

Exelon Nuclear
Peach Bottom Atomic Power Station
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November 15, 2004

Mr. Thomas Filip
Pennsylvania Department of Environmental Protection
909 Elmerton Avenue
Harrisburg, PA 17110-8200

Subject: Construction Permit for Peach Bottom Atomic Power Station
PWS Id 7670905

Dear Mr. Filip,

The purpose of this letter is to request minor changes to the Peach Bottom Atomic Power Station's Construction Permit 6704501. We are proposing to modify the permit to allow the station to modify their water treatment plant to comply with the PADEP's Long Term 1 Enhanced Surface Water Treatment Rule.

Peach Bottom's domestic water system is currently in compliance with the Disinfectant/Disinfection Byproduct Rule. The work planned on the chlorination system is not required for compliance but is an enhancement to system control.

Our initial application for our construction permit indicated that the currently installed Programmable Logic Controller (PLC) would be reprogrammed to allow the system to filter to waste during the initial spike in turbidity when the domestic water pumps initiate. The new system would filter to waste until the turbidity was less than 0.3 NTU. The PLC is old and it needs to be replaced. In addition, the piping configuration of the system will not allow filtering to waste duration determined by the turbidity. Therefore, a set time period will have to be used. Based on the data from historical strip charts, the time period will be between 7 and 10 minutes. The precise time will be a tunable parameter and will be adjusted as necessary.

The new PLC is an Allen-Bradley MicroLogix 1000. The new controller is a direct replacement of Peach Bottom's existing PLC. The Technical Data sheet is attached to this letter. The function of the PLC does not change from the function described in the application. To replace the PLC, both of the polishing filters must be removed from service. Since both filters will be removed from service, we will request, under a separate letter, a temporary truck to supply water to the Domestic Water Storage Tank. While we have the truck, we intend to install the PLC, the turbidimeters, the turbidity recorder, the flow recorder, and the totalizer.

CDO1

The equipment, which will contact the water, will be washed with a sodium hypochlorite solution before installation. The piping will be flushed with chlorinated water and sampled for total coliform bacteria. The water samples, from the flushed samples, must be free of total coliform bacteria before the system can be returned to service. Disinfection of the new components will be as described in the previously approved application.

Peach Bottom will request an inspection and seek the PADEP's permission to place the system in-service after the polishing filter work is complete. A final inspection and issuance of the operating permit would occur after the hypochlorite system work is complete.

If you have any questions on this amendment to our application or the project, please contact Mr. Arthur Arcilla {717} 456-4185, or Ms. Barbara Payne {717} 456-3410.

Thank you for your cooperation in this matter.

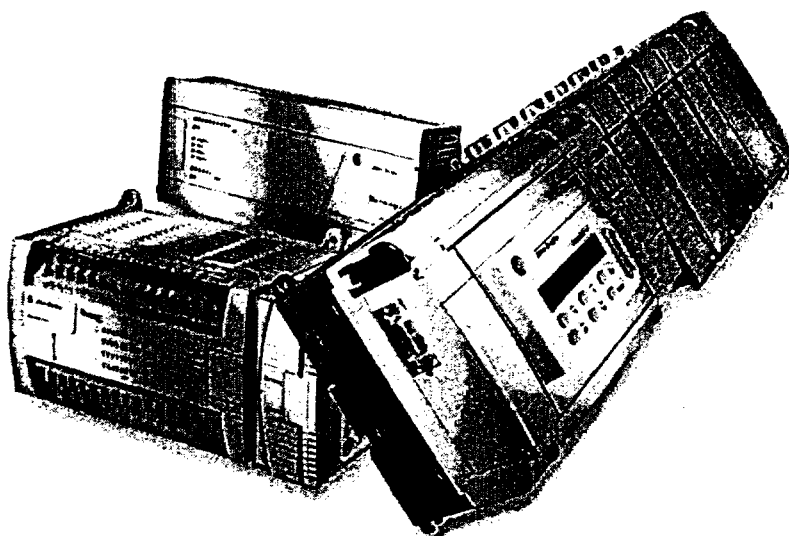
Sincerely,



Joseph P. Grimes, Plant Manager
Peach Bottom Atomic Power Station

cc: USNRC Region I Document Control Desk
T. J. Siglin
D. J. Foss
D. M. Jordan

Ccn 04 - 14085



MicroLogix Programmable Controllers Selection Guide

1761, 1762, 1764

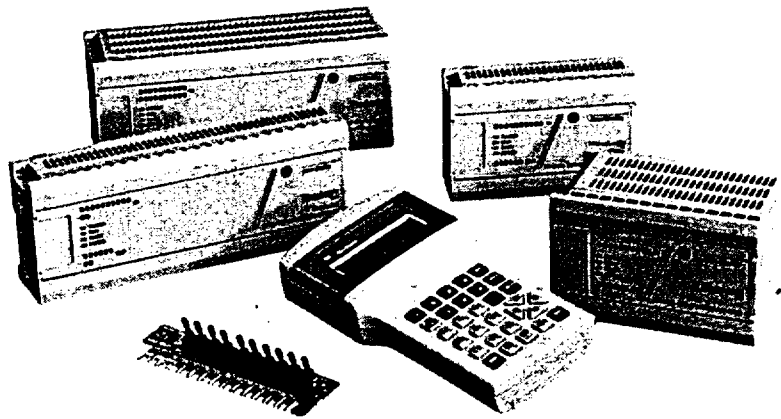


MicroLogix Overview

The MicroLogix family of programmable controllers provides 3 levels of control. Small on size, big on performance, the MicroLogix 1000 offers control capabilities in an affordable, compact package. The MicroLogix 1200 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 helps you achieve high-level control in a variety of applications.

MicroLogix 1000

Description



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

The MicroLogix 1000 programmable 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 and 5 analog I/O points.

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

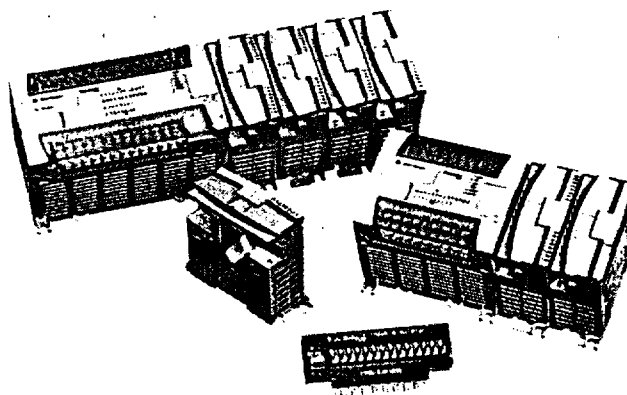
The MicroLogix 1000 controller utilizes RSLogix 500 programming software and shares a common instruction set with the MicroLogix 1200, MicroLogix 1500 and SLC 500 families of controllers.

Advantages

- 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 and output commons allow you to use the controller for either sinking or sourcing input devices and provide isolated commons for multi-voltage output applications
- Peer-to-peer messaging capability allows you to network up to 32 controllers on a DH-485 network (using a 1761-NET-AIC module)
- RTU slave protocol support using DF1 Half-Duplex allows up to 254 slave nodes to communicate with a single master using radio modems, leased-line modems or satellite uplinks
- RS-232 communication channel allows for simple connectivity to a personal computer for program upload, download and monitoring
- Controllers that have 24V dc inputs include a built-in high-speed counter (6.6 kHz)
- Adjustable DC input filters allow you to customize the input response time and noise rejection to meet your application needs
- Regulatory agency certifications for world-wide market (CE, C-Tick, UL, c-UL, including Class 1 Division 2 Hazardous Location)

MicroLogix 1200

Description



The MicroLogix 1200 controllers provide more computing power and greater I/O flexibility than the MicroLogix 1000 to solve a variety of application needs.

Available in 24 and 40-point versions, the I/O count can be expanded using rackless I/O modules. This results in lower system cost and reduced parts inventory.

A field-upgradable flash operating system ensures 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 web site download.

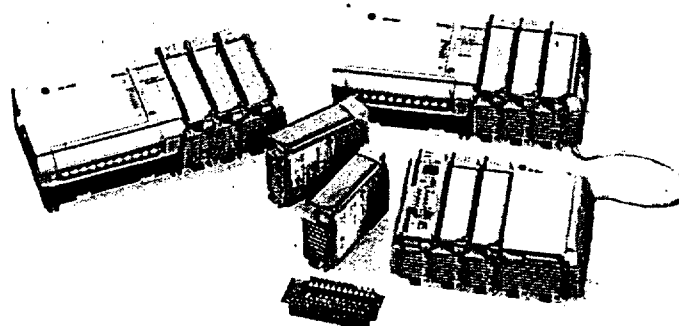
Building on the features of the MicroLogix 1000, the MicroLogix 1200 also has the following advantages.

Advantages

- Large 6K memory to solve a variety of applications
- High performance expansion I/O options (up to 6 modules depending on power budget)
- Advanced communications options including peer-to-peer and SCADA/RTU networks, DH-485, DeviceNet and EtherNet/IP via the Communications Port (Channel 0) on the controller
- An additional Programming/HMI Port, providing connectivity to a DF1-Full Duplex compatible device such as an operator interface or programming terminal (MicroLogix 1200R only)
- Communications toggle push button that allows the controller's Channel 0 port to toggle between user configured communications parameters and factory default settings for easy programming or troubleshooting
- Data file download protection prevents critical user data from being altered via program downloads
- Two built-in analog trim potentiometers
- Optional real-time clock
- Optional memory module
- High-resolution, 1 ms timers
- 20 kHz high-speed counter, featuring 8 modes of operation
- One high-speed output that can be configured as 20 kHz PTO (Pulse Train Output) or as PWM (Pulse Width Modulated) output
- Four high-speed latching (pulse-catch) inputs
- Four event interrupt inputs (EII)
- One, 1 ms, selectable timed interrupt (STI)
- 32-bit signed integer math
- Floating-point data file
- Built-in PID capabilities
- ASCII read/write capability
- Finger-safe terminal blocks meet global safety standards
- Removable terminal blocks on 40-point controllers allow pre-wiring

MicroLogix 1500

Description



The MicroLogix 1500 is a world-class programmable logic control platform with even more advanced features and performance than the MicroLogix 1200. 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 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, lowering system cost and reducing 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 includes all the features of the MicroLogix 1200, plus more.

Advantages

- Large memory to solve a variety of applications.
1764-LSP: 7K user program capacity
1764-LRP: 14K user program capacity
- Recipe (RCP) instruction saves custom lists of recipe data
- Data logging (1764-LRP only) instruction stores data records with optional time stamp in a separate 48K byte memory area
- High performance expansion I/O options (up to 16 modules)
- Additional configurable RS-232 communications port on the 1764-LRP processor for peer-to-peer and SCADA/RTU networks, DH-485, DeviceNet and EtherNet/IP
- Battery (built-in and optional replacement)
- Mode switch for Run/Remote/Program
- Optional data access tool (DAT) for monitoring and changing integer and bit values
- Two high-speed outputs that can be configured as 20 kHz PTO (Pulse Train Output) or as PWM (Pulse Width Modulated) outputs
- Eight high-speed latching (pulse-catch) inputs
- Removable terminal blocks on all Base Units and I/O modules allow pre-wiring

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 Controller Family: MicroLogix 1000, 1200 or 1500 <ul style="list-style-type: none"> controller family - based on memory, I/O, added functionality, programming instructions and dimensions consider future expansion requirements if selecting the MicroLogix 1500, make note if your application requires the additional memory, control or communication features provided by the 1764-LRP processor 	page 9
	2 Select MicroLogix Communication Interface Devices <ul style="list-style-type: none"> communication network - based on application requirements communication interface device - in addition to providing connection to DH-485, the AIC+ is recommended for use as an optical isolator between your computer/modem and the controller record your selection in the Selection Record (starts on page 60) 	page 17
	3 Select Programming Tools and Software <ul style="list-style-type: none"> programming tools - hand-held programmer with optional memory module (available for MicroLogix 1000 only) software - the appropriate RSLogix 500 package for your application record your selection in the Selection Record (starts on page 60) 	page 21
	4 Select Cables <ul style="list-style-type: none"> cables - review device port identification to find cable in the selection chart record your selection in the Selection Record (starts on page 60) 	page 22
	5 Select MicroLogix 1000 Controllers <ul style="list-style-type: none"> controller - review power and I/O configurations to select a controller catalog number, see power supply and I/O specifications for more detailed information record your selection in the Selection Record (starts on page 60) 	page 24
	6 Select MicroLogix 1200 Controllers and Accessories <ul style="list-style-type: none"> 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 selection in the Selection Record (starts on page 60) 	page 29
	7 Select MicroLogix 1200 I/O <ul style="list-style-type: none"> I/O modules - digital, analog and temperature perform system expansion calculations record your selection in the Selection Record (starts on page 60) 	page 33
	8 Select MicroLogix 1500 Controllers and Accessories <ul style="list-style-type: none"> 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 (starts on page 60) 	page 40
	9 Select 1769 Compact I/O Components <ul style="list-style-type: none"> 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 (starts on page 60) 	page 44
	10 Select Replacement Parts <ul style="list-style-type: none"> replacement parts - AIC+ and DNI replacement terminal blocks are listed with the MicroLogix 1000 record your selection in the Selection Record (starts on page 60) 	page 58
	11 Select Training and Promotional Products <ul style="list-style-type: none"> training and promotional products - starter packs, demo units and simulators record your selection in the Selection Record (starts on page 60) 	page 59
	12 Fill in Your Selection Listing <ul style="list-style-type: none"> all catalog numbers required for your system specification 	page 60

Step 1 - Select:

- controller family - based on memory, I/O, added functionality, programming instructions and dimensions
- consider future expansion requirements
- if selecting the MicroLogix 1500, make note if your application requires the additional memory, control or communication features provided by the 1764-LRP processor

Select Controller Family: MicroLogix 1000, 1200 or 1500

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

Features

MicroLogix 1000, 1200 and 1500 Feature Comparison Chart

Controller	MicroLogix 1000	MicroLogix 1200	MicroLogix 1200R	MicroLogix 1500	
Bulletin Number	1761	1762	1762	1764-LSP	1764-LRP
Memory					
Up to 1K	✓				
Up to 6K		✓	✓		
Up to 7K				✓	
Up to 14K					✓
User Program/User Data Space	1K (preconfigured)	4K/2K (max.) configurable	4K/2K (max.) configurable	3.6K/4K (max.) configurable	10K/4K (max.) configurable
Built-in EEPROM (non-volatile memory)	✓				
Flash Memory (non-volatile memory)		✓	✓		
Built-in Battery Back-up (static RAM non-volatile memory)				✓	✓
Back-up Memory Module (for supplemental program back-up and transport)	only through hand-held programmer	✓	✓	✓	✓
I/O					
Embedded I/O (max.)	32	40	40	28	28
Local Expansion I/O (max.)	0	96	96	512	512
Normal Expansion I/O (max.)	0	0	0	DeviceNet using 1769-SDN module can own up to 63 devices, such as a 1769-ADN (up to 30 I/O modules per 1769-ADN)	DeviceNet using 1769-SDN module can own up to 63 devices, such as a 1769-ADN (up to 30 I/O modules per 1769-ADN)
Added Functionality					
Analog (Embedded)	2 current inputs 2 voltage inputs 1 current or voltage output				
Analog (Expansion)		✓	✓	✓	✓
Trim Potentiometers		2	2	2	2
PID		✓	✓	✓	✓
High Speed Counters (embedded)	1 @ 6.6 kHz	1 @ 20 kHz	1 @ 20 kHz	2 @ 20 kHz	2 @ 20 kHz
High Speed Counters (expansion)				with 1769-HSC 2 quadrature or 4 pulse/count @ 1 MHz	with 1769-HSC 2 quadrature or 4 pulse/count @ 1 MHz

