

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with selected official Rockwell Automation pages

ALLEN-BRADLEY COMPACTLOGIX

1769-L16ER-BB1B

COMPACTLOGIX 5370 L1 CONTROLLER

Selected official pages cover controller features, installation, power, I/O, networking and technical specifications.

Before You Begin

The CompactLogix 5370 L1, series B and C controller redesigns occurred to provide an option to use one external power supply for system power and field side power. There are differences between the CompactLogix 5370 L1, series A, B, and C controllers. Consider the following before installing a CompactLogix 5370 L1 controller:

- The embedded power supply for the following controllers is a 24V DC nominal, non-isolated power supply with an input range of 10...28.8V DC. You wire the embedded power supply via a removable connector.

Series	Catalog Number
A	1769-L16ER-BB1B
	1769-L18ER-BB1B
	1769-L18ERM-BB1B

- The embedded power supply for the following controllers is a 24V DC nominal, isolated power supply. The input range of the power supply is 10...28.8V DC. You wire the embedded power supply via a removable connector.

Series	Catalog Number
B and C	1769-L16ER-BB1B
	1769-L18ER-BB1B
	1769-L18ERM-BB1B
A and C	1769-L18ERM-BB1BK
	1769-L19ER-BB1B
	1769-L19ER-BB1BK

IMPORTANT You must use a dedicated external Class 2/SELV-approved power supply to provide power to the system, according to the needs of the application, and within the operating voltage range of the controller for only series A 1769-L16ER-BB1B, 1769-L18ER-BB1B, or 1769-L18ERM-BB1B controllers. You can't use the external power supply that provides power to the embedded power supply of the controller to provide power to any other components or devices in the application for only series A 1769-L16ER-BB1B, 1769-L18ER-BB1B, or 1769-L18ERM-BB1B controllers.

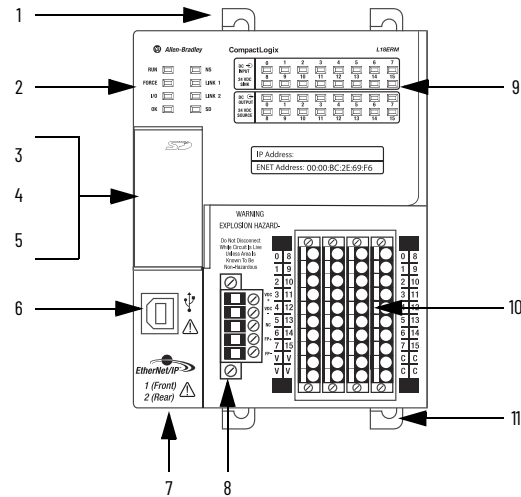
- The following controllers require a second, fused external power supply to provide power to other components.

Series	Catalog Number
A	1769-L16ER-BB1B
	1769-L18ER-BB1B
	1769-L18ERM-BB1B

- The following controllers allow the external power supply that provides power to the system to also provide power to other components.

Series	Catalog Number
B and C	1769-L16ER-BB1B
	1769-L18ER-BB1B
	1769-L18ERM-BB1B
A and C	1769-L18ERM-BB1BK
	1769-L19ER-BB1B
	1769-L19ER-BB1BK

Controller Parts



CompactLogix 5370 L1 Controller Parts

Number	Item	Description
1	Top DIN rail latches	Secures the controller to the DIN rail.
2	Controller status indicators	Show the state of the controller
3	SD card slot	Located behind the door, SD card location
4	Mode switch	Located behind the door, lets you choose the controller mode
5	Reset button	Located behind the door, lets you reset the controller to factory default state
6	USB programming port	Temporary connection to download projects
7	Ethernet ports A and B	On the bottom of the controller, connects the to an EtherNet/IP network
8	Power removable terminal block (RTB)	Connects external power supply to the controller
9	I/O status indicators	Show the state of the embedded I/O modules
10	I/O module RTB	Connects devices to the embedded I/O modules
11	Bottom DIN rail latches	Secures controller to the DIN rail

An SD card and a protective end cap ship with the controller.

Install the Secure Digital Card



WARNING: When you insert or remove the SD card while power is on, an electric arc can occur. This could cause an explosion in hazardous location installations.

