**Environmental Specifications - 1769 CompactLogix Controllers and Compact GuardLogix 5370 Controllers**

| Attribute | 1769-L16ER-BB1B, 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L19ER-BB1B | 1769-L24ER-QB1B, 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B | 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERM, 1769-L33ER, 1769-L33ERM, 1769-L36ERM | 1769-L30ERMS, 1769-L33ERMS, 1769-L36ERMS | 1769-L23-QBFC1B, 1769-L23E-QB1B, 1769-L23E-QBFC1B | 1769-L31, 1769-L32C, 1769-L35CR, 1769-L32E, 1769-L35E |
|---|---|---|---|---|---|---|
| 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 | | | 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 | | | 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 | | | 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 | 6 kV contact discharges 8 kV air discharges |

**Environmental Specifications - 1769 CompactLogix Controllers and Compact GuardLogix 5370 Controllers (continued)**

| Attribute | 1769-L16ER-BB1B, 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L19ER-BB1B | 1769-L24ER-QB1B, 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B | 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERM, 1769-L33ER, 1769-L33ERM, 1769-L36ERM | 1769-L30ERMS, 1769-L33ERMS, 1769-L36ERMS | 1769-L23-QBFC1B, 1769-L23E-QB1B, 1769-L23E-QBFC1B | 1769-L31, 1769-L32C, 1769-L35CR, 1769-L32E, 1769-L35E |
|---|---|---|---|---|---|---|
| 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; 10V/m with 1 kHz sine-wave 80% AM from 2000…2700 MHz | | 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 | 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 | **1769-L31, 1769-L32C, 1769-L35CR** 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  **1769-L32E, 1769-L35E** 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 |
| 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 | **1769-L31, 1769-L32C, 1769-L35CR** ±2 kV at 5 kHz on communication ports  **1769-L32E, 1769-L35E** ±3 kV at 5 kHz on power ports; ±3 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 | **1769-L31** Channel 0: ±2 kV line-earth (CM) on shielded ports; Channel 1: ±1 kV line-earth (CM) on shielded ports  **1769-L32C, 1769-L35CR, 1769-L32E, 1769-L35E** ±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.

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, you 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 enforces the SIL 3 integrity level. When safety memory is locked and protected, the safety logic cannot 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 system-wide 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.

**Features - CompactLogix 5370 Controllers and Compact GuardLogix 5370 Controllers**

| Feature | 1769-L16ER-BB1B, 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L19ER-BB1B | 1769-L24ER-QB1B, 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B | 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERM, 1769-L33ER, 1769-L33ERM, 1769-L36ERM | 1769-L30ERMS, 1769-L33ERMS, 1769-L36ERMS |
|---|---|---|---|---|
| Controller tasks:<br>• Continuous<br>• Periodic | • 32 tasks<br>• 100 programs/task | | | |
| Built-in communication ports | • Two EtherNet/IP ports - CompactLogix 5370 controllers have two EtherNet/IP ports to connect to an EtherNet/IP network. The ports carry the same network traffic as part of the embedded switch of the controller. However, the controller uses only one IP address.<br>• One USB port (only for temporary connection) | | | |
| Communication options | EtherNet/IP | • EtherNet/IP<br>• DeviceNet via 1769-SDN scanner | | |
| EtherNet/IP node, max | • 1769-L16ER-BB1B: Up to four nodes<br>• 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L19ER-BB1B: Up to 8 nodes | • 1769-L24ER-QB1B, 1769-L24ER-QBFC1B: Up to 8 nodes<br>• 1769-L27ERM-QBFC1B: Up to 16 nodes | • 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERM, 1769-L30ERMS: Up to 16 nodes<br>• 1769-L33ER, 1769-L33ERM, 1769-L33ERMS: Up to 32 nodes<br>• 1769-L36ERM, 1769-L36ERMS: Up to 48 nodes | |
| Controller connections | 256 | | | |
| Embedded I/O modules | • 16 DC digital inputs<br>• 16 DC digital outputs | All controllers:<br>• 16 DC digital inputs<br>• 16 DC digital outputs<br>Only 1769-L24ER-QBFC1B and 1769-L27ERM-QBFC1B:<br>• 4 high-speed counters<br>• 4 high-speed counter outputs<br>• 4 universal analog inputs<br>• 2 analog output points | – | |
| Sockets, max | 32 | | | |
| Integrated Motion over an EtherNet/IP network | 1769-L18ERM-BB1B - 1 or 2 axes | 1769-L27ERM-QBFC1B - As many as 4 axes | • 1769-L30ERM, 1769-L30ERMS - As many as 4 axes<br>• 1769-L33ERM, 1769-L33ERMS - As many as 8 axes<br>• 1769-L36ERM, 1769-L36ERMS - As many as 16 axes | |
| Programming languages | • Relay ladder[1]<br>• Structured Text<br>• Function block<br>• SFC | | | |
| Integrated safety | – | | | Yes |