MicroLogix 1000, 1200 and 1500 Feature Comparison Chart

Controller	MicroLogix 1000	MicroLogix 1200	MicroLogix 1200R	MicroLogix 1500	
Bulletin Number	1761	1762	1762	1764-LSP	1764-LRP
Thermocouple/RTD (expansion)		✓	✓	✓	✓
Real Time Clock (optional)		✓	✓	✓	✓
Motion: Pulse Width Modulated		1 @ 20 kHz	1 @ 20 kHz	2 @ 20 kHz	2 @ 20 kHz
Motion: Pulse Train Outputs for use with stepper or servos		1 @ 20 kHz	1 @ 20 kHz	2 @ 20 kHz	2 @ 20 kHz
Data Access Tool				✓	✓
Data Logging/Recipe (using user program memory)				✓	✓
Data Logging/Recipe (using additional 48K byte non-program memory)					✓
Floating Point Math		✓	✓	✓	✓
ASCII Data File		✓	✓	✓	✓
Programming					
Windows - RSLogix 500 Software	✓	✓	✓	✓	✓
Hand-Held Programmer	✓				
Communications					
RS-232 Ports	(1) 8-pin mini DIN	(1) 8-pin mini DIN	(1) 8-pin mini DIN (1) 8-pin mini DIN Programming/HMI	(1) 8-pin mini DIN	(1) 8-pin mini DIN (1) isolated 9-pin D-shell, configurable
DeviceNet Peer-to-Peer Messaging, Slave I/O	with 1761-NET-DNI	with 1761-NET-DNI	with 1761-NET-DNI	with 1761-NET-DNI	with 1761-NET-DNI
DeviceNet Scanner				with 1769-SDN	with 1769-SDN (includes peer-to-peer messaging)
EtherNet/IP Peer-to-Peer Messaging	with 1761-NET-ENI or 1761-NET-ENIW	with 1761-NET-ENI or 1761-NET-ENIW	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	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	network with 1761-NET-AIC	network with 1761-NET-AIC
SCADA RTU - DF1 Half-Duplex Slave	✓	✓	✓	✓	✓
SCADA RTU - DF1 Half-Duplex Master		✓	✓	✓	✓
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	✓	✓	✓	✓	✓
Agency Certifications					
CE, C-Tick, 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 (i.e., Examine if On, Examine if Off)
- Data Comparison Instructions (i.e., Equal, Greater than or Equal, Less than or Equal)
- Data Manipulation Instructions (i.e., Copy, Move)
- Math Instructions (i.e., Add, Subtract, Multiply)
- Program Flow Control Instructions (i.e., Jump, Subroutine)
- Application Specific Instructions (i.e., Programmable Limit Switch, Sequencer)
- High-Speed Counter Instruction
- Communication Instruction (*including ASCII for MicroLogix 1200 and 1500 only*)
- High-Speed PTO (Pulse Train Output) and PWM (Pulse Width Modulated) Instructions (*MicroLogix 1200 and 1500 only*)
- Recipe Instruction (*MicroLogix 1500 only*)
- Data Logging Instruction (*MicroLogix 1500 1764-LRP processor only*)

Controller Specifications

Controller General Specifications

Specification	MicroLogix 1000 (Bulletin 1761)	MicroLogix 1200 (Bulletin 1762)	MicroLogix 1500 (Bulletin 1764)
Memory Size and Type	1K EEPROM (approximately 737 instruction words, 437 data words)	6K flash memory 4K user program, 2K user data	1764-LSP processor: 7K user memory (total user program plus data) 1764-LRP processor: 14K 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, 2K max. data size	configurable, user defined file structure, 4K max. data size
Throughput	1.5 ms (for a typical 500-instruction program) *	2 ms (for a typical 1K word user program) *	1 ms (for a typical 1K word user program) *

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

* A typical user program contains bit, timer, counter, math and file instructions.

Environmental Specifications and Certifications

Specification	1761 Controllers	1762 Controllers	1764 Controllers
Operating Temperature	Horizontal Mounting 0...55 °C (32...131 °F) Vertical Mounting 0...45 °C (32...113 °F) for digital I/O, 0...40 °C (32...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) *
Relative Humidity	5...95% non-condensing	5...95% non-condensing	5...95% non-condensing
Vibration	Operating: 5 Hz...2 kHz, 0.381 mm (0.015 in) peak-to-peak, 2.5 g panel mounted, Non-Operating: 5 Hz...2 kHz, 0.762 mm (0.030 in) peak-to-peak, 5 g †	Operating: 100...500 Hz, 5 g, 0.030 in max. peak-to-peak (Relay Operation: 1.5 g)	Operating: 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	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)
	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		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)
Shock, Non-Operating	10 and 16 Point Controllers: 20 g 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)
	32 Point and Analog Controllers: 20 g peak acceleration (11 ± 1 ms duration), 3 times each direction, each axis		with Data Access Tool installed: 30 g panel mounted (20 g DIN Rail mounted)
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		
Electrical/EMC	The controller has passed testing at the following levels:		
ESD Immunity	EN 61000-4-2 8 kV air	EN 61000-4-2 4 kV contact, 8 kV air, 4 kV indirect	
Radiated RF Immunity	EN 61000-4-3 10 V/m, 27...1000 MHz; 3V/m, 87...108 MHz, 174...230 MHz and 470...790 MHz	EN 61000-4-3 10V/m, 80...1000 MHz, 80% amplitude modulation, +900 MHz keyed carrier	
EFT/B Immunity	EN 61000-4-4 Power Supply, I/O: 2 kV Communications: 1 kV	EN 61000-4-4 Power Supply, I/O: 2 kV, 5 kHz Communications Cable: 1 kV, 5 kHz	
Surge Transient Immunity	EN 61000-4-5 Communications: 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 Communications: 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 Communications Cable: 3V	EN 61000-4-6 Power Supply, I/O: 10V Communications Cable: 3V	

* DC input voltage derated linearly from 30°C (30V...26.4V)

* Recommended storage temperature for maximum battery life (5 years typical with normal operating/storage conditions) of Real-Time Clock modules is -40°C...+40°C (-40°F...+140°F). Battery life may be significantly shorter at elevated temperatures. Applies to 1762-RTC, 1762-MM1RTC, 1764-MM1RTC, and 1764-MM2RTC.

† DIN rail mounted controller is 1 g.

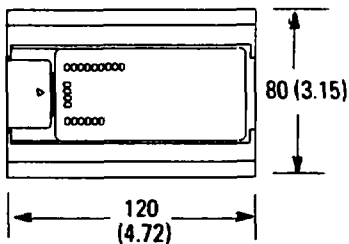
Controller Dimensions MicroLogix 1000

Dimensions are in millimeters (inches).

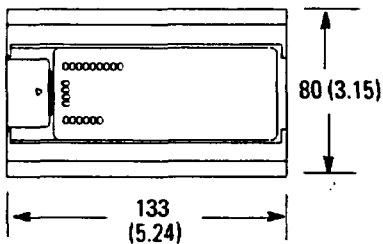
Controller spacing = 50 mm (2 in) on all sides for adequate ventilation.

MicroLogix 1000 Controller Dimensions

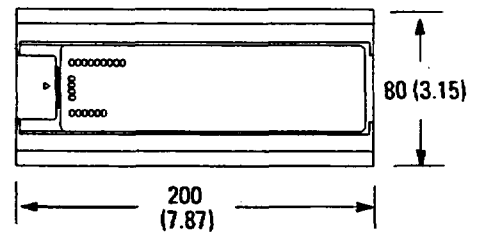
1761-L10BWA, -L10BWB,
-L10BXB, -L16BBB, -L16BWA,
-L16BWB, -L16NWA, -L16NWB



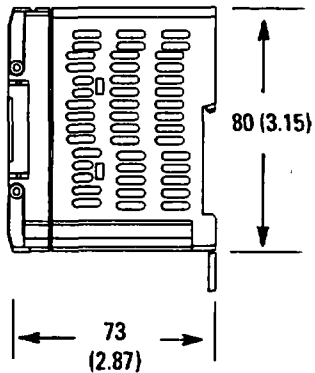
1761-L16AWA



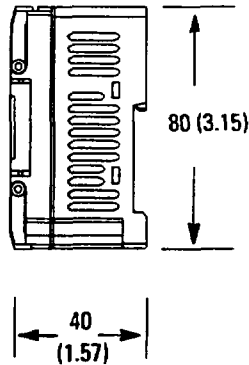
1761-L20AWA-5A, -L20BWA-5A,
-L20BWB-5A, -L32AWA, -L32BWA,
-L32AAA, -L32BBB, -L32BWB



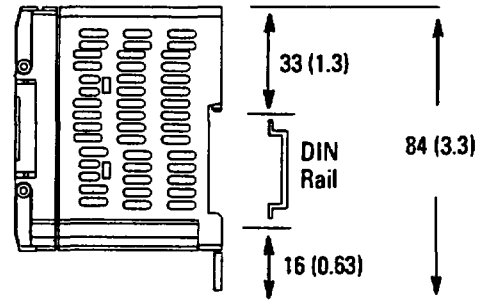
1761-L10BWA, -L16AWA,
-L16BWA, -L16NWA,
-L20AWA-5A, -L20BWA-5A,
-L32AAA, -L32AWA, -L32BWA



1761-L10BWB,
-L10BXB, -L16BWB,
-L16NWB, -L20BWB-5A,
-L32BBB, -L32BWB



MicroLogix 1000 DIN Rail Dimensions

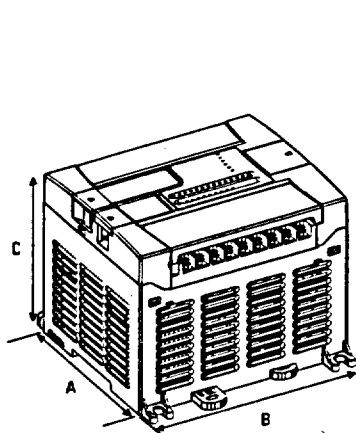


MicroLogix 1200

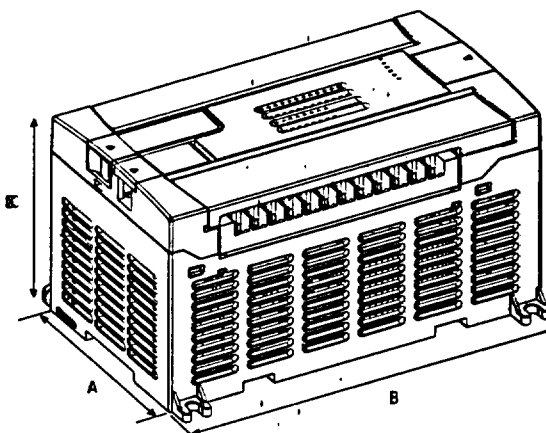
Dimensions are in millimeters (inches).

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



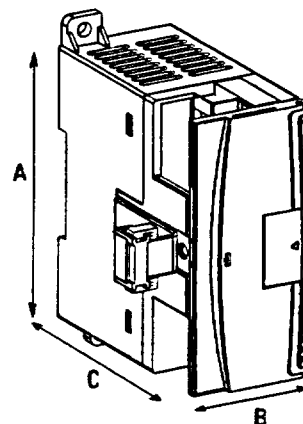
1762-L40AWA, 1762-L40BWA, 1762-L40BXB
1762-L24AWAR, 1762-L24BWAR, 1762-L24BXBR

MicroLogix 1200 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

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

Dimensions are in millimeters (inches).

Hole spacing tolerance: ± 0.4 mm (0.016 in)

For more than 2 modules: (number of modules - 1) x 40 mm (1.58 in)

A = 95.86 mm (3.774 in)

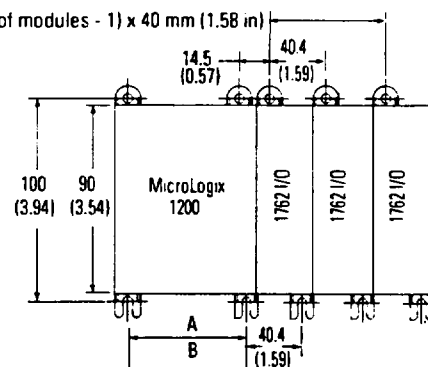
1762-L24AWA, 1762-L24BWA, 1762-L24BXB

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



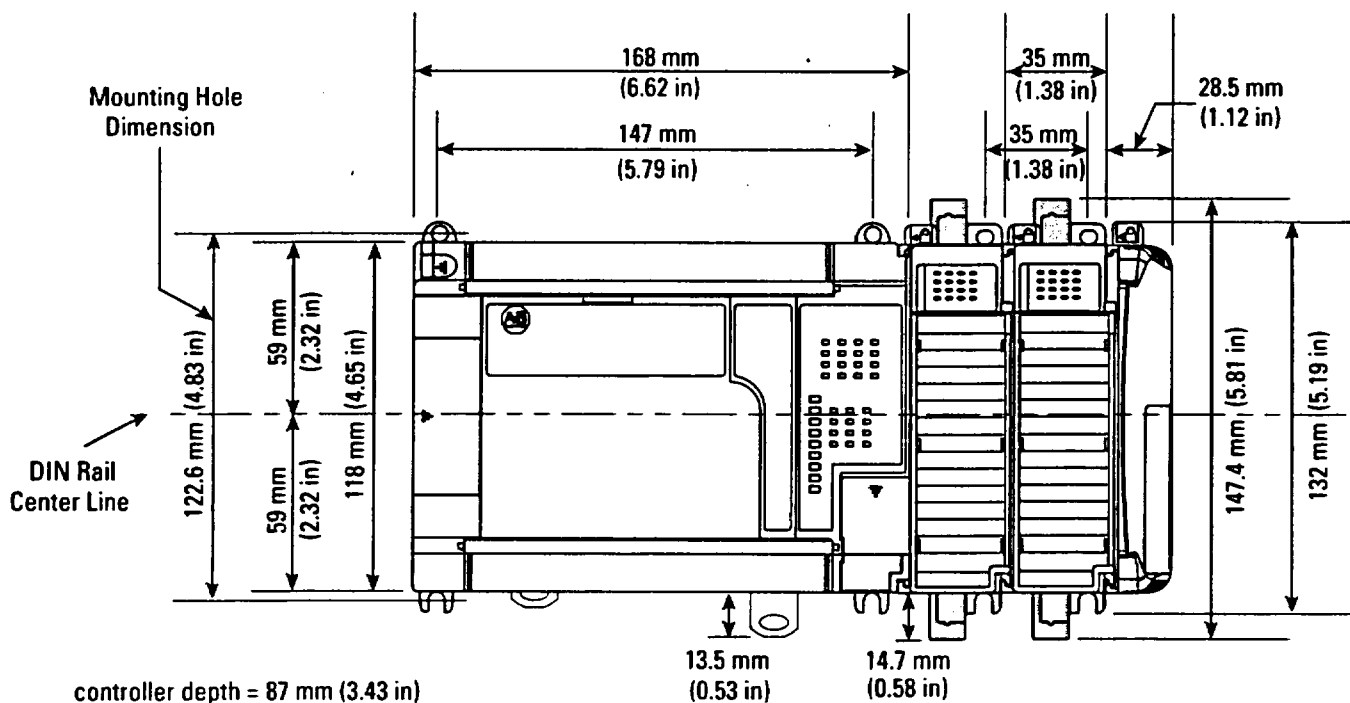
MicroLogix 1500

Dimensions are in millimeters (inches).

