Technical Data

Original Instructions

Allen-Bradley
by ROCKWELL AUTOMATION

CompactLogix Controllers Specifications

Bulletins 1769 and 1768

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Rockwell Automation

Summary of Changes

This publication contains the following new or updated information. This list includes substantive updates only and is not intended to reflect all changes.

Topic	Pages
Removed EAC certification for CompactLogix™ 5370 and Compact GuardLogix® 5370 Controllers, and Armor™ CompactLogix and Armor Compact GuardLogix Controllers	5, 26

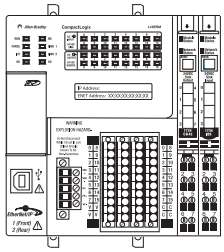
Catalog Numbers

This publication is applicable to the following catalog numbers.

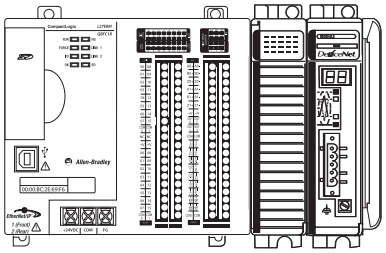
CompactLogix 5370 and Compact GuardLogix 5370 Controllers	1769-L16ER-BB1B, 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L18ERM-BB1BK, 1769-L19ER-BB1B, 1769-L19ER-BB1BK, 1769-L24ER-QB1B, 1769-L24ER-QBFC1B, 1769-L24ER-QBFC1BK, 1769-L27ERM-QBFC1B, 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERK, 1769-L30ERM, 1769-L30ERMK, 1769-L30ERMS, 1769-L33ER, 1769-L33ERK, 1769-L33ERM, 1769-L33ERMK, 1769-L33ERMS, 1769-L33ERMSK, 1769-L36ERM, 1769-L36ERMS, 1769-L37ERM, 1769-L37ERMK, 1769-L37ERMS, 1769-L37ERMSK, 1769-L38ERM, 1769-L38ERMK, 1769-L38ERMS, 1769-L38ERMSK
Armor CompactLogix and Armor Compact GuardLogix Controllers	1769-L33ERMO, 1769-L33ERMOS, 1769-L36ERMO, 1769-L36ERMOS, 1769-L37ERMO, 1769-L37ERMOS, 1769-L38ERMO, 1769-L38ERMOS
1769 Packaged Controllers	1769-L23-QBFC1B, 1769-L23E-QB1B, 1769-L23E-QBFC1B
1769 Modular Controllers	1769-L31, 1769-L32C, 1769-L35CR, 1769-L32E, 1769-L32EK, 1769-L35E
1768 Controllers	1768-L43, 1768-L43S, 1768-L45, 1768-L45S
Memory Cards	1784-CF128, 1784-SD1, 1784-SD2

CompactLogix 5370 Controllers

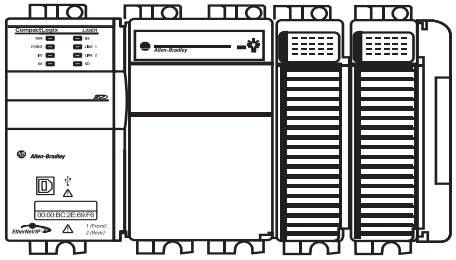
CompactLogix 5370 L1 Control System



CompactLogix 5370 L2 Control System



CompactLogix 5370 L3 Control System



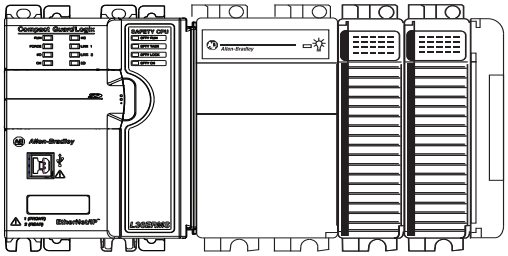
CompactLogix 5370 controllers provide scalable controller solutions to address a wide variety of applications. All CompactLogix 5370 controllers provide the following functionality:

- Two Ethernet ports
- One USB port
- Support for local expansion modules
- Control of local and distributed I/O modules
- Use of 1784-SD1 or 1784-SD2 Secure Digital (SD) card for nonvolatile memory
- A battery is no longer necessary because of the internal energy-storage solution

Some CompactLogix 5370 controllers provide the following functionality:

- Built-in power supply
- Some combination of embedded digital, analog, and high-speed counter modules
- Support for Integrated Motion over an EtherNet/IP™ network
- Access to DeviceNet® networks

Compact GuardLogix 5370 Control System



The Compact GuardLogix controller is a 1769-L3 CompactLogix controller that provides safety control to achieve SIL CL 3 according to EN62061 / EN 61511-1 / IEC 61508 and PLe according to EN ISO 13849-1. A major benefit of this system is that it's still one project; safety and standard control together.

Application	Description
SIL 1, 2, 3	The Compact GuardLogix controller system is type-approved and certified for use in safety applications up to and including SIL 3 according to IEC 61508, and applications up to and including PLe/Cat.4 according to ISO 13849-1. For more information, see these manuals: • GuardLogix 5570 and Compact GuardLogix 5370 Controllers Systems Safety Reference Manual, publication 1756-RM099 • Compact GuardLogix 5370 Controllers User Manual, publication 1769-UM002 • GuardLogix Safety Application Instruction Set Reference Manual, publication 1756-RM095

During development, safety and standard have the same rules. The following are allowed:

- Multiple programmers
- Online editing
- Forcing

Once the project is tested and ready for final validation, apply the safety application signature and safety-lock the application. This process sets the safety task to a SIL 3 integrity level. The Compact GuardLogix controller enforces the SIL 3 integrity level. When safety memory is locked and protected, the safety logic can't be modified and all safety functions operate with SIL 3 integrity. On the standard side of the Compact GuardLogix controller, all functions operate like a regular Logix controller. Thus online editing, forcing, and other activities are all allowed.