(1) The Compact GuardLogix 5370 controllers support only the relay ladder programming language in the safety task. The Compact GuardLogix 5370 controllers support all listed programming languages in the standard task.

**Technical Specifications - CompactLogix 5370 Controllers and Compact GuardLogix 5370 Controllers**

| Attribute | 1769-L16ER-BB1B, 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L19ER-BB1B | 1769-L24ER-QB1B, 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B | 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERM, 1769-L33ER, 1769-L33ERM, 1769-L36ERM | 1769-L30ERMS, 1769-L33ERMS, 1769-L36ERMS |
|---|---|---|---|---|
| User memory | • 1769-L16ER: 384 KB<br>• 1769-L18ER, 1769-L18ERM: 512 KB<br>• 1769-L19ER-BB1B: 1 MB | • 1769-L24ER-QB1B, 1769-L24ER-QBFC1B: 750 KB<br>• 1769-L27ERM-QBFC1B: 1 MB | • 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERM: 1 MB<br>• 1769-L33ER, 1769-L33ERM: 2 MB<br>• 1769-L36ERM: 3 MB | • 1769-L30ERMS: 1 MB standard + 0.5 MB safety<br>• 1769-L33ERMS: 2 MB standard + 1 MB safety<br>• 1769-L36ERMS: 3 MB standard + 1.5 MB safety |
| Optional nonvolatile memory | 1784-SD1 card with 1 Gb of available memory (shipped with controller)<br>1784-SD2 card with 2 Gb of available memory (available for separate ordering) | | | |
| Number of local expansion modules, max[1] | • 1769-L16ER-BB1B: Six 1734 POINT I/O™ modules<br>• 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L19ER-BB1B: Eight 1734 POINT I/O modules | Four 1769 Compact I/O™ modules | • 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERM, 1769-L30ERMS: Eight 1769 Compact I/O modules<br>• 1769-L33ER, 1769-L33ERM, 1769-L33ERMS: Sixteen 1769 Compact I/O modules<br>• 1769-L36ERM, 1769-L36ERMS: Thirty 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 Value rated at the following ambient temperatures: 40 °C (104 °F), 55 °C (131 °F), 60 °C (140 °F).<br>• 1769-L24ER-QBFC1B and 1769-L27ERM-QBFC1B: 1 A Value rated at the following 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: 0.95A Value rated at the following ambient temperatures: 40 °C (104 °F), 55 °C (131 °F), 60 °C (140 °F).<br>• 1769-L24ER-QBFC1B and 1769-L27ERM-QBFC1B: 0.8 A Value rated at the following 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<br>Input: 5 mA<br>Output: 500 mA | – | | |
| Power dissipation, max | 11.5 W | • 1769-L24ER-QB1B: 12 W<br>• 1769-L24ER-QBFC1B, L27ERM-QBFC1B: 21 W | 4.5 W | 6.5 W |
| Isolation voltage | 50V (continuous), Basic Insulation Type<br>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<br>Type tested at 500V AC for 60 s | | 50V, Basic Insulation Type<br>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<br>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)<br>• 1769-L24ER-QBFC1B and 1769-L27ERM-QBFC1B = 0.9 kg (1.9 lb) | 0.31 kg (0.68 lb) | 0.54 kg (1.18 lb) |

