



MicroLogix Programmable Controllers

Bulletins 1766 Controllers and 1762 Expansion I/O



Allen-Bradley

by ROCKWELL AUTOMATION

Selection Guide

Rockwell Automation recognizes that some of the terms that are currently used in our industry and in this publication are not in alignment with the movement toward inclusive language in technology. We are proactively collaborating with industry peers to find alternatives to such terms and making changes to our products and content. Please excuse the use of such terms in our content while we implement these changes.

What's Inside

| Topic | Page |
|--|--------|
| What's New | 2 |
| MicroLogix Programmable Controllers Overview | 3 |
| MicroLogix Controller System-selection Checklist | 5 |
| Select Family: MicroLogix 1400 Controller | 6 |
| MicroLogix 1400 Controller Dimensions | 8 |
| Select Communication Network | 10 |
| Select Programming Tools and Software | 11 |
| Select Network and Programming Cables | 11 |
| Select MicroLogix 1400 Controllers | 13 |
| Select 1762 Expansion I/O | 17 |
| Select Replacement Parts | 22 |
| Complete Your Selection Listing | 22 |
| For More Information | 23 |
| Additional Resources | 23, 24 |

What's New

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes. Translated versions are not always available for each revision.

| Topic | Page |
|--|------------|
| Updated template | Throughout |
| Removed catalogs for MicroLogix 1100 controllers and accessories | Throughout |
| Removed catalogs for MicroLogix 1200 controllers and accessories | Throughout |
| Added inclusive language acknowledgment | 2 |
| Updated certifications | 4, 6, 7 |
| Updated For More Information | 23 |
| Added Additional Resources | 23, 24 |

MicroLogix Programmable Controllers Overview

The MicroLogix™ family of controllers provides five levels of control. Small on size, big on performance, the MicroLogix controller offers control capabilities in an affordable, compact package. The MicroLogix 1400 controllers further enhance the MicroLogix family by expanding the application coverage area while offering great new features at an affordable price.

MicroLogix 1400 Controller



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

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

You can use the latest version of our world-class RSLogix 500® programming software to program the MicroLogix 1400 controller. RSLogix 500 Starter, Standard, and Professional applications, and RSLogix™ Micro software, all support the MicroLogix 1400 controller, including its online editing capabilities.

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

An embedded LCD screen lets you monitor the controller and I/O status, and change bit and integer data.

Advantages for the MicroLogix 1400 Controller

- Large memory (10 KB user program with 10 KB user data) to solve various applications
- True online editing allows tuning of program, including PID, without going offline
- Support for MicroLogix 1400 controller online editing in RSLogix 500 Professional, Standard, and Starter software version 8.1 and later, and RSLogix Micro
- Mode switch for Run/Remote/Program through LCD keypad operation
- Time-based or event-triggered data logging capability stores controller data records with optional time stamp in a separate 128 Kbyte memory area for later analysis (for example, trending and I/O status during alarm condition data)
- Recipe storage (up to 64 KB that is deducted from Data Logging memory) that is accessible by your ladder program, enabling quick and easy batch changes of program data for timers, counters, and other data types
- High-performance expansion I/O options (up to seven 1762 I/O modules, in any combination)
- Twelve high-speed inputs (except 1766-L32AWA and 1766-L32AWAA controllers) that can be used individually as latching (pulse-catch) inputs, event interrupts, or alternately combined as three 100 kHz high-speed counters featuring 10 modes of operation
- Two available built-in 0...10V DC analog outputs (for controllers with analog I/O options) with 12-bit resolution (not isolated)

- Three high-speed outputs that can be configured as 100 kHz pulse train output (PTO) or 40 kHz as pulse width modulation (PWM) outputs (only on 1766-L32BXXB and 1766-L32BXXBA controllers)
- Multiple input commons let you use the controller for either sinking or sourcing input devices, and multiple output commons provide individual isolation in multi-voltage output applications
- One, 1 ms, selectable timed interrupt (STI)
- High-resolution, 1 ms timers
- Communication Channel 0 provides isolated RS-232 or RS-485 electrical compatibility (selectable through the choice of communication cables)
- Through RS-232, we support all serial protocols
- Through RS-485, we support direct interface to DH-485, DF1 half-duplex master/slave, ASCII, and Modbus RTU master/slave networks, DNP 3 slave using the 1763-NC interface
- Communication channel 1 consists of an embedded RJ45 port that supports EtherNet/IP, Modbus TCP/IP, and DNP3 over IP. This 10/100 Mbps port supports BOOTP and DHCP.
- Communication channel 2 provides a 9-pin, non-isolated RS-232 port supporting all serial protocols
- Communication toggle selection that allows the controller's Channel 0 port to toggle between user-configured communication parameters and factory default settings for an easy way to switch from Modbus RTU or ASCII protocols (which do not support programming) to DF1 full-duplex (to upload/download, monitor, or edit your program). So a programming computer is able to connect to a controller with an unknown or incorrect communication-parameter settings for troubleshooting.
- Embedded real-time clock
- Embedded web server with email functionality
- Optional memory module for external program backup, for program transport, and transfer to another controller. Program and data in the controller is also battery backed for secure storage.
- Data file download protection prevents critical user data from being altered via program downloads from programming computers or memory modules
- Built-in LCD provides access to binary and integer files that can be changed, or optionally protected, for monitor only access by an operator
- LCD instruction allows the controller to output messages to the LCD, and optionally receive user input
- IP address can be monitored and configured directly through the built-in LCD
- Two built-in digital trim potentiometers
- 32-bit signed integer math
- Floating point and double integer data file support
- Built-in PID capabilities
- Fingersafe removable terminal blocks meet global safety standards
- Customizable OEM logos on the LCD display
- Regulatory agency certifications for the worldwide market (CE, RCM, cUL, and UL including Class 1 Division 2 Hazardous Location, where product is marked^(a))

(a) See the Product Certification link at rok.auto/certifications for Declaration of Conformity, Certificates, and other certification details.

MicroLogix Controller System-selection Checklist

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

| ✓ | Step | See Page |
|---|--|----------|
| | 1 Select Family: MicroLogix 1400 Controller <ul style="list-style-type: none"> • Controller family - Based on memory, I/O, added functionality, programming instructions and dimensions • Consider future expansion requirements • Consider requirements for online editing • Consider the need for networked communication | 6 |
| | 2 Select Communication <ul style="list-style-type: none"> • Communication network - Based on application requirements • Communication interface device - If necessary | 10 |
| | 3 Select Programming Tools and Software Programming software - the appropriate RSLogix™ package for your application | 11 |
| | 4 Select Network and Programming Cables Cables - review device port identification to find cable in the selection chart) | 11 |
| | 5 Select MicroLogix 1400 Controllers <ul style="list-style-type: none"> • I/O modules - Digital, analog, and temperature • Perform system expansion calculations | 13 |
| | 6 Select 1762 Expansion I/O I/O modules - digital, analog, and temperature/I/O modules - digital, analog, and temperature | 17 |
| | 7 Select Replacement Parts | 22 |
| | 8 Complete Your Selection Listing All catalog numbers required for your system specification | 22 |

