



## 1769 Compact I/O Modules Specifications

Catalog Numbers 1769 Series

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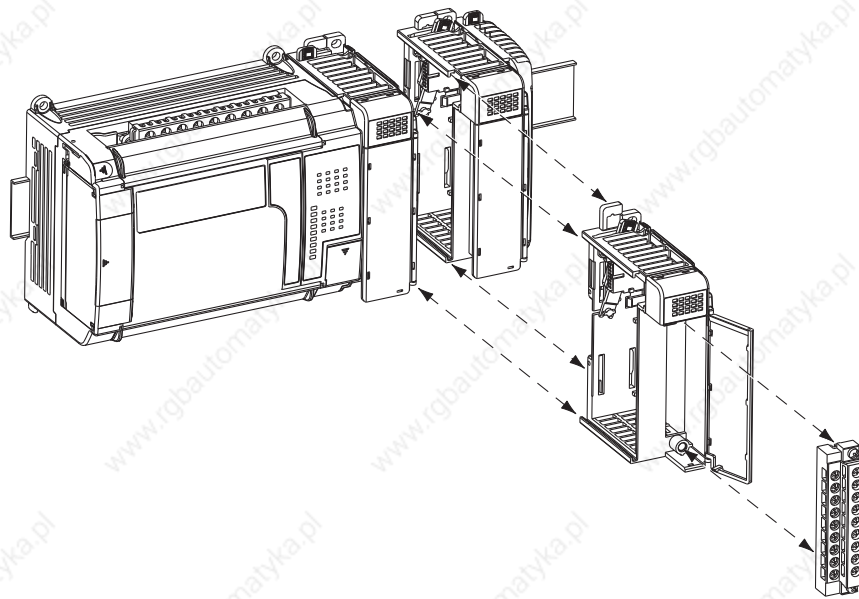
The 1769 Compact I/O modules can be used with a CompactLogix controller, as well as for expansion I/O in a MicroLogix 1500 controller assembly or in an assembly with a 1769-ADN DeviceNet adapter module. Unless connected to a MicroLogix 1500 base, each bank of I/O modules must include its own power supply.

Install the I/O modules on a panel with two mounting screws or on a DIN rail. The modules mechanically lock together by means of a tongue-and-groove design and have an integrated communication bus that is connected from module to module by a moveable bus connector.

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Each I/O module includes a built-in removable terminal block with finger-safe cover for connections to I/O sensors and actuators. The terminal block is behind a door at the front of the module. I/O wiring can be routed from beneath the module to the I/O terminals.



- Once the modules are locked together, the system becomes a rugged assembly.
- Upper and lower tongue-and-groove slots guide the module during installation and secure the module within the system.
- Removable terminal blocks help ease the wiring task.
- Self-lifting, field-wire pressure plates cut installation time.
- The patented bus connector with locking function enables reliable module and system communication.
- A color bar is provided on the front of the module.
- Digital and field circuits are optically isolated.

## Available 1769 I/O Modules

| I/O Type   | Cat. No.                       | Page                | Cat. No.                     | Page                |
|------------|--------------------------------|---------------------|------------------------------|---------------------|
| AC digital | <a href="#">1769-IA8I</a>      | <a href="#">7</a>   | <a href="#">1769-OA8</a>     | <a href="#">62</a>  |
|            | <a href="#">1769-IA16</a>      | <a href="#">9</a>   | <a href="#">1769-OA16</a>    | <a href="#">65</a>  |
|            | <a href="#">1769-IM12</a>      | <a href="#">38</a>  |                              |                     |
| DC digital | <a href="#">1769-IG16</a>      | <a href="#">36</a>  | <a href="#">1769-OB8</a>     | <a href="#">68</a>  |
|            | <a href="#">1769-IQ16</a>      | <a href="#">40</a>  | <a href="#">1769-OB16</a>    | <a href="#">70</a>  |
|            | <a href="#">1769-IQ16F</a>     | <a href="#">42</a>  | <a href="#">1769-OB16P</a>   | <a href="#">73</a>  |
|            | <a href="#">1769-IQ32</a>      | <a href="#">44</a>  | <a href="#">1769-OB32</a>    | <a href="#">76</a>  |
|            | <a href="#">1769-IQ32T</a>     | <a href="#">46</a>  | <a href="#">1769-OB32T</a>   | <a href="#">79</a>  |
|            | <a href="#">1769-IQ6XOW4</a>   | <a href="#">48</a>  | <a href="#">1769-OG16</a>    | <a href="#">99</a>  |
|            |                                |                     | <a href="#">1769-OV16</a>    | <a href="#">101</a> |
|            |                                |                     | <a href="#">1769-OV32T</a>   | <a href="#">104</a> |
| Contact    | <a href="#">1769-OW8</a>       | <a href="#">106</a> | <a href="#">1769-OW16</a>    | <a href="#">110</a> |
|            | <a href="#">1769-OW8I</a>      | <a href="#">108</a> |                              |                     |
| Analog     | <a href="#">1769-IF4</a>       | <a href="#">11</a>  | <a href="#">1769-OF2</a>     | <a href="#">81</a>  |
|            | <a href="#">1769-IF4I</a>      | <a href="#">14</a>  | <a href="#">1769-OF4</a>     | <a href="#">84</a>  |
|            | <a href="#">1769-IF4XOF2</a>   | <a href="#">17</a>  | <a href="#">1769-OF4CI</a>   | <a href="#">87</a>  |
|            | <a href="#">1769-IF4FXOF2F</a> | <a href="#">21</a>  | <a href="#">1769-OF4VI</a>   | <a href="#">90</a>  |
|            | <a href="#">1769-IF8</a>       | <a href="#">26</a>  | <a href="#">1769-OF8C</a>    | <a href="#">93</a>  |
|            | <a href="#">1769-IF16C</a>     | <a href="#">30</a>  | <a href="#">1769-OF8V</a>    | <a href="#">96</a>  |
|            | <a href="#">1769-IF16V</a>     | <a href="#">33</a>  |                              |                     |
|            | <a href="#">1769-IR6</a>       | <a href="#">51</a>  |                              |                     |
|            | <a href="#">1769-IT6</a>       | <a href="#">58</a>  |                              |                     |
| Specialty  | <a href="#">1769-ARM</a>       | <a href="#">112</a> | <a href="#">1769-BOOLEAN</a> | <a href="#">115</a> |
|            | <a href="#">1769-ASCI</a>      | <a href="#">113</a> | <a href="#">1769-HSC</a>     | <a href="#">119</a> |

**Table 1 - Environmental Specifications - 1769 I/O Modules**

| Attribute                                                                                                                                                                                                       | 1769-IA8I, 1769-IA16, 1769-IM12,<br>1769-OA8, 1769-OA16, 1769-IQ16,<br>1769-IQ16F, 1769-IQ32, 1769-IQ6XOW4,<br>1769-OB8, 1769-OB16, 1769-OB16P,<br>1769-OB32, 1769-OV16, 1769-OW8,<br>1769-OW8I, 1769-OW16<br>1769-IF4, 1769-IF4XOF2, 1769-IR6, 1769-IT6<br>1769-ARM, 1756-HSC | 1769-IG16, 1769-IQ32T, 1769-OB32T,<br>1769-OG16, 1769-OV32T<br>1769-IF4I, 1769-IF8, 1769-IF16C,<br>1769-IF16V, 1769-OF2, 1769-OF4CI,<br>1769-OF4VI, 1769-OF8C, 1769-OF8V,<br>1769-IF4FXOF2F<br>1769-ASCII, 1769-BOOLEAN |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Temperature, operating<br>IEC 60068-2-1 (Test Ad, Operating Cold),<br>IEC 60068-2-2 (Test Bd, Operating Dry Heat),<br>IEC 60068-2-14 (Test Nb, Operating Thermal Shock)                                         | 0...60 °C (32...140 °F)                                                                                                                                                                                                                                                        | 0...60 °C (32...140 °F)                                                                                                                                                                                                 |
| Temperature, storage<br>IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold),<br>IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat),<br>IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock) | -40...85 °C (-40...185 °F)                                                                                                                                                                                                                                                     | -40...85 °C (-40...185 °F)                                                                                                                                                                                              |
| Relative humidity<br>IEC 60068-2-30 (Test Db, Unpackaged Nonoperating Damp Heat)                                                                                                                                | 5...95% noncondensing                                                                                                                                                                                                                                                          | 5...95% noncondensing                                                                                                                                                                                                   |
| Vibration<br>IEC 60068-2-6 (Test Fc, Operating)                                                                                                                                                                 | Operating: 5 g @ 10...500 Hz<br>Relay operating: 2 g                                                                                                                                                                                                                           | 5 g @ 10...500 Hz                                                                                                                                                                                                       |
| Shock, operating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock)                                                                                                                                                  | Panel mount 30 g<br>DIN rail mount 20 g                                                                                                                                                                                                                                        | Panel mount 30 g<br>DIN rail mount 20 g                                                                                                                                                                                 |
| Shock, relay operating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock)                                                                                                                                            | Panel mount 7.5 g<br>DIN rail mount 5 g                                                                                                                                                                                                                                        | —                                                                                                                                                                                                                       |
| Shock, nonoperating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock)                                                                                                                                               | Panel mount 40 g<br>DIN rail mount 30 g                                                                                                                                                                                                                                        | Panel mount 40 g<br>DIN rail mount 30 g                                                                                                                                                                                 |

## Place Compact I/O Modules

You can DIN-rail or panel mount the controller and I/O modules. The number of local I/O modules supported depends on the controller.

| Controller                                                 | Supports                          | Location                              | Considerations                                                                                                                         |
|------------------------------------------------------------|-----------------------------------|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|
| 1769-L24ER-QB1B<br>1769-L24ER-QBFC1B<br>1769-L27ERM-QBFC1B | 4 local modules                   | Right side of the controller          | The additional modules are connected directly to the controller. There are no additional banks of local I/O.                           |
| 1769-L30ER<br>1769-L30ERM<br>1769-L30ER-NSE                | 8 local modules                   | 1 separate bank                       | The additional banks are powered by standard 1769 power supplies and connect to the main rack by using standard 1769 expansion cables. |
| 1769-L33ER<br>1769-L33ERM                                  | 16 local modules                  | 2 separate banks                      |                                                                                                                                        |
| 1769-L36ERM                                                | 30 local modules                  | 3 separate banks                      |                                                                                                                                        |
| 1769-L23E-QB1B<br>1769-L23E-QBFC1B<br>1769-L23-QBFC1B      | 2 local modules, V17 and earlier. | Right side of the packaged controller | The additional modules are connected directly to the packaged controller. There are no additional banks of local I/O.                  |
| 1769-L23E-QB1B                                             | 3 local modules, v18 and later.   |                                       |                                                                                                                                        |

| Controller                         | Supports         | Location         | Considerations                                                                                                                                                                                                                                                                        |
|------------------------------------|------------------|------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1769-L35CR<br>1769-L35E            | 30 local modules | 3 separate banks | The additional banks are powered by standard 1769 power supplies and connect to the main rack by using standard 1769 expansion cables.                                                                                                                                                |
| 1769-L32C<br>1769-L32E<br>1769-L31 | 16 local modules | 3 separate banks |                                                                                                                                                                                                                                                                                       |
| 1768-L43                           | 16 local modules | 3 separate banks |                                                                                                                                                                                                                                                                                       |
| 1768-L45                           | 30 local modules | 3 separate banks | As many as eight 1769 local modules can be attached to the 1768 backplane. The remaining modules can be in one or two additional I/O banks.<br>The additional banks are powered by standard 1769 power supplies and connect to the main rack by using standard 1769 expansion cables. |

Each 1769 I/O module has a distance rating. In 1769 systems, the distance rating is the number of modules between the specific module and the 1769 power supply. In a 1768 system, the distance rating is the number of modules between the specific I/O module and the 1768 controller.

## Digital I/O Modules

Choose digital I/O modules when you need these features.

| Type   | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input  | <p>An input module responds to an input signal in the following manner:</p> <ul style="list-style-type: none"> <li>• Input filtering limits the effect of voltage transients caused by contact bounce and/or electrical noise. If not filtered, voltage transients could produce false data. All input modules use input filtering.</li> <li>• Optical isolation shields logic circuits from possible damage due to electrical transients.</li> <li>• Logic circuits process the signal.</li> <li>• An input indicator turns on or off indicating the status of the corresponding input device.</li> </ul> |
| Output | <p>An output module controls the output signal in the following manner:</p> <ul style="list-style-type: none"> <li>• Logic circuits determine the output status.</li> <li>• An output indicator displays the status of the output signal.</li> <li>• Optical isolation separates module logic and bus circuits from field power.</li> <li>• The output driver turns the corresponding output on or off.</li> </ul>                                                                                                                                                                                         |

Most output modules have built-in surge suppression to reduce the effects of high-voltage transients. Use an additional suppression device if an output is being used to control inductive devices, such as relays, motor starters, solenoids, or motors.

Additional suppression is especially important if your inductive device is in series with or parallel to hard contacts, such as push buttons or selector switches. Add a suppression device directly across the coil of an inductive device to reduce the effects of voltage transients caused by interrupting the current to that device and to prolong the life of the switch contacts.

## Analog I/O Modules

Choose analog, thermocouple, or RTD modules for these features:

- Individually configurable channels
- Ability to individually enable and disable channels
- On-board scaling
- Auto calibration of inputs
- Online configuration
- Selectable input filters
- Over-range and under-range detection and indication
- Selectable response to a broken input sensor
- Selectable power source
- Input modules offer both single-ended or differential inputs
- Ability to direct output device operation during an abnormal condition
- High accuracy ratings

The data can be configured on board each module as:

- Engineering Units in volts or milliamps.
- Scaled-for-PID.
- Percent of range.
- Raw/Proportional Data for maximum resolution.

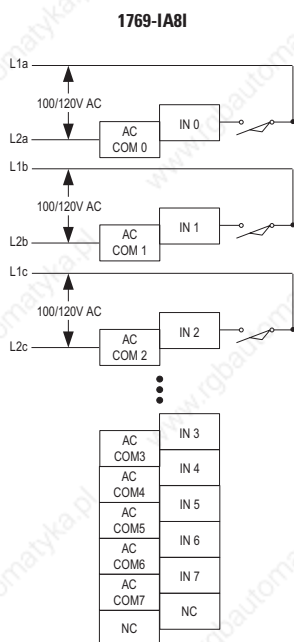
## Specialty I/O Modules

These specialty modules are available.

| Cat. No.     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1769-ARM     | Use a 1769-ARM address reserve module to reserve module slots. After creating an I/O configuration and user program, you can remove and replace any I/O module in the system with a 1769-ARM module once you inhibit the removed module in RSLogix 5000 programming software.                                                                                                                                                                |
| 1769-ASCII   | The 1769-ASCII module, a general purpose two-channel ASCII interface, provides a flexible network interface to a wide variety of RS-232, RS-485, and RS-422 ASCII devices. The module provides the communication connections to the ASCII device.                                                                                                                                                                                            |
| 1769-BOOLEAN | Use the 1769-BOOLEAN module in applications that require repeatability, such as material handling and packaging, when there is a requirement to activate an output based on an input's transition. If the Boolean expression is true, the output is directed to the ON state. If the Boolean expression is false, the output channel is directed to the OFF state. There are four operators that you can configure as OR, AND, XOR, or none. |
| 1769-HSC     | Use the 1769-HSC module when you need: <ul style="list-style-type: none"> <li>• a counter module that is capable of reacting to high-speed input signals.</li> <li>• to generate rate and time-between-pulses (pulse interval) data.</li> <li>• one or two channels of quadrature or four channels of pulse/count inputs.</li> </ul>                                                                                                         |
| 1769-SM1     | The Compact I/O to DPI/SCANport module connects to PowerFlex 7-class drives, other DPI-based host devices, and SCANport-based host devices such as 1305 and 1336 PLUS II drives.                                                                                                                                                                                                                                                             |
| 1769-SM2     | The Compact I/O to DSI/Modbus module connects to PowerFlex 4-class drives and to other Modbus RTU slave devices, such as PowerFlex 7-class drives with 20-COMM-H RS485 HVAC adapters.                                                                                                                                                                                                                                                        |

# 1769-IA8I

Compact individually-isolated 120V AC input module



**Table 2 - Technical Specifications - 1769-IA8I**

| Attribute                          | 1769-IA8I                                                                                                                                                                                     |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                             | 8 individually isolated                                                                                                                                                                       |
| Voltage category                   | 100/120V AC                                                                                                                                                                                   |
| Operating voltage range            | 79...132V AC,<br>47...63 Hz                                                                                                                                                                   |
| Input delay, on                    | 20 ms                                                                                                                                                                                         |
| Input delay, off                   | 20 ms                                                                                                                                                                                         |
| Current draw @ 5.1V                | 90 mA                                                                                                                                                                                         |
| Heat dissipation, max              | 1.81 W                                                                                                                                                                                        |
| Off-state voltage, max             | 20V AC                                                                                                                                                                                        |
| Off-state current, max             | 2.5 mA                                                                                                                                                                                        |
| On-state voltage, min              | 79V AC                                                                                                                                                                                        |
| On-state current, min              | 5 mA @ 74V AC                                                                                                                                                                                 |
| On-state current, max              | 12 mA @ 120V AC                                                                                                                                                                               |
| Inrush current, max <sup>(1)</sup> | 250 mA                                                                                                                                                                                        |
| Input impedance, max               | 12 k $\Omega$ @ 50 Hz<br>10 k $\Omega$ @ 60 Hz                                                                                                                                                |
| Isolation voltage                  | Verified by one of the following dielectric tests: 1517V AC for 1 s or 2145V DC for 1 s, input point to bus and group to group<br>132V AC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                     | 270 g (0.60 lb)                                                                                                                                                                               |

**Table 2 - Technical Specifications - 1769-IA8I**

| Attribute                    | 1769-IA8I                                                                                |
|------------------------------|------------------------------------------------------------------------------------------|
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.) |
| Slot width                   | 1                                                                                        |
| Module location              | DIN rail or panel mount                                                                  |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                   |
| Power supply distance rating | 8 modules                                                                                |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                       |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                     |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                            |
| Wire type                    | Cu-90 °C (194 °F)                                                                        |
| IEC input compatibility      | Type 1+                                                                                  |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                                                                  |
| Replacement door label       | 1769-RL1 (2 per kit)                                                                     |
| Replacement door             | 1769-RD (2 per kit)                                                                      |
| Vendor ID code               | 1                                                                                        |
| Product type code            | 7                                                                                        |
| Product code                 | 81                                                                                       |
| Enclosure type rating        | None (open-style)                                                                        |

- (1) A current limiting resistor can be used to limit inrush current; however, the operating characteristics of the AC input circuit will be affected. If a 6.8 k $\Omega$  (2.5 W minimum) resistor is placed in series with the input, the inrush current is reduced to 35 mA. In this configuration, the minimum on-state voltage increases to 92V AC. Before adding the resistor in a hazardous environment, be sure to consider the operating temperature of the resistor and the temperature limits of the environment. The operating temperature of the resistor must remain below the temperature limit of the environment.

**Table 3 - Certifications - 1769-IA8I**

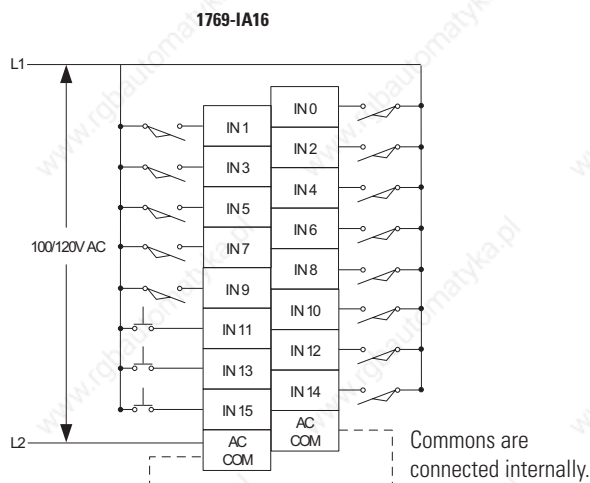
| Certification <sup>(1)</sup> | 1769-IA8I                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>                |

- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.



# 1769-IA16

## Compact 120V AC input module



**Table 4 - Technical Specifications - 1769-IA16**

| Attribute                          | 1769-IA16                                                                                                                                                                  |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                             | 16 (16 points/group, internally connected commons)                                                                                                                         |
| Voltage category                   | 100/120V AC                                                                                                                                                                |
| Operating voltage range            | 79...132V AC,<br>47...63 Hz                                                                                                                                                |
| Input delay, on                    | 20 ms                                                                                                                                                                      |
| Input delay, off                   | 20 ms                                                                                                                                                                      |
| Current draw @ 5.1V                | 115 mA                                                                                                                                                                     |
| Heat dissipation, max              | 3.30 W                                                                                                                                                                     |
| Off-state voltage, max             | 20V AC                                                                                                                                                                     |
| Off-state current, max             | 2.5 mA                                                                                                                                                                     |
| On-state voltage, min              | 79V AC                                                                                                                                                                     |
| On-state current, min              | 5 mA @ 74V AC                                                                                                                                                              |
| On-state current, max              | 12 mA @ 120V AC                                                                                                                                                            |
| Inrush current, max <sup>(1)</sup> | 250 mA                                                                                                                                                                     |
| Input impedance, max               | 12 k $\Omega$ @ 50 Hz<br>10 k $\Omega$ @ 60 Hz                                                                                                                             |
| Isolation voltage                  | Verified by one of the following dielectric tests: 1517V AC for 1 s or 2145V DC for 1 s, input point to bus<br>132V AC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                     | 280 g (0.61 lb)                                                                                                                                                            |
| Dimensions (HxWxD), approx         | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                   |
| Slot width                         | 1                                                                                                                                                                          |
| Module location                    | DIN rail or panel mount                                                                                                                                                    |

**Table 4 - Technical Specifications - 1769-IA16**

| Attribute                    | 1769-IA16                                     |
|------------------------------|-----------------------------------------------|
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4        |
| Power supply distance rating | 8 modules                                     |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                          |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                    | Cu-90 °C (194 °F)                             |
| IEC input compatibility      | Type 1+                                       |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                       |
| Replacement door label       | 1769-RL1 (2 per kit)                          |
| Replacement door             | 1769-RD (2 per kit)                           |
| Vendor ID code               | 1                                             |
| Product type code            | 7                                             |
| Product code                 | 82                                            |
| Enclosure type rating        | None (open-style)                             |

- (1) A current limiting resistor can be used to limit inrush current; however, the operating characteristics of the AC input circuit will be affected. If a 6.8 k $\Omega$  (2.5 W minimum) resistor is placed in series with the input, the inrush current is reduced to 35 mA. In this configuration, the minimum on-state voltage increases to 92V AC. Before adding the resistor in a hazardous environment, be sure to consider the operating temperature of the resistor and the temperature limits of the environment. The operating temperature of the resistor must remain below the temperature limit of the environment.