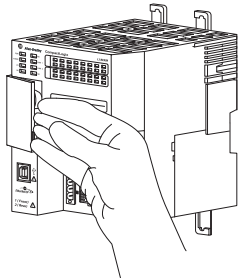
When you change switch settings while power is on, an electric arc can occur. This could cause an explosion in hazardous location installations.

The USB port is intended for temporary local programming purposes only and not intended for permanent connection. If you connect or disconnect the USB cable with power applied to this module or any device on the USB network, an electric arc can occur. This could cause an explosion in a hazardous location installation.

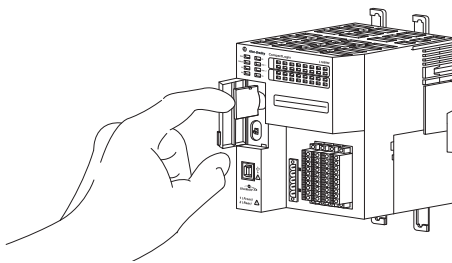
Do not use the USB port in hazardous locations.

Be sure that power is removed or the area is nonhazardous before proceeding.

1. Verify that the SD card is locked or unlocked according to your preference. Consider the following when deciding to lock the card before installation:
 - If the card is unlocked, the controller can write data to it or read data from it.
 - If the card is locked, the controller can only read data from it and you can experience issues when updating the firmware on your controller.
2. Open the SD card door.

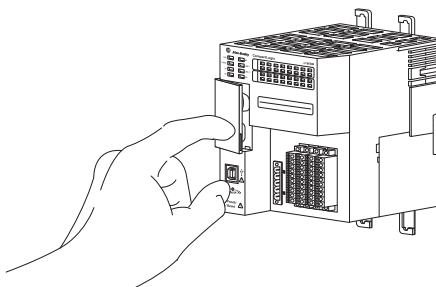


3. Insert the SD card into the SD card slot. You can install the SD card in only one orientation. The beveled corner is at the **top**.



If you feel resistance when inserting the SD card, take it out and change the orientation.

4. Gently press the card until it clicks into place.
5. Close the SD card door.



Mount the System

CompactLogix 5370 L1 control systems are mounted on a DIN rail. Install the DIN rail before completing the steps that are required to install the system.



WARNING: When used in a Class I, Division 2, hazardous location, this equipment must be mounted in a suitable enclosure with proper wiring that complies with the governing electrical codes.

Available DIN Rails

You can mount the CompactLogix 5370 L1 controller on the following DIN rails:

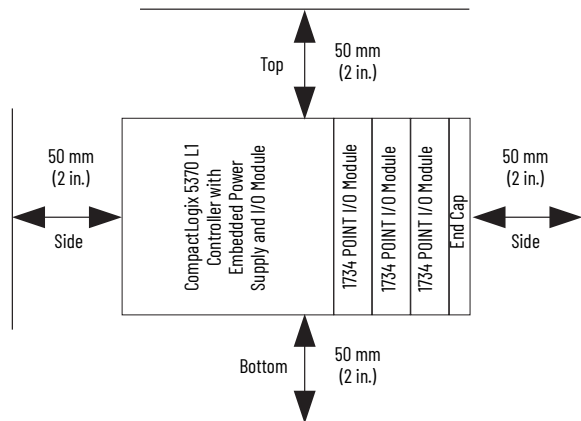
- EN 50 022 - 35 x 7.5 mm (1.38 x 0.30 in.)
- EN 50 022 - 35 x 15 mm (1.38 x 0.59 in.)

IMPORTANT

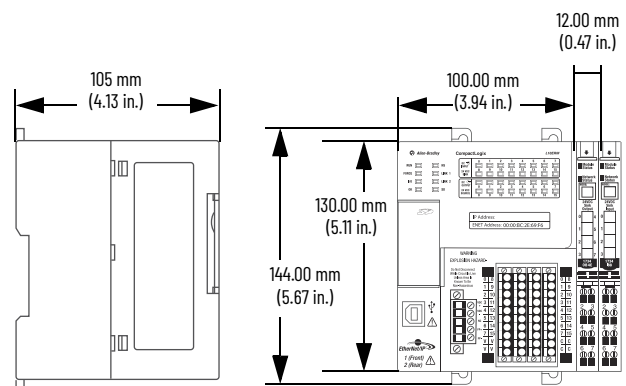
You must install bumpers on the back of your CompactLogix 5370 L1 controller before mounting it on the EN 50022 - 35 x 15 mm (1.38 x 0.59 in.) DIN rail. For more information about Bumper Selection, see Knowledgebase Technote, [5370 L16ER/L18ER recommended Bumpers for use with 1.38 x 0.59 in. DIN rail](#)