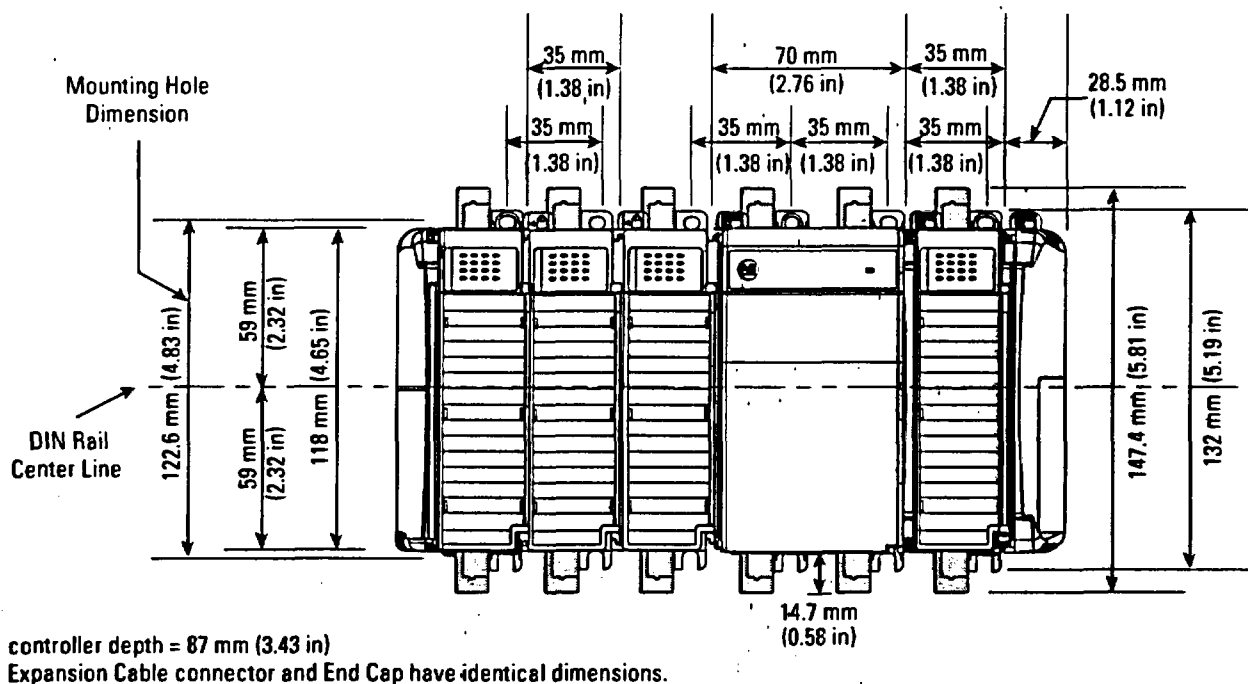
Hole spacing tolerance: ± 0.04 mm (0.016 in)

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

Compact I/O with MicroLogix 1500 Base Unit and Processor

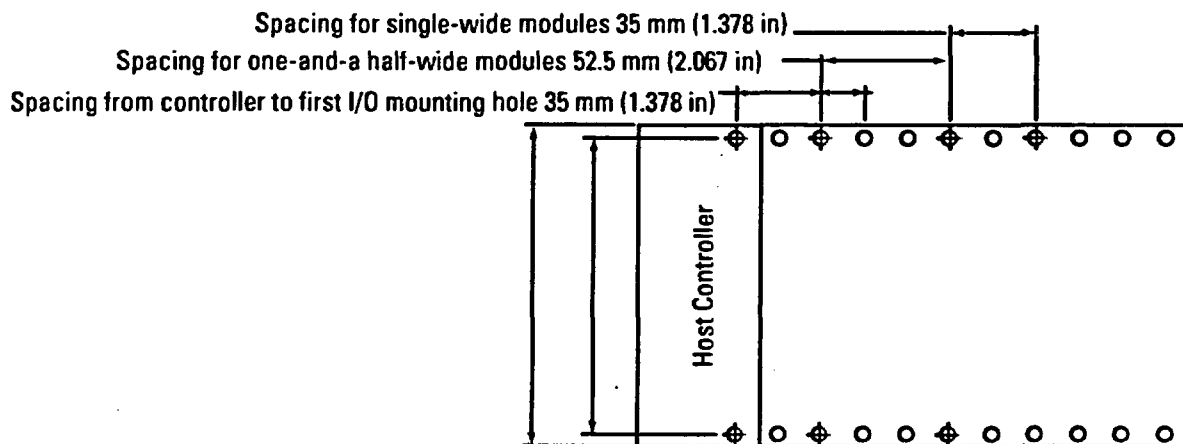


Expansion Bank with Power Supply, Expansion Cable and End Cap



Spacing for Single-Wide and One and One-Half-Wide Modules

Panel Mounting Using the Dimensional Template:



Note: 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 (e.g. 1769-IQ16) and one-and-one-half-wide modules (e.g. 1769-OA16).

Step 2 - Select:

- communication network - based on application requirements
- communication interface device - in addition to providing connection to DH-485, the AIC+ is recommended for use as an optical isolator between your computer/modem and the controller
- record your selection in the Selection Record (starts on page 60)

Select MicroLogix Communication Interface Devices

Communication Networks

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

- Enhanced Channel 0 RS-232 port (includes 24V dc power for network interface devices)
- 300; 600; 1200; 4800; 9600; 19.2K and 38.4K baud rates
- RTS/CTS hardware handshake signals
- Connection to DH-485, DeviceNet and Ethernet networks through the 1761-NET-AIC, 1761-NET-DNI and 1761-NET-ENI interface modules, respectively (*MicroLogix 1500: also connects to DeviceNet via the 1769-SDN DeviceNet Scanner Module*)
- Connection to modems for remote communications
- ASCII messaging provides dial-out capability (*MicroLogix 1200 and 1500 controllers only*)
- DF1 Half-Duplex Slave
- DF1 Full-Duplex Master (*MicroLogix 1200 and 1500 controllers only*)
- Modbus RTU Master/Slave through the 1761-NET-AIC module (*MicroLogix 1200 and 1500 controllers only*)

MicroLogix Network Options

If your application requires:	Use this network:
<ul style="list-style-type: none"> • 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 DF1 Radio Modem (<i>MicroLogix 1200 and 1500 controllers only</i>)
<ul style="list-style-type: none"> • 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 via the 1761-NET-AIC Advanced Interface Converter or 1747-UIC USB to DH-485 Interface Converter
<ul style="list-style-type: none"> • Data sharing between 64 devices • Better diagnostics for improved data collection and fault detection • Less wiring and reduced start-up time than traditional, hard-wired systems • Program upload, download and monitoring • Peer-to-peer communication • Connection of low-level multi-vendor devices directly to plant floor controllers (<i>when using the 1769-SDN</i>) 	DeviceNet via the 1761-NET-DNI DeviceNet Interface (or 1769-SDN DeviceNet Scanner Module for the MicroLogix 1500)
<ul style="list-style-type: none"> • Program upload, download and monitoring • Peer-to-peer communication • E-mail communication • 10/100Base-T port with embedded LEDs • Web server capability via the 1761-NET-ENIW 	EtherNet/IP via the 1761-NET-ENI Ethernet Interface or 1761-NET-ENIW Web-Enabled Ethernet Interface
<ul style="list-style-type: none"> • Connection to third party devices for remote data collection in a SCADA system (i.e., telephone modems, radio modems, leased lines, etc.) • Remote Terminal Unit (RTU) functions 	Modbus RTU Slave (<i>MicroLogix 1200 and 1500 controllers only</i>) Modbus RTU Master (<i>MicroLogix 1200 and 1500 controllers only</i>)

MicroLogix Network Interface Devices

The network interface devices can be mounted on a panel or DIN rail. See Network Interface Devices Communication Port Identification on page 22 for device drawings.

AIC+ Advanced Interface Converter (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 247 slave devices)
MicroLogix 1200 and 1500 controllers only

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.

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 AIC+ can draw its power from the MicroLogix controller. In all other cases, 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 protocol.

DH-485/RS-485 Network Specifications

Specification	1761-NET-AIC
Maximum Number of Nodes	32 per multi-drop network
Maximum Length	1219 m (4,000 ft) per multi-drop network

DNI DeviceNet Interface (1761-NET-DNI)

DNI capabilities:

- Peer-to-peer messaging between Allen-Bradley controllers and other devices using the DF1 Full-Duplex protocol
- Programming and on-line monitoring over the DeviceNet network
- With a DNI connected to a modem, you can dial in to any other DNI-controller combination on DeviceNet
- Other DeviceNet products can send explicit (Get or Set) messages with the DNI at any time
- The controller can initiate an explicit message to a UCMM (Unconnected Message Manager) compatible device on DeviceNet

DeviceNet Specifications

Specification	1761-NET-DNI
Maximum Number of Nodes	64
Maximum Length	500 m @ 125K baud or 100 m @ 500K baud
DeviceNet Agency Certification	ODVA conformance 2.0-A12

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 allows you to 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.

Ethernet Specifications

Specification	1761-NET-ENI
Communication Rate	10/100 MHz (Series C), 10 MHz (Series A and B)
Connector	100Base-T (Series C), 10Base-T (Series A and B)

AIC+, DNI and ENI/ENIW Specifications

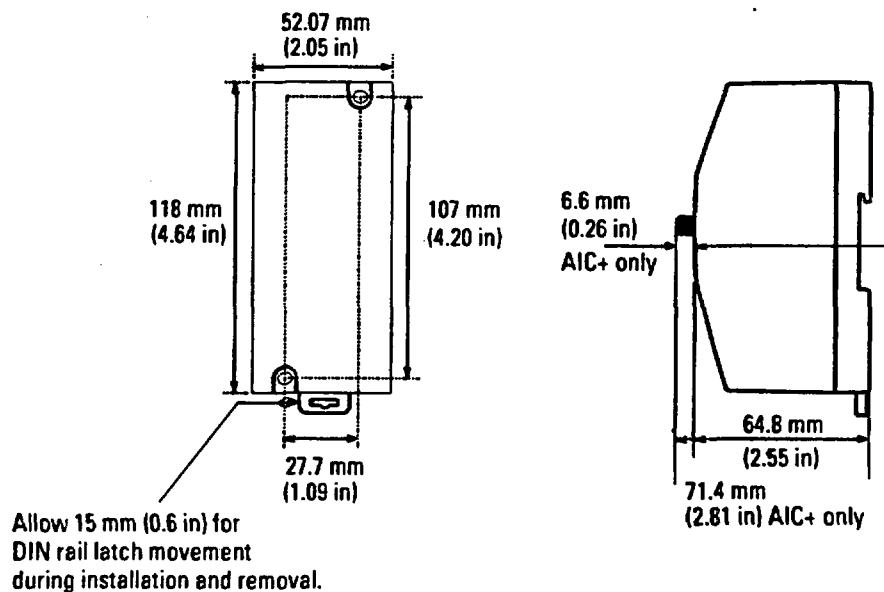
Network Modules Specifications

Specifications	1761-NET-AIC	1761-NET-DNI	1761-NET-ENI, 1761-NET-ENIW
Power Supply DC Voltage Range *	20.4...28.8V dc	11...25V dc	20.4...26.4V dc
Current Draw (mA) at 24V dc	120 mA	200 mA	100 mA
Inrush Current, Max	200 mA @ 24V	400 mA @ 24V	200 mA @ 24V
Isolation Voltage	500V dc for one minute	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% non-condensing		
Vibration	operating: 10...500 Hz, 5.0 g, 0.030 in. peak-to-peak, 2 hour each axis	operating: 5...2000 Hz, 2.5 g, 0.015 in. peak-to-peak, 1 hour each axis non-operating: 5...2000 Hz, 5.0g, 0.030 in. peak-to-peak, 1 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	30 g, ± 3 times each axis
Shock, Non-Operating	50 g, ± 3 times each axis	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 applicable acts		

* When the device is connected to a MicroLogix controller, power is provided by the MicroLogix controller's communication port.

AIC+, DNI and ENI/ENIW Dimensions

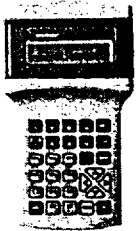
Network Interface Devices Dimensions



Step 3 - Select:

- *programming tools - hand-held programmer with optional memory module (available for MicroLogix 1000 only)*
- *software - the appropriate RSLogix 500 package for your application*
- *record your selection in the Selection Record (starts on page 60)*

Hand-Held Programmer (MicroLogix 1000 only)



Programming Software

Select Programming Tools and Software

The 1761-HHP-B30 allows you to create, edit, monitor and troubleshoot Instruction List (Boolean) programs for your MicroLogix 1000 controller. This device also allows you to store programs and to transfer programs through the use of an optional removable memory module.

There are two memory modules:

- 1761-HHM-K08 - 8K, stores 1 program
- 1761-HHM-K64 - 64K, stores 8 programs

The RSLogix 500 ladder logic programming package helps you maximize performance, save project development time and improve productivity. This product has been developed to operate on Windows® operating systems. RSLogix 500 can be used for programming both the SLC 500 and MicroLogix controller families.

RSLogix 500 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, RSNetworkx for DeviceNet and RSNetworkx for ControlNet.

TIP Download a Free Version of RSLogix 500 Starter software

Now you can download a special version of RSLogix 500 Starter Software and RSLinx Lite software to upload and download to MicroLogix 1000 10-point controllers. This version of RSLogix 500 Starter software is fully-functional when used with RSLinx Lite software and MicroLogix 10-point controllers. Additionally, you can use this software to demonstrate programming capabilities using our MicroLogix 1000 16- and 32-point controllers (demo only).
Go to <http://www.ab.com/micrologix/> for details.