Standard logic and external devices, like HMIs or other controllers, can read safety memory with this level of integration. This level of integration removes the need to condition safety memory for use elsewhere. The result is easy systemwide integration and the ability to display safety status on displays or marquees. Use Guard I/O™ modules for field device connectivity. For safety interlocking between Compact GuardLogix controllers, use Ethernet or ControlNet® networks. Multiple Compact GuardLogix controllers can share safety data for zone to zone interlocking, or one Compact GuardLogix controller can use remote distributed safety I/O between different cells/areas.

Environmental 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	1769-L23-QBFC1B 1769-L23E-QB1B 1769-L23E-QBFC1B
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Na, Operating Thermal Shock)	-20...+60 °C (-4...+140 °F)	0...60 °C (32...140 °F)			
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)				
Temperature, surrounding air, max	60 °C (140 °F)				
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing				
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz(1)		5 g @ 10...500 Hz		
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g(1)		20 g - DIN rail 30 g - Panel		
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g(1)(2)		30 g - DIN rail 40 g - Panel		
Emissions CISPR 11	IEC 61000-6-4				
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges				4 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...6000 MHz				10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±3 kV at 5 kHz on power ports ±3 kV at 5 kHz on signal ports ±3 kV at 5 kHz on communication ports		±3 kV at 5 kHz on communication ports	±3 kV at 5 kHz on communication ports ±4 kV at 5 kHz on Protective Earth (PE)	±2 kV at 5 kHz on power ports ±2 kV at 5 kHz on signal ports ±2 kV at 5 kHz on communication ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports ±2 kV line-earth (CM) on communication ports	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports ±2 kV line-earth (CM) on shielded ports ±2 kV line-earth (CM) on communication ports	±2 kV line-earth (CM) on communication ports		±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports ±2 kV line-earth (CM) on shielded ports ±2 kV line-earth (CM) on communication ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz				

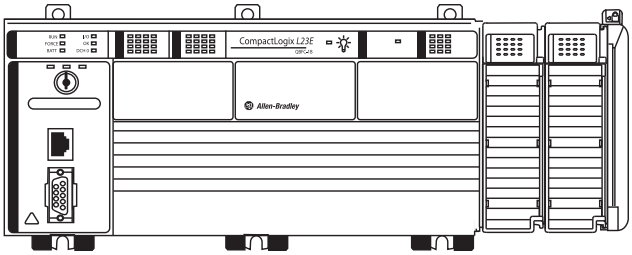
(1) If you are mounting a CompactLogix™ 5370 L1 controller on an EN 50 022 - 35 x 15 mm (1.38 x 0.59 in.) DIN rail, you must first adhere a bumper on the back of the controller. Failure to install the bumper before mounting the controller causes the system to fail to meet this specification. For more information, see the CompactLogix 5370 Controllers User Manual, publication 1769-UM021.

(2) If you are mounting a CompactLogix 5370 L1 controller on an EN 50 022 - 35 x 15 mm (1.38 x 0.59 in.) DIN rail, the Shock, nonoperating specification = 30 g.

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-L30ERM: 1 MB • 1769-L33ER, 1769-L33ERK, 1769-L33ERM, 1769-L33ERM: 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^2t 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	

1769 Packaged CompactLogix Controllers with Embedded I/O



The 1769-L23*x* controllers provide the following functionality:

- Built-in power supply
- Either two serial ports or one serial and one Ethernet port, depending on controller catalog number
- Combination of embedded digital, analog, and high-speed counter module I/O modules
- 1769-ECR right-end cap

Features - 1769 Packaged CompactLogix Controllers

Characteristic	1769-L23E-QB1B	1769-L23E-QBFC1B	1769-L23-QBFC1B
Available user memory	512 KB		
CompactFlash card	–		
Communication ports	1 Ethernet port 1 RS-232 serial port (DF1 or ASCII)		2 RS-232 ports (isolated DF1 or ASCII; only nonisolated DF1)
Embedded I/O	16 DC inputs 16 DC outputs	16 DC inputs 16 DC outputs 4 analog inputs 2 analog outputs 4 high-speed counter modules	
Module expansion capacity	Up to three additional 1769 modules	Up to two additional 1769 modules	
Embedded power supply	24V DC		

You can add one or two additional 1769 modules to the right of the controller package. The modules that you can add depend on their current draw. Each packaged controller has the following amount of 5V DC bus current.

1769-L23*x* Available DC Current

Controller	Available 5V DC Bus Current
1769-L23E-QB1B	1000 mA
1769-L23E-QBFC1B	450 mA
1769-L23-QBFC1B	800 mA

Local I/O Performance - 1769 Packaged CompactLogix L23 Controllers

The requested packet interval (RPI) defines the frequency at which the controller sends and receives all I/O data on the backplane. The default RPI is 5 ms. The combination of embedded I/O in the packaged controllers determines the fastest RPI that you can configure.

Controller	Guideline
1769-L23E-QB1B	1...4 modules can be scanned in 1.0 ms
1769-L23E-QBFC1B 1769-L23-QBFC1B	1...4 modules can be scanned in 1.5 ms 5...6 modules can be scanned in 2.0 ms

You can always select an RPI that is slower than listed previously. These considerations show how fast modules can be scanned—not how fast an application can use the data. The RPI is asynchronous to the program scan. Other factors, such as program execution duration, affect I/O throughput.

