



MicroLogix 1200 Programmable Controllers

Bulletin 1762 Controllers and Expansion I/O Modules



Allen-Bradley

by ROCKWELL AUTOMATION

User Manual

Original Instructions

Chapter 3

Wiring Requirements	27
Wiring Recommendation	27
Wire without Spade Lugs	28
Wire with Spade Lugs	28
Use Surge Suppressors	29
Recommended Surge Suppressors	30
Ground the Controller	30
Wiring Diagrams	31
Terminal Block Layouts	31
Terminal Groupings	33
Sinking and Sourcing Wiring Diagrams	34
1762-L24AWA, 1762-L24BWA, 1762-L24BXB, 1762-L24AWAR, 1762-L24BWAR and 1762-L24BXHR Wiring Diagrams	35
1762-L40AWA, 1762-L40BWA, 1762-L40BXB, 1762-L40AWAR, 1762-L40BWAR and 1762-L40BXHR Wiring Diagrams	37
Controller I/O Wiring	40
Minimize Electrical Noise	40
Expansion I/O Wiring	40
Discrete Wiring Diagrams	40
Analog Wiring	47

Chapter 4

Introduction	53
Supported Communication Protocols	53
Default Communication Configuration	53
Use the Communications Toggle Push Button	54
Connect to the RS-232 Port	54
Make a DF1 Point-to-Point Connection	55
Use a Modem	55
Isolated Modem Connection	56
Connect to a DH-485 Network	59
Recommended Tools	59
DH-485 Communication Cable	59
Connect the Communication Cable to the DH-485 Connector	60
Ground and Terminate the DH-485 Network	61
Connect the AIC+	61
Cable Selection Guide	62
Recommended User-supplied Components	64
Safety Considerations	64
Install and Attach the AIC+	64
Power the AIC+	65

Chapter 5

Trimpot Operation	67
Trimpot Information Function File	67
Error Conditions	67

Chapter 6

Real-time Clock Operation	69
Removal/Insertion Under Power	69
Write Data to the Real-time Clock	69
RTC Battery Operation	70
Memory Module Operation	70
User Program and Data Back-up	70
Program Compare	70
Data File Download Protection	71
Memory Module Write Protection	71
Removal/Insertion Under Power	71

Appendix A

Controller Specifications	73
Expansion I/O Specifications	77
Discrete I/O Modules	77
Analog Modules	82

Appendix B

MicroLogix 1200 RTB Replacement Kit	87
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Appendix C

Understand the Controller Status Indicators	89
Normal Operation	90
Error Conditions	90
Controller Error Recovery Model	91
Analog Expansion I/O Diagnostics and Troubleshooting	92
Module Operation and Channel Operation	92
Power-up Diagnostics	92
Critical and Non-critical Errors	92
Module Error Definition Table	92
Error Codes	93
Call Rockwell Automation for Assistance	94

Appendix D

Prepare for Firmware Update	95
Install ControlFLASH Software	95
Prepare the Controller for Firmware Update	95
Sequence of Operation	96
Missing or Corrupt OS LED Pattern	96

Appendix E

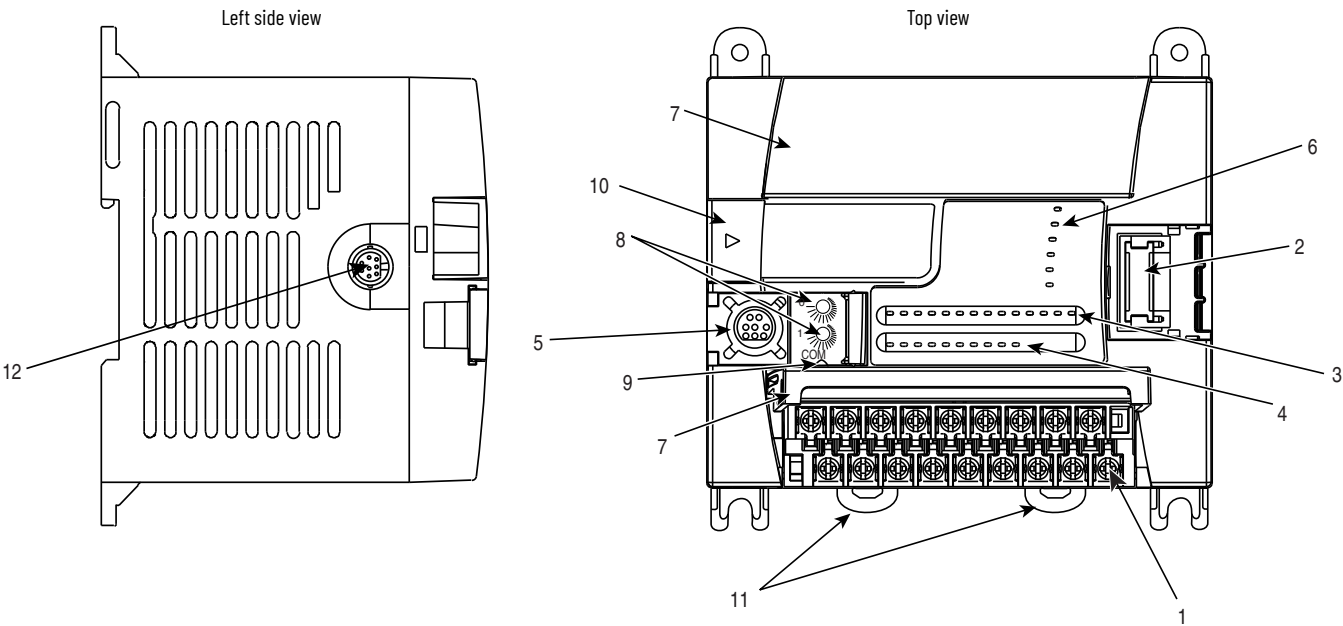
RS-232 Communication Interface	97
DF1 Full-duplex Protocol	97
DF1 Half-duplex Protocol	98
Use Modems with MicroLogix Programmable Controllers	99
DH-485 Communication Protocol	99

Hardware Overview

Hardware Features

The MicroLogix 1200 programmable controller contains a power supply, input and output circuits, and a processor. The controller is available in 24 I/O points and 40 I/O points configurations.

Figure 1 - Controller Hardware Features



Controller Description

	Description		Description
1	Terminal blocks (Removable terminal blocks on 40-point controllers only)	7	Terminal doors and labels
2	Bus connector interface to expansion I/O	8	Trim pots
3	Input LEDs	9	Communications Toggle push button
4	Output LEDs	10	Memory module port cover ⁽¹⁾ or memory module and/or real-time clock ⁽²⁾
5	Communication port/Channel 0	11	DIN rail latches
6	Status LEDs	12	Programmer/HMI port (Equipped with 1762-LxxxxR controllers only)

(1) Shipped with controller
(2) Optional equipment

Controller Input Power and Embedded I/O

Catalog Number	Description		
	Input Power	Inputs	Outputs
1762-L24AWA, 1762-L24AWAR	120/240V AC	14 120V AC	10 relay
1762-L24BWA, 1762-L24BWAR	120/240V AC	10 24V DC 4 fast 24V DC	10 relay
1762-L24BXB, 1762-L24BXBR	24V DC	10 24V DC 4 fast 24V DC	5 relay, 4 24V DC FET 1 high-speed 24V DC FET

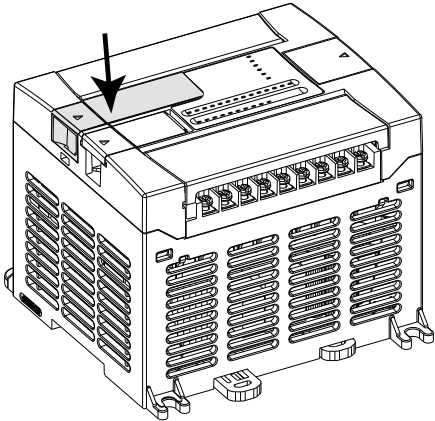
Controller Input Power and Embedded I/O (Continued)

Catalog Number	Description		
	Input Power	Inputs	Outputs
1762-L40AWA, 1762-L40AWAR	120/240V AC	24 120V AC	16 relay
1762-L40BWA, 1762-L40BWAR	120/240V AC	20 24V DC 4 fast 24V DC	16 relay
1762-L40BXB, 1762-L40BXBR	24V DC	20 24V DC 4 fast 24V DC	8 relay, 7 24V DC FET 1 high-speed 24V DC FET

Component Descriptions

MicroLogix 1200 Memory Module and/or Real-time Clock

The controller is shipped with a memory module port cover in place. You can order a memory module, real-time clock, or memory module and real-time clock as an accessory.



Memory Module and/or Real-time Clock

Catalog Number	Description
1762-MM1	Memory module only
1762-RTC	Real-time clock only
1762-MM1RTC	Memory module and real-time clock

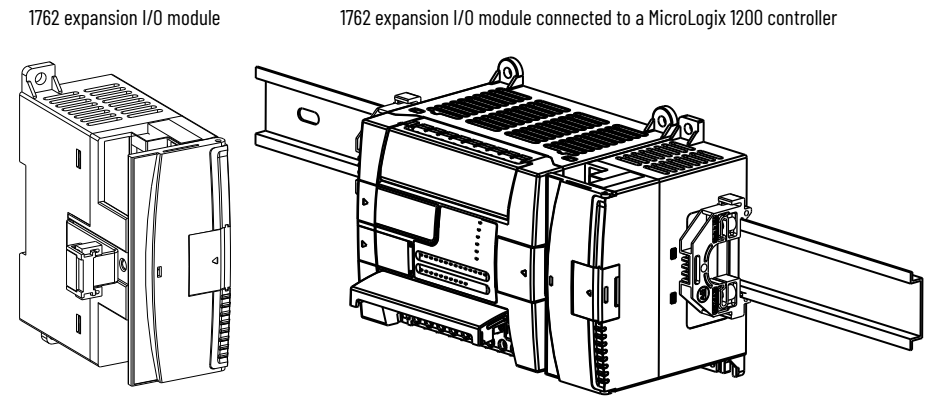
1762 Expansion I/O Modules

1762 expansion I/O modules can be connected to the MicroLogix 1200 controller, as shown in [Figure 2](#).



A maximum of six I/O modules, in certain combinations, may be connected to a controller. See [System Loading and Heat Dissipation on page 105](#) to determine valid combinations.

Figure 2 - 1762 Expansion I/O Modules



- Install emergency stop switches and the master control relay in your system. Verify that relay contacts have a sufficient rating for your application. Emergency stop switches must be easy to reach.
- In the following illustration, input and output circuits are shown with MCR protection. However, in most applications, only output circuits require MCR protection.

Figure 3 and Figure 4 show the master control relay wired in a grounded system.



In most applications input circuits do not require MCR protection; however, if you must remove power from all field devices, you must include MCR contacts in series with input power wiring.

Figure 3 - Schematic (Using IEC Symbols)