**Table 5 - Certifications - 1769-IA16**

| Certification <sup>(1)</sup> | 1769-IA16                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure                                                             |

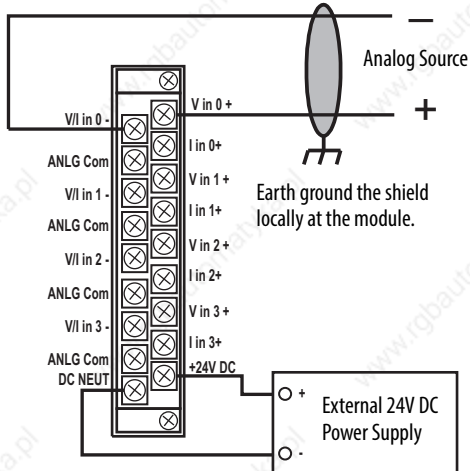
- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-IF4

## Compact voltage/current analog input module

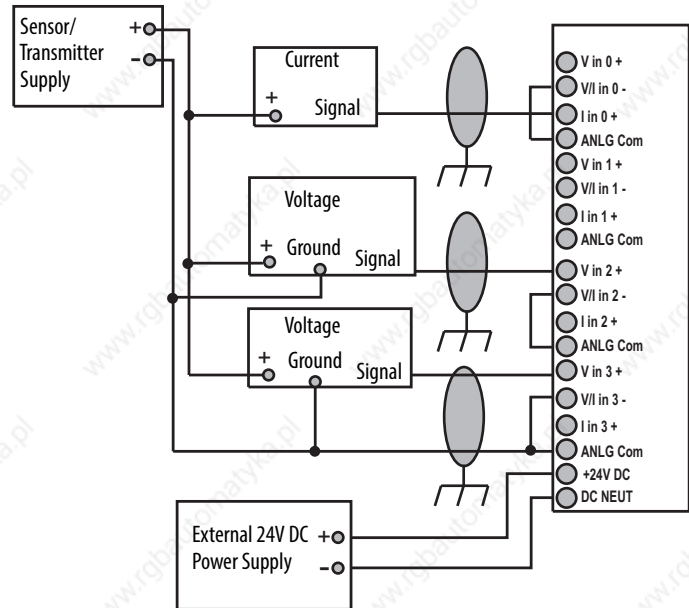
### 1769-IF4 Differential Inputs

Belden 8761 Cable (or equivalent)

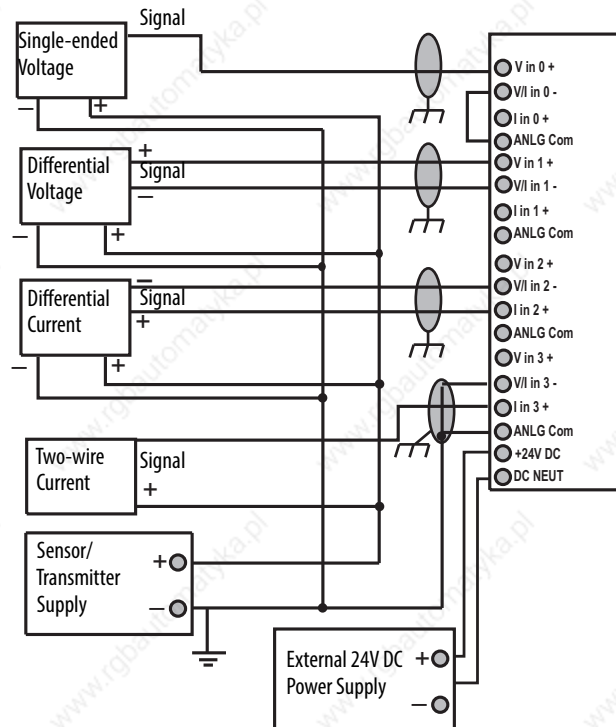


The external power supply must be rated Class 2, with a 24V DC range of 20.4...26.4V DC and 60 mA minimum. Series B and later modules support this option.

### 1769-IF4 Single-ended Sensor/Transmitter Inputs



### 1769-IF4 Mixed Transmitter Inputs



**Table 6 - Technical Specifications - 1769-IF4**

| Attribute                                                         | 1769-IF4                                                                                                                                                         |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                                                            | 4 differential or single-ended                                                                                                                                   |
| Input range                                                       | $\pm 10\text{V}$<br>$0 \dots 10\text{V}$<br>$0 \dots 5\text{V}$<br>$1 \dots 5\text{V}$<br>$0 \dots 20 \text{ mA}$<br>$4 \dots 20 \text{ mA}$                     |
| Full scale range <sup>(1)</sup>                                   | $\pm 10.5\text{V}$<br>$-0.5 \dots 10.5\text{V}$<br>$-0.5 \dots 5.25\text{V}$<br>$0.5 \dots 5.25\text{V}$<br>$0 \dots 21 \text{ mA}$<br>$3.2 \dots 21 \text{ mA}$ |
| Current draw @ 5.1V                                               | 120 mA                                                                                                                                                           |
| Current draw @ 24V                                                | 60 mA                                                                                                                                                            |
| Heat dissipation, max                                             | 2.52 W                                                                                                                                                           |
| Converter type                                                    | Delta Sigma                                                                                                                                                      |
| Resolution <sup>(2)</sup>                                         | 14 bits (unipolar)<br>14 bits plus sign (bipolar)                                                                                                                |
| Rated working voltage <sup>(3)</sup>                              | 30V AC/30V DC                                                                                                                                                    |
| Common mode voltage range <sup>(4)</sup>                          | $\pm 10\text{V}$ DC max per channel                                                                                                                              |
| Common mode rejection                                             | > 60 dB @ 50 and 60 Hz with the 50 or 60 Hz filter selected, respectively                                                                                        |
| Normal mode rejection ratio                                       | -50 dB @ 50 and 60 Hz with the 50 or 60 Hz filter selected, respectively                                                                                         |
| Input impedance                                                   | Voltage: 220 k $\Omega$<br>Current: 250 $\Omega$                                                                                                                 |
| Accuracy <sup>(5)</sup>                                           | Voltage: $\pm 0.2\%$ full scale @ 25 °C (77 °F)<br>Current: $\pm 0.35\%$ full scale @ 25 °C (77 °F)                                                              |
| Accuracy drift with temperature                                   | Voltage: $\pm 0.003\%$ per °C<br>Current: $\pm 0.0045\%$ per °C                                                                                                  |
| Nonlinearity                                                      | $\pm 0.03\%$                                                                                                                                                     |
| Repeatability <sup>(6)</sup>                                      | $\pm 0.03\%$                                                                                                                                                     |
| Module error                                                      | Voltage: $\pm 0.3\%$<br>Current: $\pm 0.5\%$                                                                                                                     |
| Overload at input terminals, max <sup>(7)</sup>                   | Voltage: $\pm 30\text{V}$ DC continuous, 0.1 mA<br>Current: $\pm 32 \text{ mA}$ continuous, $\pm 7.6\text{V}$ DC                                                 |
| Isolation voltage                                                 | 500V AC or 710V DC for 1 minute (qualification test), group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation)                          |
| Weight, approx                                                    | 300 g (0.65 lb)                                                                                                                                                  |
| Dimensions (HxWxD), approx                                        | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                         |
| Slot width                                                        | 1                                                                                                                                                                |
| Module location                                                   | DIN rail or panel mount                                                                                                                                          |
| Power supply                                                      | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                           |
| Optional 24V DC Class 2 power supply voltage range <sup>(8)</sup> | 20.4 ... 26.4V DC                                                                                                                                                |
| Power supply distance rating                                      | 8 modules                                                                                                                                                        |

**Table 6 - Technical Specifications - 1769-IF4**

| Attribute                  | 1769-IF4                                      |
|----------------------------|-----------------------------------------------|
| Terminal screw torque      | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque     | 0.46 N•m (4.1 lb•in)                          |
| Wire size                  | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                  | Cu-90 °C (194 °F)                             |
| Replacement terminal block | 1769-RTBN18 (1 per kit)                       |
| Replacement door label     | 1769-RL2 series B (2 per kit)                 |
| Replacement door           | 1769-RD (2 per kit)                           |
| Vendor ID code             | 1                                             |
| Product type code          | 10                                            |
| Product code               | 35                                            |
| Enclosure type rating      | None (open-style)                             |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected.
- (3) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (4) For proper operation, both the plus and minus input terminals must be within  $\pm 10V$  DC of analog common.
- (5) Includes offset, gain, nonlinearity, and repeatability error terms.
- (6) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (7) Damage may occur to the input circuit if this value is exceeded.
- (8) If the optional 24V DC Class 2 power supply is used, the 24V DC current draw from the bus is 0 mA.

**Table 7 - Response Speed - 1769-IF4**

| Filter Frequency | Cut-off Frequency | Step Response | Channel Update |
|------------------|-------------------|---------------|----------------|
| 50 Hz            | 13.1 Hz           | 60 ms         | 22 ms          |
| 60 Hz            | 15.7 Hz           | 50 ms         | 19 ms          |
| 250 Hz           | 65.5 Hz           | 12 ms         | 6 ms           |
| 500 Hz           | 131 Hz            | 6 ms          | 4 ms           |

**Table 8 - Certifications - 1769-IF4**

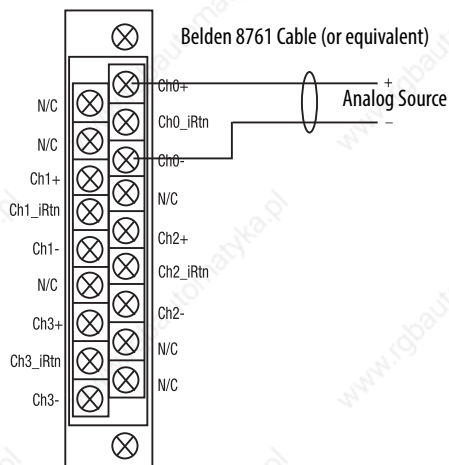
| Certification <sup>(1)</sup> | 1769-IF4                                                                                                                                                   |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>                |

- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

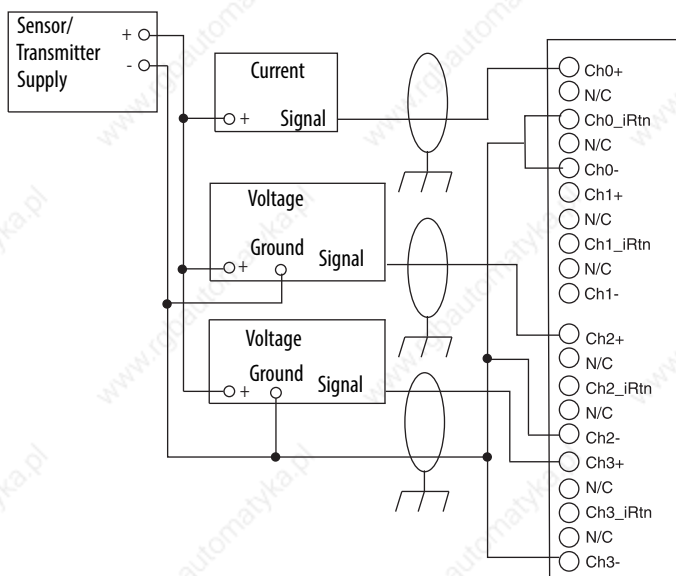
# 1769-IF4I

Compact voltage/current analog, individually-isolated input module

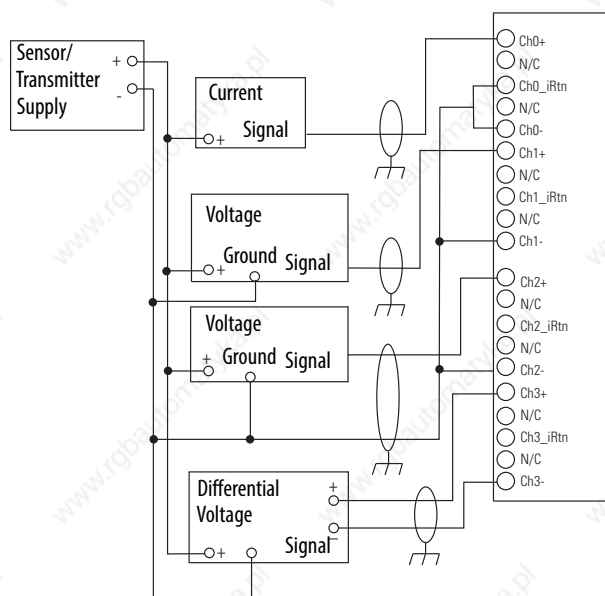
1769-IF4I Differential Inputs



1769-IF4I Single-ended Sensor/Transmitter Inputs



1769-IF4I Mixed Transmitter Inputs



**Table 9 - Technical Specifications - 1769-IF4I**

| Attribute                                       | 1769-IF4I                                                                                                                                                                                                                                                    |
|-------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                                          | 4 isolated differential                                                                                                                                                                                                                                      |
| Input range                                     | $\pm 10\text{V}$<br>$0 \dots 10\text{V}$<br>$0 \dots 5\text{V}$<br>$1 \dots 5\text{V}$<br>$0 \dots 20 \text{ mA}$<br>$4 \dots 20 \text{ mA}$                                                                                                                 |
| Full scale range <sup>(1)</sup>                 | $\pm 10.5\text{V}$<br>$-0.5 \dots 10.5\text{V}$<br>$-0.5 \dots 5.25\text{V}$<br>$0.5 \dots 5.25\text{V}$<br>$0 \dots 21 \text{ mA}$<br>$3.2 \dots 21 \text{ mA}$                                                                                             |
| Current draw @ 5.1V                             | 145 mA                                                                                                                                                                                                                                                       |
| Current draw @ 24V                              | 125 mA                                                                                                                                                                                                                                                       |
| Heat dissipation, max                           | 3.0 W                                                                                                                                                                                                                                                        |
| Converter type                                  | Delta Sigma                                                                                                                                                                                                                                                  |
| Resolution <sup>(2)</sup>                       | 16 bits (unipolar)<br>15 bits plus sign (bipolar)                                                                                                                                                                                                            |
| Rated working voltage <sup>(3)</sup>            | 30V AC/30V DC                                                                                                                                                                                                                                                |
| Common mode voltage range <sup>(4)</sup>        | $\pm 10\text{V}$ DC max per channel                                                                                                                                                                                                                          |
| Common mode rejection                           | > 60 dB @ 50 and 60 Hz with the 10 Hz filter selected                                                                                                                                                                                                        |
| Normal mode rejection ratio                     | -50 dB @ 50 and 60 Hz with the 10 Hz filter selected                                                                                                                                                                                                         |
| Input impedance                                 | Voltage: $1 \text{ M}\Omega$<br>Current: $249 \Omega$                                                                                                                                                                                                        |
| Accuracy <sup>(5)</sup>                         | Voltage: $\pm 0.2\%$ full scale @ $25^\circ\text{C}$ ( $77^\circ\text{F}$ )<br>Current: $\pm 0.35\%$ full scale @ $25^\circ\text{C}$ ( $77^\circ\text{F}$ )                                                                                                  |
| Accuracy drift with temperature                 | Voltage: $\pm 0.003\%$ per $^\circ\text{C}$<br>Current: $\pm 0.0045\%$ per $^\circ\text{C}$                                                                                                                                                                  |
| Nonlinearity                                    | $\pm 0.03\%$                                                                                                                                                                                                                                                 |
| Repeatability <sup>(6)</sup>                    | $\pm 0.03\%$                                                                                                                                                                                                                                                 |
| Module error                                    | Voltage: $\pm 0.3\%$<br>Current: $\pm 0.5\%$                                                                                                                                                                                                                 |
| Overload at input terminals, max <sup>(7)</sup> | Voltage: $\pm 24\text{V}$ DC continuous, 0.1 mA<br>Current: $\pm 28 \text{ mA}$ continuous, $\pm 7.6\text{V}$ DC                                                                                                                                             |
| Isolation voltage                               | 500V AC or 710V DC for 1 minute (qualification test), group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation)<br>500V AC or 710V DC for 1 minute or 250V continuous (optical and magnetic), channel to rack and channel to channel |
| Weight, approx                                  | 300 g (0.65 lb)                                                                                                                                                                                                                                              |
| Dimensions (HxWxD), approx                      | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                                                                                     |
| Slot width                                      | 1                                                                                                                                                                                                                                                            |
| Module location                                 | DIN rail or panel mount                                                                                                                                                                                                                                      |
| Power supply                                    | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                                                                                                       |
| Power supply distance rating                    | 8 modules                                                                                                                                                                                                                                                    |

**Table 9 - Technical Specifications - 1769-IF4I**

| Attribute                  | 1769-IF4I                                     |
|----------------------------|-----------------------------------------------|
| Terminal screw torque      | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque     | 0.46 N•m (4.1 lb•in)                          |
| Wire size                  | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                  | Cu-90 °C (194 °F)                             |
| Replacement terminal block | 1769-RTBN18 (1 per kit)                       |
| Replacement door label     | 1769-RL2 series B (2 per kit)                 |
| Replacement door           | 1769-RD (2 per kit)                           |
| Vendor ID code             | 1                                             |
| Product type code          | 10                                            |
| Product code               | 44                                            |
| Enclosure type rating      | None (open-style)                             |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected.
- (3) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (4) For proper operation, both the plus and minus input terminals must be within  $\pm 10V$  DC of analog common.
- (5) Includes offset, gain, nonlinearity, and repeatability error terms.
- (6) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (7) Damage may occur to the input circuit if this value is exceeded.

**Table 10 - Response Speed - 1769-IF4I**

| Filter Frequency | Channel Update |
|------------------|----------------|
| 28.5 Hz          | 108 ms         |
| 50 Hz            | 62 ms          |
| 60 Hz            | 52 ms          |
| 300 Hz           | 12 ms          |
| 360 Hz           | 10 ms          |

**Table 11 - Certifications - 1769-IF4I**

| Certification <sup>(1)</sup> | 1769-IF4I                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>                |

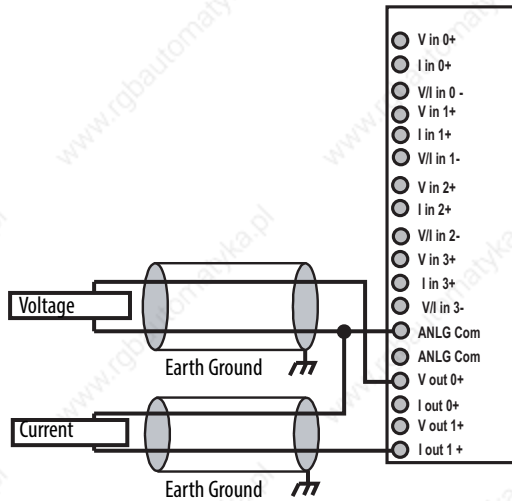
- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.



# 1769-IF4XOF2

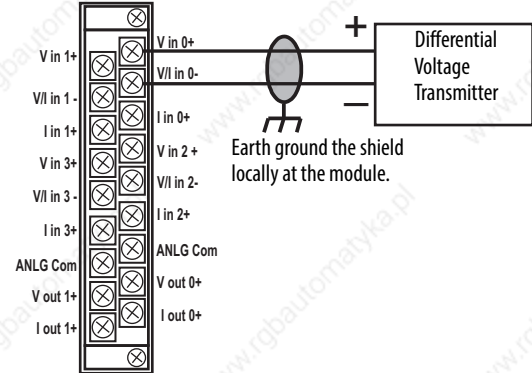
Compact combination input/output analog module

1769-IF4XOF2 Outputs

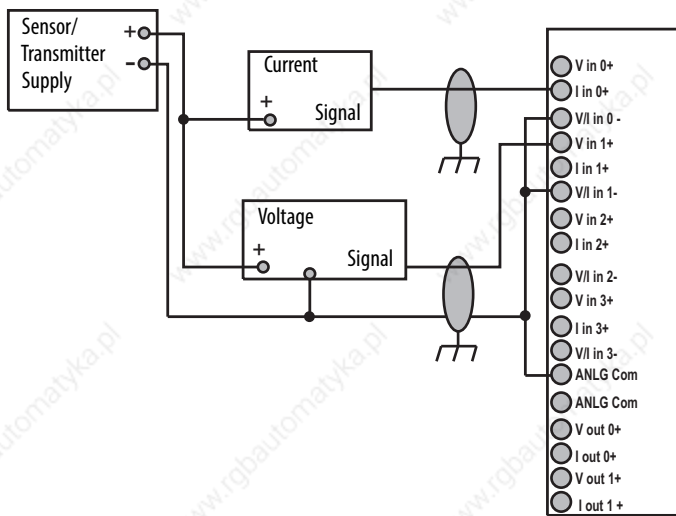


1769-IF4XOF2 Differential Inputs

Belden 8761 Cable (or equivalent)

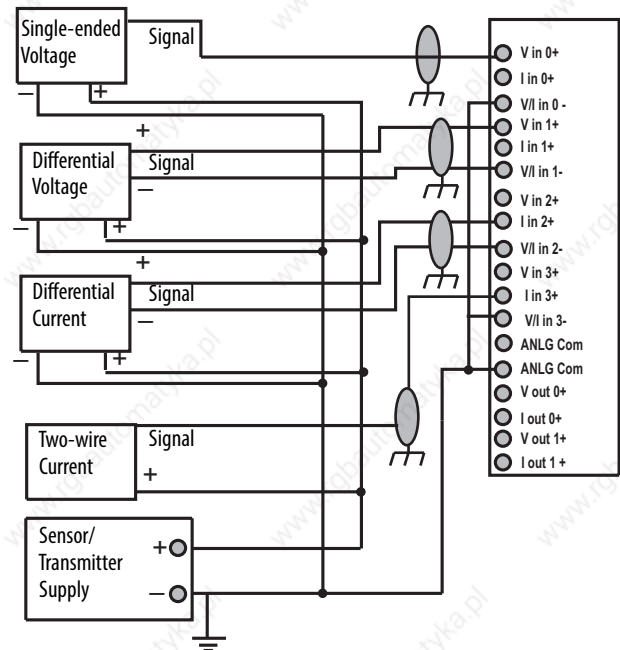


1769-IF4XOF2 Single-ended Sensor/Transmitter Inputs



The sensor power supply must be rated Class 2.

