

MicroLogix Programmable Controllers Overview

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

MicroLogix 1000 Controller



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

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

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

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

Advantages for the MicroLogix 1000 Controllers

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

Select Family: MicroLogix 1000, 1200 or 1500 Controller

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

Features

Step 1 - Select:

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

MicroLogix Controllers Feature Comparison Chart

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

MicroLogix Controllers Feature Comparison Chart

Controller	MicroLogix 1000	MicroLogix 1200/1200R	MicroLogix 1500 1764-LSP, 1764-LRP
Bulletin Number	1761	1762	1764
RS-232 Ports	(1) 8-pin mini DIN	(1) 8-pin mini DIN (1) 8-pin mini DIN Programming/HMI	(1) 8-pin mini DIN (1) 9-pin D-shell
DeviceNet Peer-to-Peer Messaging, slave I/O	With 1761-NET-DNI	With 1761-NET-DNI	With 1761-NET-DNI With 1769-SDN
DeviceNet Scanner			With 1769-SDN
EtherNet/IP	With 1761-NET-ENI or 1761-NET-ENIW	With 1761-NET-ENI or 1761-NET-ENIW	With 1761-NET-ENI or 1761-NET-ENIW
Web Server Capabilities	With 1761-NET-ENIW	With 1761-NET-ENIW	With 1761-NET-ENIW
DH-485	Network with 1761-NET-AIC	Network with 1761-NET-AIC	Network with 1761-NET-AIC
SCADA RTU - DF1 half-duplex slave	✓	✓	✓
SCADA RTU - DF1 radio modem		✓	✓
SCADA RTU - Modbus RTU slave		✓	✓
SCADA RTU - Modbus RTU master		✓	✓
ASCII - Read/Write		✓	✓
Operating Power			
120/240V AC	✓	✓	✓
24V DC	✓	✓	✓
12V DC			
Agency Certifications			
CE, 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 (for example, Examine if On, Examine if Off)
- Data Comparison instructions (for example, Equal, Greater than or Equal, Less than or Equal)
- Data Manipulation instructions (for example, Copy, Move)
- Math instructions (for example, Add, Subtract, Multiply)
- Program Flow Control instructions (for example, Jump, Subroutine)
- Application Specific instructions (for example, Programmable Limit Switch, Sequencer)
- High-speed Counter instruction
- High-speed pulse train output (PTO) and pulse width modulated (PWM) instructions (for MicroLogix 1200 and 1500 controllers only)
- Communication instruction (including ASCII for MicroLogix 1200 and 1500 controllers only)
- Recipe instruction (MicroLogix 1500 controllers only)
- Data Logging instruction (MicroLogix 1500 1764-LRP processor only)