Minimum Spacing

Maintain spacing from enclosure walls, wireways, and adjacent equipment. Allow 50 mm (2 in.) of space on all sides, as shown. This provides ventilation and electrical isolation.



System Dimensions



Ground the System

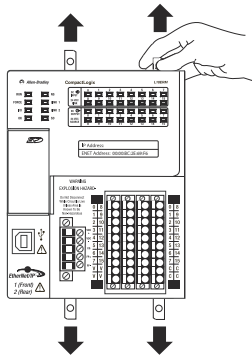


ATTENTION: This product is intended to be mounted to a well-grounded mounting surface. Additional grounding connections from the power supply's mounting tabs or DIN rail aren't required unless the mounting surface can't be grounded. See, *Industrial Automation Wiring and Grounding Guidelines*, publication [1770-4.1](#), for additional information.

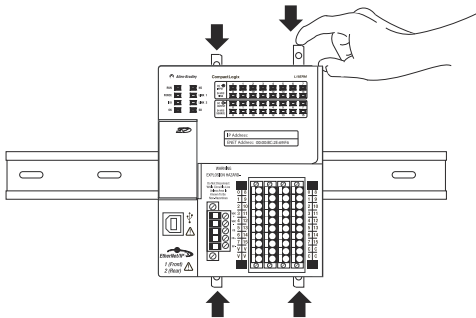
Install the Controller

Complete these steps to install the controller.

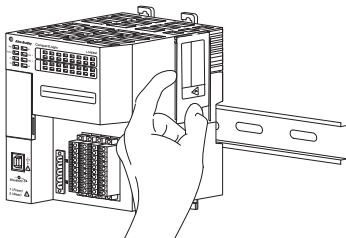
1. Pull locking tabs out.



2. Slide the controller into position on the DIN rail and push the locking tabs back in place.



3. If you aren't using local expansion modules, use the tongue-and-groove slots on the right side of the controller to slide the included end cap onto the controller. The end cap covers the exposed interconnections on the right side of the controller.



ATTENTION: Failure to use an end cap could result in equipment damage or injury from electric shock.

Connect Power to the Controller

IMPORTANT

This section describes how to power the controller via the VDC+ and VDC- terminals.

Connections to the VDC+ and VDC- terminals do not provide power to input or output devices that are connected to the embedded I/O modules of the controller or local expansion modules. Power must be connected to the FP+ and FP- terminals to provide power to input or output devices that are connected to the embedded I/O modules of the controller or local expansion modules.

The external power supply can be used to power both the VDC+/- and FP+/- terminals on CompactLogix 5370 L1 series B and C controllers.



WARNING: Do not connect directly to line voltage. Line voltage must be supplied by a suitable, approved isolating transformer or power supply with short circuit capacity not exceeding 100VA maximum or equivalent. Controller power requirement is 30VA.

Power is connected to the controller via a removable connector that is on the front of the controller.

IMPORTANT

This section assumes that any DIN rail that you use has been grounded following *Industrial Automation Wiring and Grounding Guidelines*, publication [1770-4.1](#). The controller is grounded once it's installed on a grounded DIN rail.

Consider these points before completing the steps in this section:

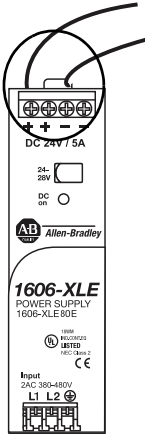
- This section describes how to connect an external 24V DC power source to the CompactLogix 5370 L1 controller.
 - Use a power source that most effectively meets your application needs. That is, calculate the power requirements for your application before choosing a power source to avoid using a power source that far exceeds your application requirements.
 - The embedded power supply of the CompactLogix 5370 L1 controller provides power to the controller and POINTBus™ backplane.
 - Not all Class 2/SELV-listed power supplies are certified for use in all applications, for example, use in nonhazardous and hazardous environments.
- Before installing an external power supply, consult all specification and certification information to verify that you're using an acceptable external power supply.
- For example purposes only, this section describes how to use a 1606-XLE120E, NEC Class 2 switched-mode power supply. The exact steps for other external power supplies can vary from the steps that are described here.