1769-IF4XOF2 Mixed Transmitter Inputs



**Table 12 - Technical Specifications - 1769-IF4XOF2**

| Attribute                    | 1769-IF4XOF2                                                                             |
|------------------------------|------------------------------------------------------------------------------------------|
| Current draw @ 5.1V          | 120 mA                                                                                   |
| Current draw @ 24V           | 160 mA                                                                                   |
| Heat dissipation, max        | 3.03 W                                                                                   |
| Weight, approx               | 290 g (0.64 lb)                                                                          |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.) |
| Slot width                   | 1                                                                                        |
| Module location              | DIN rail or panel mount                                                                  |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                   |
| Power supply distance rating | 8 modules                                                                                |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                       |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                     |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                            |
| Wire type                    | Cu-90 °C (194 °F)                                                                        |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                                                                  |
| Replacement door label       | 1769-RL2 series B (2 per kit)                                                            |
| Replacement door             | 1769-RD (2 per kit)                                                                      |
| Vendor ID code               | 1                                                                                        |
| Product type code            | 10                                                                                       |
| Product code                 | 33                                                                                       |
| Enclosure type rating        | None (open-style)                                                                        |

**Table 13 - 1769-IF4XOF2 Input Specifications**

| Attribute                                | 1769-IF4XOF2                                                                           |
|------------------------------------------|----------------------------------------------------------------------------------------|
| Inputs                                   | 4 differential or single-ended                                                         |
| Input range                              | 0...10V<br>0...20 mA                                                                   |
| Full scale range <sup>(1)</sup>          | 0...10.5V<br>0...21 mA                                                                 |
| Converter type                           | Successive approximation                                                               |
| Resolution <sup>(2)</sup>                | 8 bits plus sign                                                                       |
| Response speed per channel               | 5 ms                                                                                   |
| Rated working voltage <sup>(3)</sup>     | 30V AC/30V DC                                                                          |
| Common mode voltage range <sup>(4)</sup> | 10V DC max per channel                                                                 |
| Common mode rejection                    | > 60 dB @ 50 and 60 Hz with the 10 Hz filter selected                                  |
| Input impedance                          | Current: 150 Ω<br>Voltage: 150 kΩ                                                      |
| Accuracy <sup>(5)</sup>                  | Current: ±0.6% full scale @ 25 °C (77 °F)<br>Voltage: ±0.7% full scale @ 25 °C (77 °F) |

**Table 13 - 1769-IF4XOF2 Input Specifications**

| Attribute                                       | 1769-IF4XOF2                                                                                                                            |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Overall accuracy                                | Current: $\pm 0.8\%$ full scale @ 0...60 °C (32...140 °F)<br>Voltage: $\pm 0.9\%$ full scale @ 0...60 °C (32...140 °F)                  |
| Accuracy drift with temperature                 | Current: $\pm 0.006\%$ per °C<br>Voltage: $\pm 0.006\%$ per °C                                                                          |
| Nonlinearity                                    | $\pm 0.4\%$                                                                                                                             |
| Repeatability <sup>(6)</sup>                    | $\pm 0.4\%$                                                                                                                             |
| Overload at input terminals, max <sup>(7)</sup> | Current: $\pm 32$ mA continuous, $\pm 5$ V DC<br>Voltage: $\pm 20$ V DC continuous, 0.1 mA                                              |
| Isolation voltage                               | 500V AC or 710V DC for 1 minute (qualification test), group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected.
- (3) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (4) For proper operation, both the plus and minus input terminals must be within  $\pm 10$  V DC of analog common.
- (5) Includes offset, gain, nonlinearity, and repeatability error terms.
- (6) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (7) Damage may occur to the input circuit if this value is exceeded.

**Table 14 - 1769-IF4XOF2 Output Specifications**

| Attribute                           | 1769-IF4XOF2                                                                                                           |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------|
| Outputs                             | 2 single-ended                                                                                                         |
| Output range                        | 0...10V<br>0...20 mA                                                                                                   |
| Full scale range <sup>(1)</sup>     | 0...10.5V<br>0...21 mA                                                                                                 |
| Converter type                      | Resistor string                                                                                                        |
| Resolution                          | 8 bits plus sign                                                                                                       |
| Response speed per channel          | 0.3 ms for rated resistance and rated inductance<br>3.0 ms for rated capacitance                                       |
| Current load on voltage output, max | 10 mA                                                                                                                  |
| Resistive load on current output    | 0...300 $\Omega$ (includes wire resistance)                                                                            |
| Load range on voltage output        | $> 1$ k $\Omega$                                                                                                       |
| Inductive load, max                 | Current: 0.1 mH<br>Voltage: 1 $\mu$ F                                                                                  |
| Accuracy <sup>(2)</sup>             | Current: $\pm 0.5\%$ full scale @ 25 °C (77 °F)<br>Voltage: $\pm 0.5\%$ full scale @ 25 °C (77 °F)                     |
| Overall accuracy                    | Current: $\pm 1.0\%$ full scale @ 0...60 °C (32...140 °F)<br>Voltage: $\pm 0.6\%$ full scale @ 0...60 °C (32...140 °F) |
| Accuracy drift with temperature     | Current: $\pm 0.01\%$ per °C<br>Voltage: $\pm 0.01\%$ per °C                                                           |
| Output ripple <sup>(3)</sup>        | $\pm 0.05\%$ @ 0...50 kHz                                                                                              |

**Table 14 - 1769-IF4X0F2 Output Specifications**

| Attribute                                        | 1769-IF4X0F2                                                                                                                                |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Nonlinearity                                     | ±0.4%                                                                                                                                       |
| Repeatability <sup>(4)</sup>                     | ±0.05%                                                                                                                                      |
| Output impedance                                 | 10 kΩ                                                                                                                                       |
| Open and short-circuit protection                | Yes                                                                                                                                         |
| Short-circuit, max                               | 40 mA                                                                                                                                       |
| Open circuit, max                                | 15V                                                                                                                                         |
| Output response at system powerup and power down | +2.0...-1.0V DC spike for < 6 ms                                                                                                            |
| Isolation voltage                                | 500V AC or 710V DC for 1 min (qualification test), output group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |

(1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.

(2) Includes offset, gain, nonlinearity, and repeatability error terms.

(3) Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.

(4) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

**Table 15 - Response Speed - 1769-IF4X0F2**

| Fixed Filter Frequency | Filter Cut-off Frequency | Step Response % Complete | Step Response Time |
|------------------------|--------------------------|--------------------------|--------------------|
| 2.7 kHz                | 2.7 kHz                  | 63 %                     | 59 μs              |
| 2.7 kHz                | 2.7 kHz                  | 90 %                     | 136 μs (nom)       |

**Table 16 - Certifications - 1769-IF4X0F2**

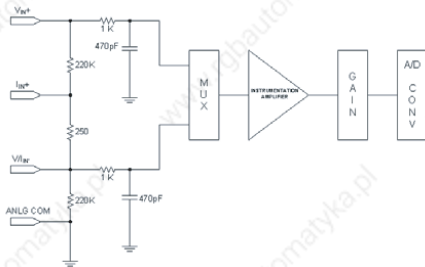
| Certification <sup>(1)</sup> | 1769-IF4X0F2                                                                                                                                                                                  |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

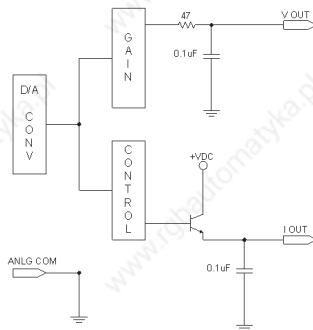
# 1769-IF4FXOF2F

Compact combination fast input/output analog module

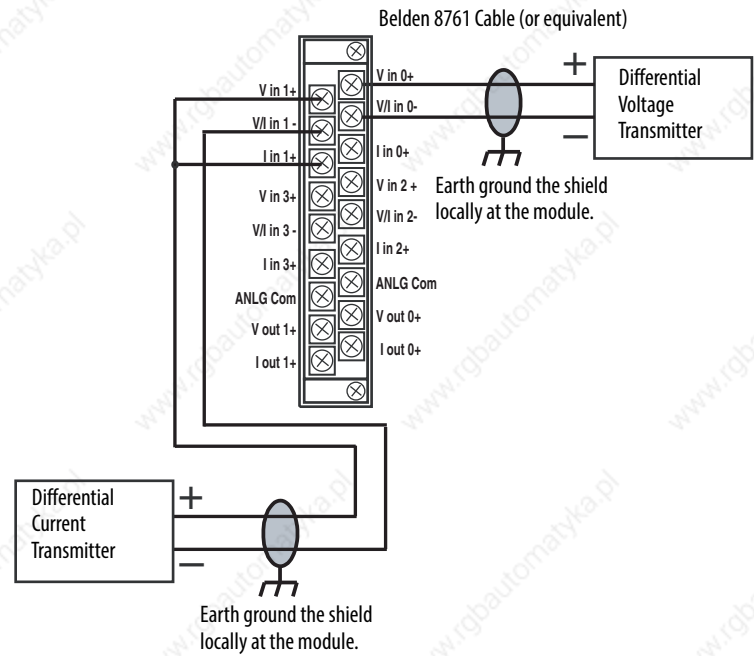
Simplified Input Circuit Diagram



Simplified Output Circuit Diagram

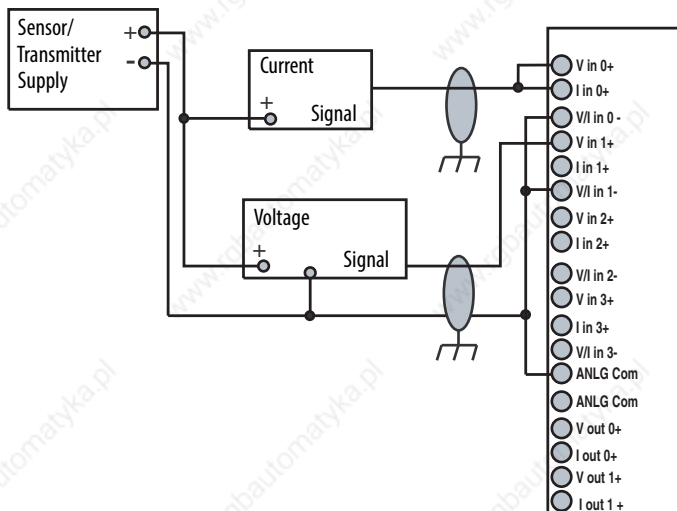


1769-IF4FXOF2F Differential Inputs



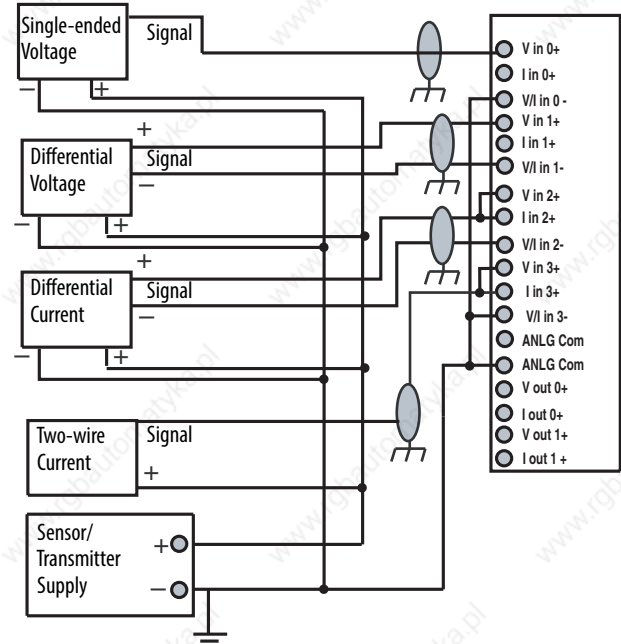
The sensor power supply must be rated Class 2.

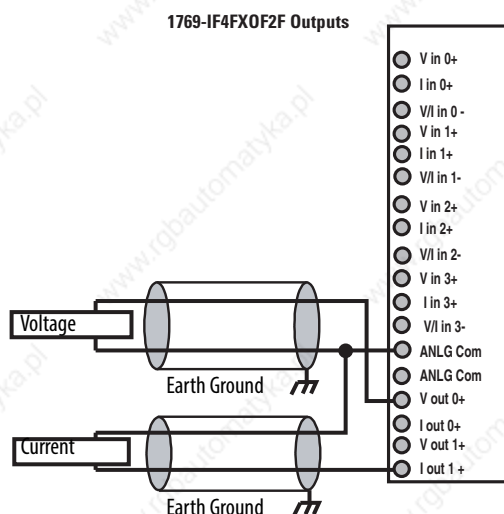
1769-IF4FXOF2F Single-ended Sensor/Transmitter Inputs



The sensor power supply must be rated Class 2.

1769-IF4FXOF2F Mixed Transmitter Inputs



**Table 17 - Technical Specifications - 1769-IF4FXOF2F**

| Attribute                    | 1769-IF4FXOF2F                                                                           |
|------------------------------|------------------------------------------------------------------------------------------|
| Current draw @ 5.1V          | 220 mA                                                                                   |
| Current draw @ 24V           | 120 mA                                                                                   |
| Heat dissipation, max        | 3.39 W                                                                                   |
| Weight, approx               | 290 g (0.64 lb)                                                                          |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.) |
| Slot width                   | 1                                                                                        |
| Module location              | DIN rail or panel mount                                                                  |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                   |
| Power supply distance rating | 8 modules                                                                                |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                       |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                     |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                            |
| Wire type                    | Cu-90 °C (194 °F)                                                                        |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                                                                  |
| Replacement door label       | 1769-RL2 series B (2 per kit)                                                            |
| Replacement door             | 1769-RD (2 per kit)                                                                      |
| Vendor ID code               | 1                                                                                        |
| Product type code            | 10                                                                                       |
| Product code                 | 43                                                                                       |
| Input words                  | 10                                                                                       |
| Output words                 | 4                                                                                        |
| Configuration words          | 42                                                                                       |
| Enclosure type rating        | None (open-style)                                                                        |

**Table 18 - 1769-IF4FX0F2F Input Specifications**

| Attribute                                       | 1769-IF4FX0F2F                                                                                                                                                 |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                                          | 4 differential or single-ended                                                                                                                                 |
| Input range                                     | $\pm 10\text{V}$<br>$0 \dots 10\text{V}$<br>$0 \dots 5\text{V}$<br>$1 \dots 5\text{V}$<br>$0 \dots 20\text{ mA}$<br>$4 \dots 20\text{ mA}$                     |
| Full scale range <sup>(1)</sup>                 | $\pm 10.5\text{V}$<br>$-0.5 \dots 10.5\text{V}$<br>$-0.5 \dots 5.25\text{V}$<br>$0.5 \dots 5.25\text{V}$<br>$0 \dots 21\text{ mA}$<br>$3.2 \dots 21\text{ mA}$ |
| Converter type                                  | Successive approximation                                                                                                                                       |
| Resolution <sup>(2)</sup>                       | 14 bits (unipolar)<br>14 bits plus sign (bipolar)                                                                                                              |
| Rated working voltage <sup>(3)</sup>            | 30V AC/30V DC                                                                                                                                                  |
| Common mode voltage range <sup>(4)</sup>        | $\pm 10\text{V}$ DC max per channel                                                                                                                            |
| Common mode rejection                           | > 70 dB @ 50 and 60 Hz with the 10 Hz filter selected                                                                                                          |
| Input impedance                                 | Current: 250 $\Omega$<br>Voltage: 220 k $\Omega$                                                                                                               |
| Accuracy <sup>(5)</sup>                         | Current: $\pm 0.2\%$ full scale @ 25 °C (77 °F)<br>Voltage: $\pm 0.15\%$ full scale @ 25 °C (77 °F)                                                            |
| Accuracy drift with temperature                 | Current: $\pm 0.0045\%$ per °C<br>Voltage: $\pm 0.003\%$ per °C                                                                                                |
| Nonlinearity                                    | $\pm 0.03\%$                                                                                                                                                   |
| Repeatability <sup>(6)</sup>                    | $\pm 0.03\%$                                                                                                                                                   |
| Module error                                    | Current: $\pm 0.3\%$<br>Voltage: $\pm 0.2\%$                                                                                                                   |
| Overload at input terminals, max <sup>(7)</sup> | Current: $\pm 32\text{ mA}$ continuous, $\pm 7.6\text{V}$ DC<br>Voltage: $\pm 30\text{V}$ DC continuous, 0.1 mA                                                |
| Isolation voltage                               | 500V AC or 710V DC for 1 minute (qualification test), group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation)                        |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected.
- (3) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (4) For proper operation, both the plus and minus input terminals must be within  $\pm 10\text{V}$  DC of analog common.
- (5) Includes offset, gain, nonlinearity, and repeatability error terms.
- (6) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (7) Damage may occur to the input circuit if this value is exceeded.

**Table 19 - 1769-IF4FXOF2F Output Specifications**

| Attribute                            | 1769-IF4FXOF2F                                                                                                                                                 |
|--------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                              | 2 single-ended                                                                                                                                                 |
| Output range                         | $\pm 10\text{V}$<br>$0 \dots 10\text{V}$<br>$0 \dots 5\text{V}$<br>$1 \dots 5\text{V}$<br>$0 \dots 20\text{ mA}$<br>$4 \dots 20\text{ mA}$                     |
| Full scale range <sup>(1)</sup>      | $\pm 10.5\text{V}$<br>$-0.5 \dots 10.5\text{V}$<br>$-0.5 \dots 5.25\text{V}$<br>$0.5 \dots 5.25\text{V}$<br>$0 \dots 21\text{ mA}$<br>$3.2 \dots 21\text{ mA}$ |
| Resolution                           | 13 bits (unipolar)<br>13 bits plus sign (bipolar)                                                                                                              |
| Conversion rate (all channels), max  | 1 ms                                                                                                                                                           |
| Step response to 63% <sup>(2)</sup>  | 2.0 ms                                                                                                                                                         |
| Current load on voltage output, max  | 10 mA                                                                                                                                                          |
| Resistive load                       | Current: $0 \dots 500\ \Omega$ (includes wire resistance)<br>Voltage: 1 k $\Omega$ or greater                                                                  |
| Inductive load, max                  | Current: 0.1 mH<br>Voltage: 1 $\mu\text{F}$                                                                                                                    |
| Field calibration                    | None required                                                                                                                                                  |
| Accuracy <sup>(3)</sup>              | $\pm 0.2\%$ full scale @ 25 °C (77 °F)                                                                                                                         |
| Accuracy drift with temperature      | Current: $\pm 0.0058\%$ per °C<br>Voltage: $\pm 0.0086\%$ per °C                                                                                               |
| Output ripple <sup>(4)</sup>         | $\pm 0.05\%$ @ $0 \dots 50\text{ kHz}$                                                                                                                         |
| Nonlinearity                         | $\pm 0.05\%$                                                                                                                                                   |
| Repeatability <sup>(5)</sup>         | $\pm 0.05\%$                                                                                                                                                   |
| Module error                         | Current: $\pm 0.4\%$<br>Voltage: $\pm 0.3\%$                                                                                                                   |
| Open and short-circuit protection    | Yes                                                                                                                                                            |
| Short-circuit protection, max        | 50 mA                                                                                                                                                          |
| Output overvoltage protection        | Yes                                                                                                                                                            |
| Rated working voltage <sup>(6)</sup> | 30V AC/30V DC                                                                                                                                                  |
| Isolation voltage                    | 500V AC or 710V DC for 1 min (qualification test), output group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation)                    |

(1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.

(2) Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.

(3) Includes offset, gain, nonlinearity, and repeatability error terms.

(4) Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.

(5) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

(6) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).



**Table 20 - Response Speed - 1769-IF4FXOF2F**

| Filter Frequency | Channel Step Response |
|------------------|-----------------------|
| 5 Hz             | 802 ms                |
| 10 Hz            | 401 ms                |
| 50 Hz            | 81 ms                 |
| 60 Hz            | 65 ms                 |
| 100 Hz           | 42 ms                 |
| 250 Hz           | 17 ms                 |
| 500 Hz           | 10 ms                 |
| 1000 Hz          | 5 ms                  |

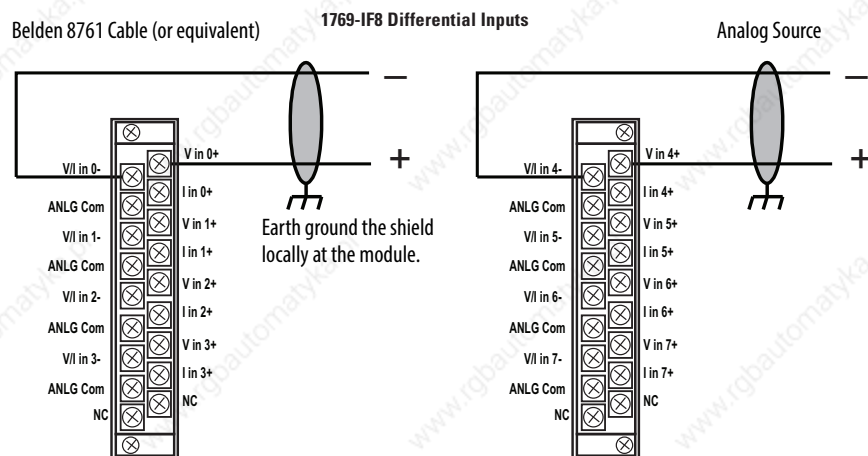
**Certifications - 1769-IF4FXOF2F**

| Certification <sup>(1)</sup> | 1769-IF4FXOF2F                                                                                                                                             |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

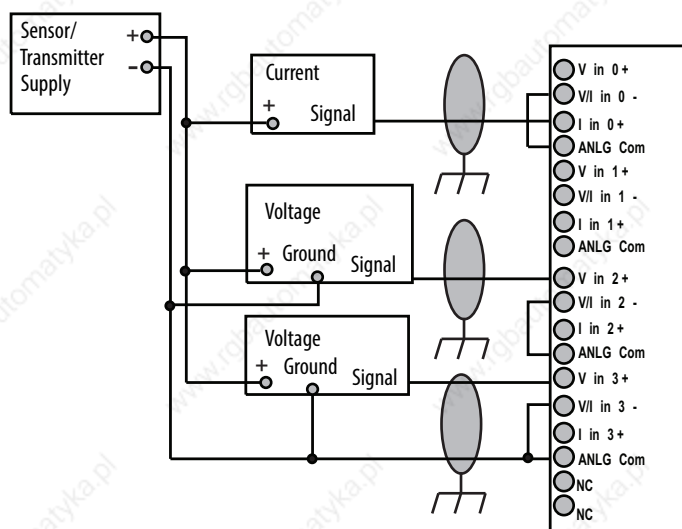
# 1769-IF8

Compact voltage/current analog input module



**1769-IF8 Single-ended Sensor/Transmitter Inputs**

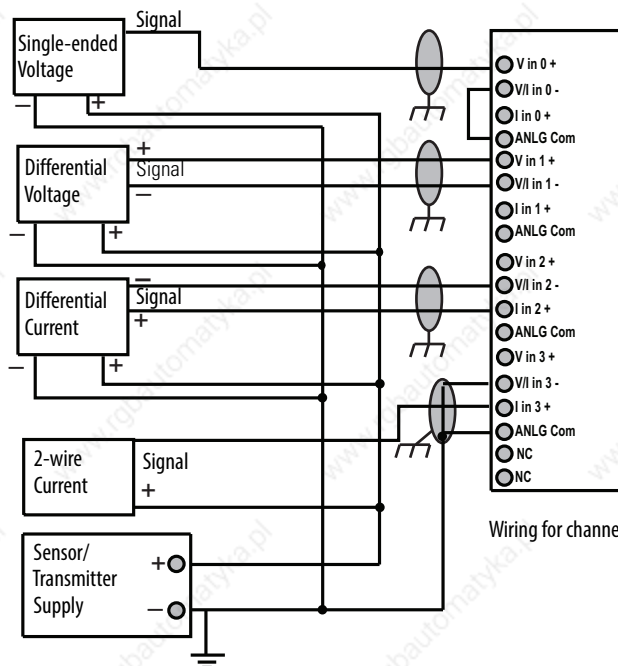
The sensor power supply must be rated Class 2.