Select Family: MicroLogix 1400 Controller

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

Features

Table 1 - MicroLogix 1400 Controller Features Chart

| Bulletin Number | 1766 |
|--|--|
| Memory (in user words) User Program/User Data | |
| Up to 20 KB | 10 KB/10 KB |
| Online editing | ✓ |
| Nonvolatile program and data | Battery backup static RAM |
| Memory module (For program back-up and transport) | Optional |
| I/O | |
| Embedded digital I/O, max | 32 |
| Embedded analog I/O | Four 0...10V DC inputs on some controllers Two 0...10V DC outputs on some controllers |
| Local expansion I/O, max | 256 |
| Thermocouple/RTD | Expansion |
| Added Functionality | |
| Trim Potentiometers | 2, digital |
| PID | ✓ |
| High-speed counters (Embedded) | Up to 6 @ 100 kHz |
| Real-time clock | ✓ |
| Motion: Pulse width modulation (PWM) | 3 @ 40 kHz |
| Motion: Pulse train outputs (PTO) | 3 @ 100 kHz |
| Data access tool | ✓ |
| Data logging | 128 KB |
| Recipe storage | Uses up to 64 KB data logging memory |
| Floating point math | ✓ |
| Programming | |
| RSLogix 500/Micro Software | ✓ |
| RSLogix Micro | ✓ |
| Communication | |
| RS-232 ports | One 8-pin mini DIN One 9-pin D-shell |
| EtherNet/IP | ✓ |
| Web server capabilities | ✓ |
| DH-485 | Network with 1763-NC01 |
| SCADA RTU – DF1 half-duplex slave | ✓ |
| SCADA RTU – DF1 radio modem | ✓ |
| SCADA RTU – Modbus RTU slave | ✓ |
| SCADA RTU – Modbus RTU master | ✓ |
| ASCII – Read/write | ✓ |
| DNP3 over IP | ✓ |
| Modbus TCP/IP | ✓ |
| Operating Power | |
| 120/240V AC | ✓ |
| 24V DC | ✓ |
| Agency Certifications | |
| CE, RCM, UL, and cUL (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 Closed, Examine if Open)
- 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 instructions
- High-speed pulse train output (PTO) and pulse width modulation (PWM) instructions
- Communication instructions including ASCII
- Recipe instructions
- Data logging instructions
- LCD instructions
- Trigonometry instructions
- Advanced math instructions (for example, X Power Y, Compute)
- Advanced timing instructions (for example, Read High-speed Clock, Compute Time Difference)

Controller Specifications

Table 2 - MicroLogix 1400 Controller General Specifications

| Attribute | Value |
|----------------------|---|
| Memory size and type | 20 KB battery backed RAM: <ul style="list-style-type: none"> • 10 KB user program • 10 KB user data |
| Data elements | Configurable, user-defined file structure, 10 KB max data size |
| Throughput | 2 ms (for a typical 1 KB word user program) |

Table 3 - MicroLogix 1400 Controller Environmental Specifications

| Attribute | Value |
|-----------------------|--|
| Operating temperature | -20...+60 °C (-4...+140 °F) |
| Storage temperature | -40...+85 °C (-40...+185 °F) |
| Relative humidity | 5...95%, noncondensing |
| Vibration | 10...500 Hz 3g, 0.030 in. max peak-to-peak, |
| Shock, operating | 30 g 3 pulses in each direction, each axis |
| Shock, nonoperating | 50 g panel mounted 40 g DIN rail mounted 3 pulses in each direction, each axis |
| Agency 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 • cUL Listed Industrial Control Equipment for use in Canada • CE marked for all applicable directives • RCM marked for all applicable acts |
| ESD immunity | EN 61000-4-2 4 kV contact 8 kV air |
| Radiated RF immunity | EN 61000-4-3 10 V/m, 26...1000 MHz (alternatively, 80...1000 MHz) 80% amplitude modulation, +900 MHz keyed carrier |
| EFT/B immunity | EN 61000-4-4 2 kV, 5 kHz Communication cable: 1 kV, 5 kHz |

Table 3 - MicroLogix 1400 Controller Environmental Specifications (Continued)

| Attribute | Value |
|--------------------------|---|
| Surge transient immunity | EN 61000-4-5 ±1 kV line-line (DM) and ±2 kV line-earth (CM) on AC power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports ±1 kV line-earth (CM) on communication ports |
| Conducted RF immunity | EN 61000-4-6 10V, 150 kHz...80 MHz |
| Radiated emissions | EN 55011 30...1000 MHz |
| Line related tests | EN 61000-4-11 60% dip for 10 periods on AC supply ports 30% dip for 25 periods at 0° and 180° on AC supply ports 100% dip for 250 periods at 0° and 180° on AC supply ports 100% dip for 0.5 periods, arbitrary angle, on AC supply ports |

MicroLogix 1400 Controller Dimensions

Figure 1 - MicroLogix 1400 Controller Dimension Drawing

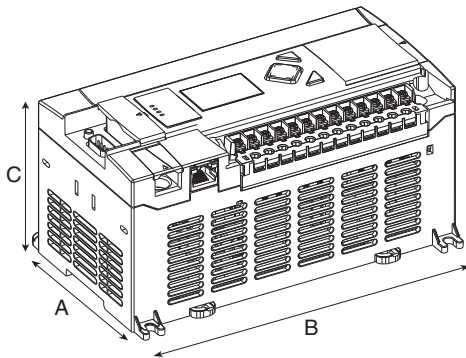


Table 4 - MicroLogix 1400 Controller Dimensions

| Dimension | Value |
|-----------|-------------------|
| A | 90 mm (3.5 in.) |
| B | 180 mm (7.08 in.) |
| C | 87 mm (3.43 in.) |

Figure 2 - MicroLogix 1200 Expansion I/O Module Dimension Drawing

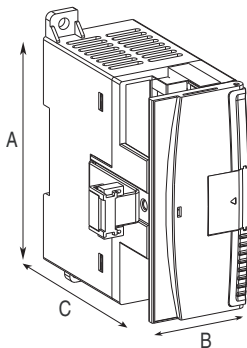


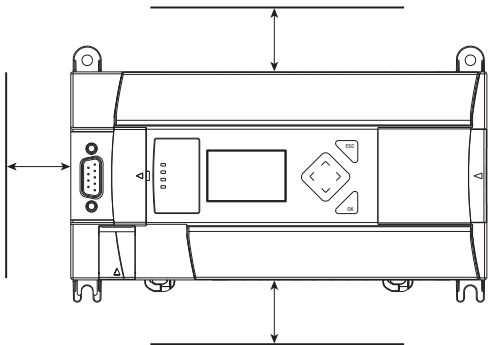
Table 5 - MicroLogix 1200 Expansion I/O Dimensions

| Dimension | Value |
|-----------|------------------|
| A | 90 mm (3.5 in.) |
| B | 40 mm (1.57 in.) |
| C | 87 mm (3.43 in.) |

Controller spacing

The controller mounts horizontally, with the expansion I/O extending to the right of the controller. Allow 50 mm (2 in.) of space on all but the right side for adequate ventilation, as shown in [Figure 3](#).

Figure 3 - Controller Spacing



DIN rail mounting

The maximum extension of the latch is 14 mm (0.55 in.) in the open position. A screwdriver is required for removal of the controller. The controller can be mounted to EN 50022-35 x 7.5 or EN 50022-35 x 15 DIN rails. DIN rail mounting dimensions are shown in [Figure 4](#).

Figure 4 - DIN Rail Mounting

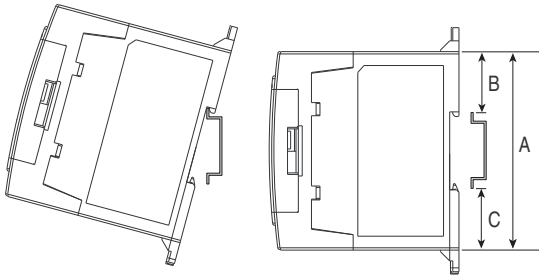
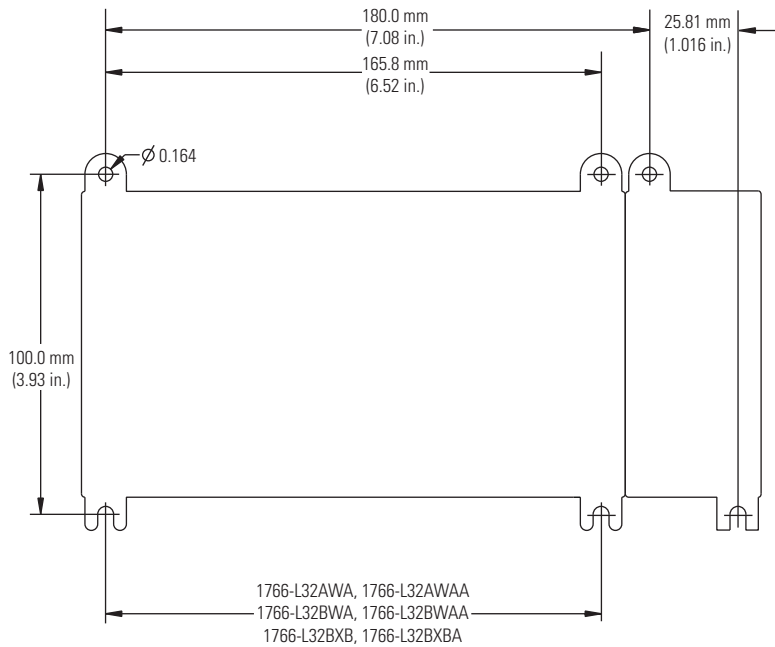


Table 6 - DIN Rail Mounting Dimensions

| Dimensions | Value |
|------------|--------------------|
| A | 90 mm (3.5 in.) |
| B | 27.5 mm (1.08 in.) |
| C | 27.5 mm (1.08 in.) |

Figure 5 - MicroLogix 1400 Controller System Mounting Dimension



Select Communication Network

Communication Networks

MicroLogix 1400 controllers allow you to choose the network that best meets your needs.

