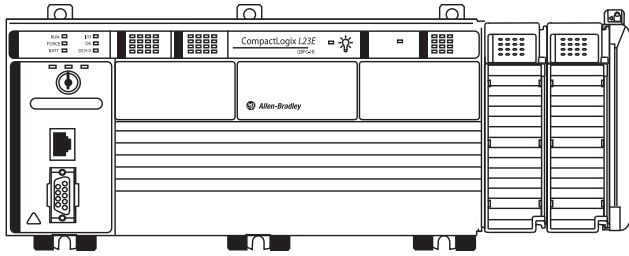


## 1769 Packaged CompactLogix Controllers with Embedded I/O



The 1769-L23x 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-L23x 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	1...4 modules can be scanned in 1.5 ms
1769-L23-QBFC1B	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 <sup>(1)</sup>	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](http://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 60068-2-30 (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 <sup>(1)</sup>	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 <sup>2</sup> (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 <sup>2</sup> (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 <sup>2</sup> (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](#).

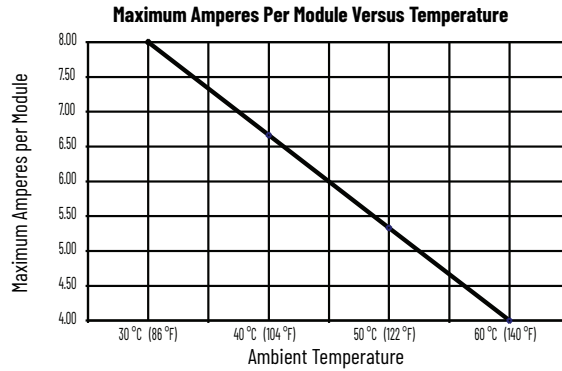
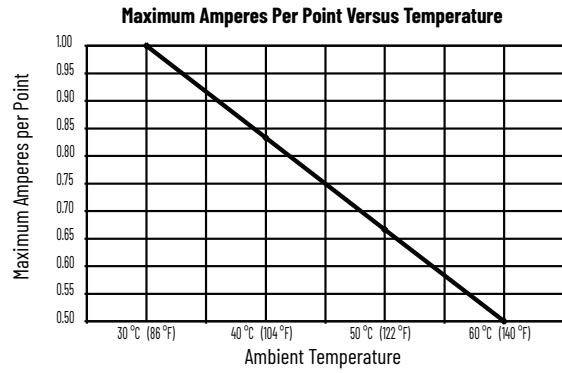
### Embedded DC Input Specifications

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 <a href="#">page 31</a>
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) <sup>(1)</sup>	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) <sup>(1)</sup>	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 <sup>(1)</sup>
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

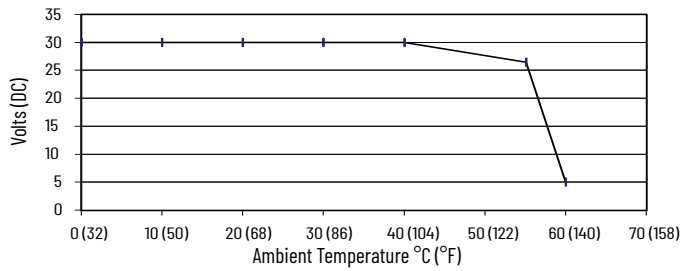
(1) See [Embedded HSC Module Temperature Derating](#) temperature derating.

## 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

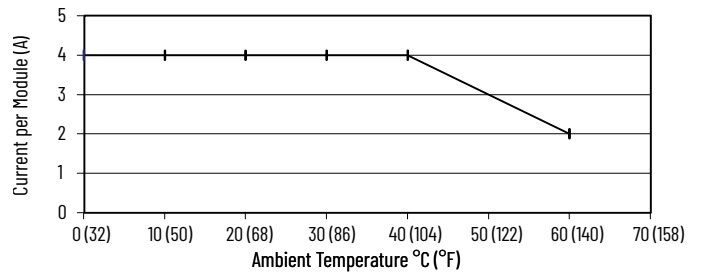
**Maximum Input Voltage - 24V DC Operation**



Temperature	Derated Voltage <sup>(1)</sup>
0...40 °C (32...104 °F)	30V DC
55 °C (131 °F)	26.4V DC
60 °C (140 °F)	5V DC

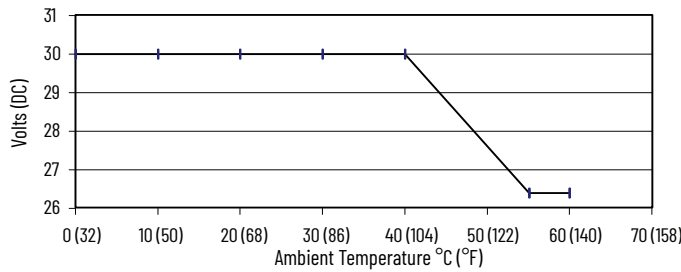
(1) You achieve an input voltage derating 55...60 °C (131...140 °F) by using a drop resistor. For 24V DC input voltage, use a 2.4 kΩ, 1/2 Watt resistor. For input voltages other than 24V DC, use a 1/2 W resistor with value:  $125 \times (V_{in} - 5V)$ .