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 60)*

Select Cables

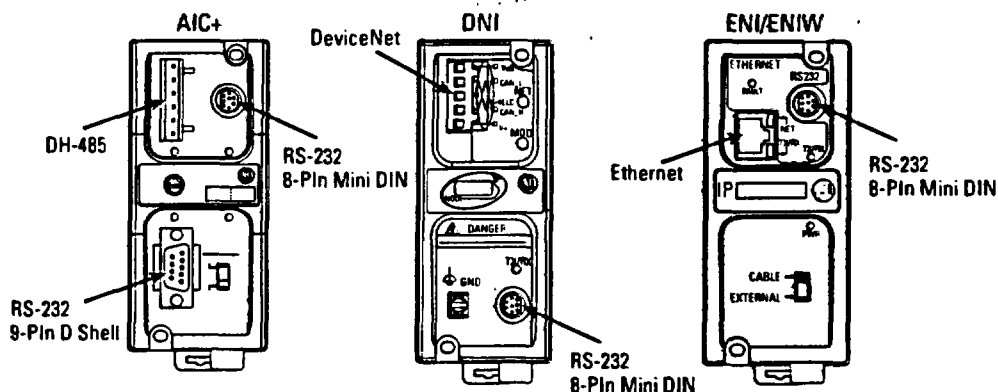
Cables come in several lengths and connector styles to provide connectivity between MicroLogix controllers and other devices. MicroLogix 1200 controllers require Series C versions of all 1761 cables.

Network Cable Selection

Controller and PC Port Identification

Device	Communication Port Description	Connector Type
MicroLogix 1000	Communications Port (Channel 0) with 24V dc power for communication device	8-pin Mini DIN
MicroLogix 1200	Communications Port (Channel 0) with 24V dc power for communication device	8-pin Mini DIN
MicroLogix 1200R	Communications Port (Channel 0) with 24V dc power for communication device	8-pin Mini DIN
	Programming/HMI Port (no 24V dc power)	8-pin Mini DIN
MicroLogix 1500	Base Unit Communications Port (Channel 0) with 24V dc power for communication device	8-pin Mini DIN
MicroLogix 1500 with 1764-LRP Processor	Base Unit Communications Port (Channel 0) with 24V dc power for communication device	8-pin Mini DIN
	Processor Communications Port (Channel 1)	9-pin D Shell (isolated)
Personal Computer	Personal Computer Communications Port	9-pin D Shell

Network Interface Devices Communication Port Identification



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	8-pin Mini DIN to 9-pin D Shell	0.5 m (1.5 ft)	1761-CBL-AP00
8-pin Mini DIN to 8-pin Mini DIN	2 m (6.5 ft)	1761-CBL-HM02	8-pin Mini DIN to 9-pin D Shell	2 m (6.5 ft)	1761-CBL-PM02
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	5 m (16 ft)	2711-CBL-PM05
8-pin Mini DIN to 8-pin Mini DIN	10 m (32 ft)	2711-CBL-HM10	8-pin Mini DIN to 9-pin D Shell	10 m (32 ft)	2711-CBL-PM10
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)	3 m (10 ft)	1761-CBL-AS03
9-pin D Shell to 9-pin D Shell	3 m (10 ft)	1747-CP3	6-pin Phoenix to RJ45 (DH-485)	9 m (30 ft)	1761-CBL-AS09

Programming Cable Selection

Programming Cable Selection Chart - Programming Device to Controller

Programming Device	MicroLogix 1000, 1200 and 1500 Channel 0 (8-pin Mini DIN) MicroLogix 1200 Programming/HMI Port (8-pin Mini DIN)		MicroLogix 1500 with 1764-LRP Processor Channel 1 (9-pin RS-232)	
	Cat. No.	Length	Cat. No.	Length
Personal Computer (9-pin D Shell)	1761-CBL-PM02	2 m (6.5 ft)	1747-CP3	3 m (10 ft)
Hand-Held Programmer (1761-HHP-B30) <i>MicroLogix 1000 controller only</i>	1761-CBL-HM02	2 m (6.5 ft)	—	—

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 Logix controller 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 (Channel 0) or higher, MicroLogix, CompactLogix, FlexLogix, ControlLogix, PanelView 300 or higher, or AIC+. Use the RS-485 port to connect to SLC 5/03 (Channel 1) or lower, 1747-AIC, or PanelView 300 or higher.

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	19.2K bps

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

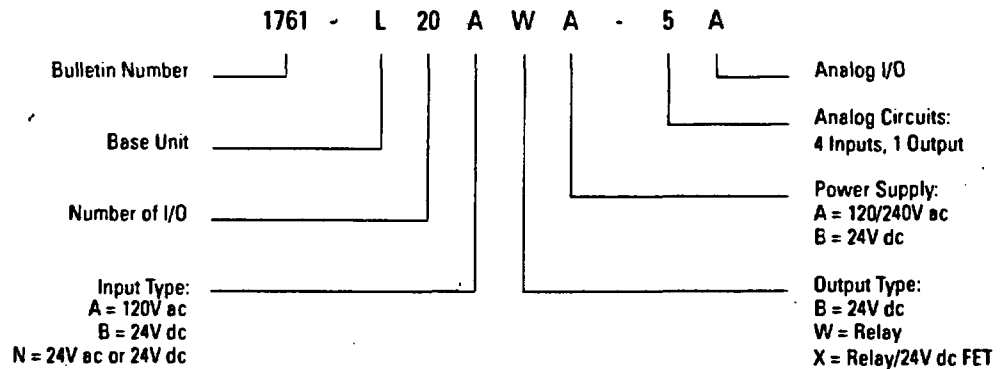
Programming Device	1761-NET-AIC (8-pin Mini DIN) to PC via 1747-UIC Universal Serial Bus to DH-485 Interface Converter		1761-NET-AIC (9-pin D Shell) to PC via 1747-UIC Universal Serial Bus to DH-485 Interface Converter	
	Cat. No.	Length	Cat. No.	Length
Personal Computer (USB Port)	1761-CBL-PM02	2 m (6.5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

Step 5 - 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
- record your selection in the Selection Record (starts on page 60)

Select MicroLogix 1000 Controllers

MicroLogix 1000 Catalog Number Explanation



MicroLogix 1000 Controller and I/O Configuration

Cat. No.	Line Voltage	Number of Inputs	Number of Outputs *	High Speed I/O
1761-L10BWA	120/240V ac	(6) 24V dc	(4) Relay	(1) 6.6 kHz input
1761-L16AWA	120/240V ac	(10) 120V ac	(6) Relay	—
1761-L16BWA	120/240V ac	(10) 24V dc	(6) Relay	(1) 6.6 kHz input
1761-L16NWA	120/240V ac	(10) 24V ac or dc	(6) Relay	—
1761-L20AWA-5A	120/240V ac	(12) 120V ac, (4) Analog	(8) Relay, (1) Analog	—
1761-L20BWA-5A	120/240V ac	(12) 24V dc, (4) Analog	(8) Relay, (1) Analog	(1) 6.6 kHz input
1761-L32AAA	120/240V ac	(20) 120V ac	(10) Triac, (2) Relay	—
1761-L32AWA	120/240V ac	(20) 120V ac	(12) Relay	—
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-L10BWB	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-L16BWB	24V dc	(10) 24V dc	(6) Relay	(1) 6.6 kHz input
1761-L16NWB	24V dc	(10) 24V ac or dc	(6) Relay	—
1761-L20BWB-5A	24V dc	(12) 24V dc, (4) Analog	(8) Relay, (1) Analog	(1) 6.6 kHz input
1761-L32BBB	24V dc	(20) 24V dc	(10) MOSFET sourcing, (2) Relay	(1) 6.6 kHz input
1761-L32BWB	24V dc	(20) 24V dc	(12) Relay	(1) 6.6 kHz input

* Two individually isolated relays per controller.

MicroLogix 1000 Specifications

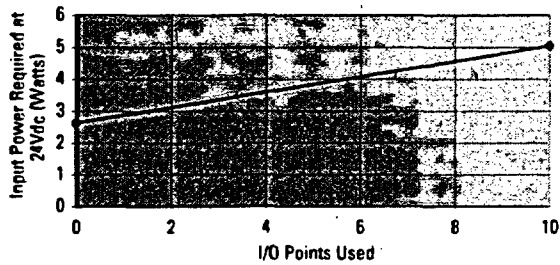
Specifications are provided for the controller's power supply and I/O.

MicroLogix 1000 Controller Power Supply Specifications

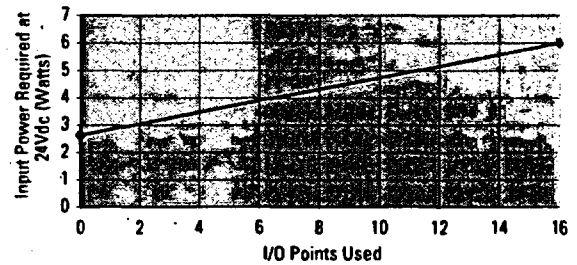
Cat. No.	Power Supply Voltage	Power Consumption			Power Supply Inrush Current (max.)	24V dc Sensor Power
		120V ac	240V ac	24V dc		
L10BWA	85 264V ac @ 47 63 Hz	24 VA	32 VA	—	30 A for 8 ms	200 mA, 200 μ F capacitance max.
L16AWA		15 VA	21 VA	—	30 A for 8 ms	—
L16BWA		26 VA	33 VA	—	30 A for 8 ms	200 mA,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

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

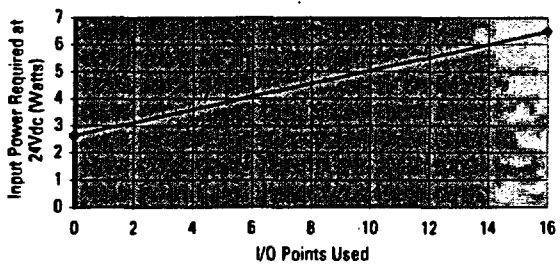
1761-L10BWB Typical Power Requirements



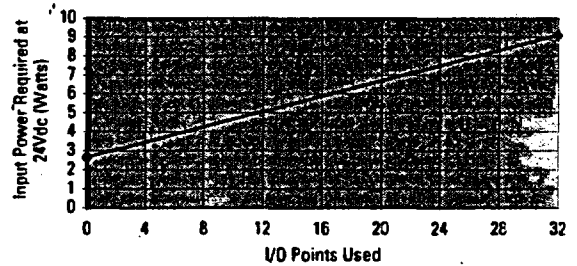
1761-L10BXB, -L16BBB Typical Power Requirements



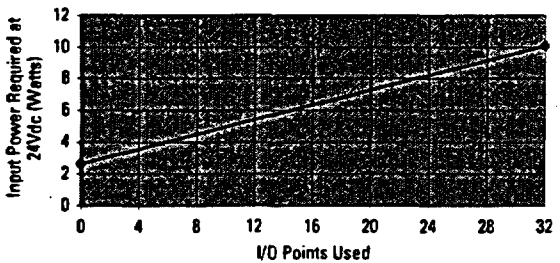
1761-L16BWB Typical Power Requirements



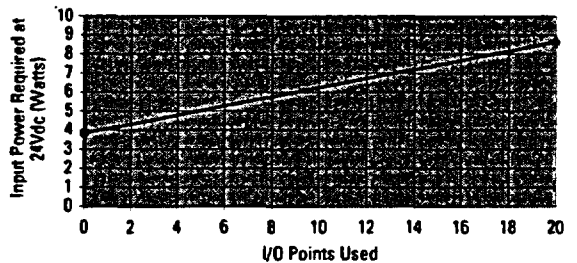
1761-L32BBB Typical Power Requirements



1761-L32BWB Typical Power Requirements



1761-L20BWB-5A Typical Power Requirements



MicroLogix 1000 Controller Digital Input Specifications

Specification	120/240V ac Controllers	24V dc Controllers	24V ac Controllers
On-State Voltage Range	75 132V ac	14 26.4V dc max @ 55 °C (131 °F) 14 30.0V dc max @ 30 °C (86 °F)	16 26.4V dc max @ 55 °C (131 °F) 16 30.0V dc max @ 30 °C (86 °F)
Off-State Voltage Range	0 20V ac	0 5V dc	0 3V ac
Operating Frequency *	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 16 ms high-speed inputs selectable from 0.075 16 ms	On Delay = 20 ms Off Delay = 20 ms
On-State Current (min.)	5.0 mA @ 79V ac @ 47 Hz	2.5 mA @ 14V dc	3.0 mA @ 18V ac
On-State Current (nominal)	12.0 mA @ 120V ac @ 60 Hz	8.0 mA @ 24V dc	8.0 mA @ 24V ac
On-State Current (max.)	16.0 mA @ 132V ac @ 63 Hz	12.0 mA @ 30V dc	12.0 mA @ 30V ac
Off-State Leakage Current (max.)	2.5 mA	1.5 mA	1.0 mA
Nominal Impedance	12 kΩ at 50 Hz, 10 kΩ @ 60 Hz	3 kΩ	3 kΩ
Maximum Inrush Current	250 mA max *	—	—

* 1761-I 16NWA ac/1761-I 16NWB controllers do not support high-speed inputs even when using 24V dc inputs.

* 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

Specification	Relay	FET	Triac
Operating Voltage Range	5...125V ac 5...264V ac	20.4...26.4V dc	85...264V ac
Continuous Current per Point (max.)	See MicroLogix 1000 Relay Contact Rating	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 @ 132V ac 4.5 mA @ 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 @ 60 Hz On Delay = 10.6 ms @ 50 Hz Off Delay = 11.0 ms
Surge Current per Point (peak)	n/a	4 A for 10 ms *	10 A for 25 ms *

* Repeatability is once every 2 seconds at 55 °C (131 °F).

MicroLogix 1000 Relay Contact Rating

Maximum Voltage	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 *		1.0 A	28 VA		
24V dc	1.2 A *		2.0 A			

* 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

Specification	1761-L20xxx-5A
Voltage Input Range *	-10.5...+10.5V dc
Current Input Range *	-21...+21 mA
Input Coding (-21...+21 mA, -10.5...+10.5V dc)	:32 768...+32 767
Voltage Input Impedance	210 k Ω
Current Input Impedance	160 k Ω
Input Resolution #	16 bit
Non-linearity	<0.002%
Overall Accuracy 0...55 °C (32...131 °F)	$\pm 0.7\%$ of full scale
Overall Accuracy Drift 0...55 °C (32...131 °F) (max.)	$\pm 0.176\%$
Overall Accuracy at 25 °C (77 °F) (max.)	$\pm 0.525\%$
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)

* The two voltage inputs accept ± 10.5 V dc. The two current inputs accept ± 21 mA.

