Block — 5-position DeviceNet plug/connector used with the 1761-NET-DNI.	1761-RPL-RT00

MicroLogix 1100 Replacement Part

Description	Cat. No.
Replacement Battery	1763-BA

MicroLogix 1200 Replacement Parts

Description	Cat. No.
Replacement Removable Terminal Block — (1) 25-pt double row, (1) 29-point double row for 1762-L40AWA and -L40BWA	1762-RPLRTB40

MicroLogix 1400 Replacement Parts

Description	Cat. No.
Replacement Battery	1747-BA
Replacement Removable Terminal Block — (1) 25-pt double row, (1) 29-point double row for all 1766-L32*xxxx*	1762-RPLRTB40

MicroLogix 1500 Replacement Parts

Description	Cat. No.
Replacement Terminal Block — 17-pt for 1764-24AWA and 1764-24BWA inputs	1764-RPLTB1
Replacement Terminal Block — 21-pt for 1764-28BXB inputs and outputs for all base units	1764-RPLTB2
Replacement Battery	1747-BA

Select Training Materials

Step 15 - Select:

- training and promotional products - starter paks, demo units and simulators
- record your selections in the Selection Record (start on page 87)

Training Materials for MicroLogix 1000, 1100, 1200, 1400, and 1500 Controllers

Description	Cat. No.
MicroLogix 1000 Integrated Demonstration Unit includes: 1761-L20BWA-5A controller; 1761-NET-AIC DH-485 Interface; 1761-NET-DNI DeviceNet Interface; quadrature encoder; 4 selector switches; 8 illuminated pushbuttons; 1 potentiometer; 1 analog meter	1796-MICROx(1)
MicroLogix 1500 Integrated Demonstration Unit includes: 1764-28BXB base unit; 1764-LSP processor unit; 1769-IF4 Analog Input Module; 1769-OF2 Analog Output Module;1761-NET-AIC DH-485 Interface Module; 1761-NET-DNI DeviceNet Interface Module; quadrature encoder; 4 selector switches; 8 illuminated pushbuttons; 1 potentiometer; 1 analog meter; 1 frequency meter	1796-MICRO15x(1) (series B)
MicroLogix 1000 Input Simulator. For use with 1761-L16BWA MicroLogix 1000 Controller.	1761-SIM-B16
MicroLogix 1200 Input Simulator. For use with 1762-L24BWA and 1762-L24BXB controllers.	1796-SIM1200
MicroLogix 1500 Input Simulator. For use with 1764-24BWA and 1764-28BXB base units.	1796-SIM1500
MicroLogix 1200/PanelView 300 Micro Integrated Demonstration Unit includes: 1762-L24BWA, 2711-M3A18L1, inductive proximity switch, photo-electric sensor, programming cable.	1796-PV300MICROx(1)
MicroLogix 1100 Input Simulator.	DEMO-SIM1100
MicroLogix 1400 Demonstration Unit.	DEMO-ML1400x(1)
Connected Components Demonstration Unit.	DEMO-MICROSOLx(1)

(1) The x equals the power cord option. Contact your local Allen-Bradley distributor for more information.

Fill in Your Selection Listing

Step 16 - Select:

- all catalog numbers required for your system specification

Master List of Catalog Numbers

Cat. No.	Description	Quantity Selected
MicroLogix 1000 Controllers		
1761-L10BWA	MicroLogix 1000 10-Point AC Controller	
1761-L10BWB	MicroLogix 1000 10-Point DC Controller	
1761-L10BXB	MicroLogix 1000 10-Point DC Controller	
1761-L16AWA	MicroLogix 1000 16-Point AC Controller	
1761-L16BBB	MicroLogix 1000 16-Point DC Controller	
1761-L16BWA	MicroLogix 1000 16-Point AC Controller	
1761-L16BWB	MicroLogix 1000 16-Point DC Controller	
1761-L16NWA	MicroLogix 1000 16-Point AC Controller	
1761-L16NWB	MicroLogix 1000 16-Point DC Controller	
1761-L20AWA-5A	MicroLogix 1000 25-Point AC Controller with Analog	
1761-L20BWA-5A	MicroLogix 1000 25-Point AC Controller with Analog	
1761-L20BWB-5A	MicroLogix 1000 25-Point DC Controller with Analog	
1761-L32AAA	MicroLogix 1000 32-Point AC Controller	
1761-L32AWA	MicroLogix 1000 32-Point AC Controller	
1761-L32BBB	MicroLogix 1000 32-Point DC Controller	
1761-L32BWA	MicroLogix 1000 32-Point AC Controller	
1761-L32BWB	MicroLogix 1000 32-Point DC Controller	
MicroLogix 1100 Controllers and Accessories		
1763-L16AWA	MicroLogix 1100 16-Point AC Controller	
1763-L16BWA	MicroLogix 1100 16-Point AC Controller	
1763-L16BBB	MicroLogix 1100 16-Point DC Controller	
1763-L16DWD	MicroLogix 1100 16-Point DC Controller	
1763-MM1	MicroLogix 1100 Memory Module	
MicroLogix 1200 Controllers and Accessories		
1762-L24AWA	MicroLogix 1200 24-Point AC Controller	
1762-L24AWAR	MicroLogix 1200 24-Point AC Controller with Programming/HMI Port	
1762-L24BWA	MicroLogix 1200 24-Point AC Controller	
1762-L24BWAR	MicroLogix 1200 24-Point AC Controller with Programming/HMI Port	
1762-L24BXB	MicroLogix 1200 24-Point DC Controller	
1762-L24BXBR	MicroLogix 1200 24-Point DC Controller with Programming/HMI Port	
1762-L40AWA	MicroLogix 1200 40-Point AC Controller	
1762-L40AWAR	MicroLogix 1200 40-Point AC Controller with Programming/HMI Port	

Master List of Catalog Numbers

Cat. No.	Description	Quantity Selected
1762-L40BWA	MicroLogix 1200 40-Point AC Controller	
1762-L40BWAR	MicroLogix 1200 40-Point AC Controller with Programming/HMI Port	
1762-L40BXB	MicroLogix 1200 40-Point DC Controller	
1762-L40BXBR	MicroLogix 1200 40-Point DC Controller with Programming/HMI Port	
1762-MM1	MicroLogix 1200 Memory Module	
1762-MM1RTC	MicroLogix 1200 Memory Module with Real-Time Clock	
1762-RTC	MicroLogix 1200 Real-Time Clock Module	
MicroLogix 1100/1200/1400 I/O		
1762-IA8	8-Point 120V AC Input Module	
1762-IF2OF2	Combination 2-Channel Input 2-Channel Output Voltage/Current Analog Module	
1762-IF4	4-Channel Voltage/Current Analog Input Module	
1762-IQ16	16-Point Sink/Source 24V DC Input Module	
1762-IQ8	8-Point Sink/Source 24V DC Input Module	
1762-IQ8OW6	8 Point Sink/Source 24V DC Input/6-Point AC/DC Relay Output Combination Module	
1762-IR4	4-Channel RTD/Resistance Input Module	
1762-IT4	4-Channel Thermocouple/mV Input Module	
1762-OA8	8-Point 120/240V AC Triac Output Module	
1762-OB16	16-Point Sourcing 24V DC Output Module	
1762-OB8	8-Point Sourcing 24V DC Output Module	
1762-OF4	4-Channel Voltage/Current Analog Output Module	
1762-OW16	16-Point AC/DC Relay Output Module	
1762-OW8	8-Point AC/DC Relay Output Module	
1762-OX6I	6-Point Isolated AC/DC Relay Output Module	
1762-OV32T	Solid State 24V DC Sink Output Module	
1762-OB32T	Solid State 24V DC Source Output Module	
1762-IQ32T	DC Input Module	
MicroLogix 1400 Controllers and Accessories		
1766-L32BWA	MicroLogix 1400 32-point AC controller	
1766-L32AWA	MicroLogix 1400 32-point AC controller	
1766-L32BXB	MicroLogix 1400 32-point DC controller	
1766-L32BWAA	MicroLogix 1400 32-point AC controller with Analog	
1766-L32AWAA	MicroLogix 1400 32-point AC controller with Analog	
1766-L32BXBA	MicroLogix 1400 32-point DC controller with Analog	
1766-MM1	MicroLogix 1400 Memory Module	
MicroLogix 1500 Controllers and Accessories		
1764-24AWA	MicroLogix 1500 24-Point AC Base Unit	
1764-24BWA	MicroLogix 1500 24-Point AC Base Unit	
1764-28BXB	MicroLogix 1500 28-Point DC Base Unit	
1764-DAT	MicroLogix Data Access Tool	
1764-LRP	MicroLogix 1500 Processor Unit with RS-232 Port	
1764-LSP	MicroLogix 1500 Processor Unit	
1764-MM1	MicroLogix 1500 8 KB Memory Module	
1764-MM1RTC	MicroLogix 1500 8 KB Memory Module with Real-Time Clock	
1764-MM2	MicroLogix 1500 16 KB Memory Module	