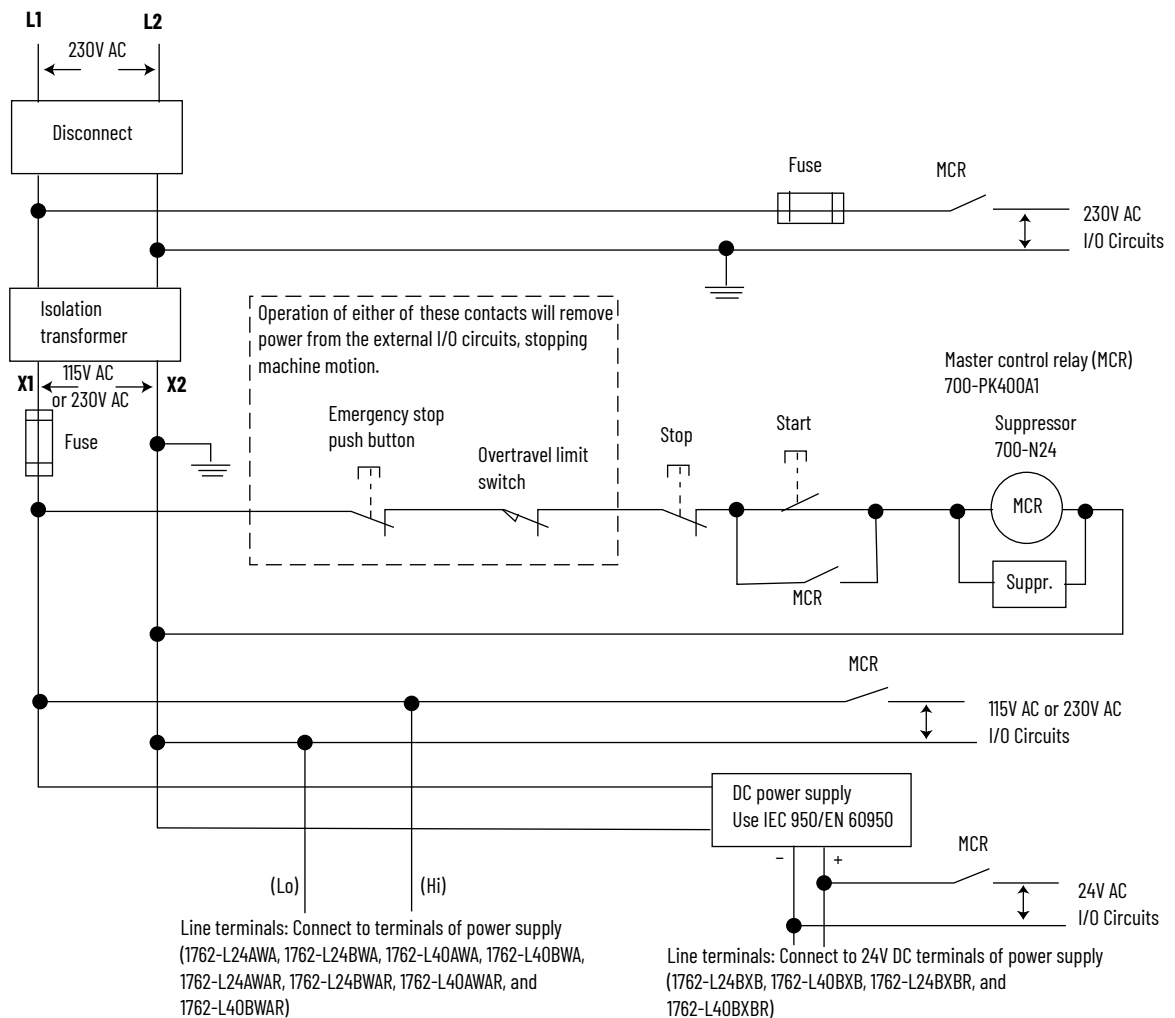
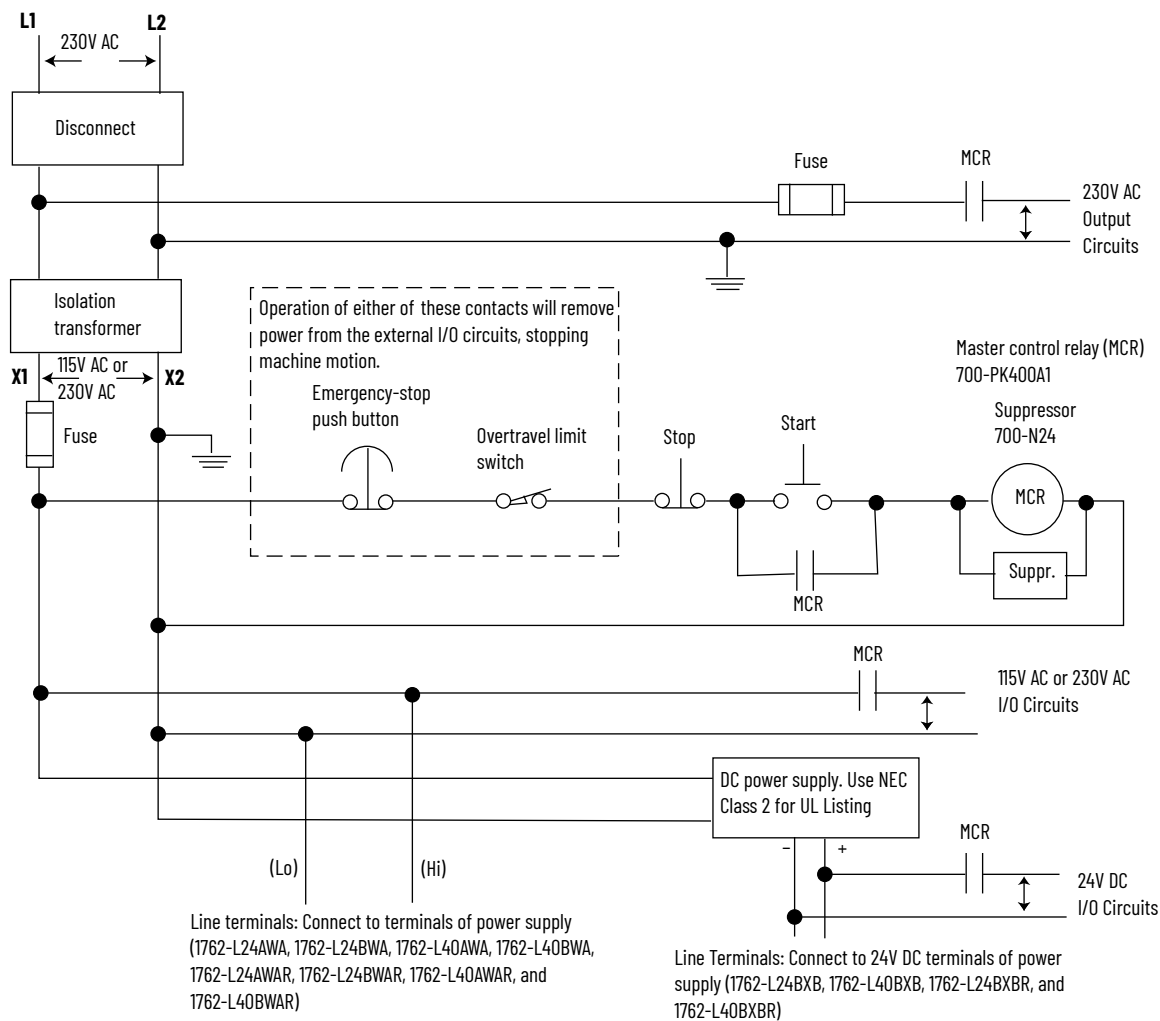


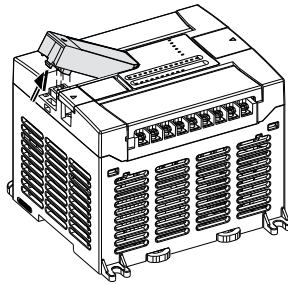
Figure 4 - Schematic (Using ANSI/CSA Symbols)



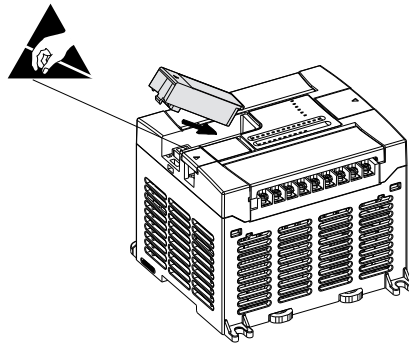
Install a Memory Module or Real-time Clock

To install a memory module, do as follows:

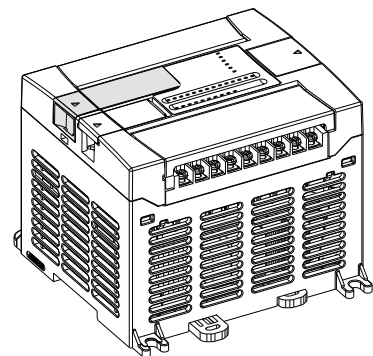
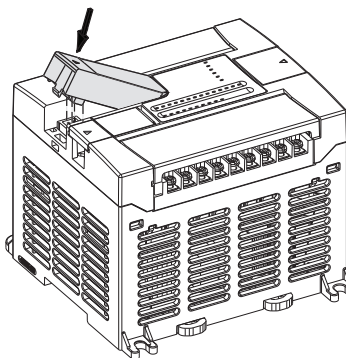
1. Remove the memory module port cover.



2. Align the connector on the memory module with the connector pins on the controller.

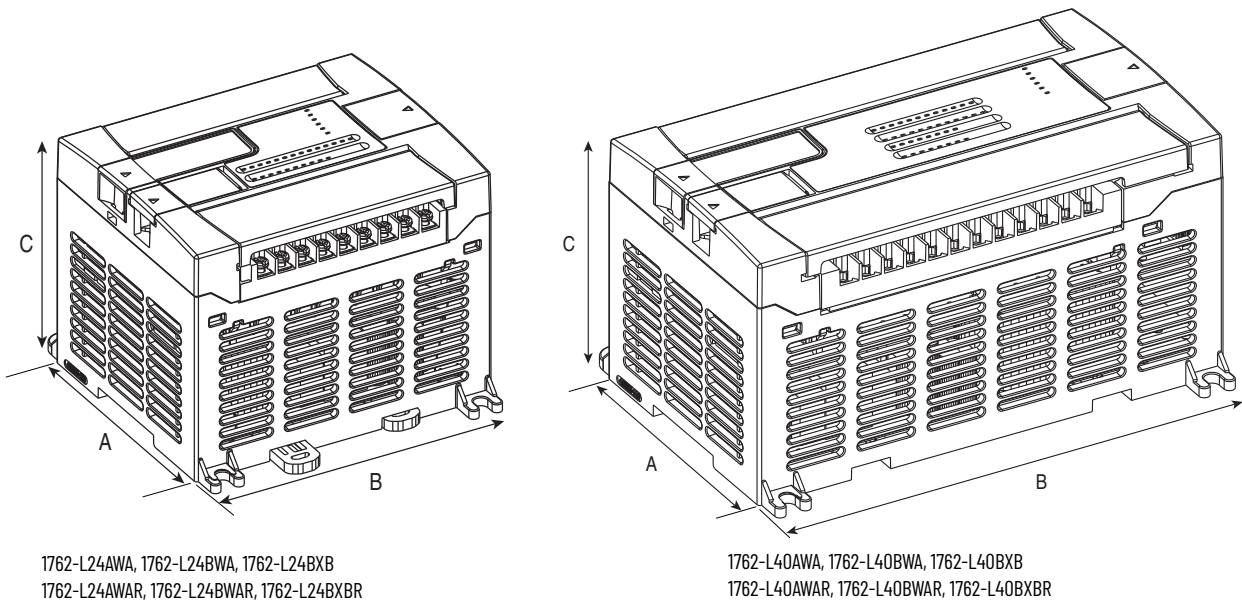


3. Firmly seat the memory module into the controller.



Controller Mounting Dimensions

Figure 5 - Controller Dimensions

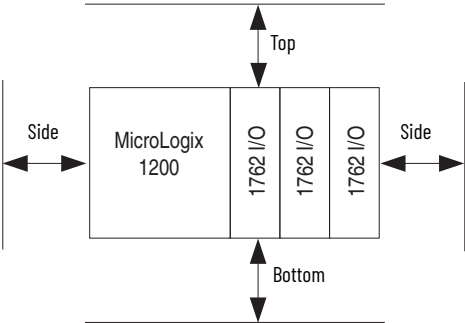


Dimension	1762-L24AWA 1762-L24AWAR	1762-L24BWA 1762-L24BWAR	1762-L24BXB 1762-L24BXR	1762-L40AWA 1762-L40AWAR	1762-L40BWA 1762-L40BWAR	1762-L40BXB 1762-L40BXR
A	90 mm (3.5 in.)			90 mm (3.5 in.)		
B	110 mm (4.33 in.)			160 mm (6.30 in.)		
C	87 mm (3.43 in.)			87 mm (3.43 in.)		

Controller and Expansion I/O 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 sides of the controller system for adequate ventilation. Maintain spacing from enclosure walls, wireways, and adjacent equipment, as shown in [Figure 6](#).

Figure 6 - Controller and Expansion I/O Spacing



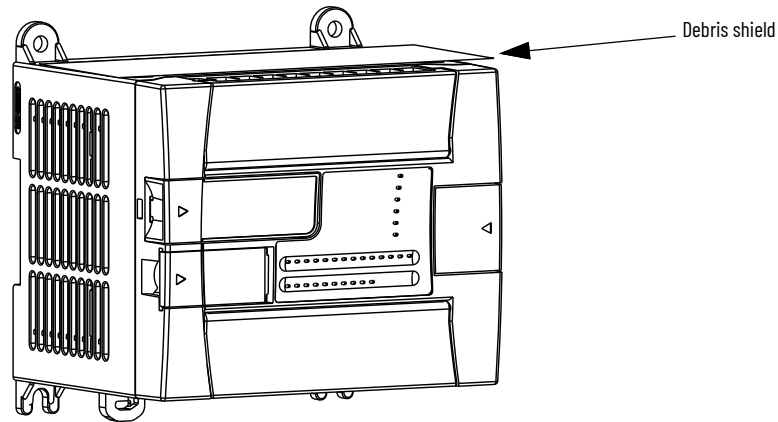
Mount the Controller

MicroLogix 1200 controllers are suitable for use in an industrial environment when installed in accordance with these instructions. Specifically, this equipment is intended for use in clean, dry environments (Pollution degree 2^(a)) and to circuits not exceeding Over Voltage Category II^(b) (IEC 60664-1)^(c).

(a) Pollution Degree 2 is an environment where, normally, only non-conductive pollution occurs except that occasionally a temporary conductivity caused by condensation shall be expected.
(b) Over Voltage Category II is the load level section of the electrical distribution system. At this level transient voltages are controlled and do not exceed the impulse voltage capability of the product's insulation.
(c) Pollution Degree 2 and Over Voltage Category II are International Electrotechnical Commission (IEC) designations.



ATTENTION: Do not remove the protective debris shield until after the controller and all other equipment in the panel near the controller are mounted and wiring is complete. Once wiring is complete, remove protective debris shield. Failure to remove shield before operating can cause overheating.



ATTENTION: Electrostatic discharge can damage semiconductor devices inside the controller. Do not touch the connector pins or other sensitive areas.