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

MicroLogix 1000 Controller Analog Output Specifications

Specification	1761-L20xxx-5A
Voltage Output Range *	0...10V dc
Current Output Range *	4...20 mA
Non-linearity	0.02%
Step Response	2.5 ms (at 95%)
Load Range - Voltage Output	1k Ω ... $\infty\Omega$
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 Setting Time	3 ms (maximum)
Overall Accuracy 0...55 °C (32...131 °F)	$\pm 1.0\%$ of full scale
Overall Accuracy Drift 0...55 °C (32...131 °F) (max.)	$\pm 0.28\%$
Overall Accuracy at 25 °C (77 °F) (max.) - Current Output	0.2%
Field Wiring to Logic Isolation	30V rated working voltage, 500V isolation

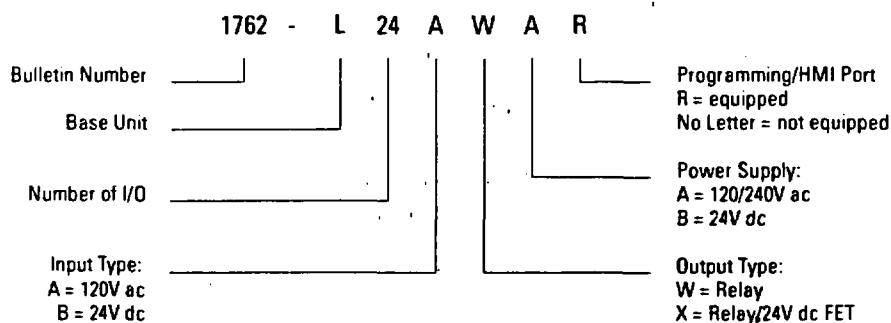
* The analog output can be configured for either voltage (0...+10V dc) or current (4...20 mA).

Step 6 - 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 selection in the Selection Record (starts on page 60)*

Select MicroLogix 1200 Controllers and Accessories

MicroLogix 1200 Catalog Number Explanation



MicroLogix 1200 Controller Power and I/O Configuration

Cat. No.	Line Voltage	Number of Inputs	Number of Outputs *	High Speed I/O
1762-L24AWA	120/240V ac	(14) 120V ac	(10) Relay	—
1762-L24AWAR	120/240V ac	(14) 120V ac	(10) Relay	—
1762-L24BWA	120/240V ac	(10) Standard 24V dc (4) Fast 24V dc	(10) Relay	(4) 20 kHz input
1762-L24BWAR	120/240V ac	(10) Standard 24V dc (4) Fast 24V dc	(10) Relay	(4) 20 kHz input
1762-L24BXB	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-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-L40AWA	120/240V ac	(24) 120V ac	(16) Relay	—
1762-L40AWAR	120/240V ac	(24) 120V ac	(16) Relay	—
1762-L40BWA	120/240V ac	(20) Standard 24V dc (4) Fast 24V dc	(16) Relay	(4) 20 kHz input
1762-L40BWAR	120/240V ac	(20) Standard 24V dc (4) Fast 24V dc	(16) Relay	(4) 20 kHz input
1762-L40BXB	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
1762-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

* Two individually isolated relays per controller.

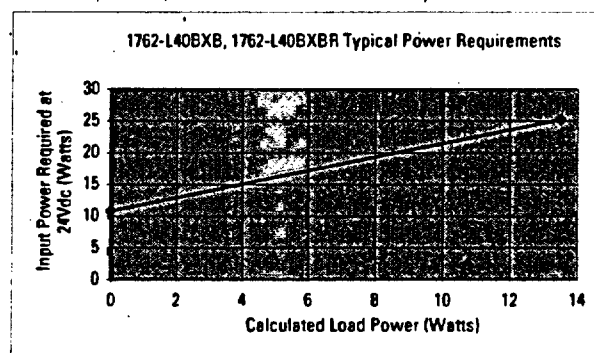
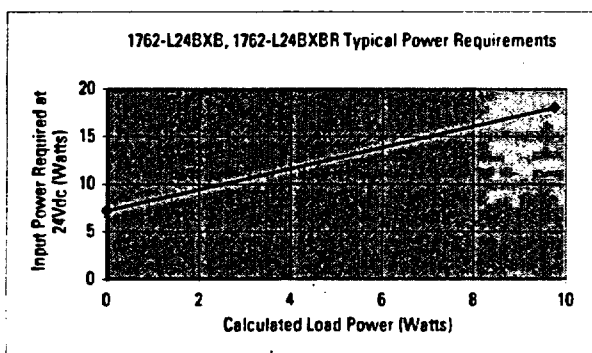
MicroLogix 1200 Specifications

MicroLogix 1200 Controller Power Supply Specifications

Specification	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
Maximum Load Current *						
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
Maximum Load Power	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.	—	—

* See Perform MicroLogix 1200 System Expansion Calculations on page 36 to calculate expansion I/O power usage.

MicroLogix 1200 DC Input Power Requirements for BXB and BXBR Units



MicroLogix 1200 Controller Input Specifications

Specification	1762-L24AWA, -L24AWAR 1762-L40AWA, -L40AWAR	1762-L24BWA, -L24BXB, -L40BWA, -L40BXB 1762-L24BWAR, -L24BXBR, -L40BWAR, -L40BXBR	
		Inputs 0 through 3	Inputs 4 and higher
On-State Voltage Range	79...132V ac @ 47...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	—	0 Hz...20 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 0.025...16 ms	
On-State Current:			
Minimum	5.0 mA @ 79V ac	2.5 mA @ 14V dc	2.0 mA @ 10V dc
Nominal	12 mA @ 120V ac	7.3 mA @ 24V dc	8.9 mA @ 24V dc
Maximum	16.0 mA @ 132V ac	12.0 mA @ 30V dc	12.0 mA @ 30V dc
Off-State Leakage Current (max.)	2.5 mA max.	1.5 mA min.	
Nominal Impedance	12 k Ω @ 50 Hz 10 k Ω @ 60 Hz	3.3 k Ω	2.7 k Ω
Maximum Inrush Current	250 mA @ 120V ac	—	

MicroLogix 1200 Controller Digital Output Specifications

Specification	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 1200 Relay Contact Rating	See MicroLogix 1200 FET Standard Outputs Continuous Current per Point (max.)	100 mA
Continuous Current per Common (max)	8.0 A	7.5 A for L24BXB, L24BXBR 6.0 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 μ s Off Delay = 18 μ s
Surge Current per Point (peak)	—	4 A for 10 ms *	

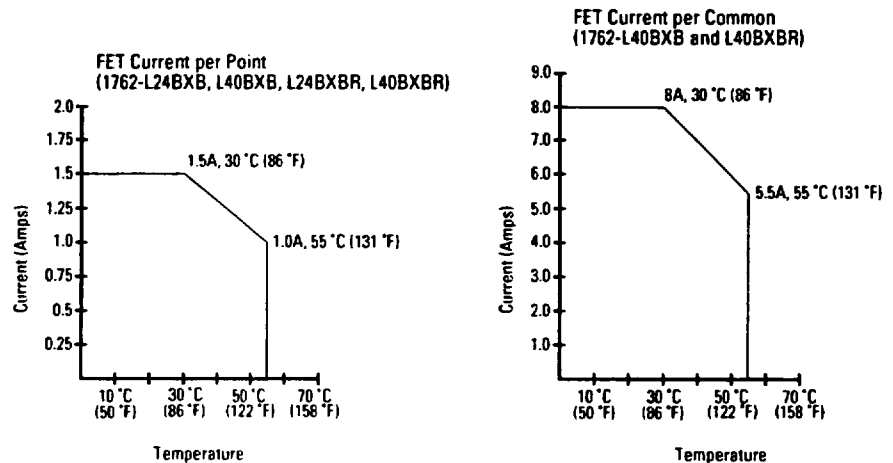
* Repeatability is once every 2 seconds at 55 °C (131 °F), once every 1 second at 30 °C (86 °F)

MicroLogix 1200 Relay Contact Rating

Maximum Voltage	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 *		1.0 A	28 VA	
24V dc	1.2 A *		2.0 A		

* 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 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)

Memory modules allow:

- user programs and data to be stored 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

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

Step 7 - Select:

- I/O modules - digital, analog and temperature
- perform system expansion calculations
- record your selections in the Selection Record (starts on page 60)

Select MicroLogix 1200 I/O

MicroLogix 1200 I/O expansion modules provide superior functionality at low cost. A variety of modules complement and extend the capabilities of MicroLogix 1200 controllers by maximizing the flexibility of I/O count and type.

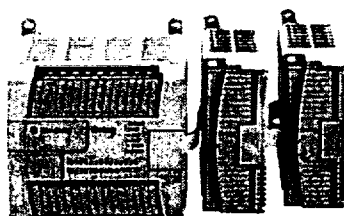
The MicroLogix 1200 system design allows modules to be either DIN rail or panel mounted. The DIN latches and screw mounting holes are an integral part of the package design.

Controller I/O can be expanded using up to 6 expansion modules per controller (depending on power budget).

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-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
1762-0X6I	6-Point Isolated AC/DC Relay Output 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
Temperature	
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

Specification	1762-IA8	1762-IQ8	1762-IQ16
Voltage Category	100/120V ac	24V dc (sink/source) *	24V dc (sink/source) *
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 @ 55 °C (131 °F) 10 ... 30V dc @ 30 °C (86 °F)
Number of Inputs	8	8	16
Number of Commons	1	1	2
Bus Current Draw (max.)	50 mA @ 5V dc (0.25 W)	50 mA @ 5V dc (0.25 W)	60 mA @ 5V dc (0.25 W)
Heat Dissipation (max.)	2.0 Total Watts	3.7 Total Watts	5.3 Total Watts @ 30V 4.2 Total Watts @ 26.4V
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
Off-State Voltage (max.)	20V ac	5V dc	5V dc
Off-State Leakage Current (max.)	2.5 mA	1.5 mA	1.5 mA
On-State Voltage (min.)	79V ac (min.) 132V ac (max.)	10V dc	10V dc
On-State Current:			
minimum	5.0 mA @ 79V ac @ 47 Hz	2.0 mA @ 10V dc	2.0 mA @ 10V dc
nominal	12.0 mA @ 120V ac @ 60 Hz	8.0 mA @ 24V dc	8.0 mA @ 24V dc
maximum	16.0 mA @ 132V ac @ 63 Hz	12.0 mA @ 30V dc	12.0 mA @ 30V dc
Inrush Current (max.)	250 mA	—	—
Nominal Impedance	12 k Ω @ 50 Hz 10 k Ω @ 60 Hz	3 k Ω	3 k Ω
Isolated Groups	Group 1: inputs 0...7 (internally connected commons)	Group 1: inputs 0...7 (internally connected commons)	Group 1: inputs 0...7 Group 2: inputs 8...15
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)	

* 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.

1762 Digital Expansion Output Modules Specifications

Specification	1762-OA8	1762-OB8	1762-OB16	1762-OW8	1762-OW16	1762-OX6I
Voltage Category	100/120V ac	24V dc	24V dc	AC/DC normally open relay	AC/DC normally open relay	AC/DC Type C Relay
Operating Voltage Range	85 265V ac @ 47 63 Hz	20 26 4V dc	20 26 4V dc	5 265V ac 5 125V dc	5 265V ac 5 125V dc	5 265V ac 5 125V dc
Number of Outputs	8	8	16	8	16	6 (N.C., N.O.)
Number of Commons	2	1	1	2	2	6
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)	80 mA @ 5V dc (0.40 W) 90 mA @ 24V dc (2.16 W)	120 mA @ 5V dc (0.60 W) 140 mA @ 24V dc (3.36 W)	110 mA @ 5V dc (0.55 W) 110 mA @ 24V dc (2.64 W)
Heat Dissipation (max.)	2.9 Total Watts	1.61 Total Watts	2.9 Total Watts @ 30 °C (86 °F) 2.1 Total Watts @ 55 °C (131 °F)	2.9 Total Watts	5.6 Total Watts	2.8 Total Watts
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: 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 Current (max.)	2 mA @ 132V 2.5 mA at 265V	1.0 mA	1.0 mA	0 mA	0 mA	0 mA
On-State Current (min.)	10 mA	1.0 mA	1.0 mA	10 mA @ 5V dc	10 mA	100 mA
On-State Voltage Drop (min.)	1.5V @ 0.5A	1.0V dc	1.0V dc	—	—	—
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)	2.5 A (Also see MicroLogix 1200 Relay Contact Rating on page 31.)		7 A (Also see MicroLogix 1200 Relay Contact Rating on page 31.)
Continuous Current per Common (max.)	1.0 A @ 55 °C (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)	8 A	8 A	7 A (Also see MicroLogix 1200 Relay Contact Rating on page 31.)
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)	16 A	16 A	30 A
Surge Current (max.)	5.0 A *	2.0 A *	2.0 A *	See MicroLogix 1200 Relay Contact Rating on page 31.		

* Repeatability is once every 2 seconds for a duration of 25 ms.

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

1762 Analog Modules

1762 Analog Expansion Modules Common Specifications

Specification	1762-IF4	1762-IF20F2	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 Ranges	Voltage: -10...+10V dc Current: 4...20 mA	Voltage: 0...10V dc Current: 4...20 mA	Voltage: 0...10V dc Current: 4...20 mA
Full Scale * Analog Ranges	Voltage: -10.5...+10.5V dc Current: -21...+21 mA	Voltage: 0...10.5V dc Current: 0...21 mA	Voltage: 0...10.5V dc Current: 0...21 mA
Resolution	15 bits	12 bits (unipolar)	12 bits (unipolar)
Repeatability *	±0.1%	±0.1%	±0.1%
Input and Output Group to System Isolation	30V ac/30V dc rated working voltage † (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

* 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.

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

† 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

Specification	1762-IF4	1762-IF20F2
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 *	$\pm 27V$	$\pm 27V$
Common Mode Rejection *	$> 55 \text{ dB @ } 50 \text{ and } 60 \text{ Hz}$	$> 55 \text{ dB @ } 50 \text{ and } 60 \text{ Hz}$
Non-linearity (in percent full scale)	$\pm 0.1\%$	$\pm 0.1\%$
Typical Overall Accuracy †	$\pm 0.3\%$ full scale at $0 \dots 55^\circ\text{C}$ ($32 \dots 131^\circ\text{F}$) $\pm 0.24\%$ full scale at 25°C (77°F)	$\pm 0.5\%$ full scale at $0 \dots 55^\circ\text{C}$ ($32 \dots 131^\circ\text{F}$) $\pm 0.3\%$ full scale at 25°C (77°F)
Input Impedance	Voltage Terminal: $200 \text{ k}\Omega$ Current Terminal: 275Ω	Voltage Terminal: $200 \text{ k}\Omega$ Current Terminal: 250Ω
Current Input Protection	$\pm 32 \text{ mA}$	$\pm 32 \text{ mA}$
Voltage Input Protection	$\pm 30V$	$\pm 30V$
Channel Diagnostics	Over or under range or open circuit condition by bit reporting for analog inputs	

* For proper operation, both the plus and minus input terminals must be within $\pm 27V$ of analog common.