Certifications - 1769 Packaged CompactLogix Controllers

Certification[1]	1769-L23-QBFC1B, 1769-L23E-QB1B, 1769-L23E-QBFC1B
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
EtherNet/IP	ODVA conformance tested to EtherNet/IP specifications
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When marked. see the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

Environmental Specifications - CompactLogix 5370 Controllers and Compact GuardLogix 5370 Controllers

Attribute	1769-L23-QBFC1B, 1769-L23E-QB1B, 1769-L23E-QBFC1B
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Na, Operating Thermal Shock)	0...60 °C (32...140 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Temperature, surrounding air, max	60 °C (140 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	5 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	20 g - DIN rail 30 g - Panel
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g - DIN rail 40 g - Panel
Emissions CISPR 11	IEC 61000-6-4
ESD immunity IEC 61000-4-2	4 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 200 Hz 50% Pulse 100% AM at 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM at 1890 MHz 10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz
EFT/B immunity IEC 61000-4-4	±2 kV at 5 kHz on power ports ±2 kV at 5 kHz on signal ports ±2 kV at 5 kHz on communication ports
Surge transient immunity IEC 61000-4-5	±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports ±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports ±2 kV line-earth (CM) on shielded ports ±2 kV line-earth (CM) on communication ports
Conducted RF immunity IEC 61000-4-6	10V rms with 1 kHz sine wave 80% AM from 150 kHz...80 MHz

Technical Specifications - 1769 Packaged CompactLogix Controllers

Attribute	1769-L23E-QB1B	1769-L23E-QBFC1B	1769-L23-QBFC1B
User memory	512 KB		
Optional nonvolatile memory	None		
Number of expansion I/O modules, max	3 (limited by current draw of module)	2 (limited by current draw of module)	2 (limited by current draw of module)
Replacement battery	1769-BA		
Current draw @ 5V DC	1000 mA	450 mA	800 mA
Current draw @ 24V DC	700 mA	500 mA	600 mA
Power dissipation	7.01 W	13.58 W	10.73 W
Isolation voltage	30V (continuous), basic insulation type Type tested at 710V DC for 60 s; RS-232 to system backplane, Ethernet to system backplane, and RS-232 to Ethernet		30V (continuous), basic insulation type Type tested at 710V DC for 60 s; RS-232 channel 0 to system backplane, no isolation between RS-232 channel 1 and system
Serial communication ports	CH0 - RS-232 DF1, DH-485, ASCII Fully isolated 38.4 Kbps max		CH0 - RS-232 DF1, DH-485, ASCII Fully isolated 38.4 Kbps max CH1 - RS-232 DF1, DH-485 Nonisolated 38.4 Kbps max
Serial cables	1756-CP3 or 1747-CP3, right angle connector to controller, straight to serial port, 3 m (9.84 ft)		
Weight, approx	0.91 kg (2 lb)	1.22 kg (2.7 lb)	1.22 kg (2.7 lb)
Slot width	1		
Module location	DIN rail or panel mount		
Mounting screw torque	1.1...1.8 N•m (10...16 lb•in) - use M4 or #8 screws		
Wire category(1)	2 - on signal ports 2 - on power ports 2 - on communication ports		
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		–
Wire size, DC power	0.25...2.5 mm^2 (22...14 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater, 1.2 mm (3/64 in.) insulation max		
Wire size, digital I/O connections	0.5...0.8 mm^2 (20...18 AWG) solid or stranded copper wire rated at 75 °C (167 °F) or greater, 1.2 mm (3/64 in.) insulation max		
Wire size, embedded analog and high-speed counter module connections	0.5...0.8 mm^2 (20...18 AWG) solid or stranded shielded copper wire rated at 75 °C (167 °F) or greater, 1.2 mm (3/64 in.) insulation max		
North American temperature code	T3C		
Enclosure type rating	None (open-style)		

(1) Use this conductor category information to plan conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1.

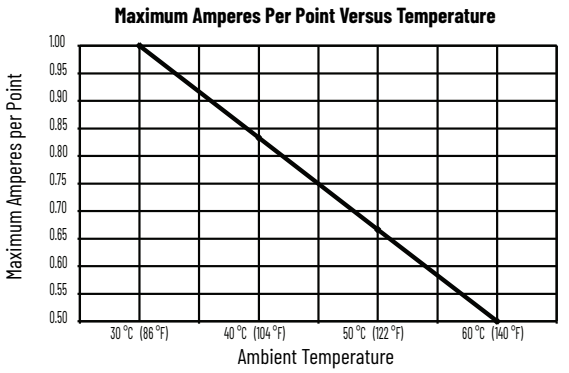
Embedded DC Input Specifications

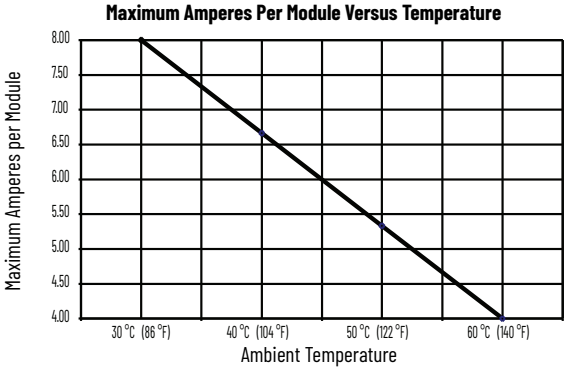
Attribute	1769-L23E-QB1B, 1769-L23E-QBFC1B, 1769-L23-QBFC1B
Inputs	16 (8 points/group)
Voltage category	24V DC sink/source
Operating voltage range	10...30V DC @ 30 °C (86 °F) 10...26.4V DC @ 60 °C (140 °F)
Digital filter, off to on	0 s, 100 µs, 500 µs, 1 ms, 2 ms
Input delay, off to on	100 µs (typical), 300 µs (max)
Digital filter, on to off	0 s, 100 µs, 500 µs, 1 ms, 2 ms
Input delay, on to off	250 µs (typical), 1 ms (max)
Off-state voltage, max	5V DC
Off-state current, max	1.5 mA
On-state current, min	2 mA @ 10V DC
Inrush current, max	250 mA
Input impedance, max	3 kΩ
Cyclic update time	100 µs...750 ms
Isolation voltage	75V (continuous), basic insulation type Type tested at 1200V AC for 60 s; inputs to system backplane and input group to input group
IEC input compatibility	Type 3
Isolated groups	Group 1: inputs 0...7 Group 2: inputs 8...15 Isolated groups operate in either sink or source configurations