### Technical Specifications - CompactLogix 5370 Controllers and Compact GuardLogix 5370 Controllers (continued)

| Attribute | 1769-L16ER-BB1B, 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L19ER-BB1B | 1769-L24ER-QB1B, 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B | 1769-L30ER, 1769-L30ER-NSE, 1769-L30ERM, 1769-L33ER, 1769-L33ERM, 1769-L36ERM | 1769-L30ERMS, 1769-L33ERMS, 1769-L36ERMS |
|---|---|---|---|---|
| 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-mounting screw torque | N/A | 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 | |
| Power supply distance rating | – | | • Controller and 1769-SDN: 4 <br> • 1769 Compact I/O modules: 4…8, depending on module | 4 (3 I/O modules between controller and power supply) |
| Wire category[2] | 1 - signal ports <br> 1 - power ports <br> 2 - communication ports | | 2 - 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 type, power terminals and embedded I/O connections | Copper | | – | |
| Wire size, power terminals[3] | 0.051…3.31 mm$^2$ (30…12 AWG) solid or stranded copper wire rated at 75 °C (167 °F), or greater, 1.2 mm (3/64 in.) insulation, max Each terminal accepts 1 or 2 wires | 0.25…2.50 mm$^2$ (22…14 AWG) solid copper wire rated at 75 °C (167 °F), or greater 1.2 mm (3/64 in.) insulation, max Each terminal accepts only 1 wire | – | |
| Wire stripping length, power terminals[3] | 10 mm (0.39 in) | 8 mm (0.31 in) | – | |
| Screw torque, power terminals [3] | 0.5…0.6 N•m (4.4…5.3 lb•in) | 1.0…1.2 N•m (8.9…10.6 lb•in) | – | |
| Wire size, embedded I/O connections | 0.205…1.31 mm$^2$ (24…16 AWG) solid or stranded copper wire rated at 75 °C (167 °F), or greater 1.2 mm (3/64 in.) insulation, max or 90 °C (194 °F) Each terminal accepts only 1 wire | | – | |
| Wire stripping length, embedded I/O connections | 10 mm (0.39 in) | | – | |
| North American temperature code | T4A | T3C | T5 | |
| IEC temperature code | T4 | | T5 | |
| Enclosure type rating | None (open-style) | | | |

(1) You can use up to the maximum number of local expansion modules with the CompactLogix 5370 L1 controllers that are listed. This condition applies if only the total current drawn by the embedded I/O and local expansion modules does not exceed both the available POINTBus™ backplane current of 1 A and the field power current of 3 A. For more information on POINTBus backplane current and field-power current considerations when installing local expansion modules, see page 12.

(2) Use this Conductor Category information for planning conductor routing. See the Industrial Automation Wiring and Grounding Guidelines, publication 1770-4.1 and the appropriate system-level installation manual.

(3) In regard to the CompactLogix 5370 L1 controllers, this specification applies to connecting wires to the power connector that is inserted in the controller. In regard to the CompactLogix 5370 L2 controllers, this specification applies to connecting wires to power terminals built into the controller.