- Channel 0 Isolated RS-232/RS-485 Combo port
- EtherNet/IP port
- DNP3 over IP
- Modbus TCP/IP
- For RS-232 communication:
 - 300, 600, 1200, 4800, 9600 bps; 19.2 and 38.4 Kbps
 - RTS/CTS hardware handshake signals
 - Connection to modems for remote communication
 - ASCII messaging provides dial-out capability
 - DF1 half-duplex slave
 - DF1 half-duplex master
 - DNP3 slave
 - Modbus RTU master/slave
 - DF1 full-duplex
 - DF1 radio modem

Table 7 - MicroLogix 1400 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 |
| <ul style="list-style-type: none"> • Program upload, download, and monitoring • Peer-to-peer communication • Email communication • 10/100 Base-T port with embedded status indicators | EtherNet/IP network directly through Channel 1 10/100 Mbps communication port ⁽¹⁾ |
| <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) • RTU functions | Modbus RTU master/slave directly through channel) RS-485 port using 1763-NC01 cable(2) DNP3 slave via RS-232 DNP3 over IP(4) Modbus TCP/IP(4) |

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

Select Programming Tools and Software

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. You can use the RSLogix 500 and RSLogix Micro software to program the MicroLogix 1400 controller.

Table 8 - RSLogix 500 and RSLogix Micro Selection Chart

| Catalog Number | Description |
|-----------------------|---|
| 9324-RL0100ENE | RSLogix 500 Starter Edition programming software |
| 9324-RL0300ENE | RSLogix 500 Standard Edition programming software |
| 9324-RL0700NXENE | RSLogix 500 Professional Edition programming software You can download RSLogix™ Emulate 500, RSNetWorx™ for DeviceNet®, and RSNetWorx for ControlNet® software from the Rockwell Automation Product Compatibility and Download Center (PCDC) at rok.auto/pcdc . |
| 9324-RLM0100ENE | RSLogix Micro Starter software |
| 9324-RLM0800ENE | RSLogix Micro Developer software |

Select Network and Programming Cables

Cables come in several lengths and connector styles to provide connectivity between MicroLogix 1400 controllers and other devices.

Network Cable Selection

Table 9 - Controller and Computer Port Identification

| Device | Communication Port Description | Connector Type |
|-----------------|---|---------------------------|
| 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) | RJ45 |
| | Communication port (Channel 2) | 9-pin D-shell |
| Computer | Serial communication port | 9-pin D-shell |
| | Ethernet communication port | RJ45 |

Table 10 - Network Cable Selection Chart

| Connectors | Length | Catalog Number | Connectors | Length | Catalog Number |
|--|-----------------|------------------------------|---|----------------------|-------------------------------|
| 8-pin mini DIN to 8-pin mini DIN | 0.5 m (1.5 ft.) | 1761-CBL-AM00 ⁽¹⁾ | 8-pin mini DIN to 9-pin D-shell | 2 m (6.5 ft.) | 1761-CBL-PM02 ⁽¹⁾ |
| 8-pin mini DIN to 8-pin mini DIN | 2 m (6.5 ft.) | 1761-CBL-HM02 ⁽¹⁾ | 8-pin mini DIN to 9-pin D-shell | 5 m (16 ft.) | 2711-CBL-PM05 |
| 8-pin mini DIN to 8-pin mini DIN | 5 m (16 ft.) | 2711-CBL-HM05 | 8-pin mini DIN to 9-pin D-shell | 10 m (32 ft.) | 2711-CBL-PM10 |
| 8-pin mini DIN to 8-pin mini DIN | 10 m (32 ft.) | 2711-CBL-HM10 | 6-pin Phoenix to RJ45 (DH-485) | 3 m (10 ft.) | 1761-CBL-AS03 |
| 9-pin D-shell to 9-pin D-shell | 0.5 m (1.5 ft.) | 1761-CBL-AC00 | 6-pin Phoenix to RJ45 (DH-485) | 9 m (30 ft.) | 1761-CBL-AS09 |
| 9-pin D-shell to 9-pin D-shell | 3 m (10 ft.) | 1747-CP3 | 8-pin mini DIN to 8-pin mini DIN | 15 m (49.2 ft.) | 2707-NC9 ⁽¹⁾ |
| 8-pin mini DIN with lock mechanism to 9-pin D-shell | 2 m (6.5 ft.) | 1761-CBL-PH02 ⁽²⁾ | 8-pin mini DIN to 6-pin DH-485 terminal | 30 cm (11.8 in.) | 1763-NC01 series A |
| 8-pin mini DIN with lock mechanism to 8-pin mini DIN with lock mechanism | 2 m (6.5 ft.) | 1761-CBL-AH02 ⁽²⁾ | RJ45 to RJ45 | 100 m (328 ft.), max | Ethernet cable ⁽³⁾ |
| 8-pin mini DIN to 9-pin D-shell | 0.5 m (1.5 ft.) | 1761-CBL-AP00 ⁽¹⁾ | — | — | — |

(1) Series C or later for Class 1 Div 2 applications.
 (2) Series A for Class 1 Div 2 applications.
 (3) Commercially available.

Programming Cable Selection

Table 11 - Programming Cable Selection Chart - Programming Device to MicroLogix 1400 Controller

| Programming Device | Channel 0 (8-pin mini DIN) | | Channel 1 (RJ45) | | Channel 2 | |
|--------------------------|----------------------------|---------------|-------------------------------|----------------------|----------------|--------------|
| | Catalog Number | Length | Catalog Number | Length | Catalog Number | Length |
| Computer (9-pin D-shell) | 1761-CBL-PM02 | 2 m (6.5 ft.) | — | — | 1747-CP3 | 3 m (10 ft.) |
| Computer (RJ45) | — | — | Ethernet cable ⁽¹⁾ | 100 m (328 ft.), max | — | — |

(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 a MicroLogix controller or other Rockwell Automation controllers and on PanelView™ terminals. The 1747-UIC features a USB connector plus an RS-232 and an RS-485 port. Use the RS-232 port to connect to MicroLogix, CompactLogix™, ControlLogix® controllers, PanelView 550 or higher terminals, or the AIC+ interface. Use the RS-485 port to connect to PanelView 550 or higher terminals, or the 1747-AIC isolated link coupler.