Controller Specifications

Controller General Specifications

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

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

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

Environmental Specifications and Certifications

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

Environmental Specifications and Certifications

Attribute	1761 Controllers	1762 Controllers	1764 Controllers
Shock, Nonoperating	10 and 16 Point Controllers: 20g peak acceleration (11 ± 1 ms duration), 3 times each direction, each axis 32 Point and Analog Controllers: 20g peak acceleration (11 ± 1 ms duration), 3 times each direction, each axis	50 g panel mounted (40 g DIN Rail mounted); 3 pulses each direction, each axis	without Data Access Tool installed: 40 g panel mounted (30 g DIN Rail mounted) with Data Access Tool installed: 30 g panel mounted (20 g DIN Rail mounted)
Agency Certification	<ul style="list-style-type: none"> • 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 level		
ESD Immunity	EN 61000-4-2 8 kV	EN 61000-4-2 4 kV contact, 8 kV air, 4 kV indirect	
Radiated Immunity			
Radiated RF Immunity	EN 61000-4-3 10 V/m, 27...1000 MHz, 3 V/m, 87...108 MHz, 174...230 MHz, and 470...790 MHz	EN 61000-4-3 10 V/m, 80...1000 MHz, 80% amplitude modulation, +900 MHz keyed carrier	
Electronic Fast Transient/Burst (EFT/B) Immunity	EN 61000-4-4 Power Supply, I/O: 2 kV Communication: 1 kV	EN 61000-4-4 Power Supply, I/O: 2 kV, 5 kHz Communication Cable: 1 kV, 5 kHz	
Surge Transient Immunity	EN 61000-4-5 Communication: 1 kV galvanic gun I/O: 2 kV CM (Common mode), 1 kV DM (Differential mode) AC Power Supply: 4 kV CM (Common mode), 1 kV DM (Differential mode)	EN 61000-4-5 Communication: 1 kV galvanic gun I/O: 2 kV CM (common mode), 1 kV DM (differential mode) AC Power Supply: 4 kV CM (Common mode), 2 kV DM (Differential mode) DC Power Supply: 500V CM (Common mode), 500V DM (Differential mode)	
Conducted RF Immunity	EN 61000-4-6 Power Supply, I/O: 10V, 150 kHz...30 MHz Communication Cable 3V	EN 61000-4-6 Power Supply, I/O: 10V Communication Cable 3V	

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

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

(3) DIN rail mounted controller is 1 g.

Controller Dimensions

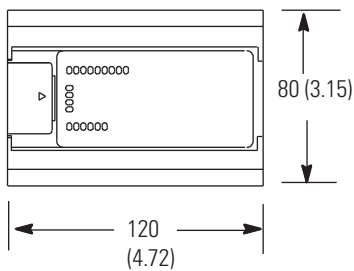
MicroLogix 1000 Controller

Dimensions are in millimeters (inches).

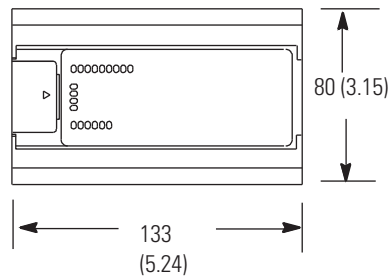
Controller Spacing = 50 mm (2 in.) on all sides for adequate ventilation.

MicroLogix Controller Dimensions

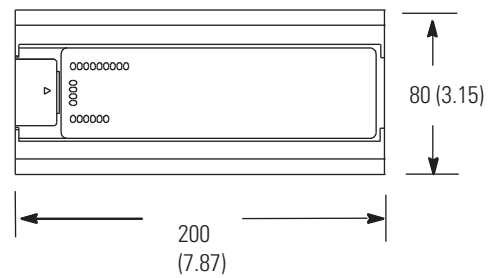
**1761-L10BWA, 1761-L10BWB, 1761-L10BXB,
1761-L16BBB, 1761-L16BWA, 1761-L16BWB,
1761-L16NWA, 1761-L16NWB**



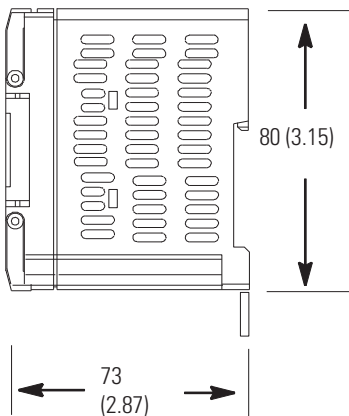
1761-L16AWA



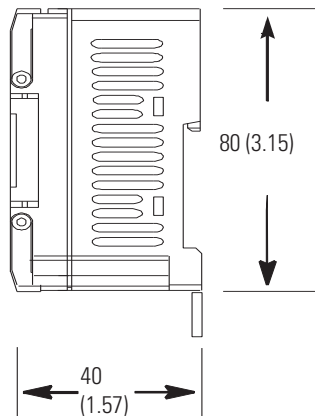
**1761-L20AWA, 1761-L20BWA, 1761-L20BWB,
1761-L32AWA, 1761-L32BWA, 1761-L32AAA,
1761-L32BBB, 1761-L32BWB**