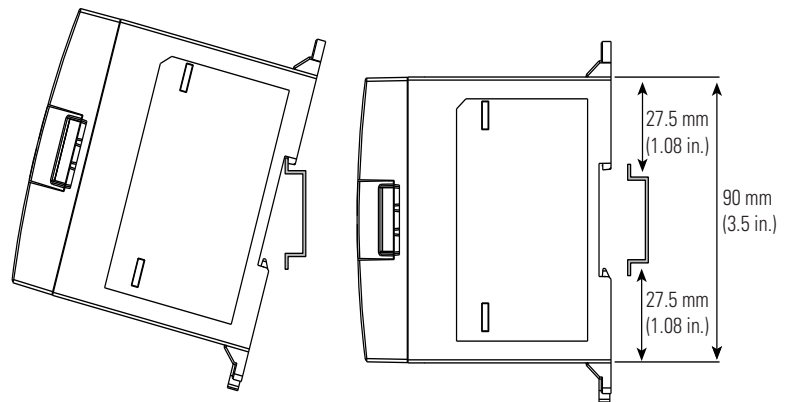


For environments with greater vibration and shock concerns, use the panel mounting method described on [Panel Mounting on page 22](#), rather than DIN rail mounting.

DIN Rail Mounting

The maximum extension of the latch is 14 mm (0.55 in.) in the open position. A flat-blade screwdriver is required for removal of the controller. The controller can be mounted to EN 50022 - 35 x 7.5 or EN 50022 - 35 x 15 DIN rails. DIN rail mounting dimensions are shown in [Figure 7](#).

Figure 7 - DIN Rail Mounting Dimensions



To install your controller on the DIN rail, do as follows:

1. Mount your DIN rail. Make sure that the placement of the controller on the DIN rail meets the recommended spacing requirements, see [Controller and Expansion I/O Spacing on page 20](#).
2. Close the DIN latch, if it is open.
3. Hook the top slot over the DIN rail.



1762 expansion I/O modules must be mounted horizontally as illustrated.



For environments with greater vibration and shock concerns, use the panel mounting method described below, instead of DIN rail mounting.

Panel Mounting

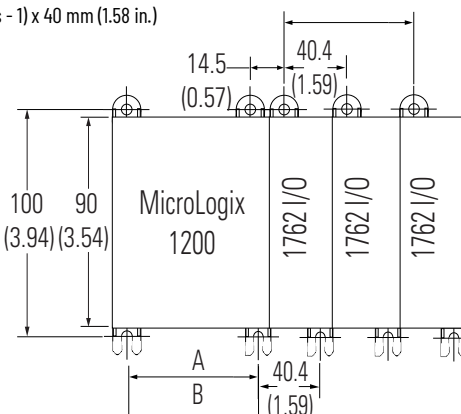
Use the dimensional template shown in [Figure 10](#) to mount the module. The preferred mounting method is to use two M4 or #8 panhead screws per module. Mounting screws are required on every module.

Figure 10 - Dimensional Template

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

A = 95.86 mm (3.774 in.)
 1762-L24AWA, 1762-L24BWA, 1762-L24BXB
 1762-L24AWAR, 1762-L24BWAR, 1762-L24BXBR
 B = 145.8 mm (5.739 in.)
 1762-L40AWA, 1762-L40BWA, 1762-L40BXB
 1762-L40AWAR, 1762-L40BWAR, 1762-L40BXBR

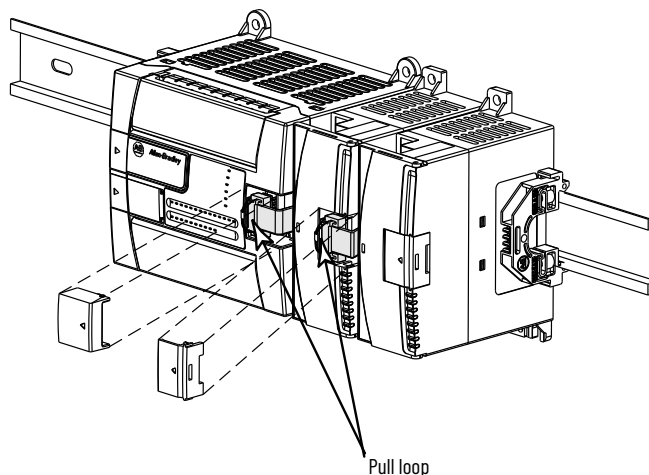
All dimensions are in mm (inches).
 Hole spacing tolerance: ± 0.4 mm (0.016 in.).



Connect Expansion I/O Modules

The expansion I/O module is attached to the controller or another I/O module by means of a flat ribbon cable after mounting, as shown in [Figure 11](#).

Figure 11 - Attach Expansion I/O Modules



Use the pull loop on the connector to disconnect modules. Do not pull on the ribbon cable.



You can connect up to six expansion I/O modules to a controller depending upon the power supply loading.



ATTENTION: Remove power before removing or inserting an I/O module. When you remove or insert a module with power applied, an electric arc may occur. An electric arc can cause personal injury or property damage by:

- Sending an erroneous signal to your system's field devices, causing the controller to fault
- Causing an explosion in a hazardous environment

Electrical arcing causes excessive wear to contacts on both the module and its mating connector. Worn contacts may create electrical resistance, reducing product reliability.



WARNING: EXPLOSION HAZARD

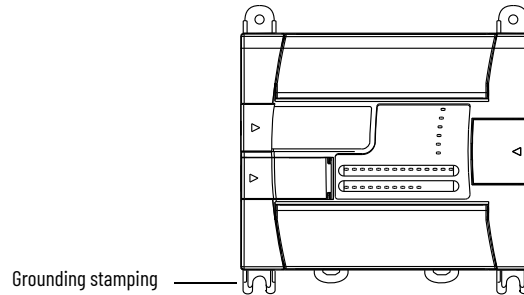
In Class I Division 2 applications, the bus connector must be fully seated and the bus connector cover must be snapped in place.

In Class I Division 2 applications, all modules must be mounted in direct contact with each other as shown in [Connect Expansion I/O Modules on page 24](#). If DIN rail mounting is used, an end stop must be installed ahead of the controller and after the last 1762 I/O module.

This product is intended to be mounted to a well grounded mounting surface such as a metal panel. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#), for additional information. Additional grounding connections from the mounting tab or DIN rail, if used, are not required unless the mounting surface cannot be grounded.



Use all four mounting positions for panel mounting installation.



ATTENTION: Remove the protective debris strip before applying power to the controller. Failure to remove the strip may cause the controller to overheat.

Wiring Diagrams

The following illustrations show the wiring diagrams for the MicroLogix 1200 controllers. Controllers with DC inputs can be wired as either sinking or sourcing inputs. Sinking and sourcing does not apply to AC inputs. See the various diagrams described in [Sinking and Sourcing Wiring Diagrams on page 34](#).

The controller terminal block layouts are shown in [Terminal Block Layouts](#). The shading on the labels indicates how the terminals are grouped. A detail of the groupings is shown in the tables in [Terminal Groupings on page 33](#).



This  symbol denotes a protective earth ground terminal which provides a low impedance path between electrical circuits and earth for safety purposes and provides noise immunity improvement. This connection must be made for safety purposes on AC-powered controllers.

This  symbol denotes a functional earth ground terminal which provides a low impedance path between electrical circuits and earth for non-safety purposes, such as noise immunity improvement.

Terminal Block Layouts

Figure 15 - 1762-L24AWA and 1762-L24AWAR

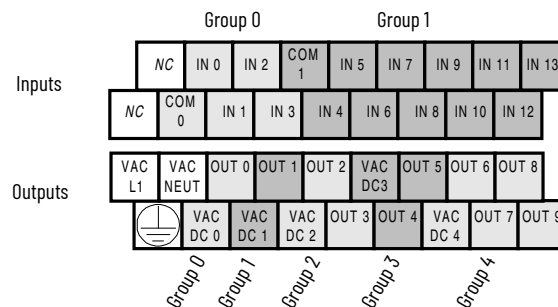
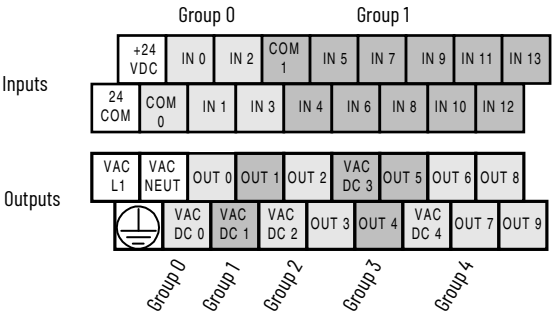


Figure 16 - 1762-L24BWA and 1762-L24BWAR



ATTENTION: The 24V DC sensor supply of the 1762-L24BWA and 1762-L24BWAR should not be used to power output circuits. It should only be used to power input devices (for example sensors and switches). See [Master Control Relay on page 16](#) for information on MCR wiring in output circuits.

Figure 17 - 1762-L24BXB and 1762-L24BXBR

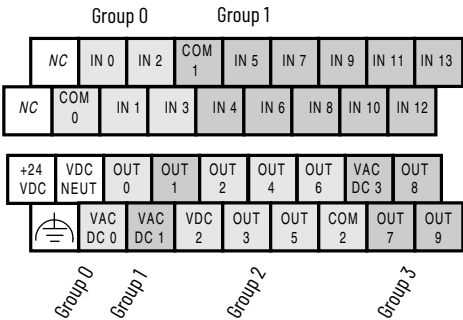


Figure 18 - 1762-L40AWA and 1762-L40AWAR

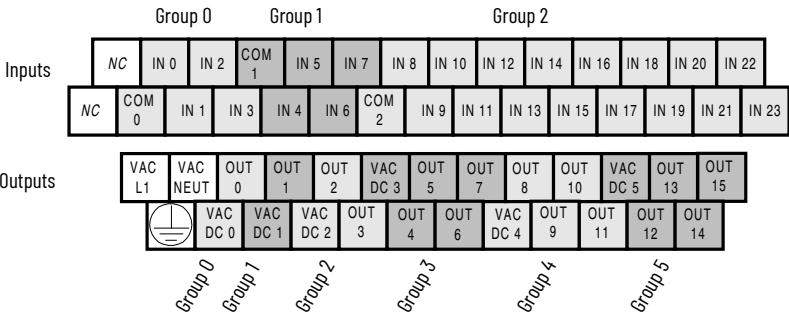
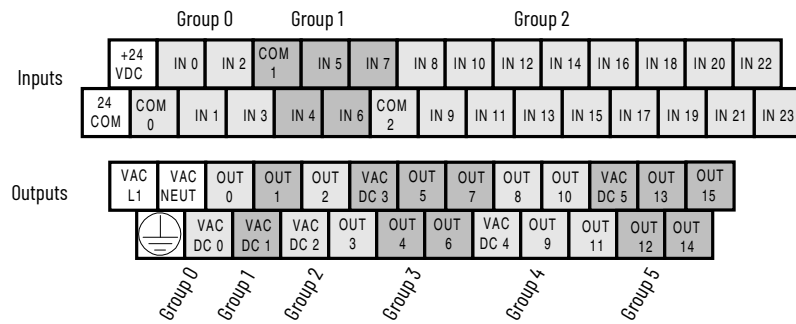
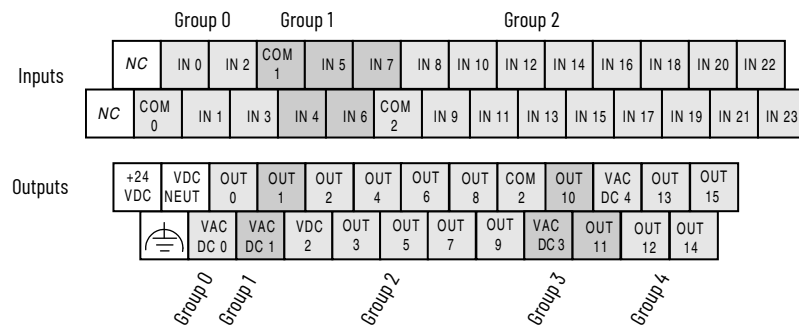


Figure 19 - 1762-L40BWA and 1762-L40BWAR



ATTENTION: The 24V DC sensor supply of the 1762-L40BWA and 1762-L40BWAR should not be used to power output circuits. It should only be used to power input devices (for example sensors and switches). See [Master Control Relay on page 16](#) for information on MCR wiring in output circuits.