Table 12 - 1747-UIC Specifications

| Attribute | Value |
|---------------------------|---------------------|
| USB power consumption | <100 mA (low power) |
| USB speed | USB 1.1 (12 Mbps) |
| DH-485 communication rate | 19.2 Kbps |

Select MicroLogix 1400 Controllers

MicroLogix 1400 Base Units

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

Figure 6 - MicroLogix 1400 Controller Catalog Number Detail

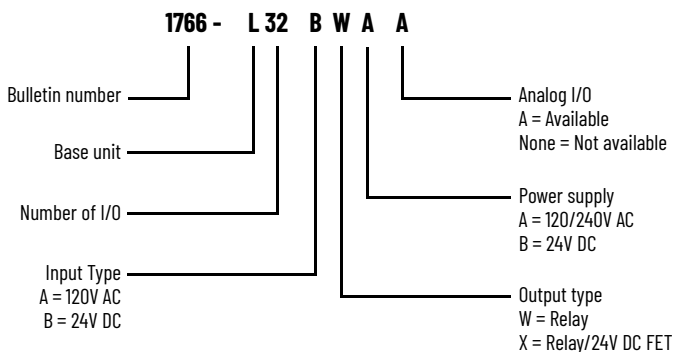


Table 13 - MicroLogix 1400 Controller Power and I/O Configuration

| Catalog Number | Line Voltage | Number of Inputs | Number of Outputs | Embedded Analog I/O |
|----------------|--------------|---------------------------------------|---|---|
| 1766-L32BWA | 120/240V AC | (12) Fast 24V DC (8) Normal 24V DC | (12) Relay | — |
| 1766-L32AWA | 120/240V AC | (20) 120V AC | (12) Relay | — |
| 1766-L32BXB | 24V DC | (12) Fast 24V DC (8) Normal 24V DC | (6) Relay (3) Fast 24V DC (3) Normal 24V DC | — |
| 1766-L32BWAA | 120/240V AC | (12) Fast 24V DC (8) Normal 24V DC | (12) Relay | (4) Voltage Inputs (2) Voltage Outputs |
| 1766-L32AWAA | 120/240V AC | (20) 120V AC | (12) Relay | (4) Voltage Inputs (2) Voltage Outputs |
| 1766-L32BXBA | 24V DC | (12) Fast 24V DC (8) Normal 24V DC | (6) Relay (3) Fast 24V DC (3) Normal 24V DC | (4) Voltage Inputs (2) Voltage Outputs |

Table 14 - MicroLogix 1400 Controller Power Supply Specifications

| Attribute | 1766-L32AWA, 1766-L32AWAA | 1766-L32BWA, 1766-L32BWAA | 1766-L32BXB, 1766-L32BXBA |
|----------------------------------|--|--|---------------------------------|
| Power supply voltage | 100...240V AC (-15%, 10%) at 47...63 Hz | | 24V DC (-15%, 10%) Class 2 SELV |
| Power consumption | 100VA | 120VA | 7.5...53 W |
| Power supply inrush current, max | 120V AC: 25 A for 8 ms 240V AC: 40 A for 4 ms | | 24V DC: 15 A for 20 ms |
| 24V DC sensor power | — | 24V DC at 250 mA, 400µF capacitance, max | — |

Figure 7 - MicroLogix 1400 Controller DC Input Power Requirements for 1766-L32BXB and 1766-L32BXBA Units

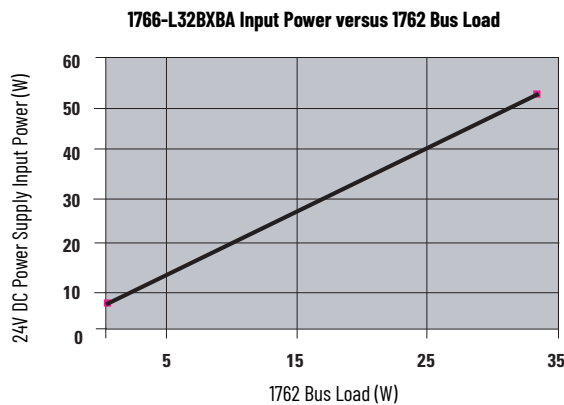


Table 15 - MicroLogix 1400 Controller Digital Input Specifications

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

Table 16 - MicroLogix 1400 Controller Analog Input Specifications

| Attribute | Value |
|---------------------------------------|-----------------------------------|
| Voltage input range | 0...10.0V DC - 1 LSB |
| Type of data | 12-bit unsigned integer |
| Input coding (0...10V DC) | 0...4095 |
| Voltage impedance | >199 Ω |
| Input resolution | 12 bit |
| Non-linearity (In percent full scale) | ±0.5% of full scale |
| Overall accuracy | ±1.0% of full scale |
| Update time | 100, 20, 16.67, 4 ms (Selectable) |
| Voltage input overvoltage protection | 10.5V DC |
| Field wiring to logic isolation | Non-isolated with internal logic |

Table 17 - MicroLogix 1400 Controller Analog Output Specifications

| Attribute | Value |
|----------------------------|-------------------------|
| Voltage output range | 0...10.0V DC - 1 LSB |
| Type of data | 12-bit unsigned integer |
| Step response | 2.5 ms @ 95% |
| Output coding (0...10V DC) | 0...4095 |
| Load range voltage output | >1 kΩ |
| Output resolution | 12 bit |
| Analog output setting time | 3 ms, max |

Table 17 - MicroLogix 1400 Controller Analog Output Specifications (Continued)

| Attribute | Value |
|----------------------|----------------------------------|
| Overall accuracy | ±1.0% of full scale |
| Electrical isolation | Non-isolated with internal logic |
| Cable length | 30 m (98 ft.) shielded cable |

Specifications for MicroLogix 1400 Controller Outputs

Table 18 - Relay and FET Outputs

| Attribute | 1766-L32AWA, 1766-L32AWAA, 1766-L32BWA, 1766-L32BWAA | 1766-L32BXB, 1766-L32BXBA |
|--------------------------------------|---|---------------------------|
| Controlled load, max | 1440VA | 1080VA |
| Continuous current, max | | |
| Current per channel and group common | 2.5 A per channel 8 A max channel 8...11 common | 2.5 A per channel |
| Current per controller @ 150V, max | 28 A or the total of per-point loads, whichever is less | — |
| Current per controller @ 240V, max | 20 A or the total of per-point loads, whichever is less | — |

Table 19 - Relay Outputs

| Attribute | Value |
|---------------------------------|----------------------|
| Turn on time/Turn off time, max | 10 ms ⁽¹⁾ |
| Load current | 10 mA |

(1) Scan time dependent.

Table 20 - Relay Contact Rating⁽¹⁾

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

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

Table 21 - 1766-L32BXB, 1766-L32BXBA FET Outputs

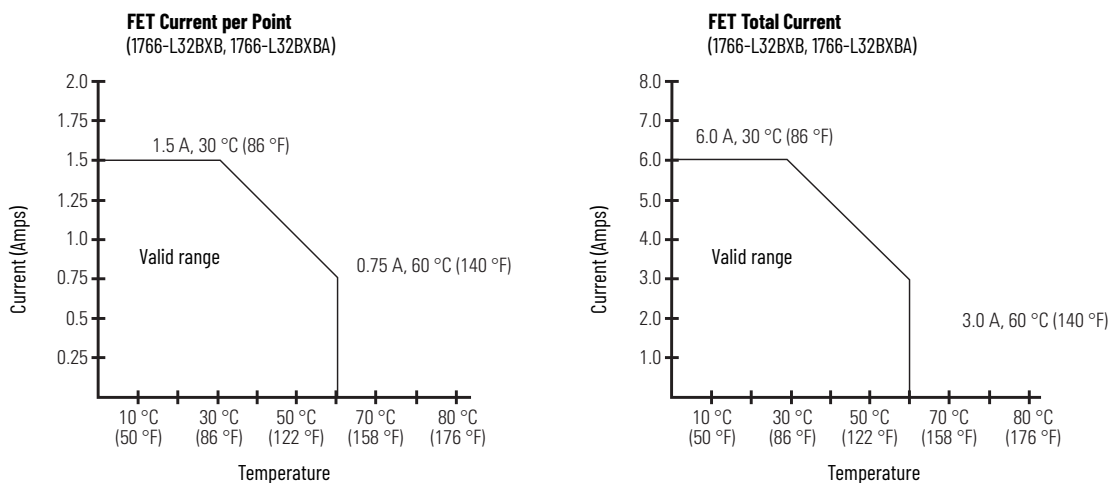
| Attribute | General Operation | High-speed Operation (Outputs 2, 3, and 4 only) ⁽¹⁾ |
|---|------------------------------|--|
| Power supply voltage (Class 2) | 24V DC (-15%, +10%) | 24V DC (-15%, +10%) |
| On-state voltage drop @ maximum load current | 1V DC | Not applicable |
| On-state voltage drop @ maximum surge current | 2.5V DC | Not applicable |
| Current rating per point, maximum load | See Figure 8 | 100 mA |
| Current rating per point, minimum load | 1.0 mA | 20 mA |
| Current rating per point, maximum leakage | 1.0 mA | 1.0 mA |
| Surge current per point, peak current | 4.0 A | Not applicable |
| Surge current per point, maximum surge duration | 10 ms | Not applicable |
| Surge current per point, maximum rate of repetition @ 30 °C (86 °F) | Once every second | Not applicable |