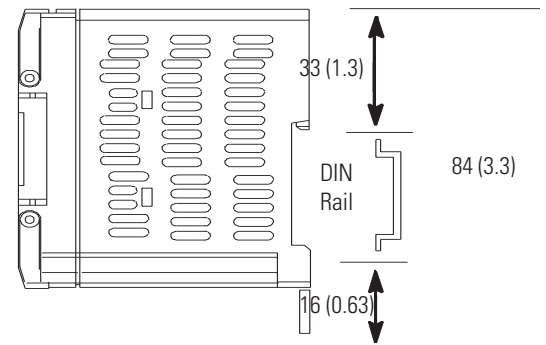
**1761-L10BWA, 1761-L16AWA, 1761-L16BWA,
1761-L16NWA, 1761-L20AWA, 1761-L20BWA,
1761-L32AWA, 1761-L32BWA, 1761-L32AAA**



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



**MicroLogix 1000 DIN Rail
Dimensions**



Select Communication

Step 2 - Select:

- communication network - based on application requirements
- communication interface device - if required
- record your selection in the Selection Record (starts on [page 86](#))

Communication Networks

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

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

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

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

If your application requires	Use this network
<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/master DF1 radio modem
<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 directly through channel 0 RS-485 port using 1763-NC01 cable ⁽¹⁾ DH-485 via the 1761-NET-AIC Advanced Interface Converter ⁽²⁾
<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 (when using the 1769-SDN scanner) 	DeviceNet network via the 1761-NET-DNI DeviceNet Interface
<ul style="list-style-type: none"> • Program upload, download, and monitoring • Peer-to-peer communication • E-mail communication • 10/100 Base-T port with embedded status indicators • Web server capability via the 1761-NET-ENIW module 	EtherNet/IP network directly through Channel 1 10/100 Mbps communication port ⁽³⁾ EtherNet/IP network via the 1761-NET-ENI Ethernet Interface or 1761-NET-ENIW Web-Enabled Ethernet Interface ⁽²⁾
<ul style="list-style-type: none"> • Connection to third party devices for remote data collection in a SCADA system (for example, telephone modems, radio modems, and leased lines.) • Remote Terminal Unit (RTU) functions 	Modbus RTU master/slave directly through channel) RS-485 port using 1763-NC01 cable ⁽²⁾ Modbus RTU slave via the 1761-NET-AIC Advanced Interface Converter ⁽²⁾ Modbus RTU master via the 1761-NET-AIC Advanced Interface Converter ⁽²⁾ DNP3 slave via RS-232 ⁽⁴⁾ DNP3 over IP ⁽⁴⁾ Modbus TCP/IP ⁽⁴⁾

(1) MicroLogix 1100 and 1400 controllers only.

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

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

(4) MicroLogix 1400 controllers only.

MicroLogix Network Interface Devices

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

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

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

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

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

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

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

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

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

DH-485 Network Specifications

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

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 online 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

Attribute	1761-NET-DNI
Number of Nodes, max	64
Length, max	500 m @ 125 Kbps or 100 m @ 500 Kbps
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 lets you easily connect a MicroLogix controller to a new or existing Ethernet network to update/download programs, communicate between controllers, and generate e-mail messages via SMTP (simple mail transport protocol).