Embedded DC Output Specifications

Attribute	1769-L23E-QB1B, 1769-L23E-QBFC1B, 1769-L23-QBFC1B
Outputs	16
Voltage category	24V DC source
Operating voltage range	20.4...26.4V DC
Output delay, off to on	0.1 ms
Output delay, on to off	1.0 ms
Off-state leakage current, max	1.0 mA @ 26.4V DC
On-state current, min	1.0 mA
On-state voltage drop, max	1.0V DC @ 1.0 A
Current per point, max	0.5 A @ 60 °C (140 °F) 1.0 A @ 30 °C (86 °F) Also see the derating graphs
Current per module, max	4.0 A @ 60 °C (140 °F) 8.0 A @ 30 °C (86 °F) Also see the derating graphs on page 31
Surge current per point	2 A for 10 ms per point, repeatable every 2 s
Load current, min	3 mA per point
Isolation voltage	75V (continuous), basic insulation type Type tested at 1200V AC for 60 s; outputs to system backplane
Isolated groups	Group 1: Outputs 0...15 (internally connected to common)
Pilot duty rating	0.5 A, 24V DC @ 60 °C (140 °F) 1.0 A, 24V DC @ 30 °C (86 °F)

Embedded DC Output Temperature Derating





Embedded Analog Input Specifications

Attribute	1769-L23E-QB1B, 1769-L23E-QBFC1B, 1769-L23-QBFC1B
Inputs	4 differential or single-ended
Input range	0...10.5V 0...21 mA
Resolution	8 bits plus sign (sign is always positive).
Input impedance	Voltage: 150 kΩ nom Current: 150 Ω nom
Converter type	Successive approximation
Response speed per channel	5 ms
Rated working voltage	30V AC/30V DC
Common mode voltage	10V DC max per channel
Common mode rejection	Greater than 60 dB at 60 Hz at 10V between inputs and analog common
Normal mode rejection ratio	None
Accuracy, overall at 25 °C (77 °F)(1)	Voltage: ±0.7% full-scale, Current: ±0.6% full-scale
Accuracy, overall at 0...60 °C (32...140 °F)	Voltage: ±0.9% full-scale, Current: ±0.8% full-scale
Accuracy drift	Voltage: ±0.006% per °C, Current: ±0.006% per °C
Calibration	Not required; components provide accuracy
Non-linearity (in percent full-scale)	±0.4%
Repeatability	±0.4%
Overload at input terminals, max	Voltage: 20V continuous, 0.1 mA Current: 32 mA continuous, +5V DC
Channel diagnostics	Overrange by bit reporting
Isolation voltage	30V (continuous), basic insulation type Type tested at 500V AC for 60 s; inputs to system backplane and outputs to system backplane

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

Embedded Analog Output Specifications

Attribute	1769-L23E-QB1B, 1769-L23E-QBFC1B, 1769-L23-QBFC1B
Outputs	2 single-ended
Output range	0…10.5V 0…21 mA
Converter type	Resistor string
Resolution, max	8 bits plus sign (sign is always positive, Bit 15 = 0)
Response speed per channel	0.3 ms for rated resistance and rated inductance 3.0 ms for rated capacitance
Current load on voltage output	10 mA max
Resistive load on current output	0…300 Ω (includes wire resistance)
Load range on voltage output	> 1 kΩ at 10V DC
Inductive load, max (current outputs)	0.1 mH
Capacitive load, max (voltage outputs)	1 µF
Accuracy, overall at 25 °C (77 °F)(1)	Voltage: ±0.5% full-scale Current: ±0.5% full-scale
Accuracy, overall at 0…60 °C (32…140 °F)	Voltage: ±0.6% full-scale Current: ±1.0% full-scale
Accuracy drift with temperature	Voltage: ±0.01% full-scale per °C Current: ±0.01% full-scale per °C
Output ripple range 0…50 kHz (referred to output range)	±0.05%
Non-linearity	±0.4% (in percent full-scale)
Repeatability	±0.05% (in percent full-scale)
Output impedance	10 Ω nom
Open and short circuit protection	Yes
Short circuit, max	Current: 40 mA
Open circuit, max	Voltage: 15V
Output response at system power-up and powerdown	+2.0…-1.0V DC spike for less than 6 ms
Isolation voltage	30V (continuous), basic insulation type Type tested at 500V AC for 60 s; inputs to system backplane and outputs to system backplane

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

Embedded HSC Module Input Specifications

Attribute	1769-L23E-QB1B, 1769-L23E-QBFC1B, 1769-L23-QBFC1B
Input frequency, max	250 kHz
Input current, max	15 mA
Input current, min	6.8 mA
Input voltage range	-30…+30V DC(1)
On-state voltage range	2.6…30V DC
On-state current, min	6.8 mA
Off-state voltage, max	1.0V DC
Off-state current, max	1.5 mA
Off-state leakage current, max	1.5 mA
Input impedance, nom	1950 Ω
Pulse width, min	2.5 µs
Phase separation, min	1.084 µs
Isolation voltage	75V (continuous), basic insulation type Type tested at 1200V AC for 60 s; inputs to system backplane and input to input

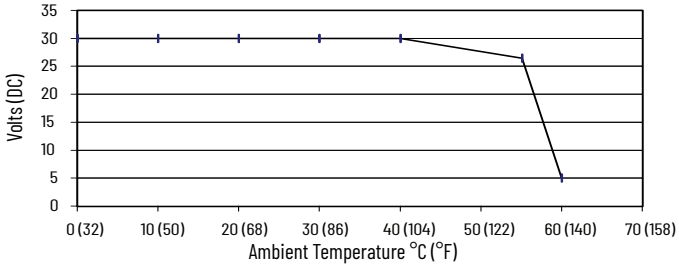
(1) See Embedded HSC Module Temperature Derating temperature derating.