Complete the following steps to connect power to the CompactLogix 5370 L1 control system.

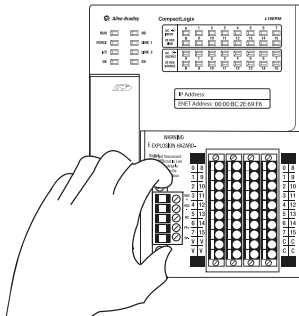
1. Verify that the external 24V DC power source isn't powered.
2. Mount the external 24V DC power source on a DIN rail.
The external 24V DC power source can be installed on the same DIN rail as the controller or a separate DIN rail.
3. Connect the wires to the 24V DC+ and 24V DC- connections on the external 24V DC power source.



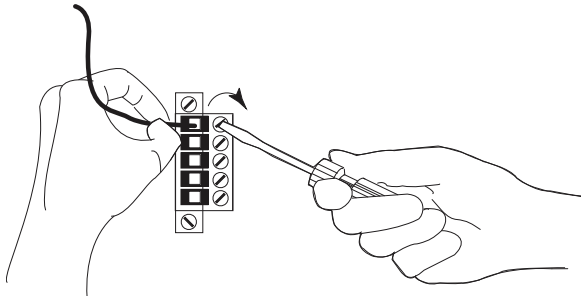
WARNING: If you connect or disconnect wiring while the field-side power is on, an electric arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.



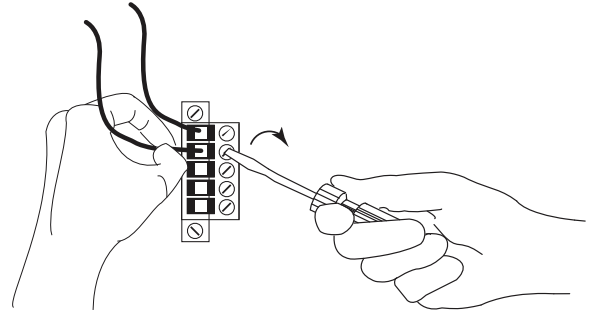
4. Pull the removable connector off the CompactLogix 5370 L1 controller.



5. Connect the wire that is connected to the 24V DC+ terminal on the external 24V DC power source to the VDC+ terminal. The VDC+ terminal is the top terminal on the removable connector.



6. Connect the wire that is connected to the 24V DC- terminal on the external 24V DC power source to the VDC- terminal. The VDC- terminal is the second from the top on the removable connector.



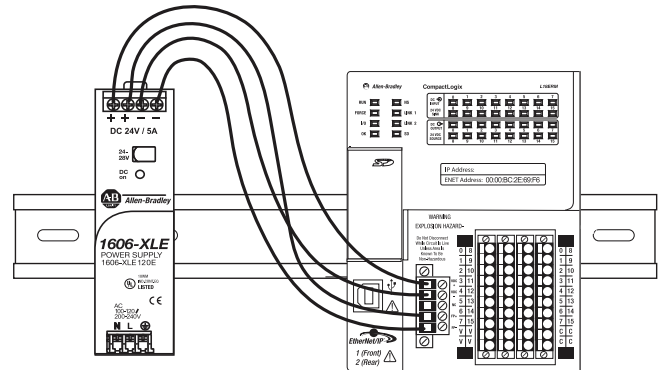
IMPORTANT

If your application requires a power control device, for example, a switch or relay, between the external 24V DC power source and the CompactLogix 5370 L1 controller to control when the controller is powered, you must install the power control device at the VDC+ terminal on the removable connector.

If you install the power control device at the VDC- terminal, the CompactLogix 5370 L1 controller can have problems powering up or powering down properly.

7. Plug the removable connector back into the controller.
8. To secure it in place, use the screws at the top and bottom of the removable connector.
9. Turn on power to the external 24V DC power source.