Master List of Catalog Numbers

Cat. No.	Description	Quantity Selected
1764-MM2RTC	MicroLogix 1500 16 KB Memory Module with Real-Time Clock	
1764-MM3	MicroLogix 1500 16 KB Memory Module	
1764-MM3RTC	MicroLogix 1500 16 KB Memory Module with Real-Time Clock	
1764-RTC	MicroLogix 1500 Real-Time Clock Module	
1769 Compact I/O Components		
1769-ADN	CompactLogix DeviceNet Adapter, series B	
1769-ASCII	Compact 2-channel ASCII Interface Module	
1769-BOOLEAN	Compact 24V I/O Boolean Control Module	
1769-CRL1	Compact I/O Right Bank-to-Left Bank 1-Foot Expansion Cable[1]	
1769-CRL3	Compact I/O Right Bank-to-Left Bank 3-Foot Expansion Cable[1]	
1769-CRR1	Compact I/O Right Bank-to-Right Bank 1-Foot Expansion Cable[1]	
1769-CRR3	Compact I/O Right Bank-to-Right Bank 3-Foot Expansion Cable[1]	
1769-ECL	Compact I/O Left End Cap	
1769-ECR	Compact I/O Right End Cap	
1769-HSC	Compact I/O High Speed Counter Module	
1769-IA16	Compact 120V AC Input Module	
1769-IA8I	Compact Individually Isolated 120V AC Input Module	
1769-IF4	Compact 1769-IF4 (series B or Later) Analog Input Module	
1769-IF4I	Compact 4-channel Isolated Analog Input Module	
1769-IF4XOF2	Compact 8-Bit Low Resolution Analog I/O Combination Module	
1769-IF4FXOF2F	Compact Combination Fast Analog I/O Module	
1769-IF8	Compact 8-channel Analog Input Module	
1769-IF16C	Compact High Density Analog Current Input Module	
1769-IF16V	Compact High Density Analog Voltage Input Module	
1769-IG16	Compact TTL Input Module	
1769-IM12	Compact 240V AC Input Module	
1769-IQ16	CompactLogix 24V DC 16-point Sink/Source Input Module	
1769-IQ16F	CompactLogix 24V DC 16-point High Speed Sink/Source Input Module	
1769-IQ32	CompactLogix 24V DC 32-point Sink/Source Input Module	
1769-IQ32T	Compact Current Sinking/Sourcing 24V DC Input Module	
1769-IQ6XOW4	Compact Combination 24V DC Sink/Source Input & AC/DC Relay Output Module	
1769-IR6	Compact I/O 1769-IR6 RTD/resistance Input Module	
1769-IT6	Compact I/O 1769-IT6 Thermocouple/mV Input Module	
1769-OA16	Compact 100 to 240V AC Solid State Output Module	
1769-OA8	Compact 100 to 240V AC Solid State Output Module	
1769-OB16	Compact Solid State 16-point 24V DC Source Output Module	
1769-OB16P	Compact Solid State 16-point 24V DC Source Output Module with Electronic Protection	
1769-OB32	Compact Solid State 32-point 24V DC Source Output Module	
1769-OB32T	Compact Current Solid-state Sourcing 24V DC Output Module	
1769-OB8	Compact Solid State 8-point 24V DC Source Output Module	
1769-OF2	Compact Analog Output Module	
1769-OF4	Compact Analog Output Module	
1769-OF4CI	Compact 4-channel Current Isolated Analog Output Module	