Embedded HSC Module Output Specifications

Attribute	1769-L23E-QB1B, 1769-L23E-QBFC1B, 1769-L23-QBFC1B
Output voltage range	5…30V DC
On-state voltage, max	User power - 0.1V DC
On-state output current, max	1 A per point
	4 A per module
On-state output current, min	1 mA
On-state voltage drop, max	0.5V DC
Off-state leakage current, max	5 µA
Turn-on time, max	400 µs
Turn-off time, max	200 µs
Reverse polarity protection	30V DC
Isolation voltage	75V (continuous), basic insulation type Type tested at 1200V AC for 60 s; inputs to system backplane and input to input

Embedded HSC Module Temperature Derating

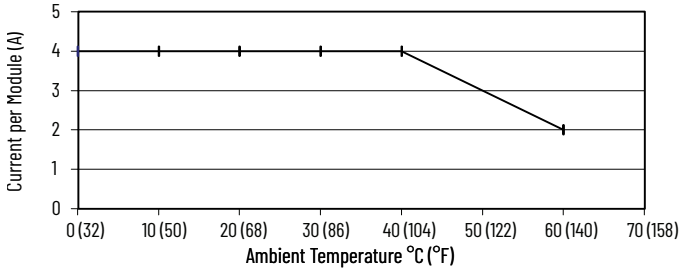
Maximum Input Voltage - 24V DC Operation



Temperature	Derated Voltage[1]
0...40 °C (32...104 °F)	30V DC
55 °C (131 °F)	26.4V DC
60 °C (140 °F)	5V DC

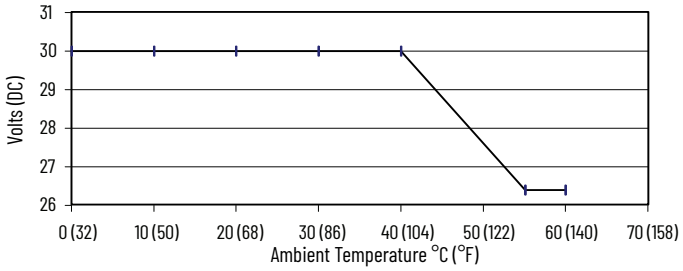
(1) You achieve an input voltage derating 55...60 °C (131...140 °F) by using a drop resistor.
For 24V DC input voltage, use a 2.4 kΩ, 1/2 Watt resistor.
For input voltages other than 24V DC, use a 1/2 W resistor with value: 125 x (V_{in} - 5V).

Maximum Output Current Per Module - 5V DC Operation



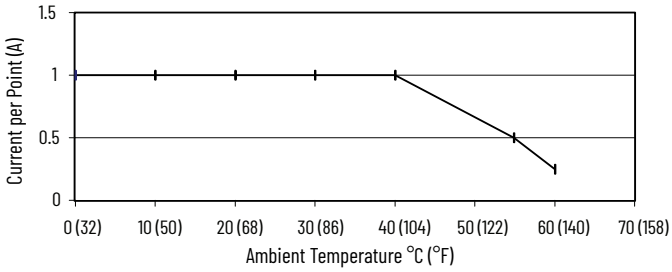
Temperature	Derated Current
0...40 °C (32...104 °F)	4 A
60 °C (140 °F)	2 A

Maximum Output Voltage - 24V DC Operation



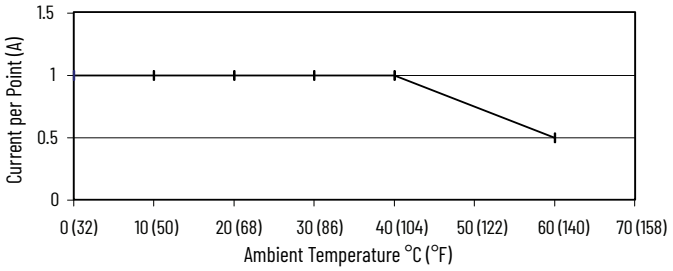
Temperature	Derated Voltage
0...40 °C (32...104 °F)	30V DC
55...60 °C (131...140 °F)	26.4V DC

Maximum Output Current Per Point - 24V DC Operation



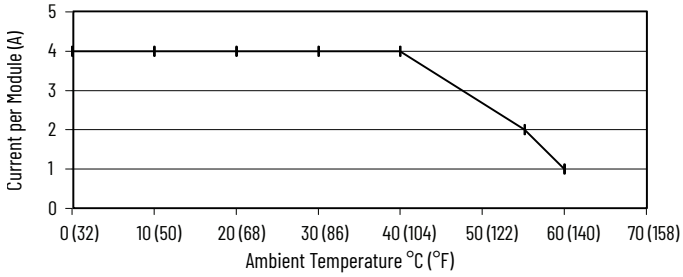
Temperature	Derated Current
0...40 °C (32...104 °F)	1 A
55 °C (131 °F)	0.5 A
60 °C (140 °F)	0.25 A