Wiring for channels 4...7 are identical.

1769-IF8 Mixed Transmitter Inputs

The sensor power supply must be rated Class 2.



Wiring for channels 4-7 are identical.

### Technical Specifications - 1769-IF8

| Attribute                                | 1769-IF8                                                                                                                                                       |
|------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                                   | 8 differential or single-ended                                                                                                                                 |
| Input range                              | $\pm 10\text{V}$<br>$0 \dots 10\text{V}$<br>$0 \dots 5\text{V}$<br>$1 \dots 5\text{V}$<br>$0 \dots 20\text{ mA}$<br>$4 \dots 20\text{ mA}$                     |
| Full scale range <sup>(1)</sup>          | $\pm 10.5\text{V}$<br>$-0.5 \dots 10.5\text{V}$<br>$-0.5 \dots 5.25\text{V}$<br>$0.5 \dots 5.25\text{V}$<br>$0 \dots 21\text{ mA}$<br>$3.2 \dots 21\text{ mA}$ |
| Current draw @ 5.1V                      | 120 mA                                                                                                                                                         |
| Current draw @ 24V                       | 70 mA                                                                                                                                                          |
| Converter type                           | Delta Sigma                                                                                                                                                    |
| Heat dissipation, max                    | 3.24 W                                                                                                                                                         |
| Resolution <sup>(2)</sup>                | 16 bits (unipolar)<br>15 bits plus sign (bipolar)                                                                                                              |
| Rated working voltage <sup>(3)</sup>     | 30V AC/30V DC                                                                                                                                                  |
| Common mode voltage range <sup>(4)</sup> | $\pm 10\text{V}$ DC max per channel                                                                                                                            |
| Common mode rejection                    | > 60 dB @ 50 and 60 Hz with the 10 Hz filter selected                                                                                                          |
| Normal mode rejection ratio              | -50 dB @ 50 and 60 Hz with the 10 Hz filter selected                                                                                                           |

**Technical Specifications - 1769-IF8**

| Attribute                                       | 1769-IF8                                                                                                                                |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Input impedance                                 | Voltage: 220 k $\Omega$<br>Current: 250 $\Omega$                                                                                        |
| Accuracy <sup>(5)</sup>                         | Voltage: $\pm 0.2\%$ full scale @ 25 °C (77 °F)<br>Current: $\pm 0.35\%$ full scale @ 25 °C (77 °F)                                     |
| Accuracy drift with temperature                 | Voltage: $\pm 0.003\%$ per °C<br>Current: $\pm 0.0045\%$ per °C                                                                         |
| Nonlinearity                                    | $\pm 0.03\%$                                                                                                                            |
| Repeatability <sup>(6)</sup>                    | $\pm 0.03\%$                                                                                                                            |
| Module error                                    | Voltage: $\pm 0.3\%$<br>Current: $\pm 0.5\%$                                                                                            |
| Overload at input terminals, max <sup>(7)</sup> | Voltage: $\pm 30\text{V}$ DC continuous, 0.1 mA<br>Current: $\pm 32\text{ mA}$ continuous, $\pm 7.6\text{V}$ DC                         |
| Isolation voltage                               | 500V AC or 710V DC for 1 minute (qualification test), group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                  | 450 g (0.99 lb)                                                                                                                         |
| Dimensions (HxWxD), approx                      | 118 x 52.5 x 87 mm (4.65 x 2.07 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                              |
| Slot width                                      | 1.5                                                                                                                                     |
| Module location                                 | DIN rail or panel mount                                                                                                                 |
| Power supply                                    | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                  |
| Power supply distance rating                    | 8 modules                                                                                                                               |
| Terminal screw torque                           | 0.68 N•m (6 lb•in)                                                                                                                      |
| Retaining screw torque                          | 0.46 N•m (4.1 lb•in)                                                                                                                    |
| Wire size                                       | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                           |
| Wire type                                       | Cu-90 °C (194 °F)                                                                                                                       |
| Replacement terminal block                      | 1769-RTBN18 (1 per kit)                                                                                                                 |
| Replacement door label                          | 1769-RL2 series B (2 per kit)                                                                                                           |
| Replacement door                                | 1769-RD (2 per kit)                                                                                                                     |
| Vendor ID code                                  | 1                                                                                                                                       |
| Product type code                               | 10                                                                                                                                      |
| Product code                                    | 38                                                                                                                                      |
| Enclosure type rating                           | None (open-style)                                                                                                                       |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected.
- (3) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (4) For proper operation, both the plus and minus input terminals must be within  $\pm 10\text{V}$  DC of analog common.
- (5) Includes offset, gain, nonlinearity, and repeatability error terms.
- (6) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (7) Damage may occur to the input circuit if this value is exceeded.

**Table 21 - Response Speed - 1769-IF8**

| Filter Frequency | Update Time Per Channel | Update Time Per Module |
|------------------|-------------------------|------------------------|
| 10Hz             | 100 ms                  | 400 ms                 |
| 50 Hz            | 30 ms                   | 120 ms                 |
| 60 Hz            | 30 ms                   | 120 ms                 |
| 250 Hz           | 9 ms                    | 36 ms                  |
| 500 Hz           | 6 ms                    | 24 ms                  |

**Certifications - 1769-IF8**

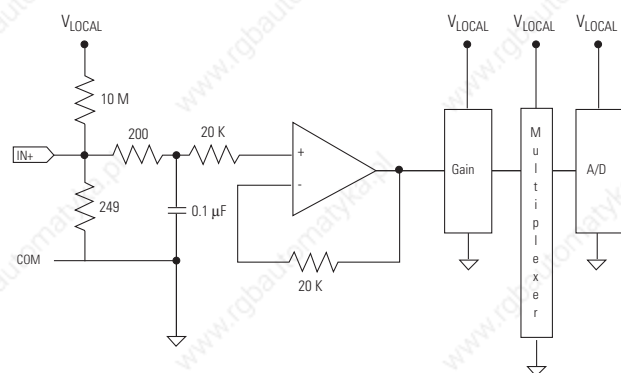
| Certification <sup>(1)</sup> | 1769-IF8                                                                                                                                                   |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>                |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

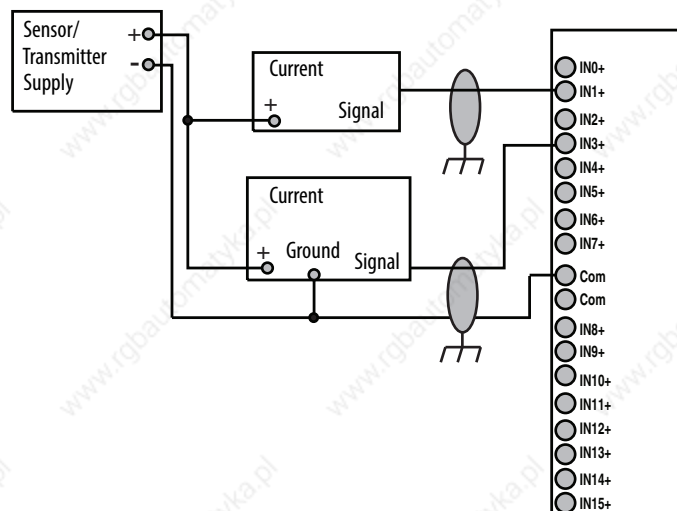
# 1769-IF16C

## Compact current analog input module

Simplified Input Circuit Diagram



1769-IF16C Sensor/Transmitter Inputs



The sensor power supply must be rated Class 2.

Table 22 - Technical Specifications - 1769-IF16C

| Attribute                                       | 1769-IF16C                                            |
|-------------------------------------------------|-------------------------------------------------------|
| Inputs                                          | 16 single-ended                                       |
| Input range                                     | 0...20 mA<br>4...20 mA                                |
| Full scale range <sup>(1)</sup>                 | 0...21 mA<br>3.2...21 mA                              |
| Current draw @ 5.1V                             | 190 mA                                                |
| Current draw @ 24V                              | 70 mA                                                 |
| Heat dissipation, max                           | 4.0 W                                                 |
| Converter type                                  | Sigma Delta                                           |
| Resolution <sup>(2)</sup>                       | 16 bits (unipolar)<br>15 bits plus sign (bipolar)     |
| Rated working voltage <sup>(3)</sup>            | 30V AC/30V DC                                         |
| Common mode voltage range <sup>(4)</sup>        | ±10V DC max per channel                               |
| Common mode rejection                           | > 60 dB @ 50 and 60 Hz with the 16 Hz filter selected |
| Input impedance                                 | 249 Ω                                                 |
| Accuracy <sup>(5)</sup>                         | ±0.5% full scale @ 25 °C (77 °F)                      |
| Accuracy drift with temperature                 | ±0.0045% per °C                                       |
| Nonlinearity                                    | ±0.03%                                                |
| Repeatability <sup>(6)</sup>                    | ±0.03%                                                |
| Module error                                    | 1.25%                                                 |
| Overload at input terminals, max <sup>(7)</sup> | ±28 mA continuous, ±7.6V DC                           |

**Table 22 - Technical Specifications - 1769-IF16C**

| Attribute                    | 1769-IF16C                                                                                                                              |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Isolation voltage            | 500V AC or 710V DC for 1 minute (qualification test), group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 281 g (0.62 lb)                                                                                                                         |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                |
| Slot width                   | 1                                                                                                                                       |
| Module location              | DIN rail or panel mount                                                                                                                 |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                  |
| Power supply distance rating | 8 modules                                                                                                                               |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                                                                      |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                                                                    |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                           |
| Wire type                    | Cu-90 °C (194 °F)                                                                                                                       |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                                                                                                                 |
| Replacement door label       | 1769-RL2 series B (2 per kit)                                                                                                           |
| Replacement door             | 1769-RD (2 per kit)                                                                                                                     |
| Vendor ID code               | 1                                                                                                                                       |
| Product type code            | 10                                                                                                                                      |
| Product code                 | 47                                                                                                                                      |
| Input words                  | 22                                                                                                                                      |
| Output words                 | 2                                                                                                                                       |
| Configuration words          | 98                                                                                                                                      |
| Enclosure type rating        | None (open-style)                                                                                                                       |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected.
- (3) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (4) For proper operation, both the plus and minus input terminals must be within  $\pm 10V$  DC of analog common.
- (5) Includes offset, gain, nonlinearity, and repeatability error terms.
- (6) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (7) Damage may occur to the input circuit if this value is exceeded.

**Table 23 - Response Speed - 1769-IF16C**

| Filter Frequency | Step Response | Update per Input Pair | Update per Module |
|------------------|---------------|-----------------------|-------------------|
| 16 Hz            | 1550 ms       | 200 ms                | 1600 ms           |
| 50 Hz            | 500 ms        | 70 ms                 | 560 ms            |
| 60 Hz            | 420 ms        | 60 ms                 | 480 ms            |
| 315 Hz           | 90 ms         | 15 ms                 | 120 ms            |
| 1365 Hz          | 35 ms         | 5 ms                  | 40 ms             |

**Table 24 - Certifications - 1769-IF16C**

| <b>Certification<sup>(1)</sup></b> | <b>1769-IF16C</b>                                                                                                                                          |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                               | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                                 | CE compliant for all applicable directives                                                                                                                 |

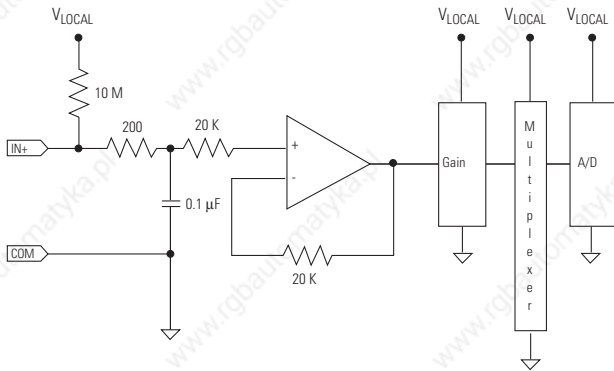
(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.



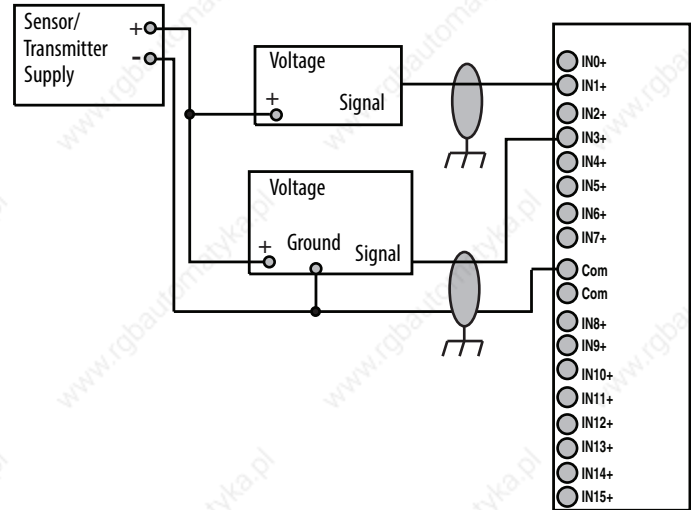
# 1769-IF16V

## Compact voltage analog input module

Simplified Input Circuit Diagram



1769-IF16V Sensor/Transmitter Inputs



The sensor power supply must be rated Class 2.

Table 25 - Technical Specifications - 1769-IF16V

| Attribute                                | 1769-IF16V                                            |
|------------------------------------------|-------------------------------------------------------|
| Inputs                                   | 16 single-ended                                       |
| Input range                              | ±10V<br>0...10V<br>0...5V<br>1...5V                   |
| Full scale range <sup>(1)</sup>          | ±10.5V<br>-0.5...10.5V<br>-0.5...5.25V<br>0.5...5.25V |
| Current draw @ 5.1V                      | 190 mA                                                |
| Current draw @ 24V                       | 70 mA                                                 |
| Heat dissipation, max                    | 2.4 W                                                 |
| Converter type                           | Sigma Delta                                           |
| Resolution <sup>(2)</sup>                | 16 bits (unipolar)<br>15 bits plus sign (bipolar)     |
| Rated working voltage <sup>(3)</sup>     | 30V AC/30V DC                                         |
| Common mode voltage range <sup>(4)</sup> | ±10V DC max per channel                               |
| Common mode rejection                    | > 60 dB @ 50 and 60 Hz with the 16 Hz filter selected |
| Input impedance                          | > 1MΩ                                                 |
| Accuracy <sup>(5)</sup>                  | ±0.35% full scale @ 25 °C (77 °F)                     |
| Accuracy drift with temperature          | ±0.03% per °C                                         |
| Nonlinearity                             | ±0.03%                                                |

**Table 25 - Technical Specifications - 1769-IF16V**

| Attribute                                       | 1769-IF16V                                                                                                                              |
|-------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Repeatability <sup>(6)</sup>                    | ±0.06%                                                                                                                                  |
| Module error                                    | 1.0%                                                                                                                                    |
| Overload at input terminals, max <sup>(7)</sup> | ±30 mA continuous, ±7.6V DC                                                                                                             |
| Isolation voltage                               | 500V AC or 710V DC for 1 minute (qualification test), group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                  | 281 g (0.62 lb)                                                                                                                         |
| Dimensions (HxWxD), approx                      | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                |
| Slot width                                      | 1                                                                                                                                       |
| Module location                                 | DIN rail or panel mount                                                                                                                 |
| Power supply                                    | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                  |
| Power supply distance rating                    | 8 modules                                                                                                                               |
| Terminal screw torque                           | 0.68 N•m (6 lb•in)                                                                                                                      |
| Retaining screw torque                          | 0.46 N•m (4.1 lb•in)                                                                                                                    |
| Wire size                                       | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                           |
| Wire type                                       | Cu-90 °C (194 °F)                                                                                                                       |
| Replacement terminal block                      | 1769-RTBN18 (1 per kit)                                                                                                                 |
| Replacement door label                          | 1769-RL2 series B (2 per kit)                                                                                                           |
| Replacement door                                | 1769-RD (2 per kit)                                                                                                                     |
| Vendor ID code                                  | 1                                                                                                                                       |
| Product type code                               | 10                                                                                                                                      |
| Product code                                    | 46                                                                                                                                      |
| Input words                                     | 22                                                                                                                                      |
| Output words                                    | 2                                                                                                                                       |
| Configuration words                             | 98                                                                                                                                      |
| Enclosure type rating                           | None (open-style)                                                                                                                       |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Resolution is dependent upon your filter selection. The maximum resolution is achieved with either the 50 or 60 Hz filter selected.
- (3) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (4) For proper operation, both the plus and minus input terminals must be within ±10V DC of analog common.
- (5) Includes offset, gain, nonlinearity, and repeatability error terms.
- (6) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (7) Damage may occur to the input circuit if this value is exceeded.

**Table 26 - Response Speed - 1769-IF16V**

| Filter Frequency | Step Response | Update per Input Pair | Update per Module |
|------------------|---------------|-----------------------|-------------------|
| 16 Hz            | 1550 ms       | 200 ms                | 1600 ms           |
| 50 Hz            | 500 ms        | 70 ms                 | 560 ms            |
| 60 Hz            | 420 ms        | 60 ms                 | 480 ms            |
| 315 Hz           | 90 ms         | 15 ms                 | 120 ms            |
| 1365 Hz          | 35 ms         | 5 ms                  | 40 ms             |

### Certifications - 1769-IF16V

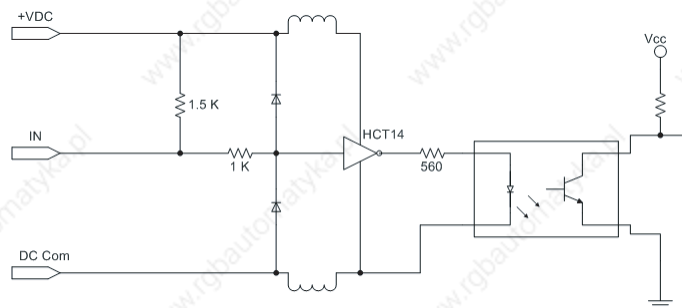
| Certification <sup>(1)</sup> | 1769-IF16V                                                                                                                                                 |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

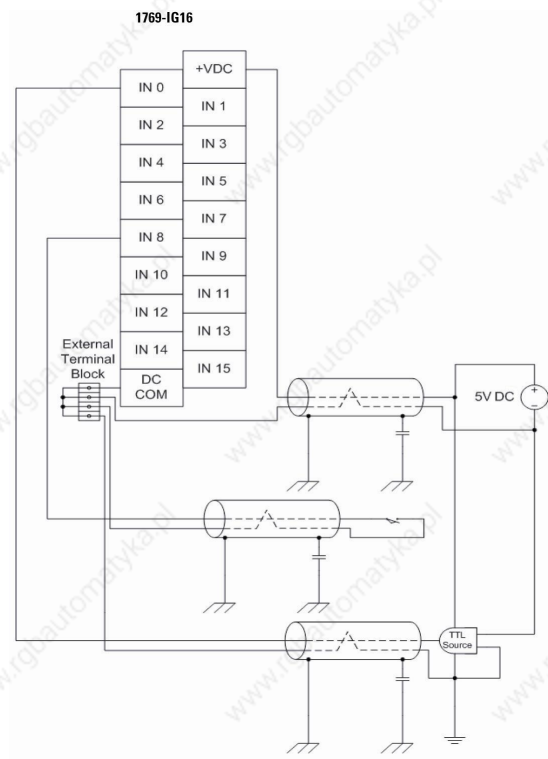
# 1769-IG16

## Compact TTL input module

### Simplified Input Circuit Diagram



- Use Belden 8761, or equivalent, shielded wire.
- Do not connect more than 2 wires to any single terminal.
- DC power cable and I/O cables should not exceed 10 m (30 ft).
- The capacitors shown above must be 0.01  $\mu$ F and rated for 2000V min.
- User power supply must be rated Class 2 with a 5V DC range of 4.5...5.5V DC.



### Low to True Format - 1769-IG16

- -0.2...0.8V = Input guaranteed to be in on-state
- 0.8...2.0V = Input state not guaranteed
- 2.0...5.5V = Input guaranteed to be in off-state

**Table 27 - Technical Specifications - 1769-IG16**

| Attribute                  | 1769-IG16                                             |
|----------------------------|-------------------------------------------------------|
| Inputs                     | 16                                                    |
| Voltage category           | 5V DC TTL source (Low=True) <sup>(1)</sup>            |
| Operating voltage range    | 4.5...5.5V DC<br>50 mV peak-to-peak ripple max        |
| Input delay, on            | 20 ms                                                 |
| Digital filter, off to on  | 0 s, 100 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms, 4 ms, 8 ms |
| Digital filter, on to off  | 0 s, 100 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms, 4 ms, 8 ms |
| Current draw @ 5.1V        | 120 mA                                                |
| Heat dissipation, max      | 1.6 W                                                 |
| Off-state voltage, typical | 2.0...5.5V DC                                         |
| Off-state current, max     | 4.1 mA                                                |

**Table 27 - Technical Specifications - 1769-IG16**

| Attribute                    | 1769-IG16                                                                                                                                                                 |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| On-state voltage, typical    | -0.2...0.8V DC                                                                                                                                                            |
| On-state current, nom        | 3.7 mA @ 5V DC                                                                                                                                                            |
| Isolation voltage            | Verified by one of the following dielectric tests: 1200V AC for 2 s or 1697V DC for 2 s, input point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 250 g (0.55 lb)                                                                                                                                                           |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                  |
| Slot width                   | 1                                                                                                                                                                         |
| Module location              | DIN rail or panel mount                                                                                                                                                   |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                    |
| Power supply distance rating | 8 modules                                                                                                                                                                 |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                                                                                                        |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                                                                                                      |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                                                             |
| Wire type                    | Cu-90 °C (194 °F)                                                                                                                                                         |
| IEC input compatibility      | No                                                                                                                                                                        |
| Vendor ID code               | 1                                                                                                                                                                         |
| Product type code            | 7                                                                                                                                                                         |
| Product code                 | 77                                                                                                                                                                        |
| Input words                  | 1                                                                                                                                                                         |
| Output words                 | 0                                                                                                                                                                         |
| Configuration words          | 4                                                                                                                                                                         |
| Enclosure type rating        | None (open-style)                                                                                                                                                         |

(1) TTL inputs are inverted (-0.2 to +0.8 = low voltage = True = On.) Use a NOT instruction in your program to convert to traditional True = High logic.