Table 21 - 1766-L32BXB, 1766-L32BXBA FET Outputs (Continued)

| Attribute | General Operation | High-speed Operation (Outputs 2, 3, and 4 only) ⁽¹⁾ |
|--|----------------------|--|
| Surge current per point, maximum rate of repetition @ 65 °C (149 °F) | Once every 2 seconds | Not applicable |
| Turn on time, max | 11 μs | 28 ns |
| Turn off time, max | 89 μs | 2.3 μs |

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

Figure 8 - MicroLogix 1400 Controller FET Standard Outputs



MicroLogix 1400 Memory Module (1766-MM1)

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

Memory modules allow:

- User programs and data to be stored as a 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 and insertion under power (RIUP)

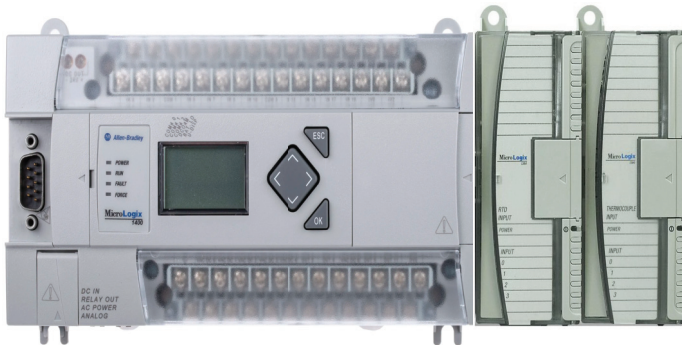
Select 1762 Expansion I/O

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

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

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

Figure 9 - 1762 Expansion I/O Modules Connected to a MicroLogix 1400 Controller



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 help 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

Table 22 - 1762 Expansion I/O Modules

| Catalog Number | Description |
|----------------|--|
| Digital | |
| 1762-IA8 | 8-point 120V AC input module |
| 1762-IQ8 | 8-point sink/source 24V DC input module |
| 1762-IQ8OW6 | 8-point sink/source 24V DC input/6-point AC/DC relay output combination module |
| 1762-IQ16 | 16-point sink/source 24V DC input module |
| 1762-OA8 | 8-point 120/240V AC triac output module |
| 1762-OB8 | 8-point sourcing 24V DC output module |
| 1762-OB16 | 16-point sourcing 24V DC output module |
| 1762-OW8 | 8-point AC/DC relay output module |
| 1762-OW16 | 16-point AC/DC relay output module |
| 1762-OX6I | 6-point isolated AC/DC relay output module |
| 1762-OV32T | 32-point solid-state 24V DC sink output module |
| 1762-OB32T | 32-point solid-state 24V DC source output module |
| 1762-IQ32T | 32-point DC input module |
| Analog | |
| 1762-IF4 | 4-channel voltage/current analog input module |
| 1762-OF4 | 4-channel voltage/current analog output module |
| 1762-IF20F2 | Combination 2-channel input 2-channel output voltage/current analog module |

Table 22 - 1762 Expansion I/O Modules (Continued)

| Catalog Number | Description |
|------------------|--|
| Specialty | |
| 1762-IR4 | 4-channel RTD/resistance input module |
| 1762-IT4 | 4-channel thermocouple/mV input module |

1762 Digital I/O

Table 23 - 1762 Digital Expansion Input Modules Specifications

| Attribute | 1762-IA8 | 1762-IQ8 | 1762-IQ80W6 (Inputs) | 1762-IQ16 | 1762-IQ32T |
|------------------------------------|---|--|---|--|--|
| Voltage category | 100/120V AC | 24V DC (sink/source) ⁽¹⁾ | 24V DC (sink/source) ⁽¹⁾ | 24V DC (sink/source) ⁽¹⁾ | 24V DC sink/source ⁽¹⁾ |
| Operating voltage range | 79...132V AC @ 47...63 Hz | 10...26.4V DC @ 55 °C (131 °F) 10...30V DC @ 30 °C (86 °F) | 10...26.4V DC @ 65 °C (149 °F) 10...30V DC @ 30 °C (86 °F) | 10...26.4V DC 10...30V DC ⁽²⁾⁽³⁾ | 10...26.4V DC 10...30V DC |
| Number of inputs | 8 | 8 | 8 | 16 | 32 |
| Number of commons | 1 | 1 | Inputs: 2 Outputs: 1 | 2 | 4 |
| Bus current draw, max | 50 mA @ 5V DC (0.25 W) | 50 mA @ 5V DC (0.25 W) | 110 mA @ 5V DC (0.55 W) 80 mA @ 24V DC (1.92 W) | 70 mA @ 5V DC (0.35 W) ⁽³⁾ | 170 mA @ 5V DC 0 mA @ 24V DC |
| Heat dissipation, max | 2.0 total watts | 3.7 total watts | 5.0 total watts @ 30V 4.4 total watts @ 26.4V | 5.4 total watts @ 30V 4.3 total watts @ 26.4V ⁽³⁾ | 5.4 total watts @ 26.4V 6.8 total watts @ 30.0V |
| Signal delay, max | On delay: 20.0 ms Off delay: 20.0 ms | On delay: 8.0 ms Off delay: 8.0 ms | On delay: 8.0 ms Off delay: 8.0 ms | On delay: 8.0 ms Off delay: 8.0 ms | On delay: 8.0 ms Off delay: 8.0 ms |
| Off-state voltage, max | 20V AC | 5V DC | 5V DC | 5V DC | 5V DC |
| Off-state leakage current, max | 2.5 mA | 1.5 mA | 1.5 mA | 1.5 mA | 1.0 mA |
| On-state voltage, min | 79V AC, min 132V AC, max | 10V DC | 10V DC | 10V DC | 10V DC |
| On-state current, min | 5.0 mA @ 79V AC, 47 Hz | 2.0 mA @ 10V DC | 2.0 mA @ 10V DC | 2.0 mA @ 10V DC | 1.6 mA @ 10V DC 2 mA @ 15V DC |
| On-state current, nom | 12.0 mA @ 120V AC, 60 Hz | 8.0 mA @ 24V DC | 8.0 mA @ 24V DC | 8.0 mA @ 24V DC | — |
| On-state current, max | 16.0 mA @ 132V AC, 63 Hz | 12.0 mA @ 30V DC | 12.0 mA @ 30V DC | 12.0 mA @ 30V DC | 5.7 mA @ 26.4V DC 6.5 mA @ 30V DC |
| Inrush current, max | 250 mA | — | 250 mA | — | — |
| Impedance, nom | 12 kΩ @ 50 Hz 10 kΩ @ 60 Hz | 3 kΩ | 3 kΩ | 3 kΩ | 4.7 kΩ |
| Isolated groups | Group 1: Inputs 0...7 (Internally connected commons) | Group 1: Inputs 0...7 (Internally connected commons) | Group 1: Inputs 0...3 Group 2: Inputs 4...7 Group 3: Outputs 0...5 | Group 1: Inputs 0...7 Group 2: Inputs 8...15 | Group 1: Inputs 0...7 Group 2: Inputs 8...15 Group 3: Inputs 16...23 Group 4: Inputs 24...31 |
| Input group to backplane isolation | Verified by one of the following dielectric tests: 1517V AC for 1 s or 2145V DC for 1 s 132V AC working voltage (IEC Class 2 reinforced insulation) | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s 75V DC working voltage (IEC Class 2 reinforced insulation) | Verified by one of the following dielectric tests: Input Group to Backplane isolation - 1200V AC for 1 s or 1697V DC for 1 s 75V DC working voltage (IEC Class 2 reinforced insulation) Output Group to Backplane isolation - 1836V AC for 1 s or 2596V DC for 1 s 265V AC working voltage (IEC Class 2 reinforced insulation) Input Group to Output Group isolation - 1836V AC for 1 s or 2596V DC for 1 s 265V AC working voltage (basic insulation) 150V AC working voltage (IEC Class 2 reinforced insulation) | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s 75V DC working voltage (IEC Class 2 reinforced insulation) | Verified by one of the following dielectric tests: 1,200V AC for 2 s or 1,697V DC for 2 s 75V DC working voltage (IEC Class 2 reinforced insulation) |

(1) Sinking/Sourcing Inputs - Sourcing/sinking describes the current flow between the I/O module and the field device. Sourcing I/O circuits supply (source) current to sinking field devices. A current sourcing field device drives sinking I/O circuits. Field devices connected to the negative side (DC Common) of the field power supply are sinking field devices. Field devices connected to the positive side (+V) of the field supply are sourcing field devices.
 (2) See MicroLogix 1762-IQ16 DC Input Module Installation Instructions, publication [1762-IN010](#) for the derating chart.
 (3) Only applicable to Series B I/O modules.