Master List of Catalog Numbers

Cat. No.	Description	Quantity Selected
1769-OF4VI	Compact 4-channel Voltage Isolated Analog Output Module	
1769-OF8C	Compact 8-point Analog Current Output Module	
1769-OF8V	Compact 8-point Analog Voltage Output Module	
1769-OG16	Compact TTL Output Module	
1769-OV16	Compact Solid State 16-point 24V DC Sink Output Module	
1769-OV32T	Compact Current Sinking 24V DC Output Module	
1769-OW16	Compact 16-Output AC/DC Relay Module	
1769-OW8	Compact 8-Output AC/DC Relay Module	
1769-OW8I	Compact Individually Isolated 8-Output AC/DC Relay Module	
1769-PA2	Compact 124/240V AC Expansion Power Supply	
1769-PA4	Compact 124/240V AC Expansion Power Supply	
1769-PB2	Compact 24V DC Expansion Power Supply	
1769-PB4	Compact 24V DC Expansion Power Supply	
1769-SDN	CompactLogix DeviceNet Scanner Module	
1769-SM1	Compact I/O to DPI/SCANport Module	
1769-SM2	Compact I/O to DSI Communication Module	
MicroLogix Communication Interface Devices		
1761-NET-AIC	MicroLogix Advanced Interface Converter Module	
1761-NET-ENI	MicroLogix Ethernet/IP Interface Module	
1761-NET-ENIW	MicroLogix Ethernet/IP Interface Module with Web Server Functionality	
Programming Tools and Software		
1747-UIC	Universal Serial Bus (USB) to DH-485 Interface Converter	
9324-RL0100ENE	RSLogix 500 Starter	
9324-RL0300ENE	RSLogix 500 Programming for the SLC 500 and MicroLogix Families	
9324-RL0700NXENE	RSLogix 500 Professional	
9324-RLM0100ENE	RSLogix Micro Starter	
9324-RLM0800ENE	RSLogix Micro Professional	
Cables		
1747-CP3	SLC 5/03, SLC 5/04, and SLC 5/05 RS-232 Programmer Cable	
1761-CBL-AC00	RS-232 Operating Cable, 9-Pin D Shell to 9-Pin D Shell (MicroLogix), 0.5 m (1.5 ft)	
1761-CBL-AM00	RS-232 Operating Cable, 8-Pin Mini DIN to 8-Pin Mini DIN (MicroLogix), 0.5 m (1.5 ft)	
1761-CBL-AP00	RS-232 Operating Cable, 8-Pin Mini DIN to 9-Pin D Shell (MicroLogix), 0.5 m (1.5 ft)	
1761-CBL-AS03	Controller/DH-485 Cable, 6-Pin Phoenix to RJ45, 3 m (10 ft)	
1761-CBL-AS09	Controller/DH-485 Cable, 6-Pin Phoenix to RJ45, 9.5 m (31 ft)	
1761-CBL-HM02	RS-232 Operating/Programming Cable, 8-Pin Mini DIN to 8-Pin Mini DIN (MicroLogix), 2 m (6.5 ft)	
1761-CBL-PM02	RS-232 Operating/Programming Cable, 8-Pin Mini DIN to 9-Pin D Shell (MicroLogix), 2 m (6.5 ft)	
1761-CBL-PH02	RS-232 Operating/Programming Cable, 8-pin Mini DIN with lock mechanism to 9-pin D Shell, 2 m (6.5 ft)	
1761-CBL-AH02	RS-232 Operating/Programming Cable, 8-pin Mini DIN with lock mechanism to 8-pin Mini DIN with lock mechanism, 2 m (6.5 ft)	
1763-NC01	DH-485 cable, 8-Pin Mini DIN to 6-Pin Phoenix	
2711-CBL-HM05	RS-232 Operating Cable, 8-Pin Mini DIN to 8-Pin Mini DIN (PanelView 300 Micro to MicroLogix), 5 m (16.4 ft)	
2711-CBL-HM10	RS-232 Operating Cable, 8-Pin Mini DIN to 8-Pin Mini DIN (PanelView 300 Micro to MicroLogix), 10 m (32.7 ft)	