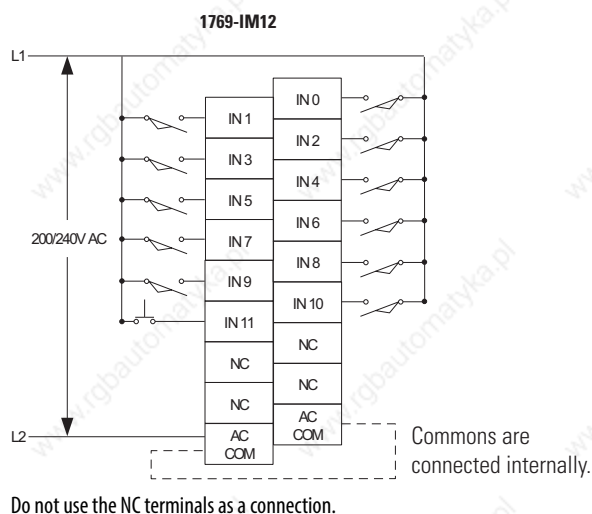
**Table 28 - Certifications - 1769-IG16**

| Certification <sup>(1)</sup> | 1769-IG16                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## 1769-IM12

### Compact 240V AC input module



**Table 29 - Technical Specifications - 1769-IM12**

| Attribute                          | 1769-IM12                                                                                                                                                                  |
|------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                             | 12 (12 points/group, internally connected commons)                                                                                                                         |
| Voltage category                   | 200/240V AC                                                                                                                                                                |
| Operating voltage range            | 159...265V AC,<br>47...63 Hz                                                                                                                                               |
| Input delay, on                    | 20 ms                                                                                                                                                                      |
| Input delay, off                   | 20 ms                                                                                                                                                                      |
| Current draw @ 5.1V                | 100 mA                                                                                                                                                                     |
| Heat dissipation, max              | 3.65 W                                                                                                                                                                     |
| Off-state voltage, max             | 40V AC                                                                                                                                                                     |
| Off-state current, max             | 2.5 mA                                                                                                                                                                     |
| On-state voltage, min              | 159V AC                                                                                                                                                                    |
| On-state current, min              | 5 mA @ 74V AC                                                                                                                                                              |
| On-state current, max              | 12 mA @ 120V AC                                                                                                                                                            |
| Inrush current, max <sup>(1)</sup> | 250 mA                                                                                                                                                                     |
| Input impedance, max               | 27 k $\Omega$ @ 50 Hz<br>23 k $\Omega$ @ 60 Hz                                                                                                                             |
| Isolation voltage                  | Verified by one of the following dielectric tests: 1836V AC for 1 s or 2596V DC for 1 s, input point to bus<br>132V AC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                     | 300 g (0.61 lb)                                                                                                                                                            |
| Dimensions (HxWxD), approx         | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                   |
| Slot width                         | 1                                                                                                                                                                          |

**Table 29 - Technical Specifications - 1769-IM12**

| Attribute                    | 1769-IM12                                     |
|------------------------------|-----------------------------------------------|
| Module location              | DIN rail or panel mount                       |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4        |
| Power supply distance rating | 8 modules                                     |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                          |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                    | Cu-90 °C (194 °F)                             |
| IEC input compatibility      | Type 1+                                       |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                       |
| Replacement door label       | 1769-RL1 (2 per kit)                          |
| Replacement door             | 1769-RD (2 per kit)                           |
| Vendor ID code               | 1                                             |
| Product type code            | 7                                             |
| Product code                 | 83                                            |
| Enclosure type rating        | None (open-style)                             |

- (1) A current limiting resistor can be used to limit inrush current; however, the operating characteristics of the AC input circuit will be affected. If a 6.8 k $\Omega$  (2.5W minimum) resistor is placed in series with the input, the inrush current is reduced to 35 mA. In this configuration the minimum on-state voltage increases to 92V AC. Before adding the resistor in a hazardous environment, be sure to consider the operating temperature of the resistor and the temperature limits of the environment. The operating temperature of the resistor must remain below the temperature limit of the environment.

**Table 30 - Certifications - 1769-IM12**

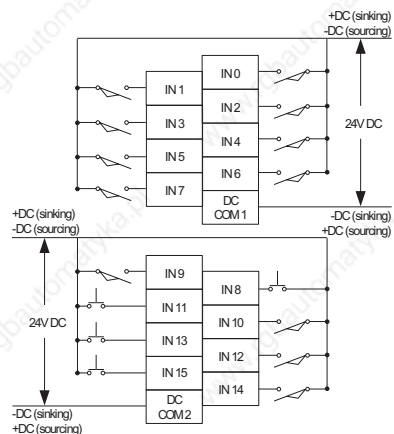
| Certification <sup>(1)</sup> | 1769-IM12                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure                                                             |

- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-IQ16

Compact 24V DC sink/source input module

1769-IQ16



**Table 31 - Technical Specifications - 1769-IQ16**

| Attribute                    | 1769-IQ16                                                                                                                                                                                    |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                       | 16 (8 points/group)                                                                                                                                                                          |
| Voltage category             | 24V DC sink/source                                                                                                                                                                           |
| Operating voltage range      | 10...30V DC @ 30 °C (86 °F)<br>10...26.4V DC @ 60 °C (140 °F)                                                                                                                                |
| Input delay, on              | 8 ms                                                                                                                                                                                         |
| Input delay, off             | 8 ms                                                                                                                                                                                         |
| Current draw @ 5.1V          | 115 mA                                                                                                                                                                                       |
| Heat dissipation, max        | 3.55 W                                                                                                                                                                                       |
| Off-state voltage, max       | 5V DC                                                                                                                                                                                        |
| Off-state current, max       | 1.5 mA                                                                                                                                                                                       |
| On-state voltage, min        | 10V DC                                                                                                                                                                                       |
| On-state current, min        | 2 mA                                                                                                                                                                                         |
| Inrush current, max          | 250 mA                                                                                                                                                                                       |
| Input impedance, nom         | 3 k $\Omega$                                                                                                                                                                                 |
| Isolation voltage            | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, input point to bus and group to group<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 270 g (0.60 lb)                                                                                                                                                                              |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                     |
| Slot width                   | 1                                                                                                                                                                                            |
| Module location              | DIN rail or panel mount                                                                                                                                                                      |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                                       |
| Power supply distance rating | 8 modules                                                                                                                                                                                    |



**Table 31 - Technical Specifications - 1769-IQ16**

| Attribute                  | 1769-IQ16                                     |
|----------------------------|-----------------------------------------------|
| Terminal screw torque      | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque     | 0.46 N•m (4.1 lb•in)                          |
| Wire size                  | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                  | Cu-90 °C (194 °F)                             |
| IEC input compatibility    | Type 1+                                       |
| Replacement terminal block | 1769-RTBN18 (1 per kit)                       |
| Replacement door label     | 1769-RL1 (2 per kit)                          |
| Replacement door           | 1769-RD (2 per kit)                           |
| Vendor ID code             | 1                                             |
| Product type code          | 7                                             |
| Product code               | 67                                            |
| Enclosure type rating      | None (open-style)                             |

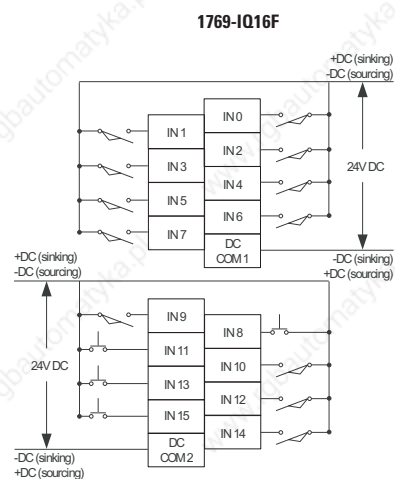
**Table 32 - Certifications - 1769-IQ16**

| Certification <sup>(1)</sup> | 1769-IQ16                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>                |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-IQ16F

Compact 24V DC sink/source, high-speed input module



**Table 33 - Technical Specifications - 1769-IQ16F**

| Attribute                  | 1769-IQ16F                                                                                                                                                                                   |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                     | 16 (8 points/group)                                                                                                                                                                          |
| Voltage category           | 24V DC sink/source                                                                                                                                                                           |
| Operating voltage range    | 10...30V DC @ 30 °C (86 °F)<br>10...26.4V DC @ 60 °C (140 °F)                                                                                                                                |
| Digital filter, off to on  | 0 s, 100 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms                                                                                                                                                    |
| Digital filter, on to off  | 0 s, 100 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms                                                                                                                                                    |
| Input delay, off to on     | 100 $\mu$ s, typical<br>300 $\mu$ s, max                                                                                                                                                     |
| Input delay, on to off     | 250 $\mu$ s, typical<br>1 ms, max                                                                                                                                                            |
| Current draw @ 5.1V        | 110 mA                                                                                                                                                                                       |
| Heat dissipation, max      | 3.55 W                                                                                                                                                                                       |
| Off-state voltage, max     | 5V DC                                                                                                                                                                                        |
| Off-state current, max     | 1.5 mA                                                                                                                                                                                       |
| On-state voltage, min      | 10V DC                                                                                                                                                                                       |
| On-state current, min      | 2 mA                                                                                                                                                                                         |
| Inrush current, max        | 250 mA                                                                                                                                                                                       |
| Input impedance, nom       | 3 k $\Omega$                                                                                                                                                                                 |
| Isolation voltage          | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, input point to bus and group to group<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx             | 270 g (0.60 lb)                                                                                                                                                                              |
| Dimensions (HxWxD), approx | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                     |

**Table 33 - Technical Specifications - 1769-IQ16F**

| Attribute                    | 1769-IQ16F                                    |
|------------------------------|-----------------------------------------------|
| Slot width                   | 1                                             |
| Module location              | DIN rail or panel mount                       |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4        |
| Power supply distance rating | 8 modules                                     |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                          |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                    | Cu-90 °C (194 °F)                             |
| IEC input compatibility      | Type 1+                                       |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                       |
| Replacement door label       | 1769-RL1 (2 per kit)                          |
| Replacement door             | 1769-RD (2 per kit)                           |
| Vendor ID code               | 1                                             |
| Product type code            | 7                                             |
| Product code                 | 69                                            |
| Enclosure type rating        | None (open-style)                             |

**Table 34 - Certifications - 1769-IQ16F**

| Certification <sup>(1)</sup> | 1769-IQ16F                                                                                                                                                 |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>                |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-IQ32

Compact 24V DC sink/source input module

1769-IQ32

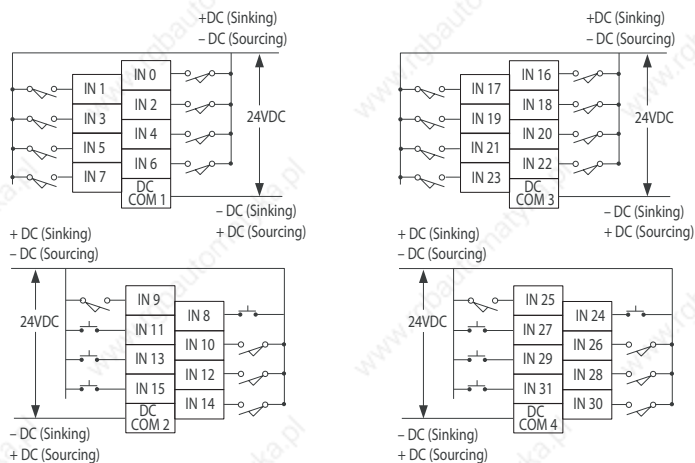


Table 35 - Technical Specifications - 1769-IQ32

| Attribute                  | 1769-IQ32                                                                                                                                                                                    |
|----------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                     | 32 (8 points/group)                                                                                                                                                                          |
| Voltage category           | 24V DC sink/source                                                                                                                                                                           |
| Operating voltage range    | 10...30V DC @ 30 °C (86 °F)<br>10...26.4V DC @ 60 °C (140 °F)                                                                                                                                |
| Input delay, on            | 8 ms                                                                                                                                                                                         |
| Input delay, off           | 8 ms                                                                                                                                                                                         |
| Current draw @ 5.1V        | 170 mA                                                                                                                                                                                       |
| Heat dissipation, max      | 4.6 W                                                                                                                                                                                        |
| Off-state voltage, max     | 5V DC                                                                                                                                                                                        |
| Off-state current, max     | 1.5 mA                                                                                                                                                                                       |
| On-state voltage, min      | 10V DC                                                                                                                                                                                       |
| On-state current, min      | 2 mA                                                                                                                                                                                         |
| Inrush current, max        | 250 mA                                                                                                                                                                                       |
| Input impedance, nominal   | 5.2 k $\Omega$ @ 24V DC<br>6.1 k $\Omega$ @ 30V DC                                                                                                                                           |
| Isolation voltage          | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, input point to bus and group to group<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx             | 440 g (0.97 lb)                                                                                                                                                                              |
| Dimensions (HxWxD), approx | 118 x 52.5 x 87 mm (4.65 x 2.07 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                   |
| Slot width                 | 1.5                                                                                                                                                                                          |
| Module location            | DIN rail or panel mount                                                                                                                                                                      |

**Table 35 - Technical Specifications - 1769-IQ32**

| Attribute                    | 1769-IQ32                                     |
|------------------------------|-----------------------------------------------|
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4        |
| Power supply distance rating | 8 modules                                     |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                          |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                    | Cu-90 °C (194 °F)                             |
| IEC input compatibility      | Type 1+                                       |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                       |
| Replacement door label       | 1769-RL1 (2 per kit)                          |
| Replacement door             | 1769-RD (2 per kit)                           |
| Vendor ID code               | 1                                             |
| Product type code            | 7                                             |
| Product code                 | 68                                            |
| Enclosure type rating        | None (open-style)                             |

**Table 36 - Certifications - 1769-IQ32**

| Certification <sup>(1)</sup> | 1769-IQ32                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>                |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-IQ32T

Compact 24V DC sink/source, terminated input module

1769-IQ32T

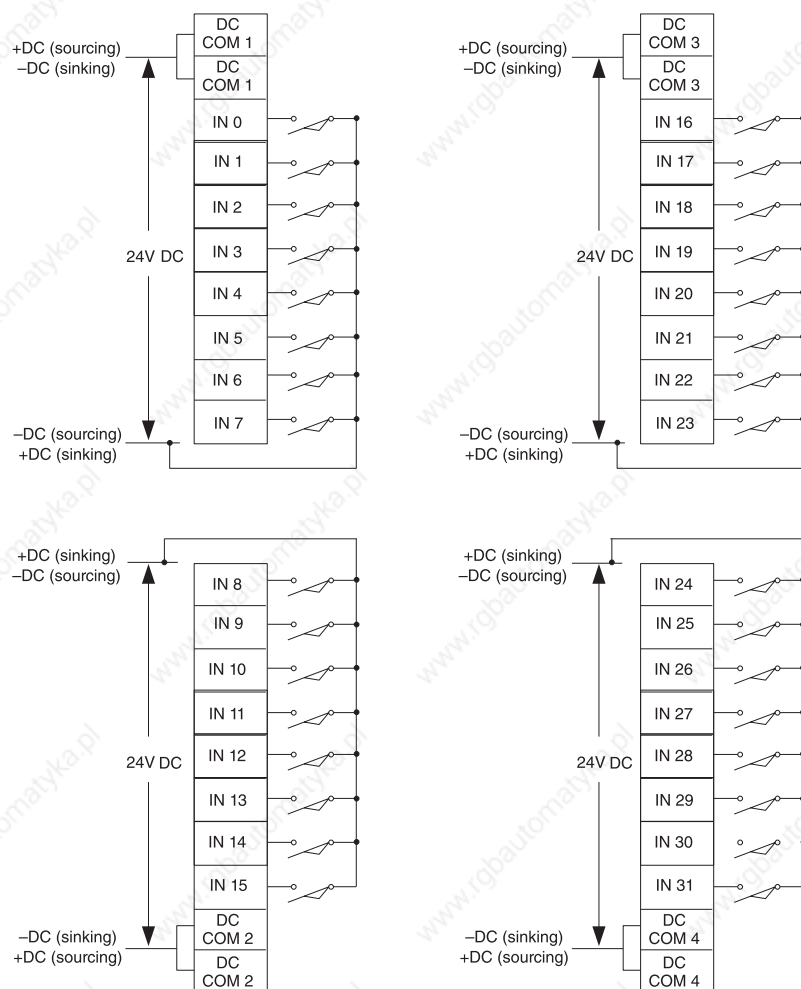


Table 37 - Technical Specifications - 1769-IQ32T

| Attribute                 | 1769-IQ32T                                            |
|---------------------------|-------------------------------------------------------|
| Inputs                    | 32 terminated (8 points/group)                        |
| Voltage category          | 24V DC sink/source                                    |
| Operating voltage range   | 20.4...26.4V DC @ 60 °C (140 °F)                      |
| Digital filter, off to on | 0 s, 100 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms, 4 ms, 8 ms |
| Digital filter, on to off | 0 s, 100 $\mu$ s, 500 $\mu$ s, 1 ms, 2 ms, 4 ms, 8 ms |
| Input delay, off to on    | 0.1 ms, typical<br>0.42 ms, max                       |
| Input delay, on to off    | 0.25 ms, typical<br>1.0 ms, max                       |
| Current draw @ 5.1V       | 170 mA                                                |
| Heat dissipation, max     | 4.77 W                                                |

**Table 37 - Technical Specifications - 1769-IQ32T**

| Attribute                    | 1769-IQ32T                                                                                                                                                                                   |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Off-state voltage, max       | 11V DC                                                                                                                                                                                       |
| Off-state current, max       | 1.7 mA                                                                                                                                                                                       |
| On-state voltage, min        | 19V DC                                                                                                                                                                                       |
| On-state current, min        | 2 mA                                                                                                                                                                                         |
| Inrush current, max          | 5 mA                                                                                                                                                                                         |
| Input impedance, nom         | 5.6 k $\Omega$                                                                                                                                                                               |
| Isolation voltage            | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, input point to bus and group to group<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 280 g (0.61 lb)                                                                                                                                                                              |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                     |
| Slot width                   | 1                                                                                                                                                                                            |
| Module location              | DIN rail or panel mount                                                                                                                                                                      |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                                       |
| Power supply distance rating | 8 modules                                                                                                                                                                                    |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                                                                                                                           |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                                                                                                                         |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                                                                                |
| Wire type                    | Cu-90 °C (194 °F)                                                                                                                                                                            |
| IEC input compatibility      | Type 1+                                                                                                                                                                                      |
| Replacement connector        | 1746-N3 (1 connector, 40 terminals)                                                                                                                                                          |
| Vendor ID code               | 1                                                                                                                                                                                            |
| Product type code            | 7                                                                                                                                                                                            |
| Product code                 | 76                                                                                                                                                                                           |
| Enclosure type rating        | None (open-style)                                                                                                                                                                            |

**Certifications - 1769-IQ32T**

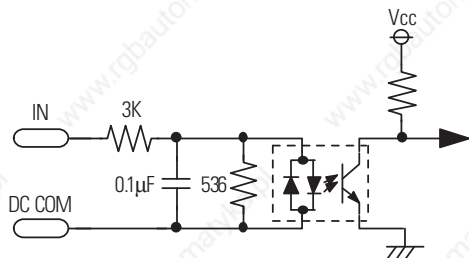
| Certification <sup>(1)</sup> | 1769-IQ32T                                                                                                                                                 |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | C-Tick compliant for all applicable directives                                                                                                             |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

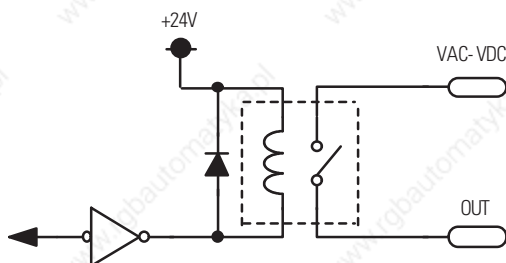
## 1769-IQ6X0W4

Compact combination 24V DC sink/source input and AC/DC relay output module

Simplified Input Circuit Diagram



Simplified Output Circuit Diagram



1769-IQ6X0W4

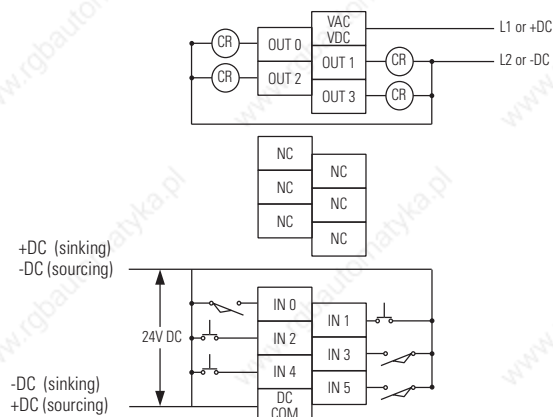


Table 38 - Technical Specifications - 1769-IQ6X0W4

| Attribute                    | 1769-IQ6X0W4                                                                                                                                                                                                                    |
|------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current draw @ 5.1V          | 105 mA                                                                                                                                                                                                                          |
| Current draw @ 24V           | 50 mA                                                                                                                                                                                                                           |
| Heat dissipation, max        | 2.75 W                                                                                                                                                                                                                          |
| Off-state voltage, max       | 11V DC                                                                                                                                                                                                                          |
| Isolation voltage            | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, input group to bus, output group to bus, and input group to output group<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 280 g (0.61 lb)                                                                                                                                                                                                                 |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                                                        |
| Slot width                   | 1                                                                                                                                                                                                                               |
| Module location              | DIN rail or panel mount                                                                                                                                                                                                         |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                                                                          |
| Power supply distance rating | 8 modules                                                                                                                                                                                                                       |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                                                                                                                                                              |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                                                                                                                                                            |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                                                                                                                   |
| Wire type                    | Cu-90 °C (194 °F)                                                                                                                                                                                                               |



**Table 38 - Technical Specifications - 1769-IQ6XOW4**

| Attribute                  | 1769-IQ6XOW4            |
|----------------------------|-------------------------|
| IEC input compatibility    | Type 1+                 |
| Replacement terminal block | 1769-RTBN18 (1 per kit) |
| Replacement door label     | 1769-RL1 (2 per kit)    |
| Replacement door           | 1769-RD (2 per kit)     |
| Vendor ID code             | 1                       |
| Product type code          | 7                       |
| Product code               | 66                      |
| Enclosure type rating      | None (open-style)       |

**Table 39 - 1769-IQ6XOW4 Input Specifications**

| Attribute               | 1769-IQ6XOW4                                                  |
|-------------------------|---------------------------------------------------------------|
| Inputs                  | 6                                                             |
| Voltage category        | 24V DC sink/source                                            |
| Operating voltage range | 10...30V DC @ 30 °C (86 °F)<br>10...26.4V DC @ 60 °C (140 °F) |
| Delay, on               | 8 ms                                                          |
| Delay, off              | 8 ms                                                          |
| Off-state voltage, max  | 5V DC                                                         |
| Off-state current, max  | 1.5 mA                                                        |
| On-state voltage, mi    | 10V DC                                                        |
| On-state current, min   | 2.0 mA                                                        |
| Inrush current, max     | 250 mA                                                        |
| Input impedance, nom    | 3 k $\Omega$                                                  |
| IEC input compatibility | Type 3                                                        |

**Table 40 - 1769-IQ6XOW4 Output Specifications**

| Attribute               | 1769-IQ6XOW4                       |
|-------------------------|------------------------------------|
| Outputs                 | 4                                  |
| Voltage category        | AC/DC normally open relay contacts |
| Operating voltage range | 5...265V AC<br>5...125V DC         |
| Delay, on               | 10 ms                              |
| Delay, off              | 10 ms                              |
| Off-state leakage, max  | 0 mA                               |
| On-state current, min   | 10 mA @ 5V DC                      |
| Current per point, max  | 2.5 A                              |
| Current per module, max | 8 A                                |

**Table 41 - Relay Contact Ratings - 1769-IQ6XOW4**

| Volts, max | Continuous Amps per Point, max | Amperes <sup>(1)</sup> |        | Voltamperes |        | NEMA ICS 2-125 |
|------------|--------------------------------|------------------------|--------|-------------|--------|----------------|
|            |                                | Make                   | Break  | Make        | Break  |                |
| 240V AC    | 2.5 A                          | 7.5 A                  | 0.75 A | 1800 VA     | 180 VA | C300           |
| 120V AC    |                                | 15 A                   | 1.5 A  |             |        |                |
| 125V DC    | 1.0 A                          | 0.22 A <sup>(2)</sup>  |        | 28 VA       |        | R150           |
| 24V DC     | 2.0 A                          | 1.2 A <sup>(2)</sup>   |        | 28 VA       |        | —              |

(1) Connecting surge suppressors across your external inductive load will extend the life of the relay contacts.