Figure 20 - 1762-L40BXB and 1762-L40BXBR



Terminal Groupings

Table 4 - Input Terminal Grouping

Controller	Inputs		
	Input Group	Common Terminal	Input Terminal
1762-L24AWA 1762-L24AWAR	Group 0	AC COM 0	I/0...I/3
	Group 1	AC COM 1	I/4...I/13
1762-L24BWA 1762-L24BWAR	Group 0	DC COM 0	I/0...I/3
	Group 1	DC COM 1	I/4...I/13
1762-L24BXB 1762-L24BXBR	Group 0	DC COM 0	I/0...I/3
	Group 1	DC COM 1	I/4...I/13
1762-L40AWA 1762-L40AWAR	Group 0	AC COM 0	I/0...I/3
	Group 1	AC COM 1	I/4...I/7
	Group 2	AC COM 2	I/8...I/23
1762-L40BWA 1762-L40BWAR	Group 0	DC COM 0	I/0...I/3
	Group 1	DC COM 1	I/4...I/7
	Group 2	DC COM 2	I/8...I/23
1762-L40BXB 1762-L40BXBR	Group 0	DC COM 0	I/0...I/3
	Group 1	DC COM 1	I/4...I/7
	Group 2	DC COM 2	I/8...I/23

Table 5 - Output Terminal Grouping

Controller	Outputs			
	Output Group	Voltage Terminal	Output Terminal	Description
1762-L24AWA 1762-L24AWAR	Group 0	VAC/VDC 0	0/0	Isolated Relay outputs
	Group 1	VAC/VDC 1	0/1	
	Group 2	VAC/VDC 2	0/2...0/3	
	Group 3	VAC/VDC 3	0/4...0/5	
	Group 4	VAC/VDC 4	0/6...0/9	
1762-L24BWA 1762-L24BWAR	Group 0	VAC/VDC 0	0/0	Isolated Relay outputs
	Group 1	VAC/VDC 1	0/1	
	Group 2	VAC/VDC 2	0/2...0/3	
	Group 3	VAC/VDC 3	0/4...0/5	
	Group 4	VAC/VDC 4	0/6...0/9	
1762-L24BXB 1762-L24BXBR	Group 0	VAC/VDC 0	0/0	Isolated Relay outputs
	Group 1	VAC/VDC 1	0/1	
	Group 2	VDC 2, VDC COM 2	0/2...0/6	Isolated FET outputs
	Group 3	VAC/VDC 3	0/7...0/9	Isolated Relay outputs
1762-L40AWA 1762-L40AWAR	Group 0	VAC/VDC 0	0/0	Isolated Relay outputs
	Group 1	VAC/VDC 1	0/1	
	Group 2	VAC/VDC 2	0/2...0/3	
	Group 3	VAC/VDC 3	0/4...0/7	
	Group 4	VAC/VDC 4	0/8...0/11	
	Group 5	VAC/VDC 5	0/12...0/15	
1762-L40BWA 1762-L40BWAR	Group 0	VAC/VDC 0	0/0	Isolated Relay outputs
	Group 1	VAC/VDC 1	0/1	
	Group 2	VAC/VDC 2	0/2...0/3	
	Group 3	VAC/VDC 3	0/4...0/7	
	Group 4	VAC/VDC 4	0/8...0/11	
	Group 5	VAC/VDC 5	0/12...0/15	
1762-L40BXB 1762-L40BXBR	Group 0	VAC/VDC 0	0/0	Isolated Relay outputs
	Group 1	VAC/VDC 1	0/1	
	Group 2	VDC 2, VDC COM 2	0/2...0/9	Isolated FET outputs
	Group 3	VAC/VDC 3	0/10...0/11	Isolated Relay outputs
	Group 4	VAC/VDC 4	0/12...0/15	

Sinking and Sourcing Wiring Diagrams

Any of the MicroLogix 1200 controller DC embedded input groups can be configured as sinking or sourcing depending on how the DC COM is wired on the group.

Type	Definition
Sinking Input	The input energizes when high-level voltage is applied to the input terminal (active high). Connect the power supply VDC (-) to the input group's COM terminal.
Sourcing Input	The input energizes when low-level voltage is applied to the input terminal (active low). Connect the power supply VDC (+) to the input group's COM terminal.



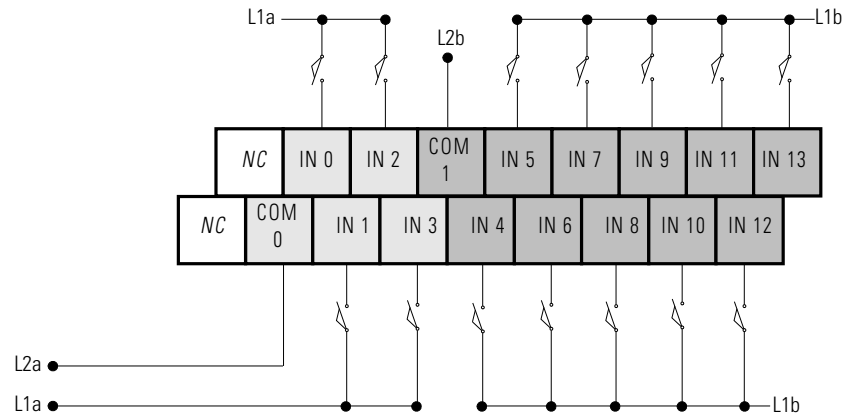
ATTENTION: The 24V DC sensor power source must not be used to power output circuits. It should only be used to power input devices (for example sensors and switches). See [Master Control Relay on page 16](#) for information on MCR wiring in output circuits.

1762-L24AWA, 1762-L24BWA, 1762-L24BXB, 1762-L24AWAR, 1762-L24BWAR and 1762-L24BXBR Wiring Diagrams



In [Figure 21](#) to [Figure 34](#), lower case alphabetic subscripts are appended to common-terminal connections to indicate that different power sources may be used for different isolated groups, if desired.

Figure 21 - 1762-L24AWA and 1762-L24AWAR Input Wiring Diagram⁽¹⁾



(1) "NC" terminals are not intended for use as connection points.

Figure 22 - 1762-L24BWA and 1762-L24BWAR Sinking Input Wiring Diagram

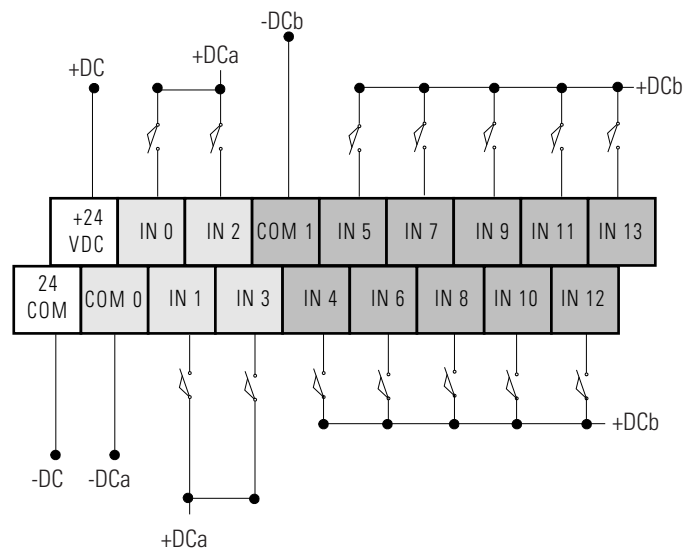


Figure 23 - 1762-L24BWA and 1762-L24BWAR Sourcing Input Wiring Diagram

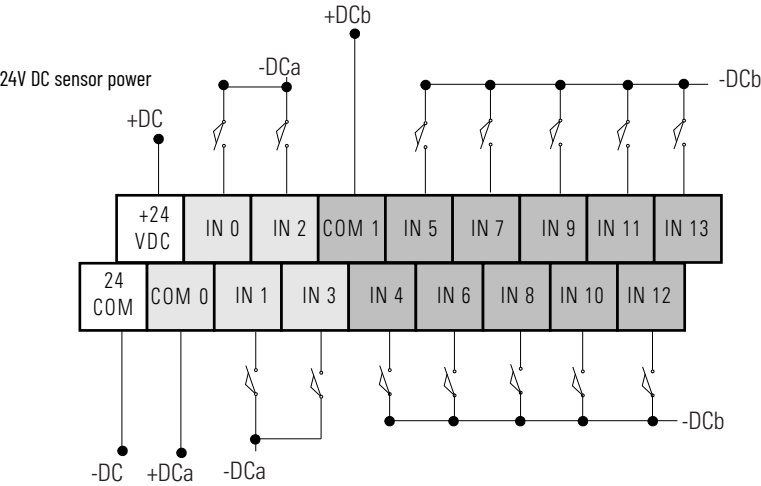


Figure 24 - 1762-L24BXB and 1762-L24BXHR Sinking Input Wiring Diagram

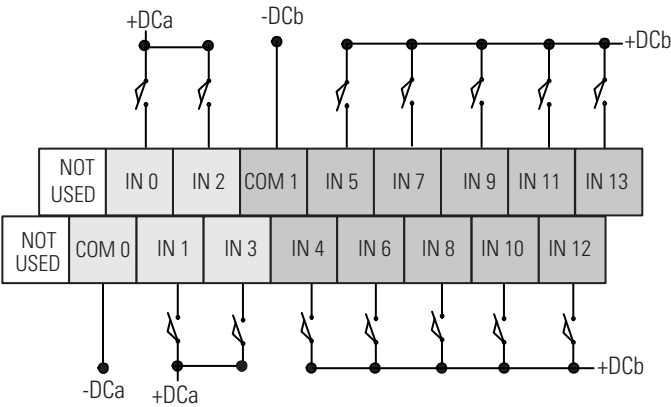


Figure 25 - 1762-L24BXB and 1762-L24BXHR Sourcing Input Wiring Diagram

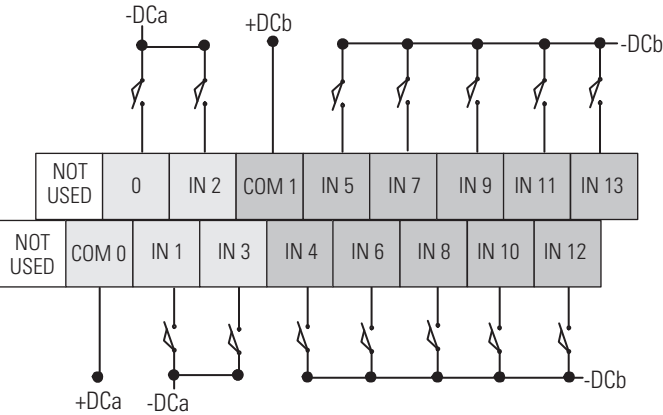


Figure 26 - 1762-L24AWA, 1762-L24BWA, 1762-L24AWAR, and 1762-L24BWAR Output Wiring Diagram

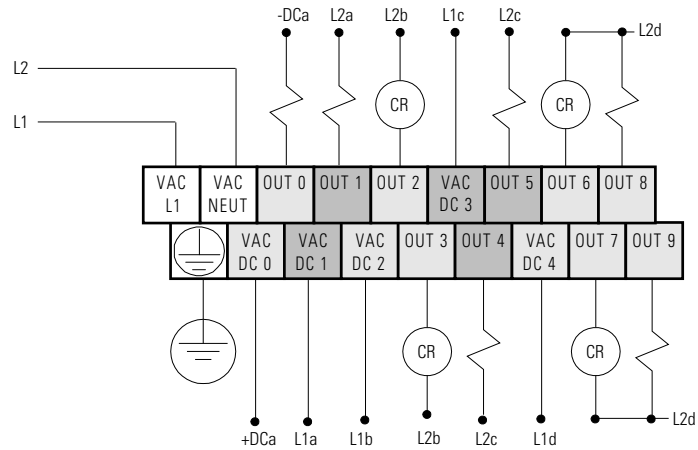
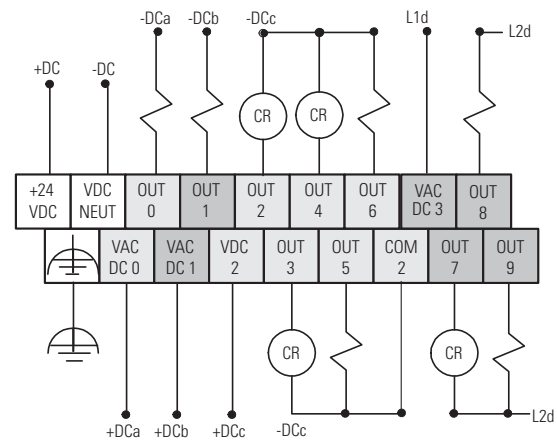


Figure 27 - 1762-L24BXB and 1762-L24BXHR Output Wiring Diagram



1762-L40AWA, 1762-L40BWA, 1762-L40BXB, 1762-L40AWAR, 1762-L40BWAR and 1762-L40BXHR Wiring Diagrams