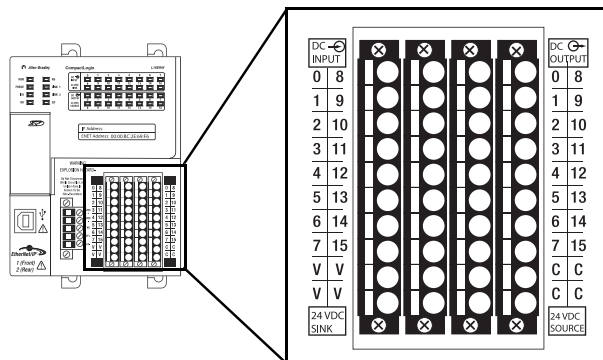
The following graphic shows an external 24V DC power source that is connected to a CompactLogix 5370 L1 controller.



CompactLogix 5370 Controllers have an embedded, battery-less Energy Storage Module (ESM) that provides power to the CPU upon power-down, allowing the controller to write customer application and tag data to the on-board flash memory. In some cases, the ESM will continue to provide enough power to keep the wall clock active until its residual stored energy is depleted.

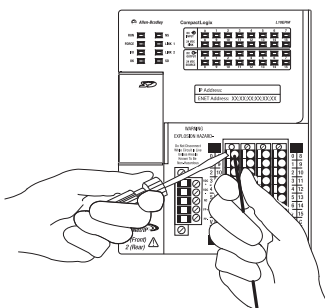
Wire the Embedded I/O Modules

CompactLogix 5370 L1 controllers provide 16-point DC embedded I/O modules. The following graphic shows the embedded I/O module terminals.



Complete the following steps to **wire the input and output points** on the CompactLogix 5370 L1 controller.

1. Verify that the control system isn't powered.
2. Use a small screwdriver to push the spring release clip and insert the wire.



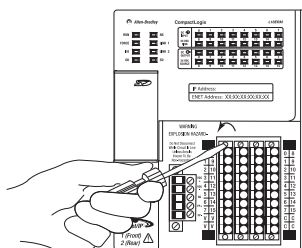
3. With the wire in place, pull the screwdriver off the spring release clip.
4. Repeat [step 2](#) for all embedded I/O wires needed in your application.

To **remove a wire** from the removable connector, complete the following steps.

1. Verify that the control system isn't powered.
2. Use a small screwdriver to push the spring release clip and remove the wire.

To remove and replace an I/O module connector, complete the following steps.

1. Verify that the control system isn't powered.
2. Use a small screwdriver to loosen the screws that secure the connector to the module.



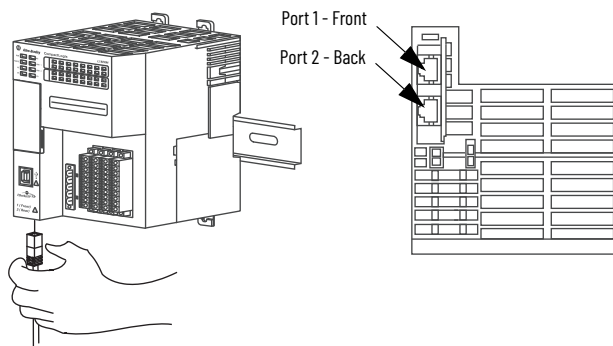
3. Pull the connector out of the module.
4. Disconnect any wires from the connector.
5. Connect any wires to the replacement connector.
6. Push the replacement connector back into the I/O module.
7. Secure the connector to the I/O module with a small screwdriver.

Connect the Controller to an Ethernet/IP Network



WARNING: If you connect or disconnect the communication cable with power applied to this module or any device on the network, an electric arc can occur. This could cause an explosion in hazardous location installations. Be sure that power is removed or the area is nonhazardous before proceeding.

Connect the RJ45 connector of the Ethernet cable to one of the Ethernet ports on the controller. The ports are on the bottom of the controller.



Connect to the USB Port

The controller has a USB port that uses a Type B receptacle. The port is USB 2.0-compatible and operates at 12 Mbps.

Use a USB cable to connect your computer to the USB port. With this connection, you can update firmware and download programs to the controller directly from your computer.