(2) For DC voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28 VA by the applied DC voltage. For example,  $28 \text{ VA} / 48 \text{ V DC} = 0.58 \text{ A}$ . For DC voltage applications less than 48V, the make/break ratings for relay contacts cannot exceed 2A.

**Table 42 - Certifications - 1769-IQ6XOW4**

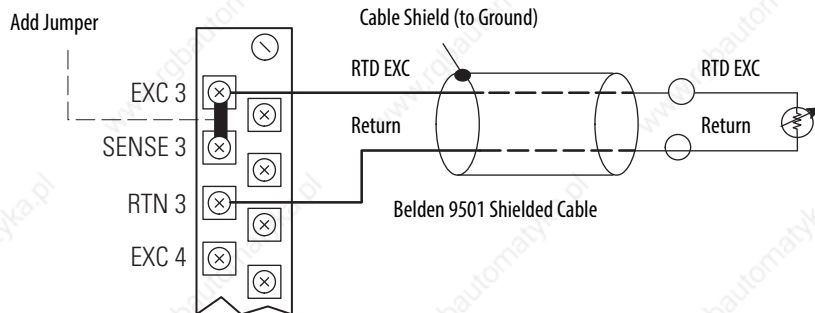
| Certification <sup>(1)</sup> | 1769-IQ6XOW4                                                                                                                                               |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | C-Tick compliant for all applicable directives                                                                                                             |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

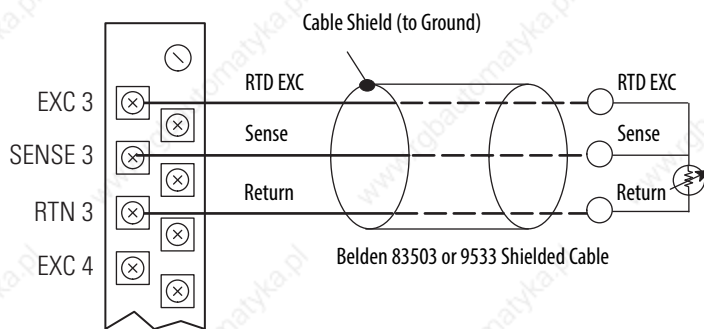
# 1769-IR6

## Compact RTD/resistance input module

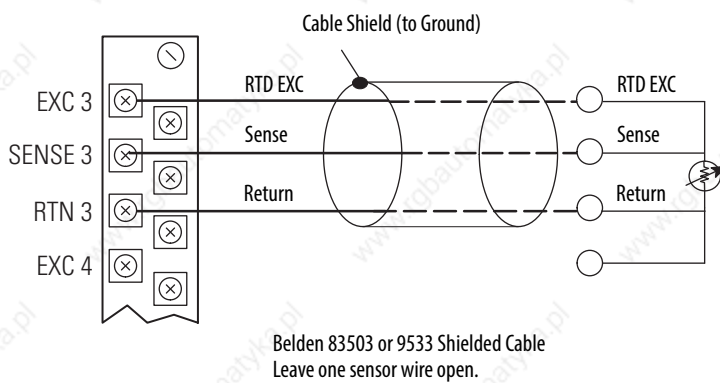
### Two Wire RTD Configuration



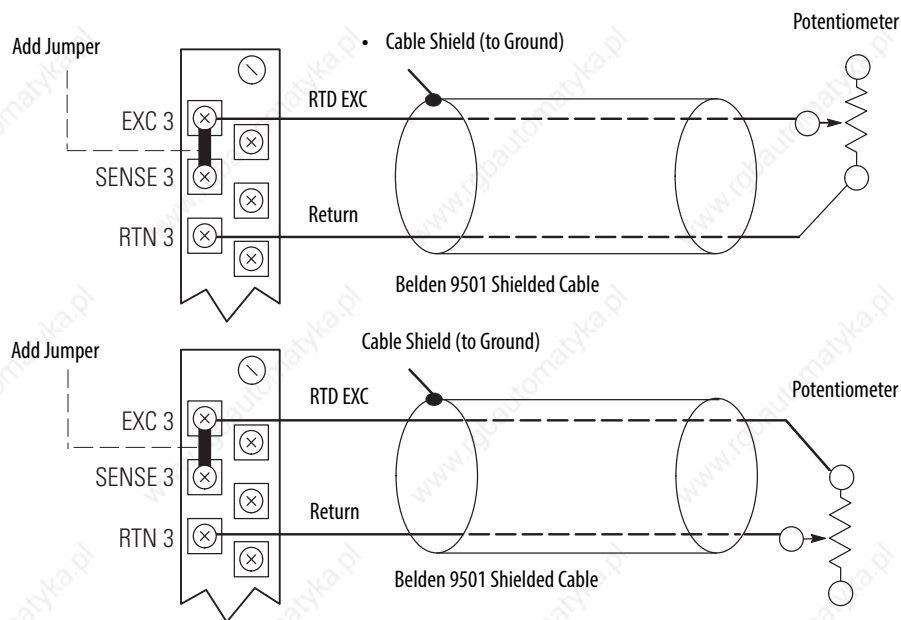
### Three Wire RTD Configuration



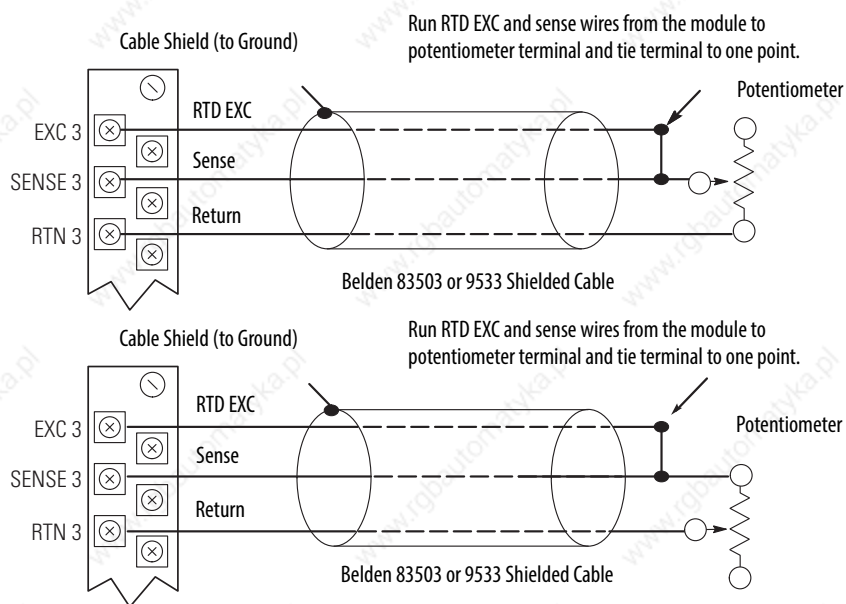
### Four Wire RTD Configuration



## Two Wire Potentiometer Configuration



## Three Wire Potentiometer Configuration



**Table 43 - Data Formats for RTD Temperature Ranges for 0.5 and 1.0 mA Excitation Current**

| RTD Input Type        | Engineering Units x1 |                | Engineering Units x10 |              | Scaled-for-PID | Proportional Counts |
|-----------------------|----------------------|----------------|-----------------------|--------------|----------------|---------------------|
|                       | 0.1 °C               | 0.1 °F         | 1.0 °C                | 1.0 °F       |                |                     |
| 100 Ω Platinum 385    | -2000...+8500        | -3280...+15620 | -200...+850           | -328...+1562 | 0...16383      | -32768...+32767     |
| 200 Ω Platinum 385    | -2000...+8500        | -3280...+15620 | -200...+850           | -328...+1562 | 0...16383      | -32768...+32767     |
| 500 Ω Platinum 385    | -2000...+8500        | -3280...+15620 | -200...+850           | -328...+1562 | 0...16383      | -32768...+32767     |
| 1000 Ω Platinum 385   | -2000...+8500        | -3280...+15620 | -200...+850           | -328...+1562 | 0...16383      | -32768...+32767     |
| 100 Ω Platinum 3916   | -2000...+6300        | -3280...+11660 | -200...+630           | -328...+1166 | 0...16383      | -32768...+32767     |
| 200 Ω Platinum 3916   | -2000...+6300        | -3280...+11660 | -200...+630           | 328...+1166  | 0...16383      | -32768...+32767     |
| 500 Ω Platinum 3916   | -2000...+6300        | -3280...+11660 | -200...+630           | 328...+1166  | 0...16383      | -32768...+32767     |
| 1000 Ω Platinum 3916  | -2000...+6300        | -3280...+11660 | -200...+630           | 328...+1166  | 0...16383      | -32768...+32767     |
| 10 Ω Copper 426       | -1000...+2600        | -1480...+5000  | +100...+260           | -148...+500  | 0...16383      | -32768...+32767     |
| 120 Ω Nickel 618      | -1000...+2600        | -1480...+5000  | -100...+260           | -148...+500  | 0...16383      | -32768...+32767     |
| 120 Ω Nickel 672      | -800...+2600         | -1120...+5000  | -80...+260            | -112...+500  | 0...16383      | -32768...+32767     |
| 604 Ω Nickel Iron 518 | -1000...+2600        | -3280...+1560  | -100...+200           | -328...+156  | 0...16383      | -32768...+32767     |

**Table 44 - Temperature Range - 1769-IR6**

| RTD Type <sup>(1)</sup>   |        | Temperature Range Using 0.5 mA Excitation | Temperature Range Using 1.0 mA Excitation |
|---------------------------|--------|-------------------------------------------|-------------------------------------------|
| Platinum 385              | 100 Ω  | -200...850 °C (-328...1562 °F)            | -200...850 °C (-328...1562 °F)            |
|                           | 200 Ω  | -200...850 °C (-328...1562 °F)            | -200...850 °C (-328...1562 °F)            |
|                           | 500 Ω  | -200...850 °C (-328...1562 °F)            | -200...850 °C (-328...1562 °F)            |
|                           | 1000 Ω | -200...850 °C (-328...1562 °F)            | N/A                                       |
| Platinum 3916             | 100 Ω  | -200C...630 °C (-328...1166 °F)           | -200...630 °C (-328...1166 °F)            |
|                           | 200 Ω  | -200C...630 °C (-328...1166 °F)           | -200...630 °C (-328...1166 °F)            |
|                           | 500 Ω  | -200C...630 °C (-328...1166 °F)           | -200...630 °C (-328...1166 °F)            |
|                           | 1000 Ω | -200C...630 °C (-328...1166 °F)           | N/A                                       |
| Copper 426                | 10 Ω   | N/A                                       | -100 to 260 °C (-148...500 °F)            |
| Nickel 618 <sup>(2)</sup> | 120 Ω  | -100...260 °C (-148...500 °F)             | -100...260 °C (-148...500 °F)             |
| Nickel 672                | 120 Ω  | -80...260 °C (-112...500 °F)              | -80...260 °C (-112...500 °F)              |
| Nickel-Iron 518           | 604 Ω  | -200...180 °C (-328...338 °F)             | -100...+200 °C (-148...392 °F)            |

(1) Digits following the RTD type represent the temperature coefficient of resistance ( $\alpha$ ), which is defined as the resistance change per Ω per °C. For instance, platinum 385 refers to a platinum RTD with  $\alpha = 0.00385 \text{ } \Omega/\Omega\text{-}^\circ\text{C}$ , or simply  $0.00385/^\circ\text{C}$ .

(2) Actual value at 0°C is 100 Ω per DIN standard.

**Resistance Device Compatibility - 1769-IR6**

| Resistance Device Type | Resistance Range (0.5 mA Excitation) | Resistance Range (1.0 mA Excitation) |
|------------------------|--------------------------------------|--------------------------------------|
| 150 Ω                  | 0...150 Ω                            | 0...150 Ω                            |
| 500 Ω                  | 0...500 Ω                            | 0...500 Ω                            |
| 1000 Ω                 | 0...1000 Ω                           | 0...1000 Ω                           |
| 3000 Ω                 | 0...3000 Ω                           | N/A                                  |

**Table 45 - Technical Specifications - 1769-IR6**

| Attribute                                                              | 1769-IR6                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                                                                 | 6 RTD inputs                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Input range                                                            | 0...150 $\Omega$<br>0...500 $\Omega$<br>0...1000 $\Omega$<br>0...3000 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Resolution                                                             | Input filter and configuration dependent                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Sensors supported                                                      | 100, 200, 500, 1000 $\Omega$ Platinum 385<br>100, 200, 500, 1000 $\Omega$ Platinum 3916<br>120 $\Omega$ Nickel 672<br>120 $\Omega$ Nickel 618<br>10 $\Omega$ Nickel-iron 518                                                                                                                                                                                                                                                                                                                                                    |
| Current draw @ 5.1V                                                    | 100 mA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Current draw @ 24V                                                     | 45 mA                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Heat dissipation, max                                                  | 1.5 W                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Converter type                                                         | Sigma Delta                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Common mode voltage range                                              | $\pm 10V$ DC max                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Common mode rejection                                                  | 110 dB @ 50 Hz with the 10 or 50 Hz filter selected<br>110 dB @ 60 Hz with the 10 or 60 Hz filter selected                                                                                                                                                                                                                                                                                                                                                                                                                      |
| Normal mode rejection ratio                                            | 70 dB @ 50 Hz with the 10 or 50 Hz filter selected<br>70 dB @ 60 Hz with the 10 or 60 Hz filter selected                                                                                                                                                                                                                                                                                                                                                                                                                        |
| Cable impedance, max                                                   | 25 $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Input impedance                                                        | > 10 M $\Omega$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Accuracy @ 25 °C (77 °F) <sup>(1)</sup><br>(50/60 Hz filter)           | $\pm 0.5$ °C (0.9 °F) for Pt 385<br>$\pm 0.4$ °C (0.72 °F) for Pt 3916<br>$\pm 0.3$ °C (0.54 °F) for Ni<br>$\pm 0.3$ °C (0.54 °F) for NiFe<br>$\pm 0.8$ °C (1.44 °F) for Cu<br>$\pm 0.15$ $\Omega$ for 150 $\Omega$ range<br>$\pm 0.5$ $\Omega$ for 500 $\Omega$ range<br>$\pm 1.0$ $\Omega$ for 1000 $\Omega$ range<br>$\pm 1.5$ $\Omega$ for 3000 $\Omega$ range                                                                                                                                                              |
| Accuracy @ 0...60 °C (32...140 °F) <sup>(1)</sup><br>(50/60 Hz filter) | $\pm 0.9$ °C (1.62 °F) for Pt 385<br>$\pm 0.8$ °C (1.44 °F) for Pt 3916<br>$\pm 0.5$ °C (0.9 °F) for Ni<br>$\pm 0.5$ °C (0.9 °F) for NiFe<br>$\pm 1.1$ °C (1.98 °F) for Cu<br>$\pm 0.25$ $\Omega$ for 150 $\Omega$ range<br>$\pm 0.8$ $\Omega$ for 500 $\Omega$ range<br>$\pm 1.5$ $\Omega$ for 1000 $\Omega$ range<br>$\pm 2.5$ $\Omega$ for 3000 $\Omega$ range                                                                                                                                                               |
| Accuracy drift @ 0...60 °C (32...140 °F) <sup>(1)</sup>                | $\pm 0.026$ °C/°C (0.026 °F/°F) for Pt 385<br>$\pm 0.023$ °C/°C (0.023 °F/°F) for Pt 3916<br>$\pm 0.012$ °C/°C (0.012 °F/°F) for Ni<br>$\pm 0.015$ °C/°C (0.015 °F/°F) for NiFe<br>$\pm 0.032$ °C/°C (0.032 °F/°F) for Cu<br>$\pm 0.007$ $\Omega$ /°C ( $\pm 0.013$ $\Omega$ /°F) for 150 $\Omega$<br>$\pm 0.023$ $\Omega$ /°C ( $\pm 0.041$ $\Omega$ /°F) for 500 $\Omega$<br>$\pm 0.043$ $\Omega$ /°C ( $\pm 0.077$ $\Omega$ /°F) for 1000 $\Omega$<br>$\pm 0.072$ $\Omega$ /°C ( $\pm 0.130$ $\Omega$ /°F) for 3000 $\Omega$ |
| Nonlinearity                                                           | $\pm 0.05\%$                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

**Table 45 - Technical Specifications - 1769-IR6**

| Attribute                                         | 1769-IR6                                                                                                                                               |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Repeatability <sup>(2)</sup><br>(50/60 Hz filter) | ±0.01 °C (0.018 °F) for Ni and NiFe<br>±0.2 °C (0.36 °F) for other RTD inputs<br>±0.04 W for 150 W resistances<br>±0.2 W for other resistances         |
| Open circuit detection time <sup>(3)</sup>        | 6 ms...303s                                                                                                                                            |
| Isolation voltage                                 | 720V DC for 1 minute, optical and magnetic (qualification), channel to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation)        |
| Weight, approx                                    | 276 g (0.61 lb)                                                                                                                                        |
| Dimensions (HxWxD), approx                        | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                               |
| Slot width                                        | 1                                                                                                                                                      |
| Module location                                   | DIN rail or panel mount                                                                                                                                |
| Power supply                                      | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                 |
| Power supply distance rating                      | 8 modules                                                                                                                                              |
| Terminal screw torque                             | 0.68 N•m (6 lb•in)                                                                                                                                     |
| Retaining screw torque                            | 0.46 N•m (4.1 lb•in)                                                                                                                                   |
| Recommended cable                                 | 2-wire configuration: Belden 9501 or equivalent<br>3-wire configuration: Belden 9533 or equivalent<br>4-wire configuration: Belden 83503 or equivalent |
| Wire size                                         | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                                          |
| Wire type                                         | Cu-90 °C (194 °F)                                                                                                                                      |
| IEC input compatibility                           | Type 1+                                                                                                                                                |
| Replacement terminal block                        | 1769-RTBN18 (1 per kit)                                                                                                                                |
| Replacement door label                            | 1769-RL2 series B (2 per kit)                                                                                                                          |
| Replacement door                                  | 1769-RD (2 per kit)                                                                                                                                    |
| Vendor ID code                                    | 1                                                                                                                                                      |
| Product type code                                 | 10                                                                                                                                                     |
| Product code                                      | 37                                                                                                                                                     |
| Enclosure type rating                             | None (open-style)                                                                                                                                      |

(1) Accuracy is dependent upon the Analog/Digital converter output rate selection, excitation current selection, data format, and input noise.

(2) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

(3) Open-circuit detection time is equal to channel update time.