Table 24 - 1762 Digital Expansion Output Modules Specifications

| Attribute | 1762-0A8 | 1762-0B8 | 1762-0B16 | 1762-0B32T | 1762-0V32T |
|------------------------------------|--|---|---|--|------------------|
| Voltage category | 100...240V AC | 24V DC | 24V DC | 24V DC source | 24V DC sink |
| Operating voltage range | 85...265V AC @ 47...63 Hz | 20.4...26.4V DC | 20.4...26.4V DC | 10.2...26.4V DC | |
| Number of outputs | 8 | 8 | 16 | 32 | |
| Number of commons | 2 | 1 | 1 | 2 | |
| Bus current draw, max | 115 mA @ 5V DC (0.575 W) | 115 mA @ 5V DC (0.575 W) | 175 mA @ 5V DC (0.88 W) | 175 mA @ 5V DC 0 mA @ 24V DC | |
| Heat dissipation, max | 2.9 total watts | 1.61 total watts | 2.9 total watts @ 30 °C (86 °F) 2.1 total watts @ 55 °C (131 °F) | 3.4 W @ 26.4V DC | 2.7 W @ 26.4V DC |
| Signal delay, max - resistive load | On delay: 1/2 cycle Off delay: 1/2 cycle | On delay: 0.1 ms Off delay: 1.0 ms | On delay: 0.1 ms Off delay: 1.0 ms | On delay: 0.5 ms Off delay: 4.0 ms | |
| Off-state leakage, max | 2 mA @ 132V 2.5 mA @ 265V | 1.0 mA | 1.0 mA | 0.1 mA @ 26.4V DC | |
| On-state current, min | 10 mA | 1.0 mA | 1.0 mA | 1.0 mA | |
| On-state voltage drop, max | 1.5V @ 0.5 A | 1.0V DC | 1.0V DC | 0.3V DC @ 0.5 A | |
| Continuous current per point, max | 0.25 A @ 55 °C (131 °F) 0.5 A @ 30 °C (86 °F) | 0.5 A @ 55 °C (131 °F) 1.0 A @ 30 °C (86 °F) | 0.5 A @ 55 °C (131 °F) 1.0 A @ 30 °C (86 °F) | 0.5 A @ 60 °C (140 °F) | |
| Continuous current per common, max | 1.0 A @ 55 °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) | 2.0 A @ 60 °C (140 °F) | |
| Continuous current per module, max | 2.0 A @ 55 °C (131 °F) 4.0 A @ 30 °C (86 °F) | 4.0 A @ 55 °C (131 °F) 8.0 A @ 30 °C (86 °F) | 4.0 A @ 55 °C (131 °F) 8.0 A @ 30 °C (86 °F) | 4.0 A @ 60 °C (140 °F) | |
| Surge current, max | 5.0 A ⁽¹⁾ | 2.0 A ⁽²⁾ | 2.0 A ⁽²⁾ | 2.0 A, repeatable every 2 s @ 60 °C (140 °F) for 10 ms | |

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

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

Table 25 - 1762 Digital Expansion Relay Output Modules Specifications

| Attribute | 1762-IQ80W6 (Outputs) | 1762-0W8 | 1762-0W16 | 1762-0X6I |
|------------------------------------|--|---|--|---|
| Voltage category | AC/DC normally open relay | AC/DC normally open relay | AC/DC normally open relay | AC/DC Type C Relay |
| Operating voltage range | 5...265V AC 5...125V DC | 5...265V AC 5...125V DC | 5...265V AC 5...125V DC | 5...265V AC 5...125V DC |
| Number of outputs | 6 | 8 | 16 | 6 (N.C., N.O.) |
| Number of commons | Inputs: 2 Outputs: 1 | 2 | 2 | 6 |
| Bus current draw, max | 110 mA @ 5V DC (0.55 W) 80 mA @ 24V DC (1.92 W) | 80 mA @ 5V DC (0.40 W) 90 mA @ 24V DC (2.16 W) | 140 mA @ 5V DC (0.70 W) 180 mA @ 24V DC (4.32 W) ⁽¹⁾ | 110 mA @ 5V DC (0.55 W) 110 mA @ 24V DC (2.64 W) |
| Heat dissipation, max | 5.0 total watts @ 30V 4.4 total watts @ 26.4V | 2.9 total watts | 6.1 watts ⁽¹⁾ | 2.8 watts |
| Signal delay, max - Resistive load | On delay: 10 ms Off delay: 10 ms | On delay: 10 ms Off delay: 10 ms | On delay: 10 ms Off delay: 10 ms | On delay: 10 ms Off delay: 20 ms |
| Off-state leakage, max | 0 mA | 0 mA | 0 mA | 0 mA |
| On-state current, min | 10 mA @ 5V DC | 10 mA @ 5V DC | 10 mA | 100 mA |
| On-state voltage drop, max | N/A | N/A | N/A | N/A |
| Continuous current per point, max | 2.5 A (See Table 30) | | | 7 A (See Table 30) |
| Continuous current per common, max | 8 A | 8 A | 8 A | 7 A (See Table 30) |
| Continuous current per module, max | 8 A | 16 A | 16 A | 30 A |
| Surge current, max | See Table 30 | | | |

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

1762 Analog Modules

Table 26 - 1762 Analog Expansion Modules Common Specifications

| Attribute | 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 range | Voltage: -10...+10V DC Current: 4...20 mA | Voltage: 0...10V DC Current: 4...20 mA | Voltage: 0...0V DC Current: 4...20 mA |
| Full scale ⁽¹⁾ analog ranges | Voltage: -10.5...+10.5V DC Current: -21...+21 mA | Voltage: 0...0.5V DC Current: 0...21 mA | Voltage: 0...0.5V DC Current: 0...21 mA |
| Resolution | 15 bits (bipolar) ⁽²⁾ | 12 bits (unipolar) | 12 bits (unipolar) |
| Repeatability ⁽³⁾ | ±0.12% ⁽²⁾ | ±0.12% ⁽²⁾ | ±0.12% ⁽²⁾ |
| Input and output group to system isolation | 30V AC/30V DC rated working voltage ⁽⁴⁾ (N.E.C. Class 2 required) (IEC Class 2 reinforced insulation) Type test: 500V AC or 707V DC for 1 minute | | 30V AC/30V DC rated working voltage (IEC Class 2 reinforced insulation) Type test: 500V AC or 707V DC for 1 minute |

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

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

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

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

Table 27 - 1762 Analog Expansion Input Modules Specifications

| Attribute | 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 ⁽¹⁾ | ±27V | ±27V |
| Common mode rejection ⁽²⁾ | >55 dB @ 50 Hz and 60 Hz | >55 dB @ 50 Hz and 60 Hz |
| Non-linearity (In percent full scale) | ±0.12% ⁽²⁾ | ±0.12% ⁽²⁾ |
| Typical overall accuracy ⁽³⁾ | ±0.32% full scale @ -20...+65 °C (-4...+149 °F) ⁽⁴⁾ ±0.24% full scale @ 25 °C (77 °F) | ±0.55% full scale @ -20...+65 °C (-4...+149 °F) ⁽⁴⁾ ±0.3% full scale @ 25 °C (77 °F) |
| Input impedance | Voltage terminal: 200 kΩ Current Terminal: 275 Ω | Voltage terminal: 200 kΩ Current Terminal: 250 Ω |
| Current input protection | ±32 mA | ±32 mA |
| Voltage input protection | ±30V | ±30V |
| Channel diagnostics | Over or under range or open circuit condition by bit reporting for analog inputs | |