Figure 28 - 1762-L40AWA and 1762-L40AWAR Input Wiring Diagram

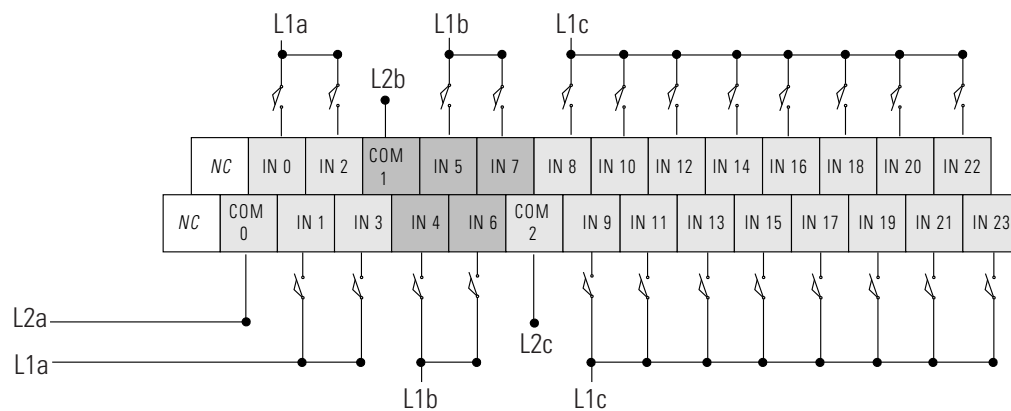


Figure 29 - 1762-L40BWA and 1762-L40BWAR Sinking Input Wiring Diagram

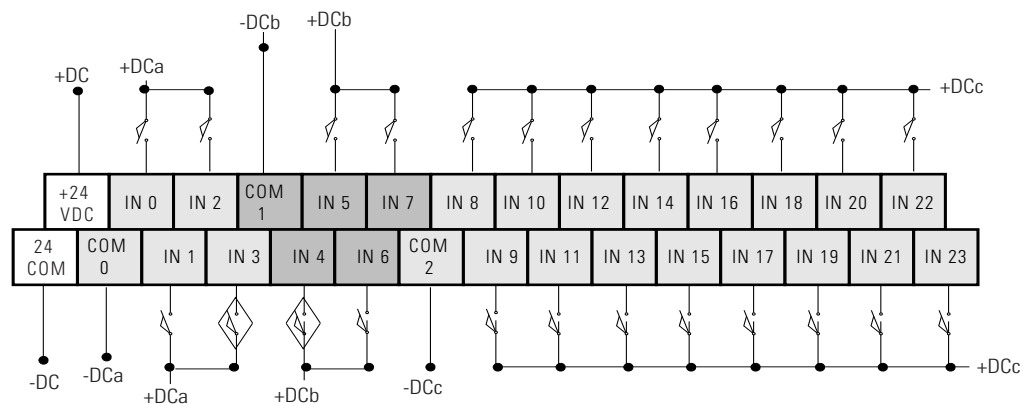


Figure 30 - 1762-L40BWA and 1762-L40BWAR Sourcing Input Wiring Diagram

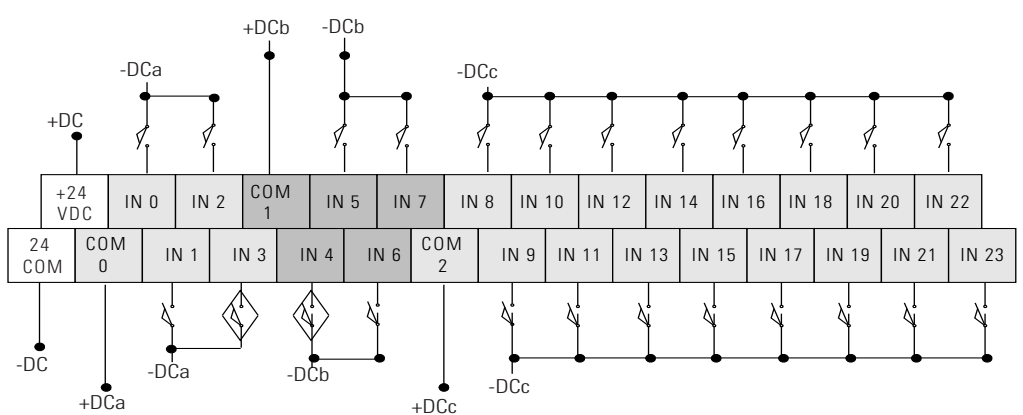
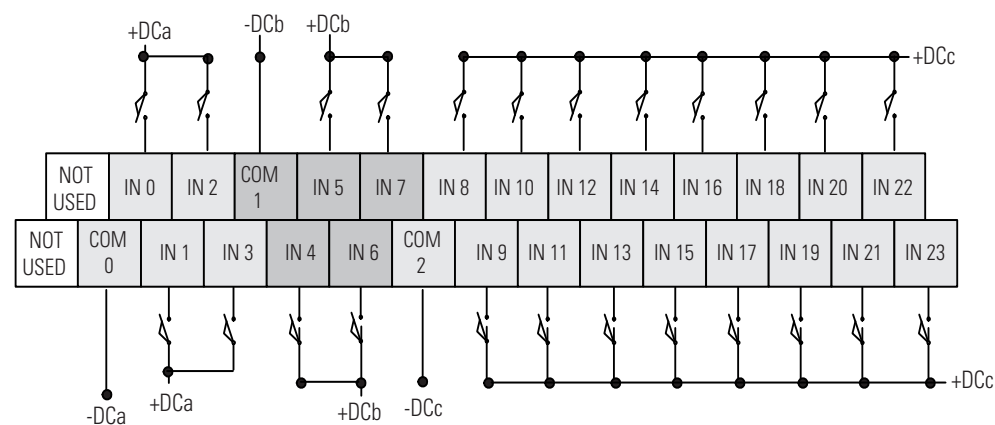


Figure 31 - 1762-L40BWB and 1762-L40BWB-R Sinking Input Wiring Diagram



Communication Connections

Introduction

The method you use and cabling required to connect your controller depends on what type of system you are employing. This chapter also describes how the controller establishes communication with the appropriate network.

MicroLogix 1200 controllers with the additional communications port (1762-L24AWAR, 1762-L24BWAR, 1762-L24BXBR, 1762-L40AWAR, 1762-L40BWAR, 1762-L40BXBR) offer advanced communications options, providing a clean, cost effective solution for applications requiring a network connection and HMI.

The additional communications port (Programmer/HMI Port) enables two communication devices to be connected to the controller simultaneously. For example, it provides local connectivity of an operator interface or programming terminal such as DF1 PanelView™ HMI, IBM-compatible personal computer using RSLogix 500 programming software, or 1747-PSD program storage device, and also allows the primary port (Channel 0) to be connected to either a network, a modem, or an ASCII device such as a barcode reader or weigh scale.

Supported Communication Protocols

MicroLogix 1200 controllers support the following communication protocols from the primary RS-232 communication channel, Channel 0:

- DH-485
- DF1 Full-duplex
- DF1 Half-duplex master and slave
- DF1 Radio modem
- Modbus RTU master and slave
- ASCII

The 1762-L24AWAR, 1762-L24BWAR, 1762-L24BXBR, 1762-L40AWAR, 1762-L40BWAR, and 1762-L40BXBR controllers are equipped with an additional RS-232 communication channel called the Programmer/HMI port, which supports DF1 Full-duplex only. The controller cannot initiate messages through this port. It can only respond to messages sent to it. All communication parameters are fixed and cannot be changed by a user.

See [Default Communication Configuration on page 53](#) for the configuration settings.

For more information on MicroLogix 1200 communications, see MicroLogix 1200 and MicroLogix 1500 Programmable Controllers Instruction Set Reference Manual, publication [1762-RM001](#).

Default Communication Configuration

The MicroLogix 1200 has the following default communication configuration. The same default configuration is applied for both Channel 0 and the Programmer/HMI Port (for 1762-LxxxxR only). The configurations for the Programmer/HMI Port are fixed and you cannot change them.



For Channel 0, the default configuration is present when:

- The controller is powered-up for the first time
- The Communications Toggle push button specifies default communications (the DCOMM LED is on)
- An OS upgrade is completed

See [Connect to Networks via RS-232 Interface on page 97](#) for more information on communicating.

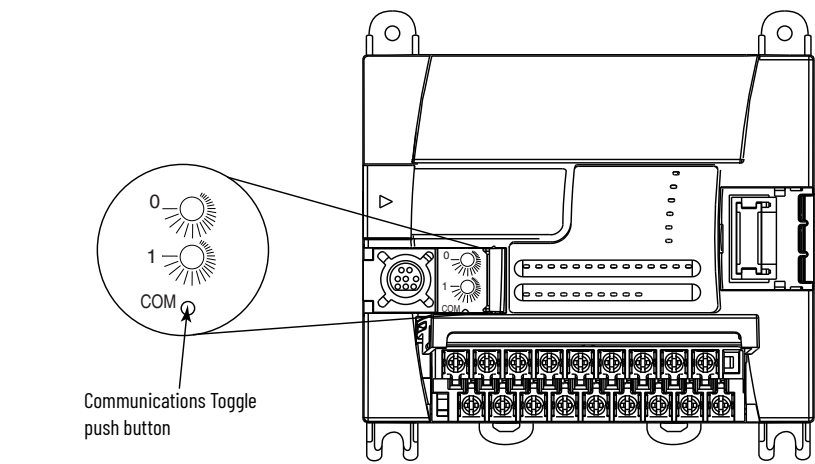
Table 6 - DF1 Full-duplex Default Configuration Parameters

Parameter	Default
Baud Rate	19.2K
Parity	none
Source ID (Node Address)	1
Control Line	no handshaking
Stop Bits	1

Use the Communications Toggle Push Button

The Communications Toggle push button is located on the processor under the processor door (if installed), as shown below.

Use the Communications Toggle push button to change from the user-defined communication configuration to the default communications mode and back on Channel 0. The parameters of the Programmer/HMI Port are fixed at the default communications configuration. The Default Communications (DCOMM) LED operates to show when the controller is in the default communications mode (settings shown in [Table 6](#)).



The Communications Toggle push button must be pressed and held for one second to activate.
The Communications Toggle push button only affects the communication configuration of Channel 0.

Connect to the RS-232 Port

There are two ways to connect the MicroLogix 1200 programmable controller to your computer using the DF1 protocol: using a point-to-point connection, or using a modem. Descriptions of these methods follow.



ATTENTION: All devices connected to the RS-232 communication port must be referenced to controller ground, or be floating (not referenced to a potential other than ground). Failure to follow this procedure may result in property damage or personal injury.

- For 1762-L24BWA, 1762-L40BWA, 1762-L24BWAR and 1762-L40BWAR controllers: The COM of the sensor supply is also connected to chassis ground internally. The 24V DC sensor power source should not be used to power output circuits. It should only be used to power input devices.
- For 1762-L24BXB, 1762-L40BXB, 1762-L24BXHR and 1762-L40BXHR controllers: The VDC NEUT or common terminal of the power supply is also connected to chassis ground internally.

Specifications

Controller Specifications

General Specifications

Attribute	1762-L24AWA 1762-L24AWAR	1762-L24BWA 1762-L24BWAR	1762-L24BXB 1762-L24BXHR	1762-L40AWA 1762-L40AWAR	1762-L40BWA 1762-L40BWAR	1762-L40BXB 1762-L40BXHR
Dimensions	Height: 90 mm (3.54 in.), 104 mm (4.09 in.) (with DIN latch open) Width: 110 mm (4.33 in.) Depth: 87 mm (3.42 in.)			Height: 90 mm (3.54 in.), 104 mm (4.09 in.) (with DIN latch open) Width: 160 mm (6.30 in.) Depth: 87 mm (3.42 in.)		
Shipping weight	0.9 kg (2.0 lbs)			1.1 kg (2.4 lbs)		
Number of I/O	14 inputs, 10 outputs			24 inputs, 16 outputs		
Power supply voltage	100...240V AC (-15%, +10%) @ 47...63 Hz		24V DC (-15%, +10%) Class 2, SELV	100...240V AC (-15%, +10%) @ 47...63 Hz		24V DC (-15%, +10%) Class 2, SELV
Heat dissipation	15.2 W	15.7 W	17.0 W	21.0 W	22.0 W	27.9 W
Power supply inrush current	120V AC: 25 A for 8 ms 240V AC: 40 A for 4 ms		24V DC: 15 A for 20 ms	120V AC: 25 A for 8 ms 240V AC: 40 A for 4 ms		24V DC: 15 A for 30 ms
Power supply usage	68VA	70VA	27 W	80VA	82VA	40 W
Power supply output	5V DC	400 mA	400 mA ⁽¹⁾	600 mA	600 mA ⁽²⁾	600 mA
	24V DC	350 mA	350 mA ⁽¹⁾	500 mA	500 mA ⁽²⁾	500 mA
Sensor power output	none	250 mA @ 24V DC AC Ripple < 500 mV peak-to-peak 400 µF max. ⁽¹⁾	none	none	400 mA @ 24V DC AC Ripple < 500 mV peak-to-peak 400 µF max. ⁽²⁾	none
Input circuit type	120V AC	24V DC sinking/sourcing	24V DC sinking/sourcing	120V AC	24V DC sinking/sourcing	24V DC sinking/sourcing
Output circuit type	Relay	Relay	Relay/FET	Relay	Relay	Relay/FET
Terminal screw torque	0.791 N•m (7 lb•in) rated					

(1) Do not allow the total load power consumed by the 5V DC, 24V DC, and sensor power outputs to exceed 12 W.

(2) Do not allow the total load power consumed by the 5V DC, 24V DC, and sensor power outputs to exceed 16 W.

See [System Loading and Heat Dissipation on page 105](#) for system validation worksheets.