**Table 46 - RTD Accuracy and Temperature Drift - 1769-IR6**

| RTD Type        |               | Scaled Accuracy Max<br>25 °C (77 °F) with Calibration | Scaled Accuracy Max<br>0...60 °C (32...140 °F) with Calibration | Temperature Drift Max<br>from 25 °C (77 °F) without Calibration |
|-----------------|---------------|-------------------------------------------------------|-----------------------------------------------------------------|-----------------------------------------------------------------|
| Copper 426      | 10 $\Omega$   | $\pm 0.6$ °C (1.08 °F)                                | $\pm 1.1$ °C (1.98 °F)                                          | $\pm 0.032$ °C/°C (0.032 °F/°F)                                 |
| Nickel 618      | 120 $\Omega$  | $\pm 0.2$ °C ( $\pm 0.36$ °F)                         | $\pm 0.4$ °C ( $\pm 0.72$ °F)                                   | $\pm 0.012$ °C/°C ( $\pm 0.012$ °F/°F)                          |
| Nickel 672      | 120 $\Omega$  | $\pm 0.2$ °C ( $\pm 0.36$ °F)                         | $\pm 0.4$ °C ( $\pm 0.72$ °F)                                   | $\pm 0.012$ °C/°C ( $\pm 0.012$ °F/°F)                          |
| Nickel-Iron 518 | 604 $\Omega$  | $\pm 0.3$ °C ( $\pm 0.54$ °F)                         | $\pm 0.5$ °C ( $\pm 0.9$ °F)                                    | $\pm 0.015$ °C/°C ( $\pm 0.015$ °F/°F)                          |
| Platinum 385    | 100 $\Omega$  | $\pm 0.5$ °C ( $\pm 0.9$ °F)                          | $\pm 0.9$ °C ( $\pm 1.62$ °F)                                   | $\pm 0.026$ °C/°C ( $\pm 0.026$ °F/°F)                          |
|                 | 200 $\Omega$  | $\pm 0.5$ °C ( $\pm 0.9$ °F)                          | $\pm 0.9$ °C ( $\pm 1.62$ °F)                                   | $\pm 0.026$ °C/°C ( $\pm 0.026$ °F/°F)                          |
|                 | 500 $\Omega$  | $\pm 0.5$ °C ( $\pm 0.9$ °F)                          | $\pm 0.9$ °C ( $\pm 1.62$ °F)                                   | $\pm 0.026$ °C/°C ( $\pm 0.026$ °F/°F)                          |
|                 | 1000 $\Omega$ | $\pm 0.5$ °C ( $\pm 0.9$ °F)                          | $\pm 0.9$ °C ( $\pm 1.62$ °F)                                   | $\pm 0.026$ °C/°C ( $\pm 0.026$ °F/°F)                          |
| Platinum 3916   | 100 $\Omega$  | $\pm 0.4$ °C ( $\pm 0.72$ °F)                         | $\pm 0.8$ °C ( $\pm 1.44$ °F)                                   | $\pm 0.023$ °C/°C ( $\pm 0.023$ °F/°F)                          |
|                 | 200 $\Omega$  | $\pm 0.4$ °C ( $\pm 0.72$ °F)                         | $\pm 0.8$ °C ( $\pm 1.44$ °F)                                   | $\pm 0.023$ °C/°C ( $\pm 0.023$ °F/°F)                          |
|                 | 500 $\Omega$  | $\pm 0.4$ °C ( $\pm 0.72$ °F)                         | $\pm 0.8$ °C ( $\pm 1.44$ °F)                                   | $\pm 0.023$ °C/°C ( $\pm 0.023$ °F/°F)                          |
|                 | 1000 $\Omega$ | $\pm 0.4$ °C ( $\pm 0.72$ °F)                         | $\pm 0.8$ °C ( $\pm 1.44$ °F)                                   | $\pm 0.023$ °C/°C ( $\pm 0.023$ °F/°F)                          |

**Table 47 - RTD Standards - 1769-IR6**

| RTD Type                       | $\alpha^{(3)}$ | IEC-751 1983,<br>Amend. 2 1995 | DIN 43760 1987 | SAMA <sup>(4)</sup> Standard<br>RC21-4-1966 | Japanese<br>Industrial<br>Standard JIS<br>C1604-1989 | Japanese<br>Industrial<br>Standard JIS<br>C1604-1997 | Minco <sup>(5)</sup> |
|--------------------------------|----------------|--------------------------------|----------------|---------------------------------------------|------------------------------------------------------|------------------------------------------------------|----------------------|
| 100 $\Omega$ Pt                | 0.00385        | X                              | X              |                                             |                                                      | X                                                    |                      |
| 200 $\Omega$ Pt                | 0.00385        | X                              | X              |                                             |                                                      | X                                                    |                      |
| 500 $\Omega$ Pt                | 0.00385        | X                              | X              |                                             |                                                      | X                                                    |                      |
| 1000 $\Omega$ Pt               | 0.00385        | X                              | X              |                                             |                                                      | X                                                    |                      |
| 100 $\Omega$ Pt                | 0.03916        |                                |                |                                             | X                                                    |                                                      |                      |
| 200 $\Omega$ Pt                | 0.03916        |                                |                |                                             | X                                                    |                                                      |                      |
| 500 $\Omega$ Pt                | 0.03916        |                                |                |                                             | X                                                    |                                                      |                      |
| 1000 $\Omega$ Pt               | 0.03916        |                                |                |                                             | X                                                    |                                                      |                      |
| 10 $\Omega$ Cu <sup>(1)</sup>  | 0.00426        |                                |                | X                                           |                                                      |                                                      |                      |
| 120 $\Omega$ Ni <sup>(2)</sup> | 0.00618        |                                | X              |                                             |                                                      |                                                      |                      |
| 120 $\Omega$ Ni                | 0.00372        |                                |                |                                             |                                                      |                                                      | X                    |
| 604 $\Omega$ NiFe              | 0.00518        |                                |                |                                             |                                                      |                                                      | X                    |

(1) Actual value at 0 °C (32 °F) is 9.04 2 $\Omega$  per SAMA standard RC21-4-1966.

(2) Actual value at 0 °C (32 °F) is 100  $\Omega$  per SAMA standard RC21-4-1966.

(3)  $\alpha$  is the temperature coefficient of resistance which is defined as the resistance change per ohm per °C.

(4) Scientific Apparatus Makers Association

(5) Minco Type "NA" (Nickel) and Minco Type "FA" (Nickel-Iron)



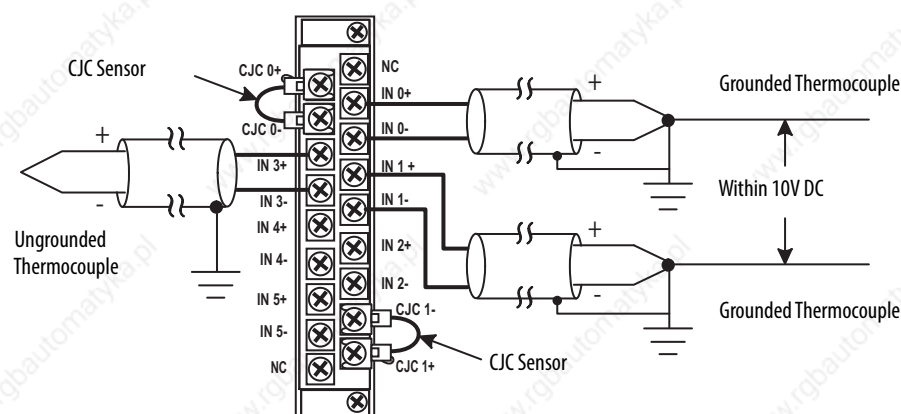
**Table 48 - Certifications - 1769-IR6**

| <b>Certification<sup>(1)</sup></b> | <b>1769-IR6</b>                                                                                                                                            |
|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                               | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                                 | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                             | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>                |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-IT6

## Compact Thermocouple/mV input module



| Thermocouple Type | °C Temperature Range | °F Temperature Range |
|-------------------|----------------------|----------------------|
| J                 | -210...+1200 °C      | -346...+2192 °F      |
| K                 | -270...+1370 °C      | -454...+2498 °F      |
| T                 | -270...+400 °C       | -454...+752 °F       |
| E                 | -270...+1000 °C      | -454...+1832 °F      |
| R                 | 0...+1768 °C         | +32...+3214 °F       |
| S                 | 0...+1768 °C         | +32...+3214 °F       |
| B                 | +300...+1820 °C      | +572...+3308 °F      |
| N                 | -210...+1300 °C      | -346...+2372 °F      |
| C                 | 0...+2315 °C         | +32...+ 4199 °F      |

| Millivolt Input Type | Range          |
|----------------------|----------------|
| ± 50 mV              | -50...+50 mV   |
| ± 100 mV             | -100...+100 mV |

| Input Type | Engineering Units x1          |                              | Engineering Units x10       |              | Scaled-for-PID | Raw/Proportional Data | Percent Range |
|------------|-------------------------------|------------------------------|-----------------------------|--------------|----------------|-----------------------|---------------|
|            | 0.1 °C                        | 0.1 °F                       | 1.0 °C                      | 1.0 °F       |                |                       |               |
| J          | -2100...+12000                | -3460...+21920               | -210...+1200                | -346...+2192 | 0...+16383     | -32767...+32767       | 0...+10000    |
| K          | -2700...+13700                | -4540...+24980               | -270...+1370                | -454...+2498 | 0...+16383     | -32767...+32767       | 0...+10000    |
| T          | -2700...+4000                 | -4540...+7520                | -270...+400                 | -454...+752  | 0...+16383     | -32767...+32767       | 0...+10000    |
| E          | -2700...+10000                | -4540...+18320               | -270...+1000                | -454...+1832 | 0...+16383     | -32767...+32767       | 0...+10000    |
| R          | 0...+17680                    | +320...32140                 | 0...+1768                   | +32...3214   | 0...+16383     | -32767...+32767       | 0...+10000    |
| S          | 0...+17680                    | +320...32140                 | 0...+1768                   | +32...3214   | 0...+16383     | -32767...+32767       | 0...+10000    |
| B          | +3000...18200                 | +5720...32767 <sup>(1)</sup> | +300...1820                 | +572...3308  | 0...+16383     | -32767...+32767       | 0...+10000    |
| N          | -2100...+13000                | -3460...+23720               | -210...+1300                | -346...+2372 | 0...+16383     | -32767...+32767       | 0...+10000    |
| C          | 0...+23150                    | +320...32767 <sup>(1)</sup>  | 0...+2315                   | +32...4199   | 0...+16383     | -32767...+32767       | 0...+10000    |
| ±50 mV     | -5000...+5000 <sup>(2)</sup>  |                              | -500...+500 <sup>(2)</sup>  |              | 0...+16383     | -32767...+32767       | 0...+10000    |
| ±100 mV    | -10000...10000 <sup>(2)</sup> |                              | -1000...1000 <sup>(2)</sup> |              | 0...+16383     | -32767...+32767       | 0...+10000    |

(1) Type B and C thermocouples cannot be represented in engineering units x1 (°F) above 3276.7 °F; therefore, it will be treated as an over-range error.

(2) When millivolts are selected, the temperature setting is ignored. Analog input data is the same for °C or °F selection.

**IMPORTANT** To reduce the effects of electrical noise, install the 1769-IT6 module at least two slots away from the AC power supplies.

**Table 49 - Technical Specifications - 1769-IT6**

| Attribute                                | 1769-IT6                                                                                                                                               |
|------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                                   | 6 RTD inputs<br>2 CJC sensors                                                                                                                          |
| Input range                              | 0...150 $\Omega$<br>0...500 $\Omega$<br>0...1000 $\Omega$<br>0...3000 $\Omega$                                                                         |
| Resolution                               | Input filter and configuration dependent                                                                                                               |
| Thermocouples                            | B, E, J, K, R, S, T, N, C                                                                                                                              |
| Current draw @ 5.1V                      | 100 mA                                                                                                                                                 |
| Current draw @ 24V                       | 45 mA                                                                                                                                                  |
| Heat dissipation, max                    | 1.5 W                                                                                                                                                  |
| Converter type                           | Sigma Delta                                                                                                                                            |
| Response speed per channel               | 3...300 ms, depending on input filter and configuration                                                                                                |
| Rated working voltage <sup>(1)</sup>     | 30V AC/30V DC                                                                                                                                          |
| Common mode voltage range <sup>(2)</sup> | $\pm 10V$ DC max                                                                                                                                       |
| Common mode rejection                    | 115 dB @ 50 Hz with 10 Hz or 50 Hz filter<br>115 dB @ 60 Hz with 10 Hz or 60 Hz filter                                                                 |
| Normal mode rejection ratio              | 85 dB @ 50 Hz with the 10 or 50 Hz filter selected<br>85 dB @ 60 Hz with the 10 or 60 Hz filter selected                                               |
| Cable impedance, max                     | 25 $\Omega$                                                                                                                                            |
| Input impedance                          | > 10 M $\Omega$                                                                                                                                        |
| CJC assembly accuracy                    | $\pm 1.0$ °C ( $\pm 1.8$ °F)                                                                                                                           |
| Nonlinearity (in percent full scale)     | $\pm 0.03\%$                                                                                                                                           |
| Open-circuit detection time              | 7 ms...2.1 s <sup>(3)</sup>                                                                                                                            |
| Overload at input terminals, max         | $\pm 35V$ DC continuous <sup>(4)</sup>                                                                                                                 |
| Isolation voltage                        | 720V DC for 1 min (qualification test) 30V AC/30V DC working voltage, group to bus                                                                     |
| Weight, approx                           | 276 g (0.61 lb)                                                                                                                                        |
| Dimensions (HxWxD), approx               | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                               |
| Slot width                               | 1                                                                                                                                                      |
| Module location                          | DIN rail or panel mount                                                                                                                                |
| Power supply                             | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                 |
| Power supply distance rating             | 8 modules                                                                                                                                              |
| Terminal screw torque                    | 0.68 N•m (6 lb•in)                                                                                                                                     |
| Retaining screw torque                   | 0.46 N•m (4.1 lb•in)                                                                                                                                   |
| Recommended cable                        | 2-wire configuration: Belden 9501 or equivalent<br>3-wire configuration: Belden 9533 or equivalent<br>4-wire configuration: Belden 83503 or equivalent |

**Table 49 - Technical Specifications - 1769-IT6**

| Attribute                  | 1769-IT6                                      |
|----------------------------|-----------------------------------------------|
| Wire size                  | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                  | Cu-90 °C (194 °F)                             |
| IEC input compatibility    | Type 1+                                       |
| Replacement terminal block | 1769-RTBN18 (1 per kit)                       |
| Replacement door label     | 1769-RL2 series B (2 per kit)                 |
| Replacement door           | 1769-RD (2 per kit)                           |
| Vendor ID code             | 1                                             |
| Product type code          | 10                                            |
| Product code               | 36                                            |
| Enclosure type rating      | None (open-style)                             |

- (1) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 30V DC input signal and 20V DC potential above ground).
- (2) For proper operation, both the plus and minus input terminals must be within  $\pm 10V$  DC of analog common.
- (3) Open-circuit detection time is equal to the module scan time, which is based on the number of enabled channels, and the filter frequency of each channel.
- (4) Maximum current input is limited due to input impedance.

**Table 50 - Repeatability at 25 °C (77 °F) - 1769-IT6**

| Input Type                                         | Repeatability for 10 Hz Filter <sup>(1)(2)</sup> |
|----------------------------------------------------|--------------------------------------------------|
| Thermocouple J                                     | $\pm 0.1$ °C [ $\pm 0.18$ °F]                    |
| Thermocouple N (-110...+1300 °C [-166...+2372 °F]) | $\pm 0.1$ °C [ $\pm 0.18$ °F]                    |
| Thermocouple N (-210...-110 °C [-346...-166 °F])   | $\pm 0.25$ °C [ $\pm 0.45$ °F]                   |
| Thermocouple T (-170...+400 °C [-274...+752 °F])   | $\pm 0.1$ °C [ $\pm 0.18$ °F]                    |
| Thermocouple T (-270...-170 °C [-454...-274 °F])   | $\pm 1.5$ °C [ $\pm 2.7$ °F]                     |
| Thermocouple K (-270...+1370 °C [-454...+2498 °F]) | $\pm 0.1$ °C [ $\pm 0.18$ °F]                    |
| Thermocouple (-270...-170 °C [-454...-274 °F])     | $\pm 2.0$ °C [ $\pm 3.6$ °F]                     |
| Thermocouple E (-220...+1000 °C [-364...+1832 °F]) | $\pm 0.1$ °C [ $\pm 0.18$ °F]                    |
| Thermocouple E (-270...-220 °C [-454...-364 °F])   | $\pm 1.0$ °C [ $\pm 1.8$ °F]                     |
| Thermocouples S and R                              | $\pm 0.4$ °C [ $\pm 0.72$ °F]                    |
| Thermocouple C                                     | $\pm 0.7$ °C [ $\pm 1.26$ °F]                    |
| Thermocouple B                                     | $\pm 0.2$ °C [ $\pm 0.36$ °F]                    |
| $\pm 50$ mV                                        | $\pm 6$ $\mu$ V                                  |
| $\pm 100$ mV                                       | $\pm 6$ $\mu$ V                                  |

- (1) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (2) Repeatability at any other temperature in the 0 to 60°C (32 to 140°F) range is the same as long as the temperature is stable.

**Accuracy - 1769-IT6**

| Input Type <sup>(1)</sup>                          | With Autocalibration Enabled                                  |                                   | Without Autocalibration                   |
|----------------------------------------------------|---------------------------------------------------------------|-----------------------------------|-------------------------------------------|
|                                                    | Accuracy <sup>(2)(3)</sup> for 10, 50 and 60 Hz Filters (max) |                                   | Temperature Drift (max) <sup>(2)(4)</sup> |
|                                                    | @ 25 °C (77 °F) Ambient                                       | @ 0...60 °C (32...140 °F) Ambient | @ 0...60 °C (32...140 °F) Ambient         |
| Thermocouple J (-210...1200 °C [-346...2192 °F])   | ±0.6 °C [± 1.1 °F]                                            | ±0.9 °C [± 1.7 °F]                | ±0.0218 °C/°C [±0.0218 °F/°F]             |
| Thermocouple N (-200...+1300 °C [-328...2372 °F])  | ±1 °C [± 1.8 °F]                                              | ±1.5 °C [±2.7 °F]                 | ±0.0367 °C/°C [±0.0367 °F/°F]             |
| Thermocouple N (-210...-200 °C [-346...-328 °F])   | ±1.2 °C [±2.2 °F]                                             | ±1.8 °C [±3.3 °F]                 | ±0.0424 °C/°C [±0.0424 °F/°F]             |
| Thermocouple T (-230...+400 °C [-382...+752 °F])   | ±1 °C [± 1.8 °F]                                              | ±1.5 °C [±2.7 °F]                 | ±0.0349 °C/°C [±0.0349 °F/°F]             |
| Thermocouple T (-270...-230 °C [-454...-382 °F])   | ±5.4 °C [± 9.8 °F]                                            | ±7.0 °C [±12.6 °F]                | ±0.3500 °C/°C [±0.3500 °F/°F]             |
| Thermocouple K (-230...+1370 °C [-382...+2498 °F]) | ±1 °C [± 1.8 °F]                                              | ±1.5 °C [±2.7 °F]                 | ±0.4995 °C/°C [±0.4995 °F/°F]             |
| Thermocouple K (-270...-225 °C [-454...-373 °F])   | ±7.5 °C [± 13.5 °F]                                           | ±10 °C [± 18 °F]                  | ±0.0378 °C/°C [±0.0378 °F/°F]             |
| Thermocouple E (-210...+1000 °C [-346...+1832 °F]) | ±0.5 °C [± 0.9 °F]                                            | ±0.8 °C [±1.5 °F]                 | ±0.0199 °C/°C [±0.0199 °F/°F]             |
| Thermocouple E (-270...-210 °C [-454...-346 °F])   | ±4.2 °C [± 7.6 °F]                                            | ±6.3 °C [±11.4 °F]                | ±0.2698 °C/°C [±0.2698 °F/°F]             |
| Thermocouple R                                     | ±1.7 °C [± 3.1 °F]                                            | ±2.6 °C [± 4.7 °F]                | ±0.0613 °C/°C [±0.0613 °F/°F]             |
| Thermocouple S                                     | ±1.7 °C [± 3.1 °F]                                            | ±2.6 °C [± 4.7 °F]                | ±0.0600 °C/°C [±0.0600 °F/°F]             |
| Thermocouple C                                     | ±1.8 °C [±3.3 °F]                                             | ±3.5 °C [±6.3 °F]                 | ±0.0899 °C/°C [±0.0899 °F/°F]             |
| Thermocouple B                                     | ±3.0 °C [±5.4 °F]                                             | ±4.5 °C [±8.1 °F]                 | ±0.1009 °C/°C [±0.1009 °F/°F]             |
| ±50 mV                                             | ±15 µV                                                        | ±25 µV                            | ±0.44 µV/°C [±0.80 µV/°F]                 |
| ±100 mV                                            | ±20 µV                                                        | ±30 µV                            | ±0.69 µV/°C [±1.25 µV/°F]                 |

(1) The module uses the National Institute of Standards and Technology (NIST) ITS-90 standard for thermocouple linearization.

(2) Accuracy and temperature drift information does not include the affects of errors or drift in the cold junction compensation circuit.

(3) Accuracy is dependent upon the analog/digital converter output rate selection, data format, and input noise.

(4) Temperature drift with autocalibration is slightly better than without autocalibration.