* $V_{CM} = 1 \text{ V pk-pk AC}$

† $V_{CM} = 0$ (includes offset, gain, non-linearity and repeatability error terms)

1762 Analog Expansion Output Modules Specifications

Specification	1762-IF20F2	1762-OF4
Number of Outputs	2 single-ended (unipolar)	4 single-ended (bipolar)
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	$0 \dots 500 \Omega$ (includes wire resistance)	$0 \dots 500 \Omega$ (includes wire resistance)
Load Range on Voltage Output	$> 1 \text{ k}\Omega$	$> 1 \text{ k}\Omega$
Reactive Load, Current Output	$< 1 \text{ mH}$	$< 1 \text{ mH}$
Reactive Load, Voltage Output	$< 1 \mu\text{F}$	$< 1 \mu\text{F}$
Typical Overall Accuracy *	$\pm 1\%$ full scale @ $0 \dots 55^\circ\text{C}$ ($32 \dots 131^\circ\text{F}$) $\pm 0.5\%$ full scale @ 25°C (77°F)	$\pm 1\%$ full scale @ $0 \dots 55^\circ\text{C}$ ($32 \dots 131^\circ\text{F}$) $\pm 0.5\%$ full scale @ 25°C (77°F)
Output Ripple, range $0 \dots 500 \text{ Hz}$ (referred to output range)	$< \pm 0.1\%$	$< \pm 0.1\%$
Non-linearity (in percent full scale)	$< \pm 0.5\%$	$< \pm 0.5\%$
Open and Short-Circuit Protection	Continuous	Continuous
Open Protection	$\pm 32 \text{ mA}$	$\pm 32 \text{ mA}$

* Includes offset, gain, non-linearity and repeatability error terms.

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 using RSLogix 500 programming software. On-screen configuration allows you to choose the input type, filtering frequency, data format and status data. On-board scaling is also provided.

1762 Temperature Expansion Input Modules Specifications

Specification	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	$^{\circ}\text{C}$ or $^{\circ}\text{F}$	$^{\circ}\text{C}$ or $^{\circ}\text{F}$
Data Formats	Raw/Proportional, Engineering Units, Engineering Units x 10, Scaled-for-PID, Percent Range	
Accuracy @ 25 $^{\circ}\text{C}$ (77 $^{\circ}\text{F}$)	Thermocouple inputs: ± 0.5 ... ± 3.0 $^{\circ}\text{C}$ (± 0.9 ... ± 5.4 $^{\circ}\text{F}$) depending on thermocouple type Millivolt inputs: ± 15 ... ± 20 mV	With Autocalibration enabled... RTD inputs: ± 0.2 ... ± 0.6 $^{\circ}\text{C}$ (± 0.36 ... ± 1.08 $^{\circ}\text{F}$) depending on RTD type Resistance inputs: ± 0.5 ... ± 1.5 Ω depending on resistance value
Accuracy @ 0...55 $^{\circ}\text{C}$ (32...131 $^{\circ}\text{F}$)	± 0.8 ... ± 1.0 $^{\circ}\text{C}$ (± 1.5 ... ± 1.8 $^{\circ}\text{F}$) depending on thermocouple type Millivolt inputs: ± 25 ... ± 30 mV	With Autocalibration enabled... RTD inputs: ± 0.4 ... ± 1.1 $^{\circ}\text{C}$ (± 0.72 ... ± 1.98 $^{\circ}\text{F}$) 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 and open circuit 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 minimum @ 50 Hz (with 10 Hz or 50 Hz filter) 115 dB minimum @ 60 Hz (with 10 Hz or 60 Hz filter)	110 dB minimum @ 50 Hz (with 10 or 50 Hz filter) 110 dB minimum @ 60 Hz (with 10 or 60 Hz filter)
Normal Mode Noise Rejection	85 dB minimum @ 50 Hz (with 10 Hz or 50 Hz filter) 85 dB minimum @ 60 Hz (with 10 Hz or 60 Hz filter)	70 dB minimum @ 50 Hz (with 10 or 50 Hz filter) 70 dB minimum @ 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	± 10 V dc	± 10 V dc
Repeatability *	Thermocouples @ 25 $^{\circ}\text{C}$ (77 $^{\circ}\text{F}$) and 10 Hz filter selected: ± 0.1 ... ± 2.0 $^{\circ}\text{C}$ (± 0.18 ... ± 3.6 $^{\circ}\text{F}$) depending on thermocouple type Millivolt inputs: ± 6 μV	± 0.1 $^{\circ}\text{C}$ (± 0.18 $^{\circ}\text{F}$) for Nickel and Nickel-Iron ± 0.2 $^{\circ}\text{C}$ (± 0.36 $^{\circ}\text{F}$) for other RTD inputs ± 0.04 Ω for 150 Ω resistances ± 0.2 Ω for other resistances
Input Impedance	> 10 M Ω	> 10 M Ω

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

Perform MicroLogix 1200 System Expansion Calculations

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

System calculations are required to ensure that the current and power requirements of the selected devices do not exceed the limits of the controller's power supply.

First, you will calculate the total system current and then use this value to determine if the system falls within allowable limits. There are three worksheets in this procedure.

To verify the controller power supply loading:

1. Use the first worksheet to record the components of your system. Do not exceed the **MAXIMUM LIMIT** for the number of I/O modules. Fill in the current amounts and add up the **TOTAL CALCULATED CURRENT**.

MicroLogix 1200 Power Supply Loading: Calculate system current

Cat. No.		Bus Current Draw Specification		Calculated Current for System	
		at 5V dc (mA)	at 24V dc (mA)	at 5V dc (mA)	at 24V dc (mA)
1761-NET-AIC * *		0	120 *		
1761-NET-ENI, 1761-NET-ENIW * *		0	100 *		
2707-MVH232 or 2707-MVP232 * *		0	80 *		
Cat. No.	n = Number of Modules (6 maximum)	A	B	n x A	n x B
1762-IA8		50	0		
1762-IO8		50	0		
1762-IO16		60	0		
1762-OA8		115	0		
1762-OB8		115	0		
1762-OB16		175	0		
1762-OW8		80	90		
1762-OW16		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		
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)	

* These are optional accessories. Current is consumed only if the accessory is installed.

* Current for the 1761-NET-AIC or 1761-NET-ENIW may be supplied by the controller's communications 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's communication port, if directly connected.

2. Use the next worksheet to 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 Maximum Load Current: Verify that current values are within limits

Cat. No.	Load Current	5V dc	24V dc	User 24V dc Sensor Current
1762-L24AWA, L24AWAR	Calculated Value	(C)	(D)	n/a
1762-L24BxB, L24BxBR	MAXIMUM LIMIT	400 mA	350 mA	
1762-L24BWA, L24BWAR	Calculated Value	(C)	(D)	(E)
	MAXIMUM LIMIT	400 mA	350 mA	250 mA
1762-L40AWA, L40AWAR	Calculated Value	(C)	(D)	n/a
1762-L40BxB, L40BxBR	MAXIMUM LIMIT	600 mA	500 mA	
1762-L40BWA, L40BWAR	Calculated Value	(C)	(D)	(E)
	MAXIMUM LIMIT	600 mA	500 mA	400 mA

3. Use the final worksheet to verify that the system is within the powerloading limits of the controller.
To use the worksheet, 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 Maximum Load Power: Verify that power consumption is within limits

Cat. No.	5V Power Consumption Calculated Watts			24V Power Consumption Calculated Watts			Calculated Watts (sum of 5V and 24V)	MAXIMUM POWER LIMIT
1762-L24AWA, L24AWAR	(C) x 5V	= W		(D) x 24V	= W		W	10.4 W
1762-L24BxB, L24BxBR	(C) x 5V	= W		(D) x 24V	= W		W	10.4 W
1762-L24BWA, L24BWAR	(C) x 5V	= W		(D) + (E) x 24V	= W		W	12 W
1762-L40AWA, L40AWAR	(C) x 5V	= W		(D) x 24V	= W		W	15 W
1762-L40BxB, L40BxBR	(C) x 5V	= W		(D) x 24V	= W		W	15 W
1762-L40BWA, L40BWAR	(C) x 5V	= W		(D) + (E) x 24V	= W		W	16 W

Step 8 - 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 (starts on page 60)*

Select MicroLogix 1500 Controllers and Accessories

MicroLogix 1500 Base Unit Catalog Number Explanation

1764 - 24 A W A			
Bulletin Number	_____	_____	_____
Number of I/O	_____	_____	_____
Input Type: A = 120V ac B = 24V dc	_____	_____	_____
			Power Supply: A = 120/240V ac B = 24V dc
			Output Type: W = Relay X = Relay/24V dc FET

MicroLogix 1500 Base Units

The Base Unit houses embedded inputs, outputs, power supply and the Channel 0 communications port. The base unit also provides the interface to expansion I/O when required by the application.

MicroLogix 1500 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	—
1764-24BWA	120/240V ac	(4) Standard 24V dc (8) Fast 24V dc	(12) Relay	(8) 20 kHz input
1764-28BXB	24V dc	(8) Standard 24V dc (8) Fast 24V dc	(6) Relay (4) Standard 24V dc FET (2) Fast 24V dc FET	(8) 20 kHz input (2) 20 kHz output

* Two individually isolated relays per base unit.

MicroLogix 1500 Base Unit Power Supply Specifications

Specification	1764-24AWA	1764-24BWA	1764-28BXB
Power Supply Voltage	85...265 V ac @ 47...63 Hz	85...265 V ac @ 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
Maximum Load Current: *			
5V dc	2250 mA	2250 mA *	2250 mA
24V dc	400 mA	400 mA *	400 mA
Maximum Load Power	16 W	22 W	16 W
24V dc Sensor Power	—	400 mA *, 400 μ F capacitance max.	—

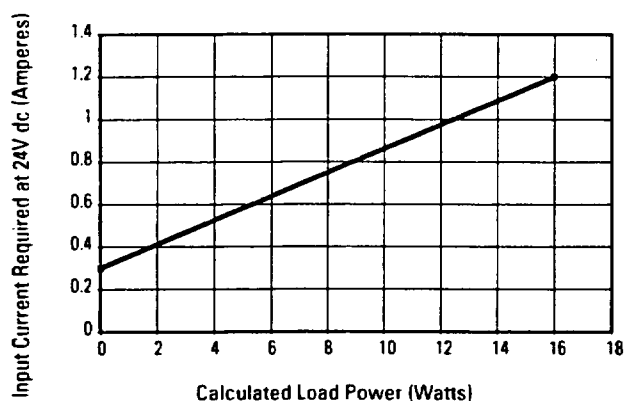
* See Perform MicroLogix 1500 System Expansion Calculations on page 53 to calculate expansion I/O power usage.

* Do not allow the total load power consumed by the 5V dc, 24V dc and sensor power outputs to exceed 22 W.

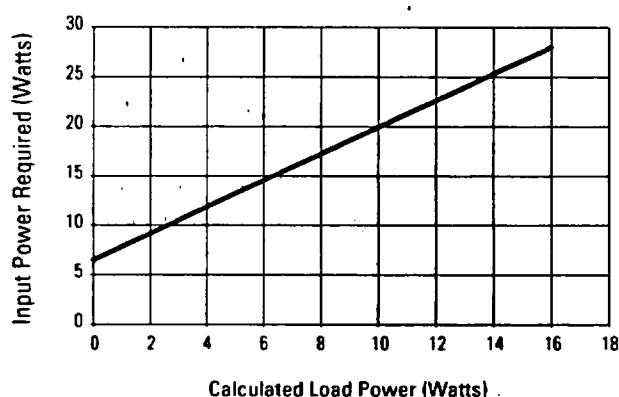
Choosing a Power Supply for the 1764-28BxB

This figure contains information for selecting a power supply for applications using a 1764-28BxB base unit. Use the worksheets on page 53 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

Specification	1764-24AWA	1764-24BWA and 1764-28BxB	
		Inputs 0 through 7	Inputs 8 and higher
On-State Voltage Range	79...132V ac @ 47...63 Hz	14...30.0V dc @ 30...°C (86 °F) 14...26.4V dc @ 55...°C (131 °F)	10...30.0V dc @ 30...°C (86 °F) 10...26.4V dc @ 55...°C (131 °F)
Off-State Voltage Range	0...20V ac	0...5V dc	0...5V dc
Operating Frequency	n/a	1...20 kHz	1...500 Hz
Signal Delay	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			
Minimum	5.0 mA @ 79V ac	2.5 mA @ 14V dc	2.0 mA @ 10V dc
Nominal	12.0 mA @ 120V ac	7.3 mA @ 24V dc	8.9 mA @ 24V dc
Maximum	16.0 mA @ 132V ac	12.0 mA @ 30V dc	12.0 mA @ 30V dc
Off-State Leakage Current (max.)	2.5 mA	1.5 mA	1.5 mA
Nominal Impedance	12 kΩ at 50 Hz 10 kΩ at 60 Hz	3.3 kΩ	2.7 kΩ
Inrush Current (max.)	250 mA @ 120V ac	—	—

MicroLogix 1500 Base Unit Output Specifications

Specification	1764-24AWA, -24BWA, -28BXB	1764-28BXB	
	Relay	FET Standard Operation	FET High-Speed Operation (Output 2 and 3 only)
Operating Voltage Range	5...125V dc 5...264V ac	20...264V dc	
Continuous Current per Point (max.)	See MicroLogix 1500 Relay Contact Rating	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 mA @ 79V ac	2.5 mA @ 14V dc	2.0 mA @ 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)	—	4 A for 10 ms *	

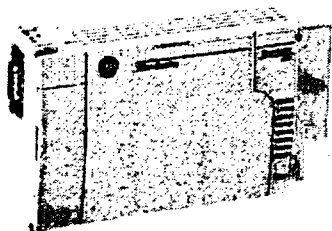
* Repeatability is once every 2 seconds at 55 °C (131 °F), once every 1 second at 30 °C (86 °F).

MicroLogix 1500 Relay Contact Rating

Maximum Voltage	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 *		1.0 A	28 VA	
24V dc	1.2 A *		2.0 A		

* 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, communications 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 Accessories

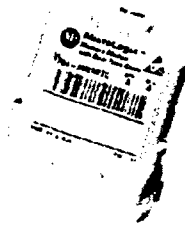


MicroLogix 1500 Data Access Tool (1764-DAT)

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 for momentary and latching bit changing
- 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.

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 using the RTC function file.

Memory modules allow:

- user programs and data to be stored 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

MicroLogix 1500 Real-Time Clock and Memory Modules

Cat. No.	Description
1764-RTC	MicroLogix 1500 Real-Time Clock Module
1764-MM1	MicroLogix 1500 8K Memory Module
1764-MM1RTC	MicroLogix 1500 8K Memory Module with Real-Time Clock
1764-MM2 *	MicroLogix 1500 16K Memory Module
1764-MM2RTC *	MicroLogix 1500 16K Memory Module with Real-Time Clock

* Use with the 1764-LRP processor to support large program and data requirements.