Input Specifications

Attribute	1762-L24AWA 1762-L40AWA 1762-L24AWAR 1762-L40AWAR	1762-L24BWA, 1762-L24BXB, 1762-L40BWA, 1762-L40BXB 1762-L24BWAR, 1762-L24BXHR, 1762-L40BWAR, 1762-L40BXHR	
		Inputs 0...3	Inputs 4 and Higher
On-state voltage range	79...132V AC	14...24V DC (+10% @ 55 °C/131 °F) (+25% @ 30 °C/86 °F)	10...24V DC (+10% @ 55 °C/131 °F) (+25% @ 30 °C/86 °F)
Off-state voltage range	0...20V AC	0...5V DC	
Operating frequency	47...63 Hz	0 Hz...20 kHz	0 Hz...1 kHz (scan time dependent)
On-state current: Minimum Nominal Maximum	5.0 mA @ 79V AC 12 mA @ 120V AC 16.0 mA @ 132V AC	2.5 mA @ 14V DC 7.3 mA @ 24V DC 12.0 mA @ 30V DC	2.0 mA @ 10V Dc 8.9 mA @ 24V Dc 12.0 mA @ 30V DC
Off-state leakage current	2.5 mA max.	1.5 mA min.	
Nominal impedance	12 kΩ @ 50 Hz 10 kΩ @ 60 Hz	3.3 kΩ	2.7 kΩ
Inrush current @ 120V AC, max	250 mA	Not applicable	

Output Specifications

Attribute		1762-L24AWA 1762-L24BWA 1762-L24AWAR 1762-L24BWAR	1762-L24BXB 1762-L24BXBR	1762-L40AWA 1762-L40BWA 1762-L40AWAR 1762-L40BWAR	1762-L40BXB 1762-L40BXBR
Relay and FET Outputs					
Controlled load, max		1440VA	–	1440VA	1440VA
Continuous current, max					
Current per group common		8 A	7.5 A	8 A	8 A
Current per controller	@ 150V max	30 A or total of per-point loads, whichever is less			
	@ 240V max	20 A or total of per-point loads, whichever is less			
Relay Outputs					
Turn on time/Turn off time, min		10 ms ⁽¹⁾			
Relay life - Electrical		See Figure 73			
Relay life - Mechanical		20,000,000 cycles			
Load current, min		10 mA			

(1) Scan time dependent

Relay Contact Ratings

Maximum Volts	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	2.5 A ⁽¹⁾	1800VA	180VA
125V DC	0.22 A ⁽²⁾		1.0 A	28VA	
24V DC	1.2 A ⁽²⁾		2.0 A		

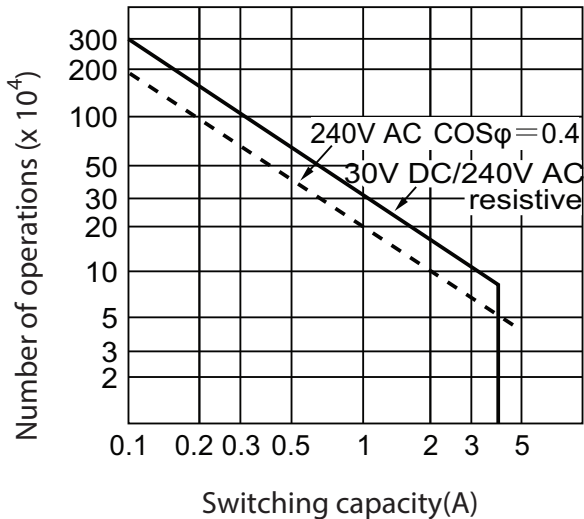
(1) 1.5 A above 40 °C (104 °F).

(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, 28VA/48V DC = 0.58 A. For DC voltage applications less than 14V, the make/break ratings for relay contacts cannot exceed 2 A.



ATTENTION: Do not exceed the “Current per group common” specification.

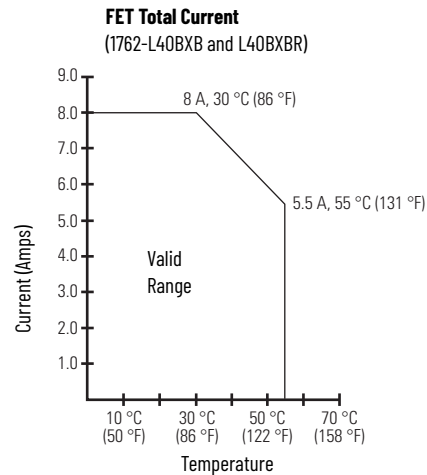
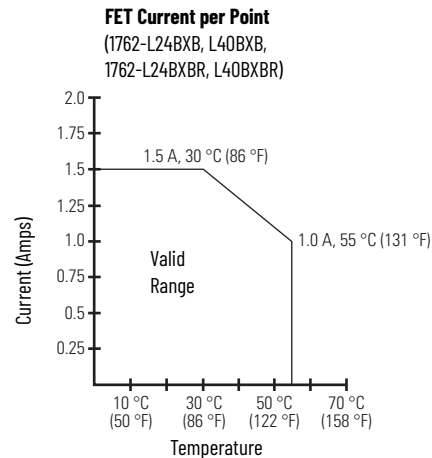
Figure 73 - Relay Life Chart



BXB FET Output Specifications

Attribute	General Operation	High Speed Operation ⁽¹⁾ (Output 2 Only)
Power supply voltage	24V DC (-15%, +10%)	
On-state voltage drop: At maximum load current At maximum surge current	1V DC 2.5V DC	Not applicable Not applicable
Current rating per point: Maximum load Minimum load Maximum leakage	See graphs below. 1.0 mA 1.0 mA	100 mA 10 mA 1.0 mA

Maximum output current (temperature dependent):



Surge current per point: Peak current Maximum surge duration Maximum rate of repetition @ 30 °C (86 °F) Maximum rate of repetition @ 55 °C (131 °F)	4.0 A 10 ms Once every second Once every 2 seconds	Not applicable Not applicable Not applicable Not applicable
Turn-on time, max	0.1 ms	6 µs
Turn-off time, max	1.0 ms	18 µs
Repeatability, max	Not applicable	2 µs
Drift, max	Not applicable	1 µs per 5 °C (41 °F)

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

AC Input Filter Settings

Nominal Filter Setting (ms)	On-delay (ms)		Off-delay (ms)	
	Minimum	Maximum	Minimum	Maximum
8	2	20	10	20

Fast DC Input Filter Settings (Inputs 0...3)

Nominal Filter Setting (ms)	On-delay (ms)		Off-delay (ms)		Maximum Counter Frequency 50% Duty Cycle
	Minimum	Maximum	Minimum	Maximum	
0.025	0.005	0.025	0.005	0.025	20.0 kHz
0.075	0.040	0.075	0.045	0.075	6.7 kHz
0.100	0.050	0.100	0.060	0.100	5.0 kHz
0.250	0.170	0.250	0.210	0.250	2.0 kHz
0.500	0.370	0.500	0.330	0.500	1.0 kHz
1.00	0.700	1.000	0.800	1.000	0.5 kHz
2.000	1.700	2.000	1.600	2.000	250 Hz

Fast DC Input Filter Settings (Inputs 0...3) (Continued)

Nominal Filter Setting (ms)	On-delay (ms)		Off-delay (ms)		Maximum Counter Frequency 50% Duty Cycle
	Minimum	Maximum	Minimum	Maximum	
4.000	3.400	4.000	3.600	4.000	125 Hz
8.000 ⁽¹⁾	6.700	8.000	7.300	8.000	63 Hz
16.000	14.000	16.000	14.000	16.000	31 Hz

(1) This is the default setting.

Normal DC Input Filter Settings (Inputs 4 and Higher)

Nominal Filter Setting (ms)	On-delay (ms)		Off-delay (ms)		Maximum Frequency 50% Duty Cycle
	Minimum	Maximum	Minimum	Maximum	
0.500	0.090	0.500	0.020	0.500	1.0 kHz
1.000	0.500	1.000	0.400	1.000	0.5 kHz
2.000	1.100	2.000	1.300	2.000	250 Hz
4.000	2.800	4.000	2.700	4.000	125 Hz
8.000 ⁽¹⁾	5.800	8.000	5.300	8.000	63 Hz
16.000	11.000	16.000	10.000	16.000	31 Hz

(1) This is the default setting.

Working Voltage – 1762-L24AWA, 1762-L40AWA, 1762-L24AWAR, 1762-L40AWAR

Attribute	Value
Power supply input to backplane isolation	Verified by one of the following dielectric tests: 1836V AC for 1 second or 2596V DC for 1 second
	265V AC Working Voltage (IEC Class 2 reinforced insulation)
Input group to backplane isolation	Verified by one of the following dielectric tests: 1517V AC for 1 second or 2145V DC for 1 second
	132V AC Working Voltage (IEC Class 2 reinforced insulation)
Input group to input group isolation	Verified by one of the following dielectric tests: 1517V AC for 1 second or 2145V DC for 1 second
	132V AC Working Voltage (basic insulation)
Output group to backplane isolation	Verified by one of the following dielectric tests: 1836V AC for 1 second or 2596V DC for 1 second
	265V AC Working Voltage (IEC Class 2 reinforced insulation)
Output group to output group isolation	Verified by one of the following dielectric tests: 1836V AC for 1 second or 2596V DC for 1 second
	265V AC Working Voltage (basic insulation) 150V AC Working Voltage (IEC Class 2 reinforced insulation).

Working Voltage – 1762-L24BWA, 1762-L40BWA, 1762-L24BWAR, 1762-L40BWAR

Attribute	Value
Power supply input to backplane isolation	Verified by one of the following dielectric tests: 1836V AC for 1 second or 2596V AC for 1 second
	265V AC Working Voltage (IEC Class 2 reinforced insulation)
Input group to backplane isolation and input group to input group isolation	Verified by one of the following dielectric tests: 1200V AC for 1 second or 1697V DC for 1 second
	75V DC Working Voltage (IEC Class 2 reinforced insulation)
Output group to backplane isolation	Verified by one of the following dielectric tests: 1836V AC for 1 second or 2596V DC for 1 second
	265V AC Working Voltage (IEC Class 2 reinforced insulation)
Output group to output group isolation	Verified by one of the following dielectric tests: 1836V AC for 1 second or 2596V DC for 1 second
	265V AC Working Voltage (basic insulation) 150V Working Voltage (IEC Class 2 reinforced insulation)

Working Voltage – 1762-L24BXB, 1762-L40BXB, 1762-L24BXBR, 1762-L40BXBR

Attribute	Value
Input group to backplane isolation and input group to input group isolation	Verified by one of the following dielectric tests: 1200V AC for 1 second or 1697V DC for 1 second
	75V DC Working Voltage (IEC Class 2 reinforced insulation)
FET output group to backplane isolation	Verified by one of the following dielectric tests: 1200V AC for 1 second or 1697V DC for 1 second
	75V DC Working Voltage (IEC Class 2 reinforced insulation)

Working Voltage – 1762-L24BXB, 1762-L40BXB, 1762-L24BXHR, 1762-L40BXHR (Continued)

Attribute	Value
Relay output group to backplane isolation	Verified by one of the following dielectric tests: 1836V AC for 1 second or 2596V DC for 1 second 265V AC Working Voltage (IEC Class 2 reinforced insulation).
Relay output group to relay output group and FET output group isolation	Verified by one of the following dielectric tests: 1836V AC for 1 second or 2596V DC for 1 second 265V AC Working Voltage (basic insulation) 150V Working Voltage (IEC Class 2 reinforced insulation)

Environmental Specifications

Attribute	1762-L24AWA 1762-L24AWAR	1762-L24BWA 1762-L24BWAR	1762-L24BXB 1762-L24BXHR	1762-L40AWA 1762-L40AWAR	1762-L40BWA 1762-L40BWAR	1762-L40BXB 1762-L40BXHR
Temperature, operating	0...55 °C (32...131 °F) ambient					
Temperature, storage	-40...+85 °C (-40...+185 °F) ambient					
Operating humidity	5...95% relative humidity (non-condensing)					
Vibration	Operating: 10...500 Hz, 5 G, 0.030 in. max. peak-to-peak, 2 hours each axis Relay Operation: 1.5 G					
Shock	Operating: 30 G; 3 pulses each direction, each axis Relay Operation: 7 G Non-Operating: 50 G panel mounted (40 G DIN Rail mounted); 3 pulses each direction, each axis					
Agency certification	UL 508 C-UL under CSA C22.2 no. 142 Class I Div. 2, Groups A, B, C, D (UL 1604, C-UL under CSA C22.2 no. 213) CE/RCM compliant for all applicable directives					
Electrical/EMC	The controller has passed testing at the following levels: EN 61000-4-2: 4 kV contact, 8 kV air, 4 kV indirect EN 61000-4-3: 10V/m, 80 to 1000 MHz, 80% amplitude modulation, +900 MHz keyed carrier EN 61000-4-4: 2 kV, 5 kHz; communications cable: 1 kV, 5 kHz EN 61000-4-5: communications cable 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) EN 61000-4-6: 10V, communications cable 3V					

Expansion I/O Specifications**Discrete I/O Modules****General Specifications – Discrete I/O Modules**

Attribute	Value
Dimensions	Height: 90 mm (3.54 in.), 110 mm (4.33 in.) (including mounting tabs) Width: 87 mm (3.43 in.) Depth: 40.4 mm (1.59 in.)
Enclosure type rating	None (open-style)

Input Specifications – 1762-IA8, 1762-IQ8, 1762-IQ16, 1762-IQ32T, 1762-IQ80W6

Attribute	1762-IA8	1762-IQ8	1762-IQ16	1762-IQ32T	1762-IQ80W6
Shipping weight, approx. (with carton)	209 g (0.46 lbs.)	200 g (0.44 lbs.)	230 g (0.51 lbs.)	200g (0.44 lbs.)	280g (0.62 lbs.)
Voltage category	100/120V AC	24V DC (sinking/sourcing) ⁽¹⁾	24V DC (sinking/sourcing) ⁽¹⁾	24V DC (sinking/sourcing) ⁽¹⁾	24V DC (sinking/sourcing) ⁽¹⁾
Operating voltage range	79...132V AC at 47...63 Hz	10...30V DC at 30 °C (86 °F) 10...26.4V DC at 55 °C (131 °F)	10...30V DC 10...26.4V DC ⁽²⁾⁽³⁾	10...30V DC (24 points) at 30 °C (86 °F) 10...26.4V DC (23 points) at 60 °C (140 °F)	10...30V DC at 30 °C (86 °F) 10...26.4V DC at 65 °C (149 °F)
Number of inputs	8	8	16	32	8
Bus current draw, max	50 mA at 5V DC (0.25 W)	50 mA at 5V DC (0.25 W)	70 mA at 5V DC (0.35 W) ⁽³⁾	170 mA at 5V DC 0 mA at 24V DC	110 mA at 5V DC 80 mA at 24V DC