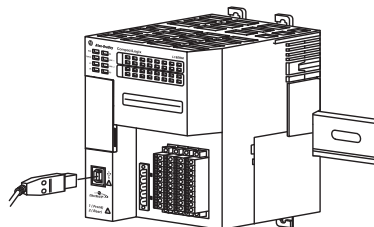


ATTENTION: The USB port is intended only for temporary local programming purposes and not intended for permanent connection. The USB cable isn't to exceed 3.0 m (9.84 ft) and must not contain hubs.



WARNING: Do not use the USB port in hazardous locations.

Plug the USB cable into the CompactLogix 5370 L1 controller.



For more information on how to supply power to a CompactLogix 5370 L1 controller, how to use the Ethernet or USB ports, or to see examples of devices connected to the embedded I/O modules, refer to the CompactLogix 5370 Controllers User Manual, publication [1769-UM021](#).

Specifications

Attribute	1769-L16ER-BB1B, 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L18ERM-BB1BK, 1769-L19ER-BB1B, 1769-L19ER-BB1BK
Current draw @ 5V DC, controller power	1 A
Current draw @ 24V DC, field power max	3 A ⁽¹⁾
Power dissipation	11.5 W
Wire screw torque	0.5...0.6 N•m (0.37...0.44 lb•ft)
Wire sizes	Power Terminal: 0.2...2.5 mm ² (24...14 AWG) solid or stranded copper wire that is rated at 75 °C (167 °F), or greater, 1.2 mm (3/64 in.) insulation max Input Terminal: 0.205...1.31 mm ² (24...16 AWG) solid or stranded copper wire that is rated at 75 °C (167 °F), or greater, 1.2 mm (3/64 in.) insulation max or 90 °C (194 °F)
Wire type, Ethernet	RJ45 connector according to IEC 60603-7, 2 or 4 pair Category 5e minimum cable according to TIA 568-B.1 or Category 5 cable according to ISO/IEC 24702

(1) Combined total for all devices drawing current from field power connections.

Additional Resources

These documents contain additional information concerning related products from Rockwell Automation.

Resource	Description
CompactLogix Controllers Specifications Technical Data, publication 1769-TD005	Provides technical data and specifications for CompactLogix controllers.
CompactLogix 5370 Controllers User Manual, publication 1769-UM021	Provides information on how to install, configure, program, and use CompactLogix controllers.
Ethernet Reference Manual, ENET-RM002	Describes basic Ethernet concepts, infrastructure components, and infrastructure features.
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 Certifications website, rok.auto/certifications	Provides declarations of conformity, certificates, and other certification details.

You can view or download publications at [rok.auto/literature](#).

Technical Specifications - CompactLogix 5370 Controllers and Compact GuardLogix 5370 Controllers