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

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

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

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

Table 28 - 1762 Analog Expansion Output Modules Specifications

| Attribute | 1762-IF20F2 | 1762-OF4 |
|---|--|--|
| Number of outputs | 2 single-ended (Unipolar) | 4 single-ended (Unipolar) ⁽²⁾ |
| Update time (Typical) | 4.5 ms | 2.5 ms |
| D/A converter type | Resistor string | R-2R ladder voltage switching |
| Resistive load on current output | 0...500 Ω (Includes wire resistance) | 0...500 Ω (Includes wire resistance) |
| Load range on voltage output | >1 kΩ | >1 kΩ |
| Reactive load, current output | <0.1 mH | <0.1 mH |
| Reactive load, voltage output | <1 μF | <1 μF |
| Typical overall accuracy ⁽¹⁾ | ±1.17% full scale @ -20...+65 °C (-4...+149 °F) ⁽²⁾ ±0.5% full scale @ 25 °C (77 °F) | ±1.17% full scale @ -20...+65 °C (-4...+149 °F) ⁽²⁾ ±0.5% full scale @ 25 °C (77 °F) |
| Output ripple range 0...500 Hz (Referred to output range) | < ±0.1% | < ±0.1% |
| Non-linearity (In percent full scale) | < ±0.59% ⁽²⁾ | < ±0.59% ⁽²⁾ |
| Open and short-circuit protection | Continuous | Continuous |
| Output protection | ±32 mA | ±32 mA |

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

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

1762 Temperature Input Modules

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

Table 29 - 1762 Temperature Expansion Input Modules Specifications

| Attribute | 1762-IT4 | 1762-IR4 |
|---|---|--|
| Bus current draw, max | 40 mA @ 5V DC 50 mA @ 24V DC | 40 mA @ 5V DC 50 mA @ 24V DC |
| Number of channels | 4 input channels plus a CJC sensor | 4 input channels |
| Accepted inputs | Thermocouples types: J, K, T, E, R, S, B, N, C Millivolt input ranges: ± 50 mV and ± 100 mV | RTDs: Platinum (385 and 3916), Copper (426), Nickel (672 and 618), Nickel-Iron (518) Resistance Ranges: 0...3000 Ω |
| Filter frequency | 10 Hz...1 kHz | 10 Hz...1 kHz |
| Temperature units | $^{\circ}\text{C}$ 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 $^{\circ}\text{F}$) | Thermocouple Inputs: ± 0.8 ... ± 10 $^{\circ}\text{C}$ (± 1.5 ... ± 18 $^{\circ}\text{F}$) 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 | Overrange or underrange and open-circuit by bit reporting | Overrange or underrange or broken input by bit reporting |
| Calibration | The module performs autocalibration on channel enable and on a configuration change between channels. You can also program the module to calibrate every five minutes. | |
| Common mode noise rejection | 115 dB min @ 50 Hz (With 10 Hz or 50 Hz filter) 115 dB min @ 60 Hz (With 10 Hz or 60 Hz filter) | 110 dB min @ 50 Hz (With 10 Hz or 50 Hz filter) 110 dB min @ 60 Hz (With 10 Hz or 60 Hz filter) |
| Normal mode noise rejection | 85 dB min @ 50 Hz (With 10 Hz or 50 Hz filter) 85 dB min @ 60 Hz (With 10 Hz or 60 Hz filter) | 70 dB min @ 50 Hz (With 10 Hz or 50 Hz filter) 70 dB min @ 60 Hz (With 10 Hz 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 ⁽¹⁾ | 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 |

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

Table 30 - 1762 Relay Contact Rating

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

(1) 1.5 A above 40 $^{\circ}\text{C}$ (104 $^{\circ}\text{F}$).

(2) For DC voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28VA 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.

Select Replacement Parts

Table 31 - MicroLogix 1400 Replacement Parts

| Description | Catalog Number |
|---|----------------|
| Replacement battery | 1747-BA |
| Replacement removable terminal block - (1) 25-pt double row, (1) 29-point double row for all 1766-L32xxxx | 1762-RPLRTB40 |

Complete Your Selection Listing

Table 32 - Master List of Catalog Numbers

| Catalog Number | Description | Quantity Selected |
|--|--|-------------------|
| MicroLogix 1400 Controllers and Accessories | | |
| 1766-L32BWA | MicroLogix 1400 32-point AC controller | |
| 1766-L32AWA | MicroLogix 1400 32-point AC controller | |
| 1766-L32BXB | MicroLogix 1400 32-point DC controller | |
| 1766-L32BWAA | MicroLogix 1400 32-point AC controller with analog I/O | |
| 1766-L32AWAA | MicroLogix 1400 32-point AC controller with analog I/O | |
| 1766-L32BXBA | MicroLogix 1400 32-point DC controller with analog I/O | |
| 1766-MM1 | MicroLogix 1400 memory module | |
| 1762 Expansion I/O | | |
| 1762-IA8 | 8-point 120V AC input module | |
| 1762-IF2F2 | Combination 2-channel input 2-channel output voltage/current analog module | |
| 1762-IF4 | 4-channel voltage/current analog input module | |
| 1762-IQ16 | 16-point sink/source 24V DC input module | |
| 1762-IQ8 | 8-point sink/source 24V DC input module | |
| 1762-IQ8OW6 | 8-point sink/source 24V DC input/6-point AC/DC relay output combination module | |
| 1762-IR4 | 4-channel RTD/resistance input module | |
| 1762-IT4 | 4-channel thermocouple/mV input module | |
| 1762-OA8 | 8-point 120/240V AC triac output module | |
| 1762-OB16 | 16-point sourcing 24V DC output module | |
| 1762-OB8 | 8-point sourcing 24V DC output module | |
| 1762-OF4 | 4-channel voltage/current analog output module | |
| 1762-OW16 | 16-point AC/DC relay output module | |
| 1762-OW8 | 8-point AC/DC relay output module | |
| 1762-OX6I | 6-point isolated AC/DC relay output module | |
| 1762-OV32T | Solid-state 24V DC sink output module | |
| 1762-OB32T | Solid-state 24V DC source output module | |
| 1762-IQ32T | DC input module | |
| Programming Tools and Software | | |
| 1747-UIC | Universal serial bus (USB) to DH-485 interface converter | |
| 9324-RL0100ENE | RSLogix 500 Starter Edition programming software | |
| 9324-RL0300ENE | RSLogix 500 Standard Edition programming software | |
| 9324-RL0700XENE | RSLogix 500 Professional Edition programming software | |
| 9324-RLM0100ENE | RSLogix Micro Starter software | |
| 9324-RLM0800ENE | RSLogix Micro Professional software | |
| Cables | | |
| 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-APO0 | RS-232 operating cable, 8-pin mini DIN to 9-pin D-shell (MicroLogix), 0.5 m (1.5 ft.) | |
| 1761-CBL-ASO3 | Controller/DH-485 cable, 6-pin Phoenix to RJ45, 3 m (10 ft.) | |
| 1761-CBL-ASO9 | Controller/DH-485 cable, 6-pin Phoenix to RJ45, 9.5 m (31 ft.) | |
| 1761-CBL-HM02 | RS-232 operating/programming cable, 8-pin mini DIN to 8-pin mini DIN (MicroLogix), 2 m (6.5 ft.) | |

Table 32 - Master List of Catalog Numbers (Continued)

| Catalog Number | Description | Quantity Selected |
|--------------------------|---|-------------------|
| 1761-CBL-PM02 | RS-232 operating/programming cable, 8-pin mini DIN to 9-pin D-shell (MicroLogix), 2 m (6.5 ft.) | |
| 1761-CBL-PH02 | RS-232 operating/programming cable, 8-pin mini DIN with lock mechanism to 9-pin D-shell, 2 m (6.5 ft.) | |
| 1761-CBL-AH02 | RS-232 operating/programming cable, 8-pin mini DIN with lock mechanism to 8-pin mini DIN with lock mechanism, 2 m (6.5 ft.) | |
| 1763-NC01 | DH-485 cable, 8-pin mini DIN to 6-pin Phoenix | |
| 2711-CBL-HM05 | RS-232 operating cable, 8-pin mini DIN to 8-pin mini DIN (PanelView 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 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 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 micro to SLC or PLC), 10 m (32.7 ft.) | |
| Replacement Parts | | |
| 1747-BA | Lithium battery (For RAM memory retention) for MicroLogix 1400 controllers | |
| 1762-RPLRTB40 | Replacement terminal block for all 1766-L32xxx controllers | |

For More Information

Visit the MicroLogix 1400 controller product [webpage](#) to learn more about MicroLogix 1400 products. Visit the Rockwell Automation Product Compatibility and Download Center (PCDC) at rok.auto/pcdc to download firmware updates for MicroLogix 1400 controllers.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation. You can view or download publications at rok.auto/literature.