**Maximum Output Current Per Module - 5V DC Operation**



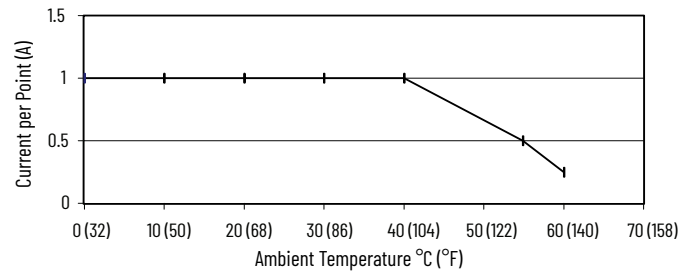
Temperature	Derated Current
0...40 °C (32...104 °F)	4 A
60 °C (140 °F)	2 A

**Maximum Output Voltage - 24V DC Operation**



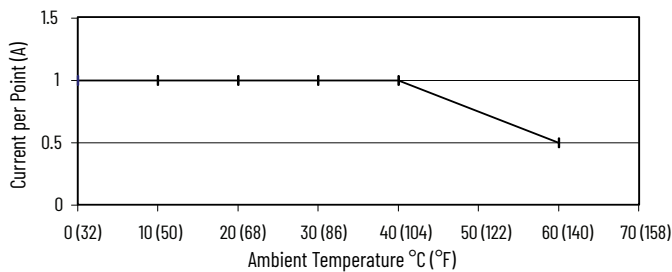
Temperature	Derated Voltage
0...40 °C (32...104 °F)	30V DC
55...60 °C (131...140 °F)	26.4V DC

**Maximum Output Current Per Point - 24V DC Operation**



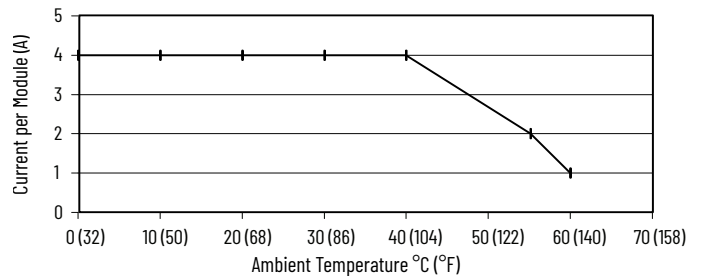
Temperature	Derated Current
0...40 °C (32...104 °F)	1 A
55 °C (131 °F)	0.5 A
60 °C (140 °F)	0.25 A

**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**

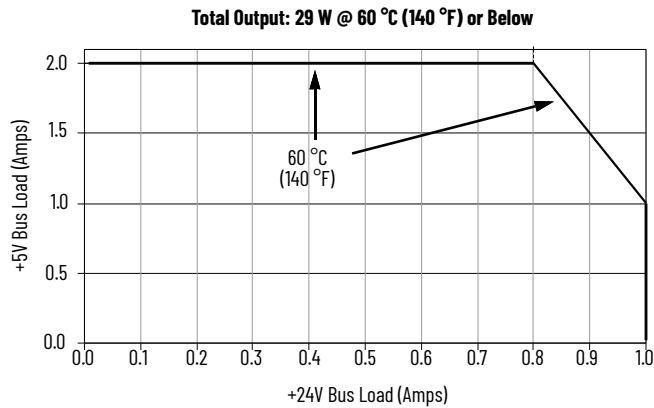


Temperature	Derated Current
0...40 °C (32...104 °F)	4 A
55 °C (131 °F)	2 A
60 °C (140 °F)	1 A

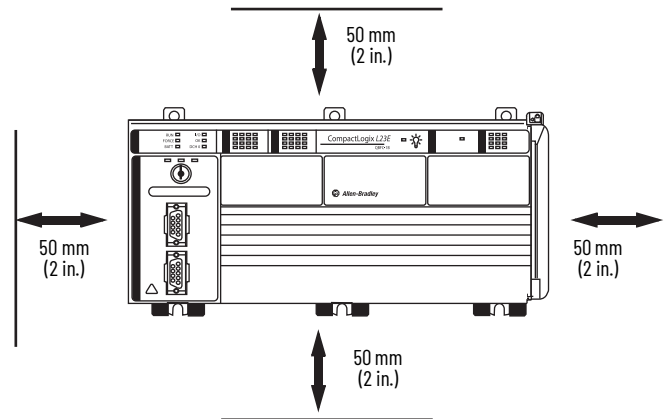
**Embedded Power Supply**

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	2 A @ 5V DC 0.8 A @ 24V DC
0...55 °C (32...131 °F) 55...60 °C (131...140 °F)	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