**Embedded Power Supply (continued)**

| Attribute | 1769-L16ER-BB1B, 1769-L18ER-BB1B, 1769-L18ERM-BB1B, 1769-L19ER-BB1B |
|---|---|
| Available 5V DC POINTBus backplane current | 1 A @ 5V DC |
| Current draw @ 24V DC, field power, max | 3 A[(1)] |
| Inrush, max | 10 A |
| Line loss ride through | 10 ms…10 s |
| Output bus current capacity, max | 0.1…3 A @ 5V DC |
| Load current, min | 300 mA |
| Power dissipation, max | 12 W |
| Short circuit protection | Internal fuse Not replaceable |
| Overvoltage protection | Yes |

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

## I/O Module Support - CompactLogix 5370 L2 Controllers

The CompactLogix 5370 L2 controllers offer embedded I/O modules and the option to use 1769 Compact I/O modules as local expansion modules. This table describes the embedded I/O modules and local expansion modules that the CompactLogix 5370 L2 controllers support.

| Cat. No. | Embedded I/O Module Support | | | | | | Local Expansion Modules Support |
|---|---|---|---|---|---|---|---|
| | Sinking/Sourcing 24V DC Digital Input Points | Sourcing 24V DC Digital Output Points | High-speed Counters | High-speed Counter Output Points | Universal Analog Input Points | Analog Output Points | 1769 Compact I/O Modules |
| 1769-L24ER-QB1B | 16 | 16 | – | – | – | – | As many as 4 modules |
| 1769-L24ER-QBFC1B | | | 4 | 4 | 4 | 2 | |
| 1769-L27ERM-QBFC1B | | | | | | | |

> **IMPORTANT** Remember the following when using the embedded I/O modules on CompactLogix 5370 L2 controllers:
>
> - 1769-L24ER-QB1B controller - The digital input points and digital output points are on one embedded I/O module. Therefore, the 1769-L24ER-QB1B controller is considered to have one embedded I/O module.
> - 1769-L24ER-QBFC1B and 1769-L27ERM-QBFC1B controllers - The digital input points and digital output points are on one embedded I/O module. The high-speed counter input/output points, universal analog input points, and analog output points are on another single embedded I/O module. Therefore, the 1769-L24ER-QBFC1B and 1769-L27ERM-QBFC1B controllers are considered to have two embedded I/O modules.

You configure an RPI rate for the embedded I/O modules to establish specific time intervals at which data is transmitted between the controller and the embedded I/O modules. The available RPI range of the embedded I/O modules is 0.5…750.0 ms and can be changed by 0.5 ms increments. The default setting is 20 ms.

To use 1769 Compact I/O modules as local expansion modules, keep in mind the following:

- Local expansion modules must be installed in the same system as the CompactLogix 5370 L2 controller.
- Local expansion modules are installed to the right of the embedded I/O modules.
- You must install a 1769-ECR Compact I/O end cap on the right side of control system. The end cap can be installed on the right side of the embedded I/O module. If local expansion modules are used, the end cap can be installed on the right side of 1769 Compact I/O module.
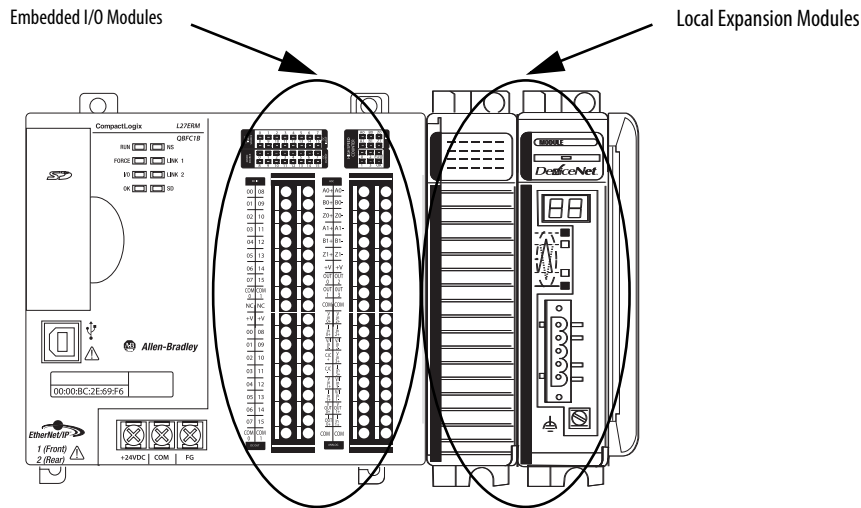