Master List of Catalog Numbers

Cat. No.	Description	Quantity Selected
2711-CBL-PM05	RS-232 Operating/Programming Cable, 9-Pin D Shell to 8-Pin Mini DIN (PanelView 300 Micro to SLC or PLC), 5 m (16.4 ft)	
2711-CBL-PM10	RS-232 Operating/Programming Cable, 9-Pin D Shell to 8-Pin Mini DIN (PanelView 300 Micro to SLC or PLC), 10 m (32.7 ft)	
Replacement Parts		
1747-BA	Lithium Battery (For RAM Memory Retention) for MicroLogix 1400/1500 controllers	
1761-RPL-RT00	Replacement Terminal Block for 1761-NET-DNI, 5-position DeviceNet plug/connector	
1761-RPL-T32X	Terminal Cover Doors for 1761-L32AWA, 1761-L32BWA, 1761-L32AAA, 1761-L32BWB, or 1761-L32BBB (2 doors per package)	
1761-RT30	Replacement Terminal Block for 1761-NET-AIC, 6-position DH-485 plug/connector	
1762-RPLRTB40	Replacement Terminal Block for all 1762-L40*xxxx* and all 1766-L32*xxxx* Controllers	
1763-BA	Lithium Battery for MicroLogix 1100 controllers	
1764-RPLTB2	21-Point Replacement Terminal Block for 1764-28BXB MicroLogix 1500 Base Unit	

(1) Approximate cable length is measured from end-to-end of the cable only.

For More Information

Visit the MicroLogix website at http://www.ab.com/micrologix to learn more about MicroLogix products and download MicroLogix software utilities and firmware updates. Software utilities are available for configuring the ENI network interface devices. System validation worksheets are available to determine I/O power usage.

You can view or download publications at http://literature.rockwellautomation.com. To order paper copies of technical documentation, contact your local Rockwell Automation distributor or sales representative.

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Installation Assistance

If you experience a problem within the first 24 hours of installation, review the information that is contained in this manual. You can contact Customer Support for initial help in getting your product up and running.

United States or Canada	1.440.646.3434
Outside United States or Canada	Use the Worldwide Locator at http://www.rockwellautomation.com/support/americas/phone_en.html, or contact your local Rockwell Automation representative.

New Product Satisfaction Return

Rockwell Automation tests all of its products to ensure that they are fully operational when shipped from the manufacturing facility. However, if your product is not functioning and needs to be returned, follow these procedures.

United States	Contact your distributor. You must provide a Customer Support case number (call the phone number above to obtain one) to your distributor to complete the return process.
Outside United States	Please contact your local Rockwell Automation representative for the return procedure.

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Your comments will help us serve your documentation needs better. If you have any suggestions on how to improve this document, complete this form, publication RA-DU002, available at http://www.rockwellautomation.com/literature/.

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