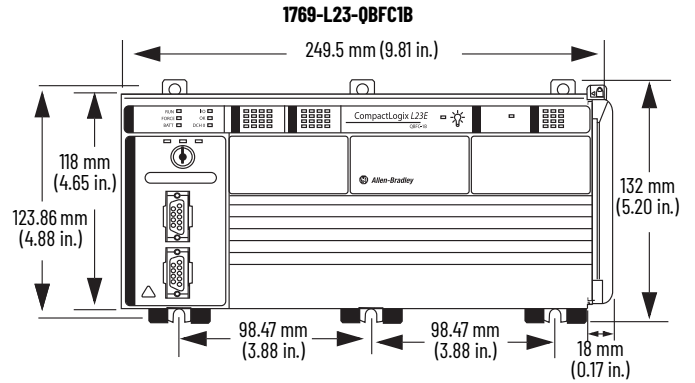
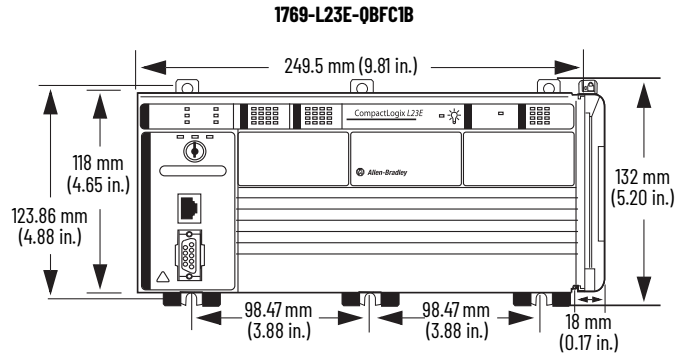
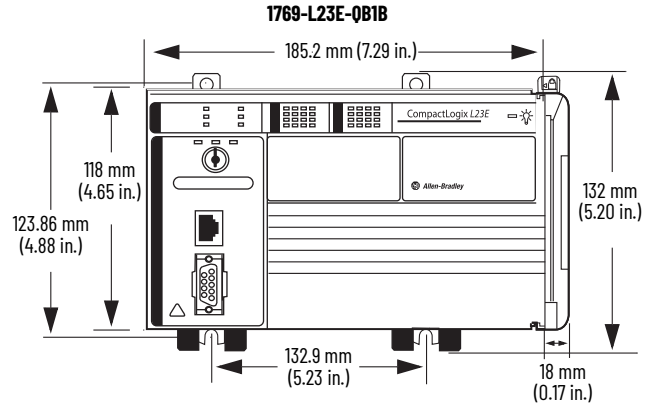
*Embedded Power Supply Temperature Derating*



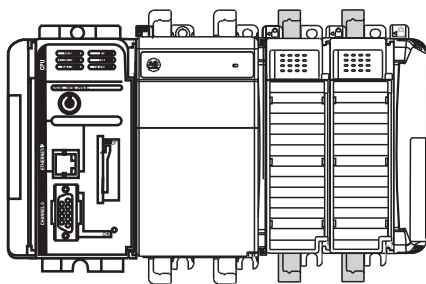
**Minimum Spacing Requirements - 1769 Packaged CompactLogix Controllers**



**Dimensions - 1769 Packaged CompactLogix Controllers**



# 1769 Modular CompactLogix Controllers



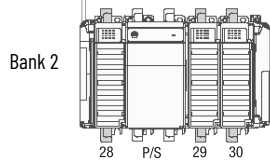
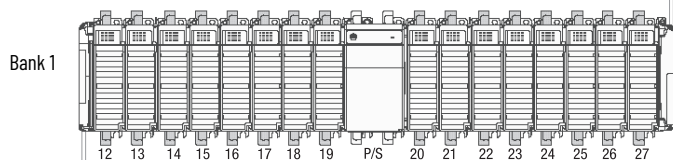
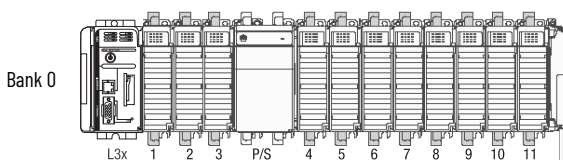
In a 1769-L3x controller system, the 1769 I/O modules can be placed to the left and the right of the power supply. As many as eight modules can be placed on each side of the power supply.

## 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 <sup>(1)</sup>	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		-
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](http://rok.auto/certifications) for Declarations of Conformity, Certificates, and other certification details.