*CompactLogix 5370 L2 Controller Local I/O Performance*

The requested packet interval (RPI) defines the frequency at which the controller sends data to and receives data from I/O modules. You set an RPI rate for each I/O module in your system in the programming software. You also set RPI rates through the programming software for embedded I/O modules, local expansion modules, and distributed I/O modules over an EtherNet/IP network.

The CompactLogix 5370 L2 controllers always attempt to scan an I/O module at the configured RPI rate. The controller scans distributed I/O modules at the configured RPI rates.

With embedded I/O modules and local expansion modules, however, some specific system-configuration parameters determine the actual rate at which the controller scans the modules. That is, the controller can be configured to scan an I/O module at one rate, but actually scan the module at another rate.

For individual I/O modules, a Module RPI Overlap minor fault occurs if there is at least one I/O module that cannot be serviced within its RPI time.

The specific configuration parameters for a system determine the impact on actual RPI rates. These configuration factors can impact the effective scan frequency for any individual embedded or local expansion module:

- Rates at which the RPI values of the embedded I/O modules are set
- Number of embedded I/O modules that are used in the system
- Types of embedded I/O modules that are used in the system
- Rates at which RPI values for the 1769 Compact I/O module are set
- Number of 1769 Compact I/O modules in the system
- Types of 1769 Compact I/O modules in the system
- Application user task priorities

The RPI Rate Guidelines table describes RPI rate guidelines.

**RPI Rate Guidelines**

| Type of Module | Guidelines |
|---|---|
| Digital and analog (any mix) | The following guidelines apply:<br>• 1…2 modules can be scanned in 0.5 ms.<br>• 3…4 modules can be scanned in 1 ms.<br>• 5…6 modules can be scanned in 2 ms.<br>• Some input modules have a fixed 8 ms filter, so selecting a faster RPI has no effect. |
| Specialty | The following conditions apply:<br>• For every full-sized 1769-SDN module in the system, increase the RPI of every other module by 2 ms.<br>• For every 1769-HSC module in the system, increase the RPI of every other module by 1 ms.<br>• For every full-sized 1769-ASCII module system, increase the RPI of every other module by 1 ms.<br>• For every 1769-SM2 module in the system, increase the RPI of every other module by 2 ms.<br>For example, the system includes four I/O modules that are configured with an RPI = 1 ms and you add a 1769-SDN module to the system. You must increase the RPI value for all four I/O modules by 2 ms. Therefore, when the 1769-SDN module is added to the system, the four I/O modules use an RPI = 3 ms.<br>If, in the same system, you add a second 1769-SDN module, the RPI value of the four I/O modules is increased to 5 ms. |

> **IMPORTANT** The number of I/O modules can be the embedded I/O modules on the controller or 1769 Compact I/O modules that are used as local expansion modules.
>
> Therefore, the consideration for using modules can be any of the following system configurations:
> • Only embedded I/O modules
> • Only 1769 Compact I/O modules
> • Some combination of embedded I/O modules and 1769 Compact I/O modules

You can set individual RPI rates for 1769 Compact I/O modules higher than those values listed in the Embedded DC Input Specifications table. The RPI shows how quickly modules can be scanned, not how quickly 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.