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

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

Ethernet Specifications

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

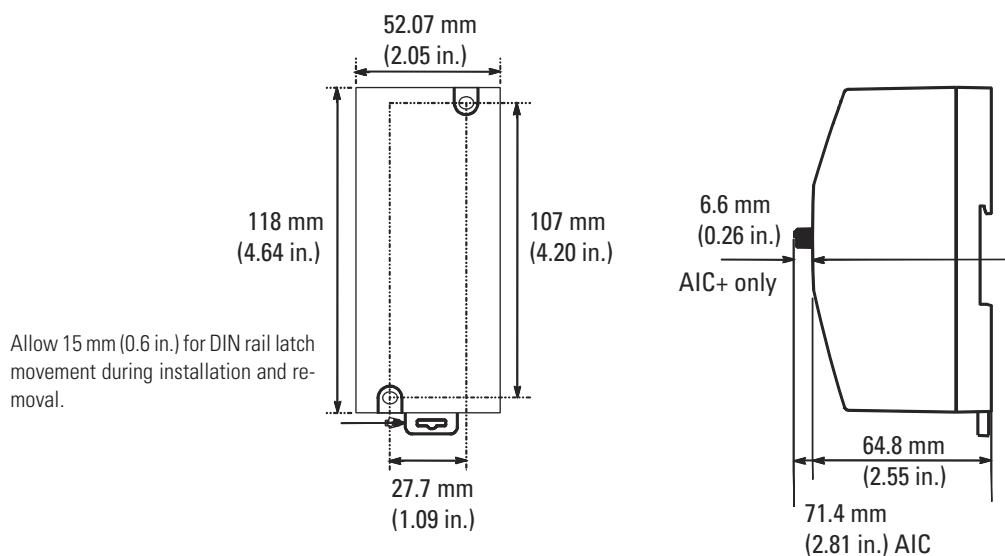
AIC+, DNI, and ENI /ENIW Specifications

Network Modules Specifications

Attribute	1761-NET-AIC	1761-NET-DNI	1761-NET-ENI, 1761-NET-ENIW
Power Supply DC Voltage Range ⁽¹⁾	20.4...28.8V DC	11...25V DC	20.4...26.4V DC
Backplane Current (mA) at 24V	120 mA	200 mA	50 mA
Inrush Current, max	200 mA	400 mA	200 mA
Isolation Voltage	500V DC for 1 minute	500V DC for one minute	710V DC for one minute
Operating Temperature	0...60 °C (32...140 °F)		
Storage Temperature	-40...85 °C (-40...185 °F)		
Relative Humidity	5...95% noncondensing		
Vibration	operating: 10...500 Hz, 5.0 g, 0.030 in. peak-to-peak, 2 hour each axis	operating: 5...2000 Hz, 2.5 g, 0.015 in. peak-to-peak, 1 hour each axis nonoperating: 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, Nonoperating	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 style="list-style-type: none"> • UL Listed Industrial Control Equipment for use in Class 1, Division 2, Hazardous Locations, Groups A, B, C, D • C-UL Listed Industrial Control Equipment for use in Canada • CE marked for all applicable directives • C-Tick marked for all applicable acts 		

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

Network Interface Devices Dimensions



Select Programming Tools and Software

Step 3 - Select:

- programming tools - hand-held programmer with optional memory module (available for MicroLogix 1000 only)
- software - the appropriate RSLogix package for your application
- record your selection in the Selection Record (starts on [page 86](#))

Programming Software

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

RSLogix 500 and RSLogix Micro Selection Chart

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

TIP



Download Free Lite Version of RSLogix Micro Starter Software

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

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

Go to

<http://www.ab.com/programmablecontrol/plc/micrologix/downloads.html> for details.

Hand-Held Programmer (MicroLogix 1000 controller only)

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

There are 2 memory modules:

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



Select Network and Programming Cables

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

Step 4 - Select:

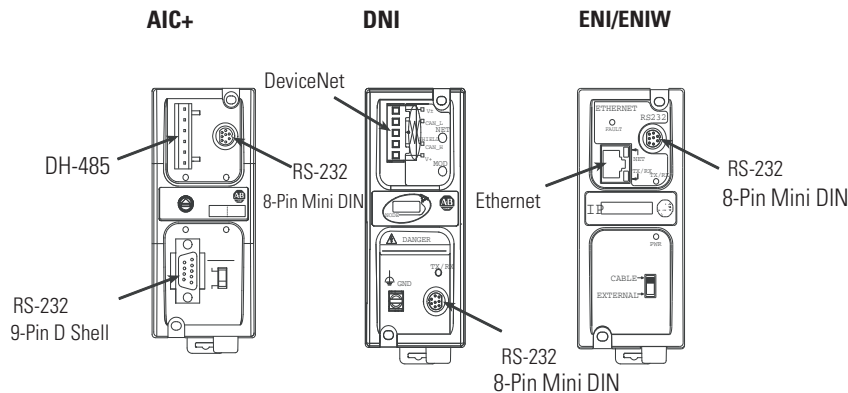
- cables - review device port identification to find cable in the selection chart
 - record your selection in the Selection Record (starts on [page 86](#))

Network Cable Selection

Controller and PC Port Identification

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

Network Interface Devices Communication Port Identification



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

Network Cable Selection Chart

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

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

(2) Commercially available.

Programming Cable Selection

Programming Cable Selection Chart - Programming Device to Controller

Programming Device	MicroLogix 1000, 1100, 1200, 1400, and 1500 Channel 0 (8-pin Mini DIN)		MicroLogix 1100 and 1400 Channel 1 (RJ-45)		MicroLogix 1400 Channel 2	
	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	Cat. No.	Length
Personal Computer (9-pin D Shell)	1761-CBL-PM02	2 m (6.5 ft)	---	---	1747-CP3	3m (10 ft)
Personal Computer (RJ-45)	---	---	Ethernet Cable ⁽¹⁾	100 m (328 ft), max	---	---
Hand-Held Programmer (1761-HHP)	1761-CBL-HM02	2 m (6.5 ft)	---	---	---	---

(1) Commercially available.

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

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

USB to DH-485 Interface Converter Specifications

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

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

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

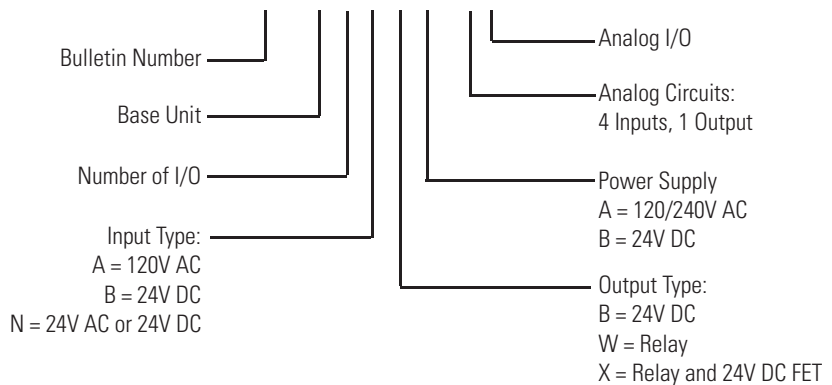
Select MicroLogix 1000 Controllers

MicroLogix 1000 Controller Catalog Number Detail

1761 - L 20 A W A - 5 A

Step 5 - Select:

- controller - review power and I/O configurations to select a controller catalog number; see power supply and I/O specification for more detailed information
- record your selection in the Selection Record (start on [page 86](#))