Attribute	1769-L16ER-BB1B 1769-L18ER-BB1B 1769-L18ERM-BB1B, 1769-L18ERM-BB1BK 1769-L19ER-BB1B, 1769-L19ER-BB1BK	1769-L24ER-QB1B 1769-L24ER-QBFC1B, 1769-L24ER-QBFC1BK 1769-L27ERM-QBFC1B	1769-L30ER, 1769-L30ERK 1769-L30ER-NSE 1769-L30ERM, 1769-L30ERMK 1769-L33ER, 1769-L33ERK, 1769-L33ERM, 1769-L33ERMK 1769-L36ERM 1769-L37ERM, 1769-L37ERMK 1769-L38ERM, 1769-L38ERMK	1769-L30ERMS 1769-L33ERMS, 1769-L33ERMSK 1769-L36ERMS 1769-L37ERMS, 1769-L37ERMSK 1769-L38ERMS, 1769-L38ERMSK
User memory	1769-L16ER-BB1B: 384 KB 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L18ERM-BB1BK: 512 KB 1769-L19ER-BB1B, 1769-L19ER-BB1BK: 1 MB	1769-L24ER-QB1B, 1769-L24ER-QBFC1B, 1769-L24ER-QBFC1BK: 750 KB 1769-L27ERM-QBFC1B: 1 MB	1769-L30ER, 1769-L30ER-NSE, 1769-L30ERK, 1769-L30ERM, 1769-L30ERMK: 1 MB 1769-L33ER, 1769-L33ERK, 1769-L33ERM, 1769-L33ERMK: 2 MB 1769-L36ERM: 3 MB 1769-L37ERM, 1769-L37ERMK: 4 MB 1769-L38ERM, 1769-L38ERMK: 5 MB	1769-L30ERMS: 1 MB standard + 0.5 MB safety 1769-L33ERMS, 1769-L33ERMSK: 2 MB standard + 1 MB safety 1769-L36ERMS: 3 MB standard + 1.5 MB safety 1769-L37ERMS, 1769-L37ERMSK: 4 MB standard + 1.5 MB safety 1769-L38ERMS, 1769-L38ERMSK: 5 MB standard + 1.5 MB safety
Optional nonvolatile memory	1784-SD1 card with 1 Gb of available memory (shipped with controller) 1784-SD2 card with 2 Gb of available memory (available for separate ordering)			
Number of local expansion modules, max ⁽¹⁾	1769-L16ER-BB1B: 6 - 1734 POINT I/O™ modules 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L18ERM-BB1BK, 1769-L19ER-BB1B, 1769-L19ER-BB1BK: 8 - 1734 POINT I/O modules	4 - 1769 Compact I/O™ modules	1769-L30ER, 1769-L30ER-NSE, 1769-L30ERK, 1769-L30ERM, 1769-L30ERMK, 1769-L30ERMS: 8 - 1769 Compact I/O modules 1769-L33ER, 1769-L33ERK, 1769-L33ERM, 1769-L33ERMK, 1769-L33ERMS, 1769-L33ERMSK: 16 - 1769 Compact I/O modules 1769-L36ERM, 1769-L36ERMS: 30 - 1769 Compact I/O modules 1769-L37ERM, 1769-L37ERMK, 1769-L37ERMS, 1769-L37ERMSK: 31 - 1769 Compact I/O modules 1769-L38ERM, 1769-L38ERMK, 1769-L38ERMS, 1769-L38ERMSK: 31 - 1769 Compact I/O modules	
Number of I/O module banks, max	–	1	3	
Current draw @ 5V DC, controller power	1 A	1769-L24ER-QB1B: 1.54 A 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B: 1 A Values rated at these ambient temperatures: 40 °C (104 °F), 55 °C (131 °F), 60 °C (140 °F).	500 mA	850 mA
Current draw @ 24V DC, controller power	–	1769-L24ER-QB1B: 0.95 A 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B: 0.8 A Values rated at these ambient temperatures: 40 °C (104 °F), 55 °C (131 °F), 60 °C (140 °F).	225 mA	700 mA
Current draw @ 24V DC, field power, max	3 A - Combined total for all devices that draw current from field power connections Input: 5 mA Output: 500 mA			
Power dissipation, max	11.5 W	1769-L24ER-QB1B: 12 W 1769-L24ER-QBFC1B, L27ERM-QBFC1B: 21 W	4.5 W	6.5 W
Isolation voltage	50V (continuous), Basic Insulation Type Tested at 500V AC for 60 s, System to Field	30V (continuous), Basic Insulation Type, USB to system, Ethernet to system and Ethernet to Ethernet Type tested at 500V AC for 60 s		50V, Basic Insulation Type Tested at 500V AC for 60 s, System to Communication ports.
Short circuit protection, field power	Internal fuse, Non-replaceable	–		
Recommended external short circuit protection, field power	User-provided 4...5 A @ 3.15...5.5 A ² t fuse	–		
Weight, approx	0.66 kg (1.5 lb)	1769-L24ER-QB1B: 0.63 kg (1.39 lb) 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B: 0.9 kg (1.9 lb)	0.31 kg (0.68 lb)	0.54 kg (1.18 lb)
Module width	100.00 mm (3.94 in.)	1769-L24ER-QB1B: 115.00 mm (4.53 in.) 1769-L24ER-QBFC1B and 1769-L27ERM-QBFC1B: 140 mm (5.51 in.)	55.00 mm (2.17 in.)	89.00 mm (3.50 in.)
Module location	DIN rail mount	DIN rail or panel mount		
Panel-mount screw torque	–	1.1...1.8 N•m (10...16 lb•in) - use M4 or #8 screws		
Embedded power supply	24V DC input, isolated	24V DC Input, isolated	1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4	