**Embedded DC Input Specifications**

| Attribute | 1769-L24ER-QB1B | 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B |
|---|---|---|
| Inputs | 16 | |
| Voltage category | 24V DC sink/source | |
| Operating voltage range | 10…28.8V DC @ 40 °C (104 °F)<br>10…26.4V DC @ 60 °C (140 °F)<br>24V DC nom | 10…28.8V DC @ 40 °C (104 °F)<br>10…27.0V DC @ 55 °C (131 °F)<br>10…26.4V DC @ 60 °C (140 °F)<br>24V DC nom |
| Digital filter, off to on | 0 s, 100 µs, 500 µs, 1 ms, 2 ms, 4 ms, 8 ms | |
| Input delay, off to on | 100 µs, min<br>8 ms, max | |
| Digital filter, on to off | 0 s, 100 µs, 500 µs, 1 ms, 2 ms, 4 ms, 8 ms | |
| Input delay, on to off | 100 µs, min<br>8 ms, max | |
| Off-state voltage, max | 5V DC | |
| Off-state current, max | 1.5 mA | |
| On-state current, min | 2 mA @ 24V DC per channel | |
| On-state current, max | 5 mA @ 24V DC per channel | |
| Input impedance, max | 5.2 kΩ @ 24V DC<br>6.1 kΩ @ 30V DC | |
| Cyclic update time | 0.5…750 ms | |

**Embedded DC Input Specifications (continued)**

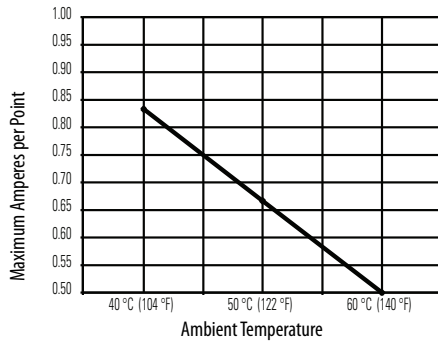| Attribute | 1769-L24ER-QB1B | 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B |
|---|---|---|
| Isolation voltage | 75V (continuous), Reinforced Insulation Type<br>Type tested at 1200V AC for 1 s and at 1700V DC for 1 s; group to system, group to group | |
| IEC input compatibility | Type 3 | |
| Isolated groups | Group 1: inputs 0…7<br>Group 2: inputs 8…15<br>Isolated groups operate in either sink or source configurations | |

**Embedded DC Output Specifications**

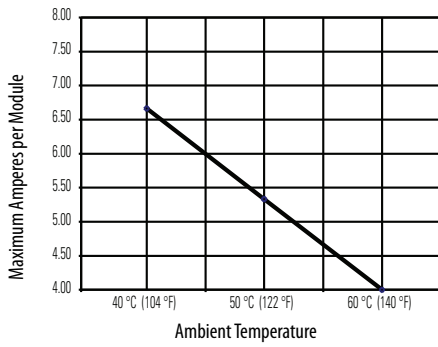| Attribute | 1769-L24ER-QB1B | 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B |
|---|---|---|
| Outputs | 16 | |
| Voltage category | 24V DC source | |
| Operating voltage range | 20.4…26.4V DC<br>24V DC nom | |
| Output delay, off to on | 0.05 ms | |
| Output delay, on to off | 0.5 ms | |
| Off-state leakage current, max | 0.1 mA @ 26.4V DC | |
| On-state current, max | 0.5 mA @ 24V DC per channel | |
| On-state voltage drop, max | 1.0V DC @ 1.0 A | |
| Current per point, max | 0.83 A @ 40 °C (104 °F)<br>0.5 A @ 60 °C (140 °F) | 0.83 A @ 40 °C (104 °F)<br>0.58 A @ 55 °C (131 °F)<br>0.5 A @ 60 °C (140 °F) |
| Current per module, max | 6.64 A @ 40 °C (104 °F)<br>4.0 A @ 60 °C (140 °F) | 6.64 A @ 40 °C (104 °F)<br>4.64 A @ 55 °C (131 °F)<br>4.0 A @ 60 °C (140 °F) |
| Surge current per point, max | 2.0 A for 10 ms per point, repeatable every 2 s | |
| Isolation voltage | 75V (continuous), Reinforced Insulation Type<br>Type tested at 1200V AC for 1 s and at 1700V DC for 1 s; group to system, group to group | |
| Isolated groups | Group 1: inputs 0…7<br>Group 2: inputs 8…15 | |

*Embedded DC Output Temperature Derating*

The area within the curves represents the safe operating range for the embedded DC outputs under various conditions of user supplied voltages and ambient temperatures.