Step 9 - 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 (starts on page 60)

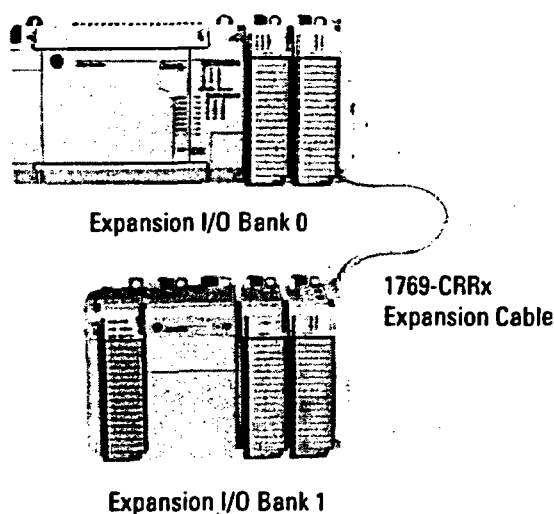
Select 1769 Compact I/O Components

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.

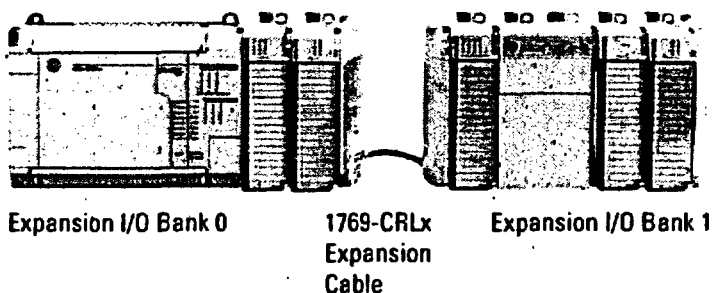
In a MicroLogix 1500 system, a maximum of one 1769 Expansion cable can be used, allowing for two banks of I/O modules (one connected directly to the controller and the other connected via the cable). Each I/O bank requires its own power supply (Bank 0 uses the controller's embedded power supply).

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

Vertical Orientation



Horizontal Orientation



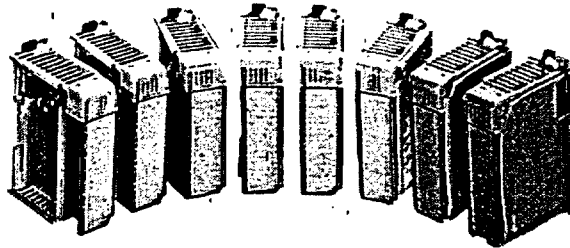
The following section of this document, 1769 Compact Expansion I/O and Communication Modules, provides information for choosing Compact I/O expansion options.

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 53 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.

1769 Compact Expansion I/O and Communications Modules



High-density Bulletin 1769 Compact I/O rackless expansion modules offer superior functionality and high value at competitive prices. 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 connected to the Base Unit or expansion power supply within their power supply distance rating. Refer to module's specifications for power supply distance ratings.

Advantages

- Modular system
- Feature-rich I/O to address a wide range of applications
- Rackless design reduces system components
- Small footprint minimizes panel space requirements
- Front insertion and removal reduces assembly and replacement time
- Unique tongue-and-groove interlocking case design ensures 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 communications modules

1769 Compact Digital I/O Modules

1769 Compact Digital AC Input Modules

Cat. No.	Number of Inputs	Voltage Category/Type, Input	Voltage Range	Input Delay Time, ON to OFF	Current, On-State Input, Min.	Current, Off-State Input, Max.	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-IA8I	8 individually isolated	100 or 120V ac	79...132V ac @ 47...63Hz	20 ms	5 mA @ 79V ac	2.5 mA	90 mA	8 modules
1769-IA16	16	100 or 120V ac	79...132V ac @ 47...63Hz	20 ms	5 mA @ 79V ac	2.5 mA	115 mA	8 modules
1769-IM12	12	200 or 240V ac	159...265V ac @ 47...60Hz	20 ms	5 mA @ 159V ac	2.5 mA	100 mA	8 modules

1769 Compact Digital AC Output Modules

Cat. No.	Number of Outputs	Voltage Category/Type, Output	Voltage Range	Current Leakage, Off-State Output, Max.	Current per Output, Max.	Current per Module, Max.	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-OA8	8	100...240V ac	85...265V ac @ 47...63Hz	2.0 mA @ 132V ac 2.5 mA @ 265V ac	0.25 A @ 60 °C (140 °F) 0.50 A @ 30 °C (86 °F)	2.0 A @ 60 °C (140 °F) 4.0 A @ 30 °C (86 °F)	145 mA	8 modules
1769-OA16	16	100...240V ac	85...265V ac @ 47...63Hz	2.0 mA @ 132V ac 2.5 mA @ 265V ac	0.25 A @ 60 °C (140 °F) 0.50 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)	225 mA	8 modules

The 1769-OA16 is dimensionally one and one-half as wide as other modules.

1769 Compact Digital DC Input Modules

Cat. No.	Number of Inputs	Voltage Category/Type, Input	Voltage Range	Input Delay Time, ON to OFF	Current, On-State Input, Min.	Current, Off-State Input, Max.	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-IQ6XOW4	6	24V dc, sinking or sourcing	10...30V dc @ 30 °C (86 °F) 10...26.4V dc @ 60 °C (140 °F)	8 ms	2 mA	1.5 mA	105 mA	8 modules
1769-ID16	16	24V dc, sinking or sourcing	10...30V dc @ 30 °C (86 °F) 10...26.4V dc @ 60 °C (140 °F)	8 ms	2 mA	1.5 mA	115 mA	8 modules
1769-ID16F	16 high-speed	24V dc, sinking or sourcing	10...30V dc @ 30 °C (86 °F) 10...26.4V dc @ 60 °C (140 °F)	1 ms	2 mA	1.5 mA	110 mA	8 modules
1769-IQ32	32	24V dc, sinking or sourcing	10...30V dc @ 30 °C (86 °F) 10...26.4V dc @ 60 °C (140 °F)	8 ms	2 mA	1.5 mA	170 mA	8 modules

The 1769-IQ32 is dimensionally one and one-half as wide as other modules.

The 1769-IQ6XOW4 is a combination input/output module. See "1769 Compact Digital Relay Output Modules" for its output specifications.

1769 Compact Digital DC Output Modules

Cat. No.	Number of Outputs	Voltage Category/Type, Output	Voltage Range	Current Leakage, Off-State Output, Max.	Current per Output, Max.	Current per Module, Max.	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-OB8	8	24V dc, sourcing	20.4...26.4 dc	1.0 mA @ 26.4V dc	2.0 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	8.0 A @ 60 °C (140 °F) 4.0 A @ 30 °C (86 °F)	145 mA	8 modules
1769-OB16	16	24V dc, sourcing	20.4...26.4 dc	1.0 mA @ 26.4V dc	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)	200 mA	8 modules
1769-OB16P	16 protected	24V dc, sourcing	20.4...26.4 dc	1.0 mA @ 26.4V dc	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)	160 mA	8 modules
1769-OB32	32	24V dc, sourcing	20.4...26.4 dc	1.0 mA @ 26.4V dc	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	8.0 A @ 60 °C (140 °F) 16.0 A @ 30 °C (86 °F)	300 mA	6 modules
1769-OV16	16	24V dc, sinking	20.4...26.4 dc	1.0 mA @ 26.4V dc	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F)	200 mA	8 modules

The 1769-OB32 is dimensionally one and one-half as wide as other modules.

1769 Compact Digital Relay Output Modules

Cat. No.	Number of Outputs	Voltage Category/Type, Output	Voltage Range	Current Leakage, Off-State Output, Max.	Current per Output, Max.	Current per Module, Max.	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	Power Supply Distance Rating
1769-IO6XOW4	4	24V dc	5...265V ac 5...125V dc	0 mA	2.5 A	8.0 A	105 mA	50 mA	8 modules
1769-OW8	8	24V dc	5...265V ac 5...125V dc	0 mA	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	16 A	125 mA	100 mA	8 modules
1769-OW8I	8 individually isolated	24V dc	5...265V ac 5...125V dc	0 mA	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F)	16 A	125 mA	100 mA	8 modules
1769-OW16	16	24V dc	5...265V ac 5...125V dc	0 mA	2.5 A	20 A	205 mA	180 mA	8 modules

The 1769-OW16 is dimensionally one and one-half as wide as other modules.

The 1769-IO6XOW4 is a combination input/output module. See "1769 Compact Digital DC Input/Output Modules" for its input specifications.

1769 Compact Relay Contact Ratings

Volts, Max.	Continuous Amps per Point	Amperes		Voltamperes		
		Make	Break	Make	Break	
240V ac	2.5 A	7.5 A	0.75 A	1800 VA	180 VA	
120V ac		15 A	1.5 A			
125V dc	1.0 A	0.22 A		28 VA		
24V dc	2.0 A	1.2 A		28 VA		

1769 Compact Analog I/O Modules

1769 Compact Analog Modules Specifications

Cat. No.	Number of Inputs	Number of Outputs	Resolution, Bits	Signal Range	Sensors Supported	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	Power Supply Distance Rating
1769-IF4	4	—	14 bits (unipolar)	0...20 mA 4...20 mA 0...10V dc ± 10 V dc 0...5V dc 1...5V dc	—	106 mA	60 mA	8 modules
1769-IF8	8	—	16 bits (unipolar)	0...20 mA 4...20 mA 0...10V dc ± 10 V dc 0...5V dc 1...5V dc	—	120 mA	70 mA	8 modules
1769-OF2	—	2	—	—	—	120 mA	120 mA	8 modules
1769-OF8C	—	8 current	16 bits (unipolar)	0...20 mA 4...20 mA 0...10V dc ± 10 V dc 0...5V dc 1...5V dc	—	145 mA	160 mA	8 modules
1769-OF8V	—	8 voltage	16 bits (unipolar)	0...20 mA 4...20 mA	—	145 mA	125 mA	8 modules
1769-IF4XOF2	4	2 individually isolated	8 bits plus sign individually isolated	0...10V dc ± 10 V dc 0...5V dc 1...5V dc	—	120 mA	160 mA	8 modules

1769 Compact Temperature Input Modules

1769 Compact Temperature Input Modules Specifications

Cat. No.	Number of Inputs	Resolution, Bits	Sensors Supported	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	Power Supply Distance Rating
1769-IR6	6	Input filter and configuration dependent	supports RTD and direct resistance signal measurement 100, 200, 500, 1000 Ω Platinum, α =385 100, 200, 500, 1000 Ω Platinum, α =3916 120 Ω Nickel, α =672 120 Ω Nickel, α =618 10 Ω Copper 604 Ω Nickel-Iron 518 0...150 Ω 0...500 Ω 0...1000 Ω 0...3000 Ω	100 mA	45 mA	8 modules
1769-IT6	6, plus 2 cold junction sensors	—	supports thermocouple and millivolt signal measurement Thermocouple types: J, K, T, E, R, S, B, N, C ± 50 mV ± 100 mV	100 mA	40 mA	8 modules

1769 Compact High-Speed Counter Module

The 1769-HSC is a 1 MHz counter/encoder module with 4 on-board outputs and 12 virtual outputs. Use this module for high-speed control applications such as flow control, or for measuring length, position, speed, frequency or duration. The module can simultaneously interface with up to 2 quadrature incremental encoders or 4 single-input counters.

1769 Compact High-Speed Counter Module Specifications

Cat. No.	Number of Inputs	Number of Outputs	Backplane Current (mA) at 5V	External Power	Power Supply Distance Rating
1769-HSC	2	4	425 mA	19.2-31.2V dc 100 mA @ 24V dc	4 modules

1769 Compact DPI/SCANport Module

The 1769-SM1 module provides a direct 1769 platform connection for PowerFlex 7-Class drives, other DPI-based Host devices, and SCANport-based Host devices such as 1305 and 1336 PLUS II drives. Three channels support any combination of as many as three DPI and/or SCANport Host devices to be connected per module. The 1769-SM1 can be used with the MicroLogix 1500, CompactLogix, and remote 1769-based nodes such as the 1769-ADN DeviceNet adapter.

1769 Compact DPI/SCANport Module Specifications

Cat. No.	Number of Channels	Communication Rate	Backplane Current (mA) at 5V	Backplane Current (mA) at 24V	Power Supply Distance Rating
1769-SM1	3 any combination of DPI or SCANport	DPI or SCANport 125 Kbps or 500 Kbps	280 mA	60 mA per channel supplied by the DPI/SCANport host	6 modules

1769 Compact DeviceNet Scanner and DeviceNet Adapter Communications Modules

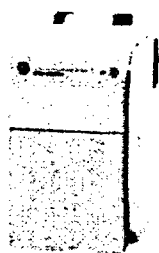
Via the 1769-SDN, a MicroLogix 1500 controller can act as a DeviceNet master, slave or peer. The 1769-SDN provides standard DeviceNet master functionality, as well as several new performance and ease-of-use features. With the 1764-LRP processor, you can also message between devices using one of two methods (PCCC and Explicit messaging) and perform program upload, download and monitoring through the scanner.

The 1769-ADN is a DeviceNet adapter/slave module that supports the DeviceNet 2.0 Specification. The adapter allows any 1769 Compact discrete, analog or specialty I/O module to become part of a DeviceNet system.

Both modules can be configured using RSNetWorx for DeviceNet software.

1769 Compact DeviceNet Modules Specifications

Cat. No.	Communication Rate	Cable	Power Requirements, Max.	Power Consumption (W) at 24V	Backplane Current (mA) at 5V	Power Supply Distance Rating
1769-SDN scanner	• 125 Kbps • 250 Kbps • 500 Kbps	Allen-Bradley part number 1485C-P1-Cxxx	90 mA @ 11V dc 110 mA @ 25V dc	2.2	440 mA	4 modules
1769-ADN adapter			90 mA	2.5	450 mA	4 modules



1769 Compact Power Supplies, Expansion Cables and End Caps

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

1769 Compact Power Supplies Specifications

Specification	1769-PA2	1769-PB2	1769-PA4	1769-PB4
Nominal Input Voltage	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
Maximum Line Requirement	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° to 55°C)	2 A @ 5V dc 0.8 A @ 24V dc		4 A @ 5V dc 2 A @ 24V dc	
24V dc User Power Capacity (0° to 55°C)	250 mA	—	—	—
Maximum Inrush	25 A @ 132V ac, 10 Ω source impedance 40 A @ 265V ac, 10 Ω source impedance	30 A @ 31.2V dc	25 A @ 132V ac, 10 Ω source impedance 40 A @ 265V ac, 10 Ω source impedance	30 A @ 31.2V dc
Line Loss Ride Through	10 ms (minimum)...10 s (maximum)		5 ms (minimum)...10 s (maximum)	
Minimum Load Current	0 mA @ 5V dc, 0 mA @ 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 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

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:

- Calculating System Current
- Verifying the System Loading
- Selecting Expansion Cables and End Caps

Calculating System Current

1. Use the first worksheet to record the processor and optional communications 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.