Maximum Output Current Per Point - 5V DC Operation



Temperature	Derated Current
0...40 °C (32...104 °F)	1 A
60 °C (140 °F)	0.5 A

Maximum Output Current Per Module - 5V DC Operation

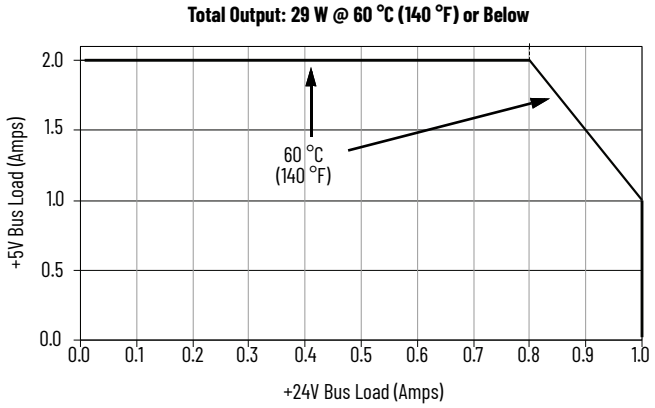


Temperature	Derated Current
0...40 °C (32...104 °F)	4 A
55 °C (131 °F)	2 A
60 °C (140 °F)	1 A

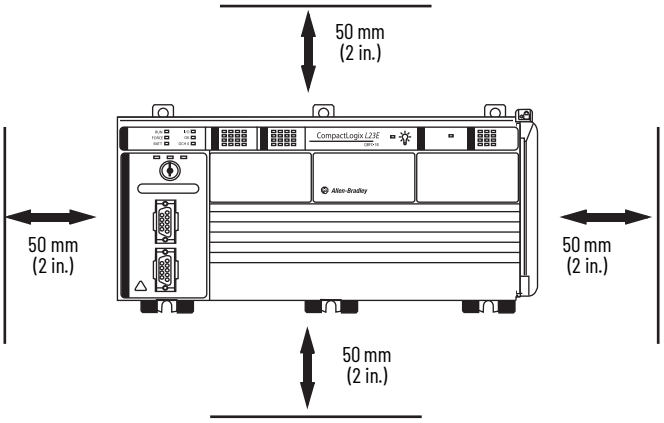
Embedded Power Supply

Attribute	1769-L23E-QB1B, 1769-L23E-QBFC1B, 1769-L23-QBFC1B
Input voltage range	19.2…31.2V DC
Input voltage, nom	24V AC
Line requirement, max	50VA at 24V DC
Available 5V DC bus current	1769-L23E-QB1B: 1 A (1000 mA) 1769-L23E-QBFC1B: 450 mA 1769-L23-QBFC1B: 800 mA
Inrush, max	30 A @ 31.2V DC
Line loss ride-through	10 ms…10 s
Output bus current capacity 0…55 °C (32…131 °F) 55…60 °C (131…140 °F)	2 A @ 5V DC 0.8 A @ 24V DC See temperature derating graphs
Load current, min	0 mA @ 5V DC 0 mA @ 24V DC
Short circuit protection	Front access fuse Replacement part number: Wickmann 19193-6.3A
Overvoltage protection	Yes
Isolation voltage	75V (continuous), basic insulation type Type tested at 1200V AC for 60 s; power to system backplane