MicroLogix 1000 Controller Power and I/O Configuration

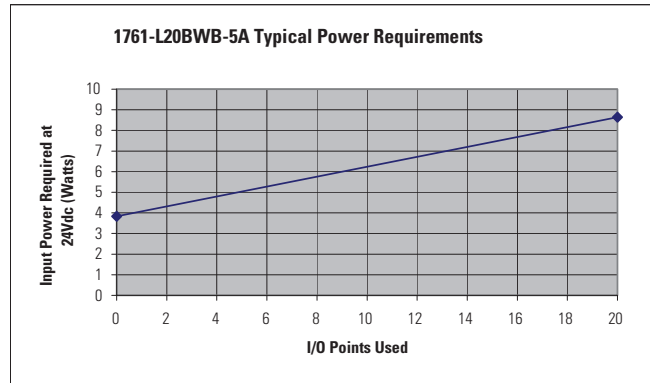
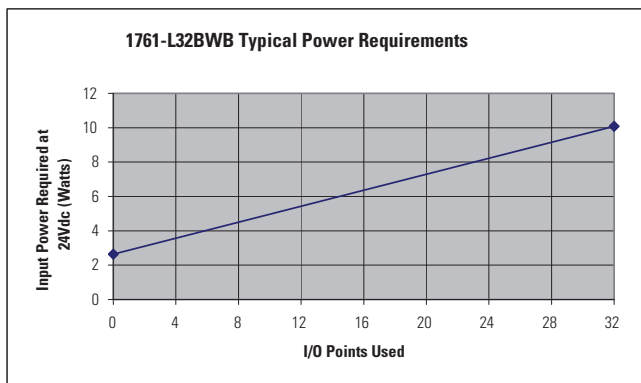
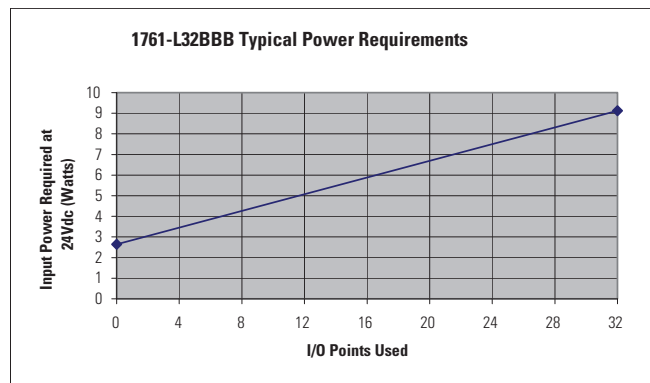
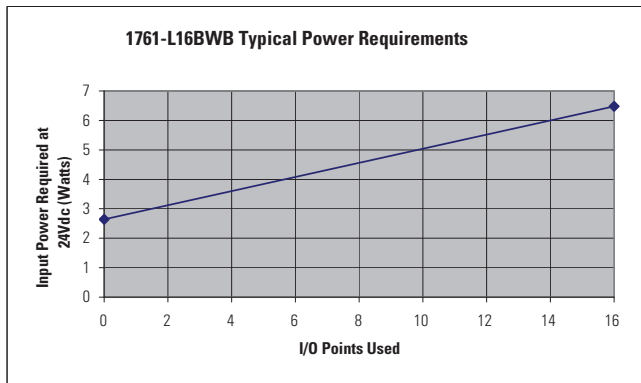
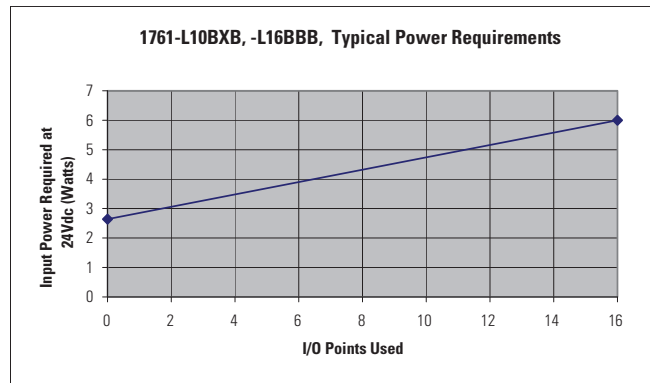
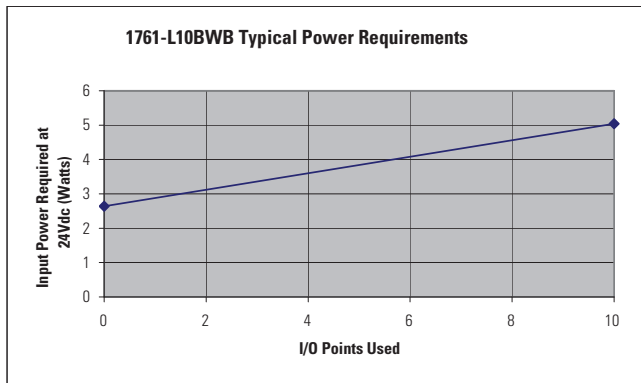
Cat. No.	Line Voltage	Number of Inputs	Number of Outputs ⁽¹⁾	High Speed I/O
1761-L16AWA	120/240V AC	(10) 120V AC	(6) Relay	N/A
1761-L32AWA	120/240V AC	(20) 120V AC	(12) Relay	N/A
1761-L20AWA-5A	120/240V AC	(12) 120V AC, (4) Analog	(8) Relay, (1) Analog	N/A
1761-L32AAA	120/240V AC	(20) 120V AC	(10) Triac, (2) Relay	N/A
1761-L16NWA	120/240V AC	(10) 24V AC or DC	(6) Relay	N/A
1761-L10BWA	120/240V AC	(6) 24V DC	(4) Relay	(1) 6.6 kHz input
1761-L16BWA	120/240V AC	(10) 24V DC	(6) Relay	(1) 6.6 kHz input
1761-L20BWA-5A	120/240V AC	(12) 24V DC, (4) Analog	(8) Relay, (1) Analog	(1) 6.6 kHz input
1761-L32BWA	120/240V AC	(20) 24V DC	(12) Relay	(1) 6.6 kHz input
1761-L10BWB	24V DC	(6) 24V DC	(4) Relay	(1) 6.6 kHz input
1761-L16BWB	24V DC	(10) 24V DC	(6) Relay	(1) 6.6 kHz input
1761-L20BWB-5A	24V DC	(12) 24V DC	(8) Relay	(1) 6.6 kHz input
1761-L32BWB	24V DC	(20) 24V DC	(12) Relay	(1) 6.6 kHz input
1761-L10BXB	24V DC	(6) 24V DC	(2) MOSFET sourcing, (2) relay	(1) 6.6 kHz input
1761-L16BBB	24V DC	(10) 24V DC	(4) MOSFET sourcing, (2) relay	(1) 6.6 kHz input
1761-L32BBB	24V DC	(20) 24V DC	(10) MOSFET sourcing, (2) relay	(1) 6.6 kHz input
1761-L16NWB	24V DC	(10) 24V AC or DC	(6) Relay	N/A