MicroLogix 1500 Base Unit and Communications/Display: Calculate current draw

Cat. No.	Select Devices	Bus Current Draw Specification		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 * optional		350	0		
Communications/Display Devices, optional, one only maximum:					
1761-NET-AIC * *		0	120		
1761-NET-ENI, 1761-NET-ENIW * *		0	100		
2707-MVH232, 2707-MVP232 * *		0	80		
SUBTOTAL1				(A1)	(B1)

* These are optional accessories. Current is consumed only if the accessory is installed.

* Current for the 1761-NET-AIC or 1761-NET-ENI(W) may be supplied by the controller's communications 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's communication port, if directly connected.

3. Use the next worksheet to record the 1769 I/O modules and communications 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 may be located from the power supply. For most modules, the rating is 8. For the 1769-HSC, 1769-ADN and 1769-SDN, the rating is 4. For the 1769-SM1, the rating is 6.

Depending on its configuration, the 1769-SDN may 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 ensure that the maximum available 4K 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.

1769 Compact Expansion: Calculate current draw

Select I/O Modules for Each Bank:					Calculate Current Draw:			
Expansion I/O Modules	Base Unit Expansion	Bank 1	Bus Current Draw Specification (mA)		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 *		at 5V dc	at 24V dc	at 5V dc	at 24V dc	at 5V dc	at 24V dc
1769-IA16			115 mA	0 mA				
1769-IA8I			90 mA	0 mA				
1769-IF4 (Series A)			120 mA	150 mA				
1769-IF4 (Series B)			120 mA	60 mA				
1769-IF4XOF2			120 mA	160 mA				
1769-IM12			100 mA	0 mA				
1769-IO16			115 mA	0 mA				
1769-IO16f			110 mA	0 mA				
1769-IO32			170 mA	0 mA				
1769-IO6XOW4			105 mA	50 mA				
1769-IR6			100 mA	45 mA				
1769-IT6			100 mA	40 mA				
1769-OA8			145 mA	0 mA				
1769-OA16			225 mA	0 mA				
1769-OB8			145 mA	0 mA				
1769-OB16			200 mA	0 mA				
1769-OB16P			160 mA	0 mA				
1769-OB32			300 mA	0 mA				
1769-OF2 (Series A)			120 mA	200 mA				
1769-OF2 (Series B)			120 mA	120 mA				
1769-OF8C			145 mA	160 mA				
1769-OF8V			145 mA	125 mA				
1769-OV16			200 mA	0 mA				
1769-OW8			125 mA	100 mA				
1769-OW8I			125 mA	100 mA				
1769-OW16			205 mA	180 mA				
1769-HSC*			425 mA	0 mA				
1769-SDN*			440 mA	0 mA				
1769-SM1†			280 mA	0 mA				
TOTAL MODULES:			SUBTOTAL2:		(A2)	(B2)	(C)	(D)

* Up to 16 modules may be used in a MicroLogix 1500 system when using a Series E 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.

* The 1769-HSC, 1769-ADN and 1769-SDN modules have a power supply distance rating of 4. They may have no more than 3 modules between them and the MicroLogix 1500 Base Unit or Expansion Power Supply.
† The 1769-SM1 module has a power supply distance rating of 6. It may 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.

Verifying the Base Unit Loading

1. Enter the SUBTOTAL values from the worksheet, MicroLogix 1500 Base Unit and Communications/Display Device: Calculate current draw, and 1769 Compact Expansion: Calculate current draw. Add the total current draw for the Base Unit. Verify the values are within the maximum limits.

MicroLogix 1500 Base Unit Power Supply Loading: Verify that current values are within limits

Current from:	Calculated Current for System	
	at 5V dc (mA)	at 24V dc (mA)
For 1764-24BWA 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

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

MicroLogix 1500 Base Unit Power Supply Loading: Verify that power value is within limits

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 in the worksheet. Bank 1 Power Supply Loading: Verify that current values are within limits. Consider future expansion when selecting a power supply.

Bank 1 Power Supply Loading: Verify that current values are within limits

Specification	Cat. No.	Calculated Current for System		24V dc User Output Capacity
		at 5V dc (mA)	at 24V dc (mA)	
Values from SUBTOTAL2 on page 55		(C)	(D)	
MAXIMUM CURRENT LIMIT	1769-PA2	2000	800	250 mA
	1769-PA4	4000	2000	
	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 must have an end cap. If I/O Bank 1 is used, an expansion cable is also required. If you have not already done so, 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-CRR1, 1769-CRRL3
	left end cap	1769-ECL

Step 10 - Select:

Select Replacement Parts

- replacement parts - AIC+ and DNI
replacement terminal blocks are listed
with the MicroLogix 1000
- record your selections in the Selection
Record (starts on page 60)

MicroLogix 1000 Replacement Parts

Cat. No.	Description
1761-RPL-T32X	Terminal Cover Doors for 1761-L32AAA, -L32AWA, -L32BWA, -L32BWB, or -L32BBB (2 doors per package)
1761-RPL-DIN	Replacement DIN Rail Latches for MicroLogix 1000 Controllers (2 per package)
1761-RT30	Replacement Terminal Block for 1761-NET-AIC, 6-position DH-485 plug/connector
1761-RPL-RT00	Replacement Terminal Block for 1761-NET-DNI, 5-position DeviceNet plug/connector

MicroLogix 1200 Replacement Parts

Cat. No.	Description
1762-RPLRTB40	Replacement Terminal Block for 1762-L40AWA and -L40BWA
1762-RPLDIN2	Replacement DIN Rail Latches for 1762 I/O Modules
1762-RPLDR2	Replacement Door Kit for 1762 I/O Modules (2 I/O module doors, 2 communications bus doors)
1762-RPLTLBL2	Replacement Terminal Label Kit for 1762 I/O Modules

MicroLogix 1500 Replacement Parts

Cat. No.	Description
1764-RPLTB1	17-Point Replacement Terminal Block for 1764-24AWA and 1764-24BWA MicroLogix 1500 Base Units
1764-RPLTB2	21-Point Replacement Terminal Block for 1764-28BWB MicroLogix 1500 Base Unit
1747-BA	Lithium Battery (For RAM Memory Retention)

Step 11 - Select:

- training and promotional products - starter paks, demo units and simulators
- record your selection in the Selection Record (starts on page 60)

Select Training and Promotional Products

Training and Promotional Products for MicroLogix 1000, 1200 and 1500

Description	Cat. No.
MicroMentor Basics Book Provides an introduction to understanding and applying PLC fundamentals	1761-MMB
MicroLogix 1000 RSLogix Starter Pak includes: 1761-L16BWA controller, 9324-RL0100ENE (RSLogix Starter Programming Software), 1761-CBL-PM02 PC-to-controller cable, 1761-SIM-B16 input switch simulator, user documentation	1761-L16BWA-R1E
MicroLogix 1000 10-Point Controller Starter Pak includes: 1761-L16BWA controller, RSLogix 500 Starter Software for 10-Point MicroLogix Controllers, RSLink Lite, 1761-CBL-PM02 PC-to-controller cable, user documentation	1761-START1000E
MicroLogix 1200 RSLogix Starter Pak includes: 1762-L24BWA controller, 9324-RL0100ENE (RSLogix Starter Programming Software), 1761-CBL-PM02 PC-to-controller cable, 1796-SIM1200 input switch simulator, user documentation	1762-START1200E
MicroLogix 1500 RSLogix Starter Pak includes: 1764-LSP processor, 1764-24BWA base unit, 9324-RL0100ENE (RSLogix Starter Programming Software), 1764-CBL-PM02 PC-to-controller cable, 1796-SIM1500 input switch simulator, 1764-MM1RTC memory module and real-time clock, user documentation	1764-START1500E
MicroLogix 1500 RSLogix Starter Pak includes: 1764-LRP processor, 1764-24BWA base unit, 9324-RL0100ENE (RSLogix Starter Programming Software), 1764-CBL-PM02 PC-to-controller cable, 1796-SIM1500 input switch simulator, 1764-MM1RTC memory module and real-time clock, user documentation	1764-START1500RE
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-MICRO1
MicroLogix 1500 Integrated Demonstration Unit includes: 1764-28BWB 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-MICRO151 (Series B)
MicroLogix 1000 Input Simulator For use with 1761-L16BWA MicroLogix 1000 Programmable Controller	1761-SIM-B16
MicroLogix 1200 Input Simulator For use with 1762-L24BWA and 1762-L24BXB controllers	1761-SIM1200
MicroLogix 1500 Input Simulator For use with 1764-24BWA and 1764-28BWB 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-PV300MICRO1

Step 12 - Select:**Fill in Your Selection Listing**

- all catalog numbers required for your system specification

Selection Record

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-L16NBW	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 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	
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 1200 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	

Cat. No.	Description	Quantity Selected
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	
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-DAI	MicroLogix Data Access Tool	
1764-LRP	MicroLogix 1500 Processor Unit with RS-232 Port	
1764-LSP	MicroLogix 1500 Processor Unit	
1764-MM1	MicroLogix 1500 8K Memory Module	
1764-MM1RTC	MicroLogix 1500 8K Memory Module with Real-Time Clock	
1764-MM2	MicroLogix 1500 16K Memory Module	
1764-MM2RTC	MicroLogix 1500 16K 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-CRL1	Compact I/O Right Bank-to-Left Bank 1-Foot Expansion Cable*	
1769-CRL3	Compact I/O Right Bank-to-Left Bank 3-Foot Expansion Cable*	
1769-CRR1	Compact I/O Right Bank-to-Right Bank 1-Foot Expansion Cable*	
1769-CRR3	Compact I/O Right Bank-to-Right Bank 3-Foot Expansion Cable*	
1769-ECI	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-IF4XDF2	Compact 8-Bit Low Resolution Analog I/O Combination Module	
1769-IF8	Compact 8-point Analog Input Module	
1769-IM12	Compact 240V ac Input Module	
1769-IQ16	Compact 24V dc 16-point Sink/Source Input Module	
1769-IQ16F	Compact 24V dc 16-point High Speed Sink/Source Input Module	
1769-IQ32	Compact 24V dc 32-point Sink/Source 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	

* Approximate cable length is measured from end-to-end of the cable only

Cat. No.	Description	Quantity Selected
1769-OB32	Compact Solid State 32-point 24V dc Source Output Module	
1769-OB6	Compact Solid State 8-point 24V dc Source Output Module	
1769-OF2	Compact Analog Output Module	
1769-OF8C	Compact 8-point Analog Current Output Module	
1769-OF8V	Compact 8-point Analog Voltage Output Module	
1769-OV16	Compact Solid State 16-point 24V dc Sink 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 DP1/SCANport Module	
MicroLogix Communication Interface Devices		
1761-NET-AIC	MicroLogix Advanced Interface Converter Module	
1761-NET-DNI	MicroLogix DeviceNet Interface 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	
1761-HHM-K08	8K Memory Module for MicroLogix 1000 Hand-Held Programmer	
1761-HHM-K64	64K Memory Module for MicroLogix 1000 Hand-Held Programmer	
1761-HHP-B30	MicroLogix 1000 Hand-Held Programmer	
9324-RD100ENE	RSLogix 500 Starter	
9324-RD300ENE	RSLogix 500 Programming for the SLC 500 and MicroLogix Families	
9324-RD700XENE	RSLogix 500 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-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)	
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)	
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)	

Cat. No.	Description	Quantity Selected
Starter Paks		
1761-L16BWA-R1E	MicroLogix 1000 RSLogix 500 Starter Pak	
1761-START1000E	MicroLogix 1000 10-Point Controller Starter Pak	
1762-START1200E	MicroLogix 1200 RSLogix 500 Starter Pak	
1764-START1500E	MicroLogix 1500 1764-LSP RSLogix 500 Starter Pak	
1764-START1500RE	MicroLogix 1500 1764-LRP RSLogix 500 Starter Pak	
Demonstration Units and Simulators		
1781-MMB	MicroMentor Basics Book	
1761-SIM-B16	MicroLogix 1000 Input Simulator	
1796-MIRCRO1	MicroLogix 1000 Integrated Demonstration Unit	
1796-MICRO151	MicroLogix 1500 Integrated Demonstration Unit	
1796-PV300MICRO1	MicroLogix 1200/PanelView 300 Micro Integrated Demonstration Unit	
1796-SIM1200	MicroLogix 1200 Input Simulator	
1796-SIM1500	MicroLogix 1500 Input Simulator	
MicroView Units		
2707-MVH232	MicroView Handheld, 2 Line LCD, RS-232, 11 25V dc, Class 1 Div 2 Rated	
2707-MVP232	MicroView Panel Mount, 2 Line LCD, RS-232, 11 25V dc, Class 1 Div 2 Rated	
Replacement Parts		
1747-BA	Lithium Battery (For RAM Memory Retention)	
1761-RPL-DIN	Replacement DIN Rail Latches for MicroLogix 1000 Controllers (2 per package)	
1761-RPL-RT00	Replacement Terminal Block for 1761-NET-DNI, 5-position DeviceNet plug/connector	
1761-RPL-T32X	Terminal Cover Doors for 1761-L32AAA, -L32AWA, -L32BWA, -L32BWB, or -L32BBB (2 doors per package)	
1762-RPLDIN2	Replacement DIN Rail Latches for 1762 I/O Modules	
1762-RPLDR2	Replacement Door Kit for 1762 I/O Modules (2 I/O module doors, 2 communications bus doors)	
1762-RPLRTB40	Replacement Terminal Block for 1762-L40AWA and -L40BWA	
1762-RPLTLBL2	Replacement Terminal Label Kit for 1762 I/O Modules	
1764-RPLTB1	17-Point Replacement Terminal Block for 1764-24AWA and 1764-24BWA MicroLogix 1500 Base Units	
1764-RPLTB2	21-Point Replacement Terminal Block for 1764-28BWB MicroLogix 1500 Base Unit	

Rockwell Automation Support

Rockwell Automation provides technical information on the web to assist you in using our products. At <http://support.rockwellautomation.com>, you can find technical manuals, a knowledge base of FAQs, technical and application notes, sample code and links to software service packs, and a MySupport feature that you can customize to make the best use of these tools.

For an additional level of technical phone support for installation, configuration and troubleshooting, we offer TechConnect Support programs. For more information, contact your local distributor or Rockwell Automation representative, or visit <http://support.rockwellautomation.com>.

Installation Assistance

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

United States	1.440.646.3223 Monday - Friday, 8am - 5 pm EST
Outside United States	Please contact your local Rockwell Automation representative for any technical support issues.

New Product Satisfaction Return

We test all of our 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:

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

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