**Embedded DC Outputs Maximum Amperes per Point Versus Temperature**



**Embedded DC Outputs Maximum Amperes per Module Versus Temperature**

**Embedded Analog Input Specifications**

| Attribute | 1769-L24ER-QBFC1B, 1769-L27ERM-QBFC1B |
|---|---|
| Inputs | 4 channels of thermocouple/voltage/current<br>2 channels of RTD/Resistance inputs |
| Operating voltage range | 2.6…30.0V DC @ 40 °C (104 °F)<br>2.6…26.4V DC @ 55 °C (131 °F)<br>2.6…5V DC @ 60 °C (140 °F) |
| Input types | • Thermocouple: J, K, T, E, R, S, B, N, and C<br>• Voltage<br>• Current<br>• RTD: Platinum 385, Platinum 3916, Copper 426, Nickel 672, Nickel 618, Nickel-Iron 518<br>• Resistance |
| Input ranges[1] | Thermocouple:<br>• K at 1370…1372 °C (2498…2501.6 °F)<br>• K at -170…+1370 °C (-274…+2498 °F)<br>• K at -200…+1370 °C (-328…+2498 °F)<br>• S and R at 0…1768 °C (32…3214.4 °F)<br>• S and R at -50…0 °C (-58…+32 °F)<br>• B at 300…1820 °C (572…3308 °F)<br>• B at 250…300 °C (482…572 °F)<br>• J at -210…+1200 °C (-328…+2192 °F)<br>• T at -170…+400 °C (-274…+752 °F)<br>• T at -200…-170 °C (-328…-274 °F)<br>• E at -200…+1000 °C (-328…+1832 °F)<br>• N at -110…+1300 °C (-166…+2372 °F)<br>• N at -200…-110 °C (-328…-166 °F)<br>• C at 0…2315 °C (32…4199 °F)<br>Voltage:<br>• -50…+50 mV<br>• -100…+100 mV<br>• 0…5V<br>• 1…5V<br>• 0…10V<br>• -10V…+10V<br>Current:<br>• 0…20 mA<br>• 4…20 mA<br>RTD:<br>• 0…100 Ω Platinum 385<br>• 0…200 Ω Platinum 385<br>• 0…500 Ω Platinum 385<br>• 0…1000 Ω Platinum 385<br>• 0…100 Ω Platinum 3916<br>• 0…200 Ω Platinum 3916<br>• 0…500 Ω Platinum 3916<br>• 0…1000 Ω Platinum 3916<br>• 0…10 Ω Copper 426<br>• 0…120 Ω Nickel 618<br>• 0…120 Ω Nickel 672<br>• 0…604 Ω Nickel-Iron 518<br>Resistance:<br>• 0…150 Ω<br>• 0…500 Ω<br>• 0…1000 Ω<br>• 0…3000 Ω |
| Resolution, max | 15 bits plus sign (Bipolar)<br>16 bits (Unipolar) |
| Input impedance | Voltage: 10 MΩ<br>Current: 250 Ω |
| Converter type | Sigma-Delta |
| Cyclic update time | 11…5000 ms dependent on user configuration |
| Rated working voltage | 30V AC/30V DC |
| Common mode voltage | ±10V DC per channel |
| Common mode rejection ratio, min | 115 dB at 50 Hz at 10V<br>115 dB at 60 Hz at 10V |
| Normal mode rejection ratio, min | 85 dB at 50 Hz at 1.5V<br>85 dB at 60 Hz at 1.5V |