(1) Two individually isolated relays per unit.

MicroLogix 1000 Controller Power Supply Specifications

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

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



MicroLogix 1000 Controller Digital Input Specifications

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

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

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

MicroLogix 1000 Controller Digital Output Specifications

Attribute	Relay	FET	Triac
Operating Voltage Range	5...125V DC 5...264V AC	20.4...26.4V DC	85...264V AC
Continuous Current per Point, max	See MicroLogix 1500 Controller Relay Contact Rating on page 72.	1.0 A @ 55 °C (131 °F) 1.5 A @ 30 °C (86 °F)	0.5 A @ 55 °C (131 °F) 1.0 A @ 30 °C (86 °F)
Continuous Current per Common, max	8.0 A	3 A for L10BBB and L16BBB 6 A for L32BBB	6 A
Continuous Current per Controller, max	1440 VA	3 A for L10BBB and L16BBB 6 A for L32BBB	1440 VA
On-state Current, min	10.0 mA	1 mA	10.0 mA
Off-state Leakage Current, max	0 mA	1 mA	2 mA at 132V AC 4.5 mA at 264V AC
Signal Delay, max - resistive load	ON Delay = 10 ms OFF Delay = 10 ms	ON Delay = 0.1 ms OFF Delay = 1 ms	ON Delay = 8.8 ms at 60 Hz ON Delay = 10.6 ms at 50 Hz OFF Delay = 11.0 ms
Surge Current per Point (peak)	N/A	4 A for 10 ms ⁽¹⁾	10 A for 25 ms ⁽¹⁾