Additional Resources

| Resource | Description |
|--|--|
| MicroLogix 1200 120V AC Input Module Installation Instructions, publication 1762-IN002 | Provides information on how to mount and wire the expansion I/O module, 1762-IA8. |
| MicroLogix 1200 Relay Output Module Installation Instructions, publication 1762-IN003 | Provides information on how to mount and wire the expansion I/O module, 1762-OW8. |
| MicroLogix 1200 24V DC Input Module Installation Instructions, publication 1762-IN004 | Provides information on how to mount and wire the expansion I/O module, 1762-IQ8. |
| MicroLogix 1762-IF20F2 Analog Input/Output Module Installation Instructions, publication 1762-IN005 | Provides information on how to mount and wire the expansion I/O module, 1762-IF20F2. |
| MicroLogix 1200 Solid-state Output Module Installation Instructions, publications 1762-IN007 | Provides information on how to mount and wire the expansion I/O module, 1762-OA8. |
| MicroLogix 1200 Solid-state 24V DC Source Output Module Installation Instructions, publication 1762-IN008 | Provides information on how to mount and wire the expansion I/O module, 1762-OB8. |
| MicroLogix 1762-OW16 Relay Output Module Installation Instructions, publication 1762-IN009 | Provides information on how to mount and wire the expansion I/O module, 1762-OW16. |
| MicroLogix 1762-IQ16 DC Input Module Installation Instructions, publication 1762-IN010 | Provides information on how to mount and wire the expansion I/O module, 1762-IQ16. |
| MicroLogix 1200 16-point Solid-state 24V DC Source Output Module Installation Instructions, publication 1762-IN011 | Provides information on how to mount and wire the expansion I/O module, 1762-OB16. |
| MicroLogix 1762-IF4 Analog Input Module Installation Instructions, publication 1762-IN012 | Provides information on how to mount and wire the expansion I/O module, 1762-IF4. |
| MicroLogix 1200 Thermocouple/mV Input Module Installation Instructions, publication 1762-IN013 | Provides information on how to mount and wire the expansion I/O module, 1762-IT4. |
| MicroLogix 1200 RTD/Resistance Input Module Installation Instructions, publication 1762-IN014 | Provides information on how to mount and wire the expansion I/O module, 1762-IR4. |
| MicroLogix Analog Output Module Installation Instructions, publication 1762-IN016 | Provides information on how to mount and wire the expansion I/O module, 1762-OF4. |
| MicroLogix 1200 Isolated Relay Output Module Installation Instructions, publication 1762-IN017 | Provides information on how to mount and wire the expansion I/O module, 1762-OX6I. |

Additional Resources (Continued)

| Resource | Description |
|--|---|
| MicroLogix 1200 DC Input/Relay Output Combination Module Installation Instructions, publication 1762-IN018 | Provides information on how to mount and wire the expansion I/O module, 1762-IQ80W6. |
| MicroLogix 1762-IQ32T DC Input Module Installation Instructions publication 1762-IN019 | Provides information on how to mount and wire the expansion I/O module, 1762-IQ32T. |
| MicroLogix 1762-OB32T Solid State 24V DC Source Output Module Installation Instructions, publication 1762-IN020 | Provides information on how to mount and wire the expansion I/O module, 1762-OB32T. |
| MicroLogix 1762-OV32T Solid State 24V DC Sink Output Module Installation Instructions, publication 1762-IN021 | Provides information on how to mount and wire the expansion I/O module, 1762-OV32T. |
| MicroLogix 1400 Programmable Controllers Installation Instructions, publication 1766-IN001 | Provides information on how to mount and wire the MicroLogix 1400 controllers. |
| MicroLogix 1200 Programmable Controllers and Expansion I/O User Manual, publication 1762-UM001 | Describes how to wire, use, and troubleshoot the 1762 expansion I/O modules. |
| MicroLogix 1200 Thermocouple/mV Input Module User Manual, publication 1762-UM002 | Describes how to wire, use, and troubleshoot the expansion I/O module, 1762-IT4. |
| MicroLogix 1200 RTD/Resistance Input Module User Manual, publication 1762-UM003 | Describes how to wire, use, and troubleshoot the expansion I/O module, 1762-IR4. |
| MicroLogix 1400 Programmable Controllers User Manual, publication 1766-UM001 | Describes how to install, use, and troubleshoot MicroLogix 1400 controllers. |
| MicroLogix 1400 Embedded Web Server User Manual, publication 1766-UM002 | Describes how to use the web server feature of MicroLogix 1400 controllers. |
| MicroLogix 1400 Programmable Controllers Reference Manual, publication 1766-RM001 | Describes how to configure, program, and troubleshoot MicroLogix 1400 controllers. |
| EtherNet/IP Network Devices User Manual, publication ENET-UM006 | Describes how to configure and use EtherNet/IP devices to communicate on the EtherNet/IP network. |
| Ethernet Reference Manual, publication ENET-RM002 | Describes basic Ethernet concepts, infrastructure components, and infrastructure features. |
| System Security Design Guidelines Reference Manual, publication SECURE-RM001 | Provides guidance on how to conduct security assessments, implement Rockwell Automation products in a secure system, harden the control system, manage user access, and dispose of equipment. |
| UL Standards Listing for Industrial Control Products, publication CMPNTS-SR002 | Assists original equipment manufacturers (OEMs) with construction of panels, to help ensure that they conform to the requirements of Underwriters Laboratories. |
| Industrial Components Preventive Maintenance, Enclosures, and Contact Ratings Specifications, publication IC-TD002 | Provides a quick reference tool for Allen-Bradley industrial automation controls and assemblies. |
| Safety Guidelines for the Application, Installation, and Maintenance of Solid-state Control, publication SGI-1.1 | Designed to harmonize with NEMA Standards Publication No. ICS 1.1-1987 and provides general guidelines for the application, installation, and maintenance of solid-state control in the form of individual devices or packaged assemblies incorporating solid-state components. |
| Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 | Provides general guidelines for installing a Rockwell Automation industrial system. |
| Product Selection and Configuration website, rok.auto/systemtools | Helps configure complete, valid catalog numbers and build complete quotes based on detailed product information. |
| Product Certifications website, rok.auto/certifications | Provides declarations of conformity, certificates, and other certification details. |

Rockwell Automation Support

Use these resources to access support information.

| | | |
|---|---|--|
| Technical Support Center | Find help with how-to videos, FAQs, chat, user forums, Knowledgebase, and product notification updates. | rok.auto/support |
| Local Technical Support Phone Numbers | Locate the telephone number for your country. | rok.auto/phonesupport |
| Technical Documentation Center | Quickly access and download technical specifications, installation instructions, and user manuals. | rok.auto/techdocs |
| Literature Library | Find installation instructions, manuals, brochures, and technical data publications. | rok.auto/literature |
| Product Compatibility and Download Center (PCDC) | Download firmware, associated files (such as AOP, EDS, and DTM), and access product release notes. | rok.auto/pcdc |

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Rockwell Otomasyon Ticaret A.Ş. Kar Plaza İş Merkezi E Blok Kat:6 34752, İçerenköy, İstanbul, Tel: +90 (216) 5698400 EEE Yönetmeliğine Uygundur

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AMERICAS: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000

EUROPE/MIDDLE EAST/AFRICA: Rockwell Automation NV, Pegasus Park, De Kleetlaan 12a, 1831 Diegem, Belgium, Tel: (32) 2663 0600

ASIA PACIFIC: Rockwell Automation SEA Pte Ltd, 2 Corporation Road, #04-05, Main Lobby, Corporation Place, Singapore 618494, Tel: (65) 6510 6608

UNITED KINGDOM: Rockwell Automation Ltd., Pitfield, Kiln Farm, Milton Keynes, MK11 3DR, United Kingdom, Tel: (44)(1908) 838-800

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