Input Specifications – 1762-IA8, 1762-IQ8, 1762-IQ16, 1762-IQ32T, 1762-IQ80W6 (Continued)

Attribute	1762-IA8	1762-IQ8	1762-IQ16	1762-IQ32T	1762-IQ80W6
Heat dissipation, max	2.0 W	3.7 W	4.3 W at 26.4V DC 5.4 W at 30V DC ⁽³⁾	5.4 W at 26.4V DC 6.8 W at 30V DC	5.0 W at 30V DC 4.4 W at 26.4V DC (The Watts per point, plus the min W, with all points energized)
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 current, max	2.5 mA	1.5 mA	1.5 mA	1.0 mA	1.5 mA
On-state voltage, min	79V AC (min) 132V AC (max)	10V DC	10V DC	10V DC	10V DC
On-state current	5.0 mA min at 79V AC 47 Hz 12.0 mA nom. at 120V AC 60 Hz 16.0 mA max at 132V AC 63 Hz	2.0 mA min at 10V DC 8.0 mA nom. at 24V DC 12.0 mA max at 30V DC	2.0 mA min at 10V DC 8.0 mA nom. at 24V DC 12.0 mA max at 30V DC	1.6 mA min at 10V DC 2.0 mA min at 15V DC 5.7 mA max at 26.4V DC 6.5 mA max at 30.0V DC	10 mA at 5V DC
Inrush current, max	250 mA	Not applicable	Not applicable	Not applicable	250 mA
Nominal impedance	12 kΩ at 50 Hz 10 kΩ at 60 Hz	3 kΩ	3 kΩ	4.7 kΩ	3 kΩ
IEC input compatibility	Type 1+	Type 1+	Type 1+	Type 1	Type 1+
Isolated groups	Group 1: inputs 0...7 (internally connected commons)	Group 1: inputs 0...7 (internally connected commons)	Group 1: inputs 0...7; Group 2: inputs 8...15	Group 1: Inputs 0...7; Group 2: Inputs 8...15; Group 3: Inputs 16...23; Group 4: Inputs 24...31	Group 1: inputs 0...3; Group 2: inputs 4...7
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 ACAC 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: 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: 1200V AC for 2 s or 1697V DC for 2 s 75V DC 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)
Vendor ID code	1				
Product type code	7				
Product code	114	96	97	99	98

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

Output Specifications – 1762-OA8, 1762-OB8, 1762-OB16, 1762-OB32T, 1762-OV32T

Attribute	1762-OA8	1762-OB8	1762-OB16	1762-OB32T	1762-OV32T
Shipping weight, approx. (with carton)	215 g (7.58 oz.)	210 g (7.41 oz.)	235 g (8.29 oz.)	200 g (7.05 oz.)	200 g (7.05 oz.)
Voltage category	100...240V AC	24V DC	24V DC	24V DC sourcing	24V DC sinking
Operating voltage range	85...265V AC at 47...63 Hz	20.4...26.4V DC	20.4...26.4V DC	10.2...26.4V DC	10.2...26.4V DC
Number of outputs	8	8	16	32	32
Bus current draw, max	115 mA at 5V DC (0.575 W)	115 mA at 5V DC (0.575 W)	175 mA at 5V DC (0.88 W)	175 mA at 5V DC 0 mA at 24V DC	175 mA at 5V DC 0 mA at 24V DC
Heat dissipation, max	2.9 W	1.61 W	2.9 W at 30 °C (86 °F) 2.1 W at 55 °C (131 °F)	3.4 W at 26.4 DC	2.7 W at 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	On delay: 0.5 ms Off delay: 4.0 ms
Off-state leakage current, max	2 mA at 132V 2.5 mA at 265V	1.0 mA	1.0 mA	0.1 mA at 26.4V DC	0.1 mA at 26.4V DC
On-state current, min	10 mA	1.0 mA	1.0 mA	1.0 mA	1.0 mA
On-state voltage drop, max	1.5V at 0.5 A	1.0V DC	1.0V DC	0.3V DC at 0.5 A	0.3V DC at 0.5 A
Continuous current per point, max	0.25 A at 55 °C (131 °F) 0.5 A at 30 °C (86 °F)	0.5 A at 55 °C (131 °F) 1.0 A at 30 °C (86 °F)	0.5 A at 55 °C (131 °F) 1.0 A at 30 °C (86 °F)	0.5 A at 60 °C (140 °F)	0.5 A at 60 °C (140 °F)
Continuous current per common, max	1.0 A at 55 °C (131 °F) 2.0 A at 30 °C (86 °F)	4.0 A at 55 °C (131 °F) 8.0 A at 30 °C (86 °F)	4.0 A at 55 °C (131 °F) 8.0 A at 30 °C (86 °F)	2.0 A at 60 °C (140 °F)	2.0 A at 60 °C (140 °F)

Troubleshoot Your System

Understand the Controller Status Indicators

The controller status indicators provide a mechanism to determine the current status of the controller if a programming device is not present or available.

Figure 75 - Controller Status Indicator Location

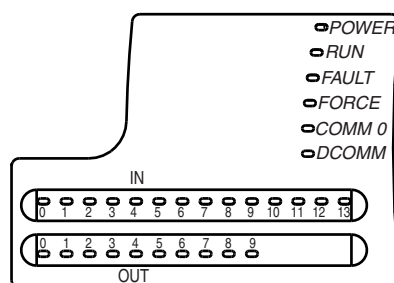


Table 21 - Controller Status Indicators

Status Indicator	Color	Indicates
POWER	Off	No input power or power error condition
	Steady green	Power on
RUN	Off	Not executing the user program
	Steady green	Executing the user program in run mode
	Flashing green	Memory module transfer occurring
FAULT	Off	No fault detected
	Flashing red	Application fault detected
	Steady red	Controller hardware faulted
FORCE	Off	No forces installed
	Steady amber	Forces installed
COMM 0 ⁽¹⁾	Off	Not transmitting via RS-232 port
	Steady green	Transmitting via RS-232 port
DCOMM ⁽²⁾	Off	Configured communications
	Steady green	Default communications
INPUTS	Off	Input is not energized
	Steady amber	Input is energized (terminal status)
OUTPUTS	Off	Output is not energized
	Steady amber	Output is energized (logic status)

(1) 1762-L24AWAR, 1762-L24BWAR, 1762-L24BXHR, 1762-L40AWAR, 1762-L40BWAR, 1762-L40BXHR controllers are equipped with an additional communications port (Programmer/HMI Port) but provide no additional LED indicator indicating its operational status.

(2) When using a 1762-L24AWAR, 1762-L24BWAR, 1762-L24BXHR, 1762-L40AWAR, 1762-L40BWAR, or 1762-L40BXHR controller, the DCOMM LED applies only to Channel 0.

Normal Operation

The POWER and RUN status indicators are On. If a force condition is active, the FORCE status indicator turns on and remains on until all forces are removed.

Error Conditions

If an error exists within the controller, the controller LEDs operate as described in [Table 22](#).

Table 22 - List of Error Conditions

If the LEDS Indicate	The Following Error Exists	Probable Cause	Recommended Action
All LEDs off	No input power or power supply error	No line power	Verify proper line voltage and connections to the controller.
		Power supply overloaded	This problem can occur intermittently if power supply is overloaded when output loading and temperature varies.
Power and FAULT LEDs on solid	Hardware faulted	Processor hardware error	Cycle power. Contact your local Allen-Bradley representative if the error persists.
		Loose wiring	Verify connections to the controller.
Power LED on and FAULT LED flashing	Application fault	Hardware/software major fault detected	For error codes and Status File information, see MicroLogix 1200 and MicroLogix 1500 Programmable Controllers Instruction Set Reference Manual, publication 1762-RM001 .
RUN, FORCE, and FAULT LEDs all flashing	Operating system fault	Missing or corrupt operating system	See Missing or Corrupt OS LED Pattern on page 96 .

Table 31 - Calculating the Current for Expansion I/O (Continued)

Catalog Number ⁽¹⁾	n	A	B	n x A	n x B
	Number of Modules	Device Current Requirements (max)		Calculated Current	
		@ 5V DC (mA)	@ 24V DC (mA)	@ 5V DC (mA)	@ 24V DC (mA)
1762-0W16		140 ⁽²⁾	180 ⁽²⁾		
1762-0X6I		110	110		
1762-IQ80W6		110	80		
Total Modules (6 maximum):	4	Subtotal 2:		260	180

(1) See your expansion I/O Installation Instructions for Current Requirements not listed in this table.

(2) Only applicable for series B and series C I/O modules.

Validate the System

The example systems that are shown in [Table 32](#) and [Table 33](#) are verified to be acceptable configurations. The systems are valid because:

- Calculated Current Values < Maximum Allowable Current Values
- Calculated System Loading < Maximum Allowable System Loading

Table 32 - Validating Systems Using 1762-L24AWA, 1762-L24BXB, 1762-L24AWAR or 1762-L24BXHR

Maximum Allowable Values		Calculated Values	
Current		Current (Subtotal 1 from Table 30 + Subtotal 2 from Table 31)	
400 mA @ 5V DC	350 mA @ 24V DC	0 mA + 260 mA = 260 mA @ 5V DC	120 mA + 180 mA = 300 mA @ 24V DC
System Loading		System Loading	
10.4 W		$= (260 \text{ mA} \times 5 \text{ V}) + (300 \text{ mA} \times 24 \text{ V})$ $= (1300 \text{ mW}) + (7200 \text{ mW})$ $= 8500 \text{ mW}$ $= 8.50 \text{ W}$	

Table 33 - Validating Systems using 1762-L24BWA or 1762-L24BWAR

Maximum Allowable Values		Calculated Values	
Current for Devices Connected to the +24V DC Sensor Supply		Sum of all sensor currents	
250 mA @ 24V DC		140 mA @ 24V DC (example sensor value)	
Current for MicroLogix Accessories and Expansion I/O		Current Values (Subtotal 1 from Table 30 + Subtotal 2 from Table 31)	
400 mA @ 5V DC	350 mA @ 24V DC	0 mA + 260 mA = 260 mA @ 5V DC	120 mA + 180 mA = 300 mA @ 24V DC
System Loading		System Loading	
12 W		$= (140 \text{ mA} \times 24 \text{ V}) + (260 \text{ mA} \times 5 \text{ V}) + (300 \text{ mA} \times 24 \text{ V})$ $= (3360 \text{ mW}) + (1300 \text{ mW}) + (7200 \text{ mW})$ $= 11,860 \text{ mW}$ $= 11.9 \text{ W}$	

System Loading Example Calculations (40-point Controller)

Current Loading

Table 34 - Calculating the Current for MicroLogix Accessories

Catalog Number	Device Current Requirements		Calculated Current	
	@ 5V DC (mA)	@ 24V DC (mA)	@ 5V DC (mA)	@ 24V DC (mA)
1761-NET-AIC ⁽¹⁾ when powered by the base unit communications port, selector switch in the up position	0	120	0	120
Subtotal 1:			0	120

(1) This is an optional accessory. Current is consumed only if the accessory is installed.

Table 35 - Calculating the Current for Expansion I/O

Catalog Number ⁽¹⁾	n	A	B	n x A	n x B
	Number of Modules	Device Current Requirements (max)		Calculated Current	
		@ 5V DC (mA)	@ 24V DC (mA)	@ 5V DC (mA)	@ 24V DC (mA)
1762-IA8		50	0		
1762-IF4		40	50		
1762-IF20F2	1	40	105	40	105
1762-IQ8		50	0		
1762-IQ16	2	70 ⁽²⁾	0	140 ⁽²⁾	0
1762-IQ32T		170	0		
1762-IR4		40	50		
1762-IT4		40	50		
1762-OA8	1	115	0	115	0
1762-OB8		115	0		
1762-OB16		175	0		
1762-OB32T		175	0		
1762-OF4		40	165		
1762-OV32T		175	0		
1762-OW8		80	90		
1762-OW16	1	140 ⁽²⁾	180 ⁽²⁾	140 ⁽²⁾	180 ⁽²⁾
1762-OX6I		110	110		
1762-IQ8OW6		110	80		
Total Modules (6 maximum):	5	Subtotal 2:		435	285

(1) See your expansion I/O Installation Instructions for Current Requirements not listed in this table.

(2) Only applicable for series B and series C I/O modules.