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

MicroLogix 1000 Controller Relay Contact Rating

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

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

MicroLogix 1000 Controller Analog Input Specifications

Attribute	1761-L20xxx-5A
Voltage Input Range ⁽¹⁾	-10.5...10.5V DC
Current Input Range ⁽¹⁾	-21...21 mA
Input Coding (-21...21 mA, -10.5...10.5V DC)	-32,768...32,767
Voltage Input Impedance	210 k Ω
Current Input Impedance	160 Ω
Input Resolution ⁽²⁾	16-bit
Non-linearity	< 0.002%
Overall Accuracy 0...55 °C (32...131 °F)	±0.7% of full scale
Overall Accuracy Drift 0...55 °C (32...131 °F), max	±0.176%
Overall Accuracy at 25 °C (77 °F), max	±0.525%
Update Time	selectable from 4...100 ms
Voltage Input Overvoltage Protection	24V DC
Current Input Overcurrent Protection	±50 mA
Input to Output Isolation and Field Wiring to Logic Isolation	30V rated working voltage, 500V isolation (test 60 Hz for 1 s)

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

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

MicroLogix 1000 Controller Analog Output Specifications

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

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

Select Replacement Parts

Step 14 - Select:

- replacement parts
- record your selections in the Selection Record (start on [page 86](#))

MicroLogix 1000 Replacement Parts

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

MicroLogix 1100 Replacement Part

Description	Cat. No.
Replacement Battery	1763-BA

MicroLogix 1200 Replacement Parts

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

MicroLogix 1400 Replacement Parts

Description	Cat. No.
Replacement Battery	1747-BA
Replacement Removable Terminal Block — (1) 25-pt double row, (1) 29-point double row for all 1766-L32xxxx	1762-RPLRTB40

MicroLogix 1500 Replacement Parts

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

Select Training Materials

Step 15 - Select:

- training and promotional products - starter paks, demo units and simulators
- record your selections in the Selection Record (start on [page 86](#))

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

Description	Cat. No.
MicroLogix 1000 Integrated Demonstration Unit includes: 1761-L20BWA-5A controller; 1761-NET-AIC DH-485 Interface; 1761-NET-DNI DeviceNet Interface; quadrature encoder; 4 selector switches; 8 illuminated pushbuttons; 1 potentiometer; 1 analog meter	1796-MICROx ⁽¹⁾
MicroLogix 1500 Integrated Demonstration Unit includes: 1764-28BxB base unit; 1764-LSP processor unit; 1769-IF4 Analog Input Module; 1769-OF2 Analog Output Module; 1761-NET-AIC DH-485 Interface Module; 1761-NET-DNI DeviceNet Interface Module; quadrature encoder; 4 selector switches; 8 illuminated pushbuttons; 1 potentiometer; 1 analog meter; 1 frequency meter	1796-MICRO15x ⁽¹⁾ (series B)
MicroLogix 1000 Input Simulator. For use with 1761-L16BWA MicroLogix 1000 Controller.	1761-SIM-B16
MicroLogix 1200 Input Simulator. For use with 1762-L24BWA and 1762-L24BxB controllers.	1796-SIM1200
MicroLogix 1500 Input Simulator. For use with 1764-24BWA and 1764-28BxB base units.	1796-SIM1500
MicroLogix 1200/PanelView 300 Micro Integrated Demonstration Unit includes: 1762-L24BWA, 2711-M3A18L1, inductive proximity switch, photo-electric sensor, programming cable.	1796-PV300MICROx ⁽¹⁾
MicroLogix 1100 Input Simulator.	DEMO-SIM1100
MicroLogix 1400 Demonstration Unit.	DEMO-ML1400x ⁽¹⁾
Connected Components Demonstration Unit.	DEMO-MICROSOLx ⁽¹⁾

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