Embedded Power Supply Temperature Derating

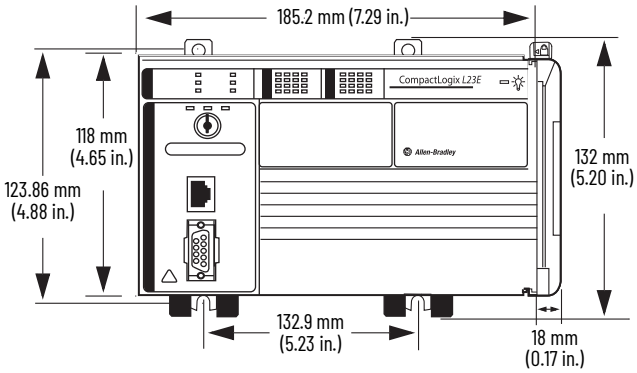


Minimum Spacing Requirements - 1769 Packaged CompactLogix Controllers

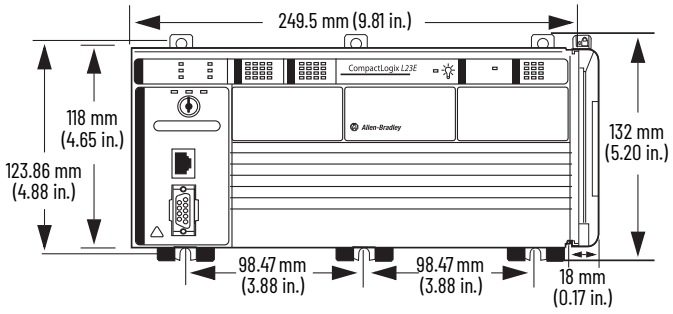


Dimensions - 1769 Packaged CompactLogix Controllers

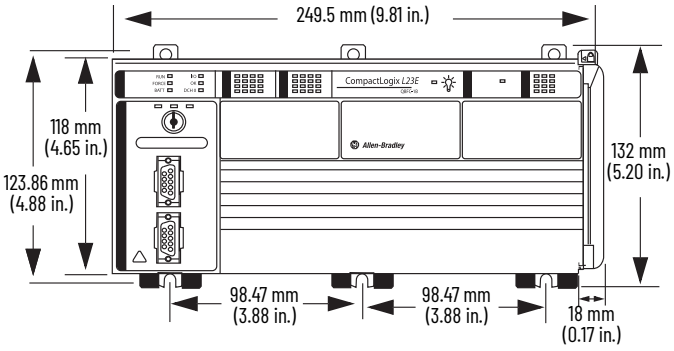
1769-L23E-QB1B



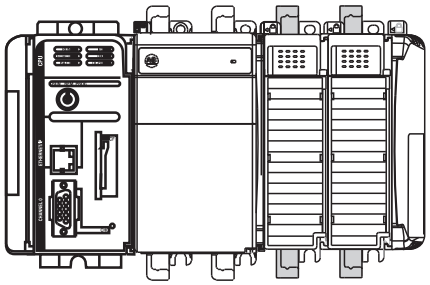
1769-L23E-QBFC1B



1769-L23-QBFC1B



1769 Modular CompactLogix Controllers



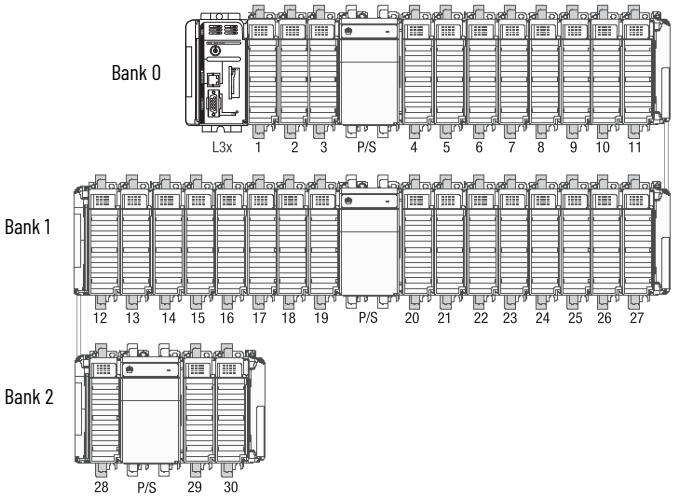
In a 1769-L3*x* controller system, the 1769 I/O modules can be placed to the left and the right of the power supply. As many as eight modules can be placed on each side of the power supply.

Features - 1769 Modular CompactLogix Controllers

Characteristic	1769-L31	1769-L32C	1769-L32E, 1769-L32EK	1769-L35CR	1769-L35E
Available user memory	512 KB	750 KB		1.5 MB	
CompactFlash card	1784-CF128				
Communication ports	2 RS-232 ports (isolated DF1 or ASCII; only nonisolated DF1)	1 ControlNet port	1 Ethernet port	1 ControlNet port	1 Ethernet port
		1 RS-232 serial port (DF1 or ASCII)			
Module expansion capacity	16 1769 modules			30 1769 modules	
Power supply distance rating	4 modules				

The CompactLogix controller has a power supply distance-rating of four modules. The controller must be the leftmost module in the first bank of the system. The maximum configuration for the first bank of a CompactLogix controller includes the following:

- The controller
- Three I/O modules to the left of the power supply
- Eight I/O modules to the right of the power supply



Local I/O Performance - 1769 CompactLogix L3 *Controllers*

You can configure an individual RPI for each local 1769 Compact I/O module. The RPI defines the frequency at which the controller sends and receives all I/O data on the backplane.

Type of Module	Guideline
Digital and analog (any mix)	1...4 modules can be scanned in 1 ms 5...30 modules can be scanned in 2 ms Some input modules have a fixed 8 ms filter, so selection of a faster RPI has no effect
Specialty	Full-sized 1769-SDN modules add 2 ms per module 1769-HSC modules add 1 ms per module Full-sized 1769-ASCII modules add 1 ms per module

You can always select an RPI that is slower than listed previously. These considerations show how fast modules can be scanned—not how fast an application can use the data. The RPI is asynchronous to the program scan. Other factors, such as program execution duration, affect I/O throughput.

Certifications - 1769 Modular CompactLogix Controllers

Certification[1]	1769-L31	1769-L32C 1769-L35CR	1769-L32E, 1769-L32EK 1769-L35E
c-UL-us	UL Listed Industrial Control Equipment, certified for US and Canada. See UL File E65584. UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E194810.		
CE	European Union 2004/108/EC EMC Directive, compliant with: EN 61000-6-2; Industrial Immunity EN 61000-6-4; Industrial Emissions		
	EN 61326-1; Meas./Control/Lab., Industrial Requirements EN 61131-2; Programmable Controllers (Clause 8, Zone A & B)		–
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions		
EX	–		European Union 94/9/EC ATEX Directive, compliant with: EN 60079-15; Potentially Explosive Atmospheres, Protection 'n' EN 60079-0; General Requirements (Zone 2) II 3 G Ex nA IIC T4 Gc
ODVA	–	ControlNet International conformance tested to ControlNet specifications	ODVA conformance tested to EtherNet/IP specifications.
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3		

(1) When marked. See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

CompactLogix Controller Accessories

These accessories are compatible with the indicated CompactLogix controllers.

Memory Cards

Memory cards offer nonvolatile memory to store a user program and tag data on a controller. You can use the programming software to prompt the controller to save to or load from nonvolatile memory or you can configure the controller to load from nonvolatile memory on power-up.

IMPORTANT The 1769-L23x packaged CompactLogix controllers do not offer a nonvolatile memory option.

The CompactLogix 5370 controllers come with a 1784-SD1 Secure Digital (SD) card installed. Order a 1784-SD2 SD card separately for additional nonvolatile memory with the CompactLogix 5370 controllers.

You can use a 1784-CF128 CompactFlash card with the 1768 L4 and L3 modular CompactLogix controllers for a nonvolatile memory option. Insert the CompactFlash card into the memory card slot on the controller.

Certifications - 1784 Memory Cards

Certification[1]	1784-CF128, 1784-SD1, 1784-SD2
CE	European Union 2014/30/EU EMC Directive, compliant with: • EN 61000-6-4; Industrial Emissions • EN 61326-1; Meas./Control/Lab., Industrial Requirements • EN 61000-6-2; Industrial Immunity • EN 61131-2; Programmable Controllers (Clause 8, Zone A & B) European Union 2011/65/EU RoHS, compliant with: • EN IEC 63000; Technical documentation
RCM	Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions
KC	Korean Registration of Broadcasting and Communications Equipment, compliant with: Article 58-2 of Radio Waves Act, Clause 3

(1) When marked. See the Product Certification link at rok.auto/certifications for Declarations of Conformity, Certificates, and other certification details.