Validate the System

The example systems that are shown in [Table 36](#) and [Table 41](#) are verified to be acceptable configurations. The systems are valid because:

- Calculated Current Values < Maximum Allowable Current Values
- Calculated System Loading < Maximum Allowable System Loading

Table 36 - Validating Systems using 1762-L40AWA, 1762-L40BXB, 1762-L40AWAR or 1762-L40BXHR

Maximum Allowable Values		Calculated Values	
Current		Current (Subtotal 1 from Table 34 + Subtotal 2 from Table 35)	
600 mA @ 5V DC	500 mA @ 24V DC	0 mA + 435 mA = 435 mA @ 5V DC	120 mA + 285 mA = 405 mA @ 24V DC
System Loading		System Loading	
15 W		= (4.5 mA x 5V) + (405 mA x 24V) = (2175 mW) + (9720 mW) = 11,895 mW = 11.90 W	

System Loading Worksheet for 24-point Controllers

[Table 37](#), [Table 38](#), [Table 39](#), and [Table 40](#) are provided for system loading validation for 24-point controllers. See [System Loading Example Calculations \(24-point Controller\) on page 105](#).

Current Loading

Table 37 - Calculating the Current for MicroLogix Accessories

Catalog Number	Device Current Requirements		Calculated Current	
	@ 5V DC (mA)	@ 24V DC (mA)	@ 5V DC (mA)	@ 24V DC (mA)
1761-NET-AIC ⁽¹⁾ when powered by the base unit communications port, selector switch in the up position	0	120		
Subtotal 1:				

(1) This is an optional accessory. Current is consumed only if the accessory is installed.

Table 38 - Calculating the Current for Expansion I/O

Catalog Number ⁽¹⁾	n	A	B	n x A	n x B
	Number of Modules	Device Current Requirements (max)		Calculated Current	
		@ 5V DC (mA)	@ 24V DC (mA)	@ 5V DC (mA)	@ 24V DC (mA)
1762-IA8		50	0		
1762-IF4		40	50		
1762-IF20F2		40	105		
1762-IQ8		50	0		
1762-IQ16		70 ⁽²⁾	0		
1762-IQ32T		170	0		
1762-IR4		40	50		
1762-IT4		40	50		
1762-OA8		115	0		
1762-OB8		115	0		
1762-OB16		175	0		
1762-OB32T		175	0		
1762-OF4		40	165		
1762-OV32T		175	0		
1762-OW8		80	90		
1762-OW16		140 ⁽²⁾	180 ⁽²⁾		
1762-OX6I		110	110		
1762-IQ80W6		110	80		
Total Modules (6 maximum):		Subtotal 2:			

(1) See your expansion I/O Installation Instructions for Current Requirements not listed in this table.

(2) Only applicable for series B and series C I/O modules.

Table 39 - Validating Systems using 1762-L24AWA, 1762-L24BXB, 1762-L24AWAR or 1762-L24BXHR

Maximum Allowable Values		Calculated Values	
Current		Current (Subtotal 1 from Table 37 + Subtotal 2 from Table 38)	
400 mA @ 5V DC	350 mA @ 24V DC	mA @ 5V DC	mA @ 24V DC
System Loading		System Loading	
10.4 W		= (_____ mA x 5V) + (_____ mA x 24V) = _____ mW + _____ mW = _____ mW = _____ W	

Table 40 - Validating Systems using 1762-L24BWA or 1762-L24BWAR

Maximum Allowable Values		Calculated Values	
Current for Devices Connected to the +24V DC Sensor Supply		Sum of all sensor currents Include 1761-NET-AIC here rather than in Table 37 , if it is powered externally by the sensor supply.	
250 mA @ 24V DC		mA @ 24V DC	
Current for MicroLogix Accessories and Expansion I/O		Current (Subtotal 1 from Table 37 + Subtotal 2 from Table 38)	
400 mA @ 5V DC	350 mA @ 24V DC	mA @ 5V DC	mA @ 24V DC
System Loading		System Loading	
12 W		$= (\text{----- mA} \times 24 \text{ V}) + (\text{----- mA} \times 5 \text{ V}) + (\text{----- mA} \times 24 \text{ V})$ $= \text{----- mW} + \text{----- mW} + \text{----- mW}$ $= \text{----- mW}$ $= \text{----- W}$	

Table 41 - Validating Systems using 1762-L40BWA or 1762-L40BWAR

Maximum Allowable Values		Calculated Values	
Current for Devices Connected to the +24V DC Sensor Supply		Sum of all current sensors	
400 mA @ 24V DC		150 mA @ 24V DC (example sensor value)	
Current for MicroLogix Accessories and Expansion I/O		Current (Subtotal 1 from Table 34 + Subtotal 2 from Table 35)	
600 mA @ 5V DC	500 mA @ 24V DC	0 mA + 435 mA = 435 mA @ 5V DC	120 mA + 285 mA = 405 mA @ 24V DC
System Loading		System Loading	
16 W		$= (150 \text{ mA} \times 24 \text{ V}) + (435 \text{ mA} \times 5 \text{ V}) + (405 \text{ mA} \times 24 \text{ V})$ $= (3600 \text{ mW}) + (2175 \text{ mW}) + (9720 \text{ mW})$ $= 15,495 \text{ W}$ $= 15.50 \text{ W}$	

System Loading Worksheet for 40-point Controllers

[Table 42](#), [Table 43](#), [Table 44](#), and [Table 45](#) are provided for system loading validation for 40-point Controllers. See [System Loading Example Calculations \(40-point Controller\) on page 106](#).

Current Loading

Table 42 - Calculating the Current for MicroLogix Accessories

Catalog Number	Device Current Requirements		Calculated Current	
	@ 5V DC (mA)	@ 24V DC (mA)	@ 5V DC (mA)	@ 24V DC (mA)
1761-NET-AIC ⁽¹⁾ when powered by the base unit communications port, selector switch in the up position	0	120		
Subtotal 1:				

(1) This is an optional accessory. Current is consumed only if the accessory is installed.

Table 43 - Calculating the Current for Expansion I/O

Catalog Number ⁽¹⁾	n	A	B	n x A	n x B
	Number of Modules	Device Current Requirements (max)		Calculated Current	
		@ 5V DC (mA)	@ 24V DC (mA)	@ 5V DC (mA)	@ 24V DC (mA)
1762-IA8		50	0		
1762-IF4		40	50		
1762-IF20F2		40	105		
1762-IQ8		50	0		
1762-IQ16		70 ⁽²⁾	0		
1762-IQ32T		170	0		
1762-IR4		40	50		
1762-IT4		40	50		
1762-OA8		115	0		
1762-OB8		115	0		
1762-OB16		175	0		

Table 43 - Calculating the Current for Expansion I/O (Continued)

Catalog Number ⁽¹⁾	n	A	B	n x A	n x B
	Number of Modules	Device Current Requirements (max)		Calculated Current	
		@ 5V DC (mA)	@ 24V DC (mA)	@ 5V DC (mA)	@ 24V DC (mA)
1762-OB32T		175	0		
1762-OF4		40	165		
1762-OV32T		175	0		
1762-OW8		80	90		
1762-OW16		140 ⁽²⁾	180 ⁽²⁾		
1762-OX6I		110	110		
1762-IQ8OW6		110	80		
Total Modules (6 maximum):		Subtotal 2:			

(1) See your expansion I/O Installation Instructions for Current Requirements not listed in this table.

(2) Only applicable for series B and series C I/O modules.

Table 44 - Validating Systems using 1762-L40AWA, 1762-L40BXB, 1762-L40AWAR or 1762-L40BXR

Maximum Allowable Values		Calculated Values	
Current		Current (Subtotal 1 from Table 42 + Subtotal 2 from Table 43)	
600 mA @ 5V DC	500 mA @ 24V DC	mA @ 5V DC	mA @ 24V DC
System Loading		System Loading	
15 W		= (_____ mA x 5V) + (_____ mA x 24V) = _____ mW + _____ mW = _____ mW = _____ W	

Table 45 - Validating Systems using 1762-L40BWA or 1762-L40BWAR

Maximum Allowable Values		Calculated Values	
Current for Devices Connected to the +24V DC Sensor Supply		Sum of all sensor currents Include 1761-NET-AIC here rather than in Table 42 , if it is powered externally by the sensor supply.	
400 mA @ 24V DC		mA @ 24V DC	
Current for MicroLogix Accessories and Expansion I/O		Current (Subtotal 1 from Table 42 + Subtotal 2 from Table 43)	
600 mA @ 5V DC	500 mA @ 24V DC	mA @ 5V DC	mA @ 24V DC
System Loading		System Loading	
16 Watts		= (_____ mA x 24V) + (_____ mA x 5V) + (_____ mA x 24V) = _____ mW + _____ mW + _____ mW = _____ mW = _____ W	

Calculating Heat Dissipation

Use [Table 46](#) when you must determine the heat dissipation of your system for installation in an enclosure. For System Loading, take the value from the appropriate [System Loading Worksheet for 24-point Controllers on page 107](#) or [System Loading Worksheet for 40-point Controllers on page 109](#).

Table 46 - Heat Dissipation

Catalog Number	Heat Dissipation		
	Equation or Constant	Calculation	Sub-Total
1762-L24AWA, 1762-L24AWAR	15.2 W + (0.4 x System Loading)	15.2 W + (0.4 x _____ W)	_____ W
1762-L24BWA, 1762-L24BWAR	15.7 W + (0.4 x System Loading)	15.7 W + (0.4 x _____ W)	_____ W
1762-L24BXB, 1762-L24BXR	17.0 W + (0.3 x System Loading)	17.0 W + (0.3 x _____ W)	_____ W
1762-L40AWA, 1762-L40AWAR	21.0 W + (0.4 x System Loading)	21.0 W + (0.4 x _____ W)	_____ W
1762-L40BWA, 1762-L40BWAR	22.0 W + (0.4 x System Loading)	22.0 W + (0.4 x _____ W)	_____ W
1762-L40BXB, 1762-L40BXR	27.9 W + (0.3 x System Loading)	27.9 W + (0.3 x _____ W)	_____ W
1762-IA8	2.0 W x number of modules	2.0 W x _____	_____ W
1762-IF4	2.0 W x number of modules	2.0 W x _____	_____ W
1762-IF20F2	2.6 W x number of modules	2.6 W x _____	_____ W

Table 46 - Heat Dissipation (Continued)

Catalog Number	Heat Dissipation		
	Equation or Constant	Calculation	Sub-Total
1762-IQ8	3.7 W x number of modules	3.7 W x _____	_____ W
1762-IQ16	5.1 W ⁽¹⁾ x number of modules	5.1 W ⁽¹⁾ x _____	_____ W
1762-IQ32T	6.8 W x number of modules (@ 30V DC)	6.8 W x _____ (@ 30V DC)	_____ W
	5.4 W x number of modules (@ 26.4V DC)	5.4 W x _____ (@ 26.4V DC)	_____ W
1762-IR4	1.5 W x number of modules	1.5 W x _____	_____ W
1762-IT4	1.5 W x number of modules	1.5 W x _____	_____ W
1762-OA8	2.9 W x number of modules	2.9 W x _____	_____ W
1762-OB8	1.6 W x number of modules	1.6 W x _____	_____ W
1762-OB16	2.9 W x number of modules	2.9 W x _____	_____ W
1762-OB32T	3.4 W x number of modules	3.4 W x _____	_____ W
1762-OF4	2.8 W x number of modules	2.8 W x _____	_____ W
1762-OV32T	2.7 W x number of modules	2.7 W x _____	_____ W
1762-OW8	2.9 W x number of modules	2.9 W x _____	_____ W
1762-OW16	6.1 W ⁽¹⁾ x number of modules	6.1 W ⁽¹⁾ x _____	_____ W
1762-OX6I	2.8 W x number of modules	2.8 W x _____	_____ W
1762-IQ80W6	5.0 W x number of modules (@ 30V DC)	5.0 W x _____	_____ W
	4.4 W x number of modules (@ 26.4V DC)	4.4 W x _____	_____ W
Add Subtotals to Determine Heat Dissipation			_____ W

(1) Only applicable for series B and series C I/O modules.

system loading

- calculations 105
- example calculations 105
- worksheet 107

system loading and heat dissipation 105**T****terminal 116****terminal block layouts**

- 1762-IF20F2 48
- 1762-IF4 50
- controllers 31
- terminal groupings 33

terminal groupings 33**throughput 116****Trimpot Information Function File 67****trimpot operation 67****trimpots 67**

- adjustment 67
- error conditions 67
- location 67

troubleshoot your system 89**true 116****U****upload 116****use communications toggle push button 54****use emergency-stop switches 16****use memory modules 69****use real-time clock 69****use trimpots 67****W****wire your controller 27****wiring diagram**

- 1762-IA8 40
- 1762-IF20F2 differential sensor 48
- 1762-IF20F2 single-ended sensor 49
- 1762-IQ16 41
- 1762-IQ32T 42
- 1762-IQ8 40
- 1762-IQ80W6 46
- 1762-L24AWA input 35
- 1762-L24AWA output 37
- 1762-L24BWA output 37
- 1762-L24BWA sinking 35
- 1762-L24BWA sourcing 36
- 1762-L24BWB output 37
- 1762-L24BWB sinking 36
- 1762-L24BWB sourcing 36
- 1762-L40AWA input 37
- 1762-L40AWA output 39
- 1762-L40BWA output 39
- 1762-L40BWA sourcing 38
- 1762-L40BWB output 39
- 1762-L40BWB sinking 38
- 1762-L40BWB sourcing 39
- 1762-OA8 42
- 1762-OB16 43
- 1762-OB32T 44
- 1762-OB8 43
- 1762-OV32T 44
- 1762-OW16 45
- 1762-OW8 45
- 1762-OX6I 46
- terminal block layouts 31, 48, 50

wiring diagrams 31**workspace 116****write 116**