Environmental Specifications - 1784 Memory Cards

Attribute	1784-CF128, 1784-SD1, 1784-SD2
Temperature, operating IEC 60068-2-1 (Test Ad, Operating Cold), IEC 60068-2-2 (Test Bd, Operating Dry Heat), IEC 60068-2-14 (Test Nb, Operating Thermal Shock)	-25...+70 °C (-13...+158 °F)
Temperature, storage IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold), IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat), IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock)	-40...+85 °C (-40...+185 °F)
Relative humidity IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)	5...95% noncondensing
Vibration IEC 60068-2-6 (Test Fc, Operating)	2 g @ 10...500 Hz
Shock, operating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	30 g
Shock, nonoperating IEC 60068-2-27 (Test Ea, Unpackaged Shock)	50 g

Environmental Specifications - 1784 Memory Cards

Attribute	1784-CF128, 1784-SD1, 1784-SD2
Emissions CISPR 11	Group 1, Class A
ESD immunity IEC 61000-4-2	6 kV contact discharges 8 kV air discharges
Radiated RF immunity IEC 61000-4-3	10V/m with 1 kHz sine wave 80% AM from 80...2000 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 900 MHz 10V/m with 200 Hz 50% Pulse 100% AM @ 1890 MHz 3V/m with 1 kHz sine wave 80% AM from 2000...2700 MHz

Technical Specifications - 1784-CF128, 1784-SD1, 1784-SD2

Attribute	1784-CF128	1784-SD1	1784-SD2
Memory	128 MB	1 GB	2 GB
Supported controllers	1769 modular controllers 1768 controllers	CompactLogix 5370 controllers	
Weight, approx	14.2 g (0.5 oz)	1.76 g (0.062 oz)	

1769 CompactLogix Batteries

The 1769 L23 and L3*x* controllers come with one 1769-BA lithium battery.

The 1768 controllers and the CompactLogix 5370 controllers do not require a battery. The controller uses internal nonvolatile memory to store its program during shutdown. Energy that is stored in the system maintains controller power long enough to store the program to internal nonvolatile memory, but not the external CompactFlash card nor SD card respectively.

Technical Specifications - 1769-BA

Attribute	1769-BA
Description	Lithium battery (0.59 g)
CompactLogix controllers	1769-L23-QBFC1B, 1769-L23E-QB1B, 1769-L23E-QBFC1B 1769-L31 1769-L32C, 1769-L35CR 1769-L32E, 1769-L35E

Removable Terminal Kits

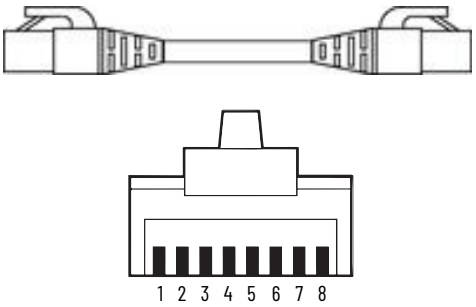
You can order removable terminal kits separately for the CompactLogix 5370 L1 and L2 controllers.

Cat. No.	Controllers Supported	Description
1769-RTB45	CompactLogix 5370 L1	• Four 10-pin connectors are used to connect the wiring to the embedded digital I/O module of the controller. • One 5-pin connector is used to connect an external 24V DC power source to the controller.
1769-RTB40DI0	CompactLogix 5370 L2	Four 10-pin connectors are used to connect the wiring to the embedded digital I/O module of the controller.
1769-RTB40AI0	1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B	Four 10-pin connectors are used to connect the wiring to the embedded analog I/O module of the controller.

Cold Junction Compensation

The CompactLogix 5370 L2 controllers require the use of the 1769-CJC CompactLogix CJC Sensor when the embedded analog input of the controller is configured for Thermocouple mode.

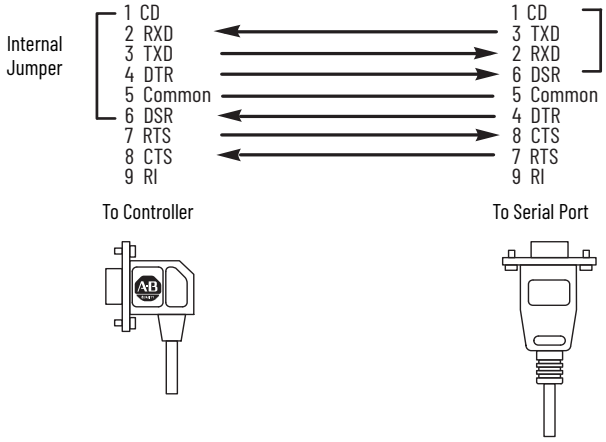
Ethernet Communication Cables



Connector Number	Color	1585J-M8xBJM-2	1585J-M4TBJM-2
1	White/Orange	TxData +	
2	Orange	TxData -	
3	White/Green	Recv Data +	
4	Blue	Unused	-
5	White/Blue	Unused	-
6	Green	Recv Data -	
7	White/Brown	Unused	-
8	Brown	Unused	-

Attribute	Value
Connector type	RJ45 Male to RJ45 Male
Connector angle	Straight-through
Length	Varies by catalog number

Serial Communication Cables



Attribute	1756-CP3	1747-CP3
Connector type	Female 9-pin D-shell	
Connector angle	Right angle connector to controller, straight to serial port	
Length	3 m (118 in.)	