**Table 51 - Certifications - 1769-IT6**

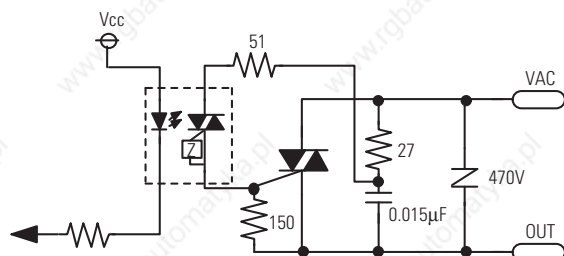
| Certification <sup>(1)</sup> | 1769-IT6                                                                                                                                                   |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure                                                             |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-0A8

Compact 100/240V AC solid state output module

Simplified Output Circuit Diagram



1769-0A8

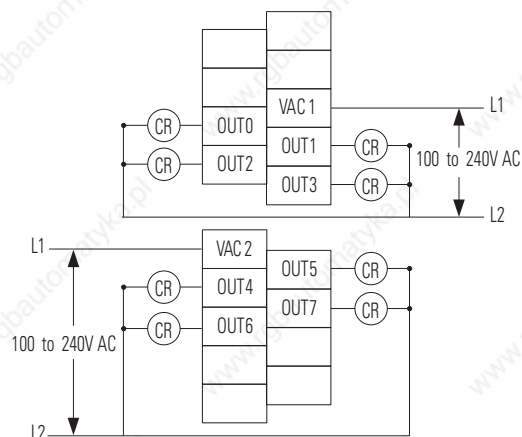


Table 52 - Technical Specifications - 1769-0A8

| Attribute                                     | 1769-0A8                                                                                                                                                                                                             |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                       | 8 (4 points/group)                                                                                                                                                                                                   |
| Voltage category                              | 100/240V AC                                                                                                                                                                                                          |
| Operating voltage range                       | 85...265V AC<br>47...63 Hz                                                                                                                                                                                           |
| Output delay, on <sup>(1)</sup>               | 1/2 cycle                                                                                                                                                                                                            |
| Output delay, off <sup>(1)</sup>              | 1/2 cycle                                                                                                                                                                                                            |
| Current draw @ 5.1V                           | 145 mA                                                                                                                                                                                                               |
| Heat dissipation, max                         | 2.12 W                                                                                                                                                                                                               |
| Off-state leakage current, max <sup>(2)</sup> | 2.0 mA @ 132V AC<br>2.5 mA @ 265V AC                                                                                                                                                                                 |
| On-state current, max                         | 10 mA                                                                                                                                                                                                                |
| On-state voltage drop, max                    | 1.5V peak @ 2 A                                                                                                                                                                                                      |
| Current per point, max                        | 0.25 A @ 60 °C<br>0.5 A @ 30 °C                                                                                                                                                                                      |
| Current per module, max                       | 2 A @ 60 °C<br>4 A @ 30 °C                                                                                                                                                                                           |
| Surge current <sup>(3)</sup>                  | 10 A for 25 ms, repeatable every 2 s                                                                                                                                                                                 |
| Isolation voltage                             | Verified by one of the following dielectric tests: 1836V AC for 1 s or 2596V DC for 1 s, group to group<br>265V AC working voltage (basic insulation)<br>150V AC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                | 280 g (0.61 lb)                                                                                                                                                                                                      |
| Dimensions (HxWxD), approx                    | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                                             |
| Slot width                                    | 1                                                                                                                                                                                                                    |

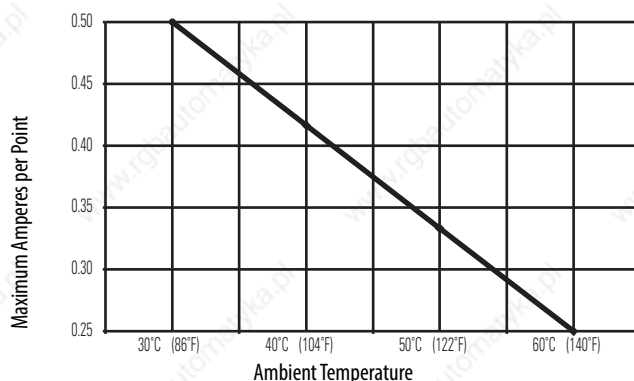
**Table 52 - Technical Specifications - 1769-0A8**

| Attribute                    | 1769-0A8                                      |
|------------------------------|-----------------------------------------------|
| Module location              | DIN rail or panel mount                       |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4        |
| Power supply distance rating | 8 modules                                     |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                          |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                    | Cu-90 °C (194 °F)                             |
| Replacement terminal block   | 1769-RTBN10 (1 per kit)                       |
| Replacement door label       | 1769-RL1 (2 per kit)                          |
| Replacement door             | 1769-RD (2 per kit)                           |
| Vendor ID code               | 1                                             |
| Product type code            | 7                                             |
| Product code                 | 84                                            |
| Enclosure type rating        | None (open style)                             |

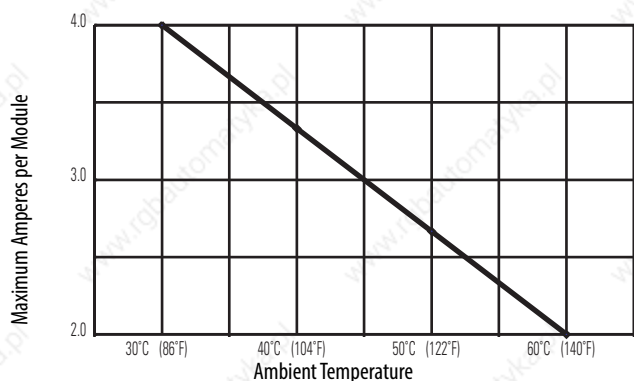
- (1) Triac outputs turn on and off at AC line zero cross.
- (2) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. For 120V AC operation, use a 15 k $\Omega$ , 2W resistor. For 240V AC operation use a 5 k $\Omega$ , 5W resistor.
- (3) Connecting surge suppressors across your external load will extend the life of the triac outputs.

## Temperature Derating - 1769-0A8

**1769-0A8 Maximum Amperes per Point versus Temperature**



**1769-0A8 Maximum Amperes per Module versus Temperature**



## Certifications - 1769-0A8

| Certification <sup>(1)</sup> | 1769-0A8                                                                                                                                                                                      |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

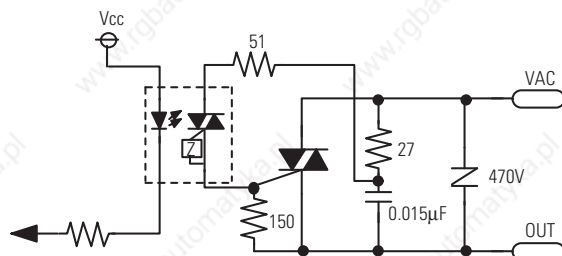
(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.



# 1769-0A16

Compact 120/240V AC solid state output module

Simplified Output Circuit Diagram



1769-0A16

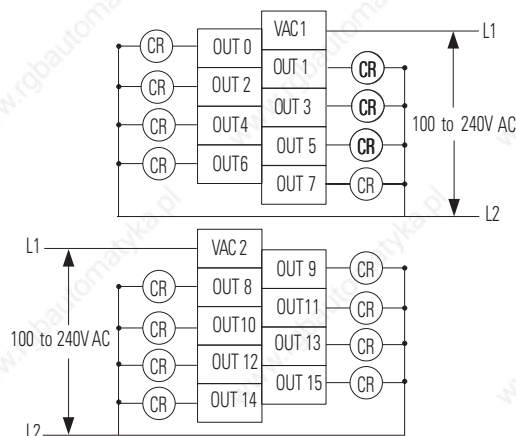


Table 53 - Technical Specifications - 1769-0A16

| Attribute                                     | 1769-0A16                                                                                                                                                                                                                                                                                                                                                                                                |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                       | 16 (8 points/group)                                                                                                                                                                                                                                                                                                                                                                                      |
| Voltage category                              | 100/240V AC                                                                                                                                                                                                                                                                                                                                                                                              |
| Operating voltage range                       | 85 ... 265V AC<br>47 ... 63 Hz                                                                                                                                                                                                                                                                                                                                                                           |
| Output delay, on <sup>(1)</sup>               | 1/2 cycle                                                                                                                                                                                                                                                                                                                                                                                                |
| Output delay, off <sup>(1)</sup>              | 1/2 cycle                                                                                                                                                                                                                                                                                                                                                                                                |
| Current draw @ 5.1V                           | 225 mA                                                                                                                                                                                                                                                                                                                                                                                                   |
| Heat dissipation, max                         | 4.9 W                                                                                                                                                                                                                                                                                                                                                                                                    |
| Off-state leakage current, max <sup>(2)</sup> | 2.0 mA @ 132V AC<br>2.5 mA @ 265V AC                                                                                                                                                                                                                                                                                                                                                                     |
| On-state current, max                         | 10 mA                                                                                                                                                                                                                                                                                                                                                                                                    |
| On-state voltage drop, max                    | 1.5V peak @ 2 A                                                                                                                                                                                                                                                                                                                                                                                          |
| Current per point, max                        | 0.25 A @ 60 °C<br>0.5 A @ 30 °C                                                                                                                                                                                                                                                                                                                                                                          |
| Current per module, max                       | 2 A @ 60 °C<br>4 A @ 30 °C                                                                                                                                                                                                                                                                                                                                                                               |
| Surge current <sup>(3)</sup>                  | 5 A for 25 ms, repeatable every 2 s                                                                                                                                                                                                                                                                                                                                                                      |
| Isolation voltage                             | Verified by one of the following dielectric tests: 1836V AC for 1 s or 2596V DC for 1 s, output point to bus<br>265V AC working voltage (IEC Class 2 reinforced insulation)<br>Verified by one of the following dielectric tests: 1836V AC for 1 s or 2596V DC for 1 s, output point to bus<br>265V AC working voltage (basic insulation)<br>150V AC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                | 280 g (0.61 lb)                                                                                                                                                                                                                                                                                                                                                                                          |

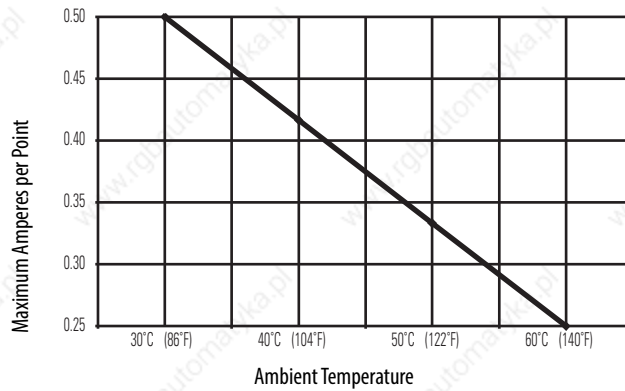
**Table 53 - Technical Specifications - 1769-0A16**

| Attribute                    | 1769-0A16                                                                                |
|------------------------------|------------------------------------------------------------------------------------------|
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.) |
| Slot width                   | 1                                                                                        |
| Module location              | DIN rail or panel mount                                                                  |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                   |
| Power supply distance rating | 8 modules                                                                                |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                       |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                     |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                            |
| Wire type                    | Cu-90 °C (194 °F)                                                                        |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                                                                  |
| Replacement door label       | 1769-RL1 (2 per kit)                                                                     |
| Replacement door             | 1769-RD (2 per kit)                                                                      |
| Vendor ID code               | 1                                                                                        |
| Product type code            | 7                                                                                        |
| Product code                 | 93                                                                                       |
| Enclosure type rating        | None (open style)                                                                        |

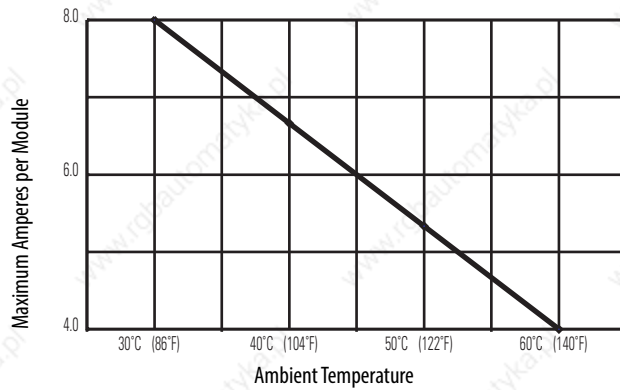
- (1) Triac outputs turn on and off at AC line zero cross.
- (2) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. For 120V AC operation, use a 15 k $\Omega$ , 2W resistor. For 240V AC operation use a 5 k $\Omega$ , 5W resistor.
- (3) Connecting surge suppressors across your external load will extend the life of the triac outputs.

## Temperature Derating - 1769-0A16

**1769-0A16 Maximum Amperes per Point versus Temperature**



**1769-0A16 Maximum Amperes per Module versus Temperature**



**Table 54 - Certifications - 1769-0A16**

| Certification <sup>(1)</sup> | 1769-0A16                                                                                                                                                                                     |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## 1769-0B8

Compact solid state 24V DC source, high-current output module

Simplified Output Circuit Diagram

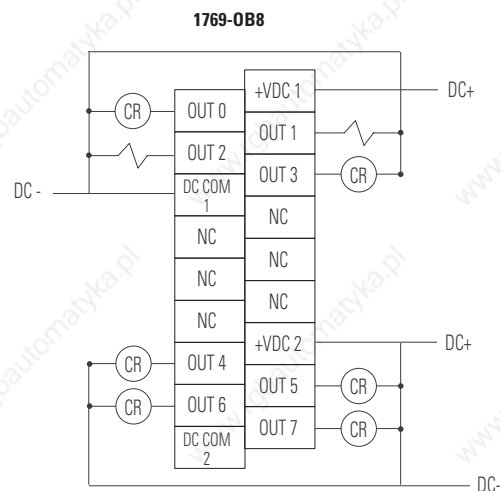
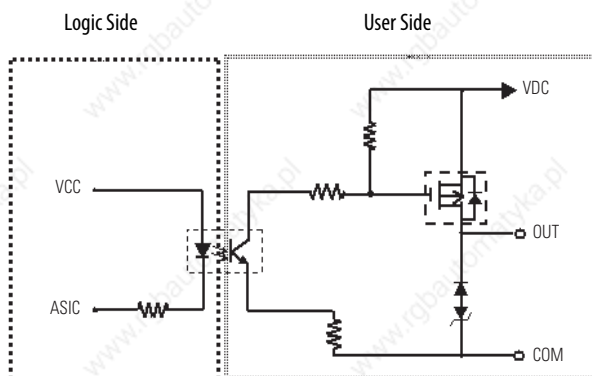


Table 55 - Technical Specifications - 1769-0B8

| Attribute                                     | 1769-0B8                                                                                                                                                                                       |
|-----------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                       | 8 (4 points/group)                                                                                                                                                                             |
| Voltage category                              | 24V DC source                                                                                                                                                                                  |
| Operating voltage range                       | 20.4...26.4V DC                                                                                                                                                                                |
| Output delay, on                              | 0.1 ms                                                                                                                                                                                         |
| Output delay, off                             | 1.0 ms @ 60 °C max load 2 A, min V in 20.4V<br>1.5 ms @ 60 °C max load 1mA, min V in 20.4V                                                                                                     |
| Current draw @ 5.1V                           | 145 mA                                                                                                                                                                                         |
| Heat dissipation, max                         | 2.20 W                                                                                                                                                                                         |
| Off-state leakage current, max <sup>(1)</sup> | 1.0 mA @ 26.4V DC                                                                                                                                                                              |
| On-state current, min                         | 1.0 mA                                                                                                                                                                                         |
| On-state voltage drop, max                    | 1.0V DC @ 2 A                                                                                                                                                                                  |
| Current per point, max                        | 2.0 A @ 60 °C (140 °F)                                                                                                                                                                         |
| Current per module, max                       | 8.0 A @ 60 °C (140 °F)                                                                                                                                                                         |
| Surge current <sup>(2)</sup>                  | 4 A for 10 ms, repeatable every 2 s                                                                                                                                                            |
| Isolation voltage                             | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, output point to bus, and group to group<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                | 280 g (0.61 lb)                                                                                                                                                                                |
| Dimensions (HxWxD), approx                    | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                       |
| Slot width                                    | 1                                                                                                                                                                                              |
| Module location                               | DIN rail or panel mount                                                                                                                                                                        |
| Power supply                                  | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                                         |
| Power supply distance rating                  | 8 modules                                                                                                                                                                                      |

**Table 55 - Technical Specifications - 1769-OB8**

| Attribute                  | 1769-OB8                                      |
|----------------------------|-----------------------------------------------|
| Terminal screw torque      | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque     | 0.46 N•m (4.1 lb•in)                          |
| Wire size                  | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                  | Cu-90 °C (194 °F)                             |
| Replacement terminal block | 1769-RTBN18 (1 per kit)                       |
| Replacement door label     | 1769-RL1 (2 per kit)                          |
| Replacement door           | 1769-RD (2 per kit)                           |
| Vendor ID code             | 1                                             |
| Product type code          | 7                                             |
| Product code               | 70                                            |
| Enclosure type rating      | None (open style)                             |

(1) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k $\Omega$ , 1/2 W resistor for transistor outputs, 24V DC operation.

(2) Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads.

**Table 56 - Certifications - 1769-OB8**

| Certification <sup>(1)</sup> | 1769-OB8                                                                                                                                                   |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with:<br>– AS/NZS CISPR 11; Industrial Enclosure           |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## 1769-OB16

Compact solid state 24V DC source output module

Simplified Output Circuit Diagram

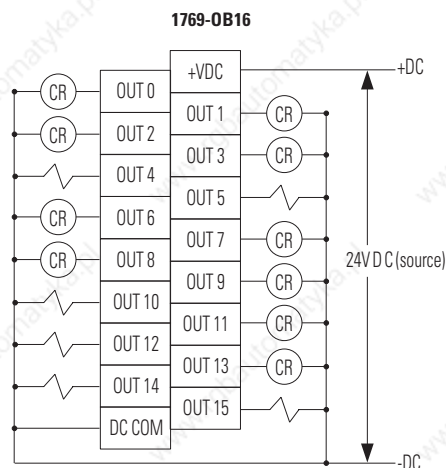
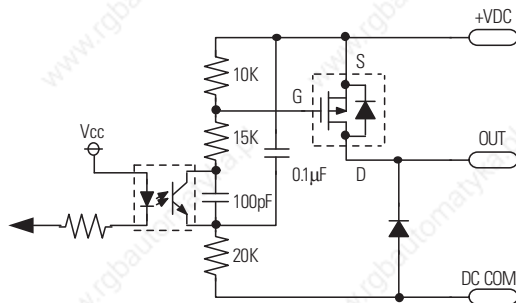


Table 57 - Technical Specifications - 1769-OB16

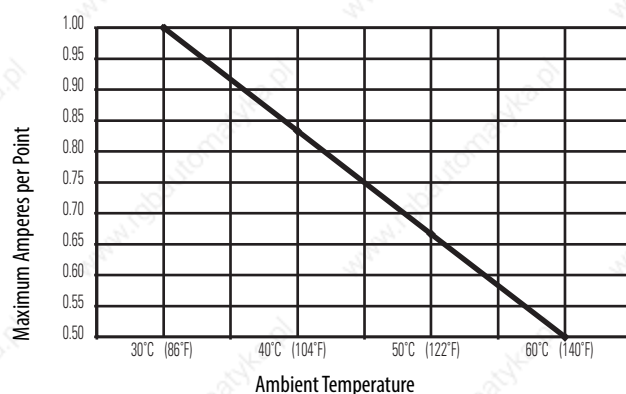
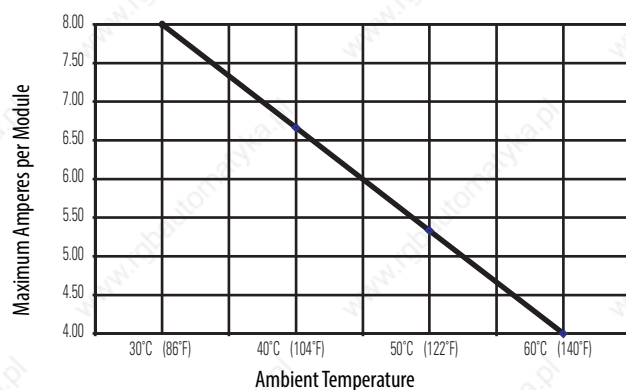
| Attribute                                     | 1769-OB16                                                                                                                                                                  |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                       | 16 (16 points/group)                                                                                                                                                       |
| Voltage category                              | 24V DC source                                                                                                                                                              |
| Operating voltage range                       | 20.4...26.4V DC                                                                                                                                                            |
| Output delay, on                              | 0.1 ms                                                                                                                                                                     |
| Output delay, off                             | 1.0 ms                                                                                                                                                                     |
| Current draw @ 5.1V                           | 200 mA                                                                                                                                                                     |
| Heat dissipation, max                         | 2.11 W                                                                                                                                                                     |
| Off-state leakage current, max <sup>(1)</sup> | 1.0 mA @ 26.4V DC                                                                                                                                                          |
| On-state current, min                         | 1.0 mA                                                                                                                                                                     |
| On-state voltage drop, max                    | 1.0V DC @ 1 A                                                                                                                                                              |
| Current per point, max                        | 0.5 A @ 60 °C (140 °F)<br>1.0 A @ 30 °C (86 °F)                                                                                                                            |
| Current per module, max                       | 4.0 A @ 60 °C (140 °F)<br>8.0 A @ 30 °C (86 °F)                                                                                                                            |
| Surge current <sup>(2)</sup>                  | 2.0 A for 10 ms, repeatable every 2 s                                                                                                                                      |
| Isolation voltage                             | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, output point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                | 280 g (0.61 lb)                                                                                                                                                            |
| Dimensions (HxWxD), approx                    | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                   |
| Slot width                                    | 1                                                                                                                                                                          |
| Module location                               | DIN rail or panel mount                                                                                                                                                    |
| Power supply                                  | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                     |
| Power supply distance rating                  | 8 modules                                                                                                                                                                  |

**Table 57 - Technical Specifications - 1769-OB16**

| Attribute                  | 1769-OB16                                     |
|----------------------------|-----------------------------------------------|
| Terminal screw torque      | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque     | 0.46 N•m (4.1 lb•in)                          |
| Wire size                  | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                  | Cu-90 °C (194 °F)                             |
| Replacement terminal block | 1769-RTBN18 (1 per kit)                       |
| Replacement door label     | 1769-RL1 (2 per kit)                          |
| Replacement door           | 1769-RD (2 per kit)                           |
| Vendor ID code             | 1                                             |
| Product type code          | 7                                             |
| Product code               | 71                                            |
| Enclosure type rating      | None (open style)                             |

- (1) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k $\Omega$ , 1/2 W resistor for transistor outputs, 24V DC operation.
- (2) Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads.

## Temperature Derating - 1769-OB16

**1769-OB16 Maximum Amperes per Point versus Temperature****1769-OB16 Maximum Amperes per Module versus Temperature**

**Table 58 - Certifications - 1769-0B16**

| <b>Certification<sup>(1)</sup></b> | <b>1769-0B16</b>                                                                                                                                                                              |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                               | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                                 | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                             | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

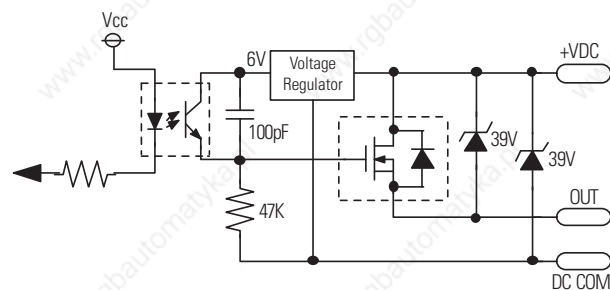
(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.



## 1769-OB16P

Compact solid state 24V DC source, protected output module

Simplified Output Circuit Diagram



Protection circuit is not shown.

1769-OB16P

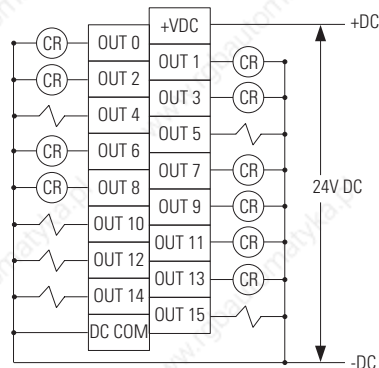


Table 59 - Technical Specifications - 1769-OB16P

| Attribute                                     | 1769-OB16P                                                                                                                                                                 |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                       | 16 (16 points/group)                                                                                                                                                       |
| Voltage category                              | 24V DC source                                                                                                                                                              |
| Operating voltage range                       | 20.4...26.4V DC                                                                                                                                                            |
| Output delay, on                              | 1.0 ms                                                                                                                                                                     |
| Output delay, off                             | 2.0 ms                                                                                                                                                                     |
| Current draw @ 5.1V                           | 160 mA                                                                                                                                                                     |
| Heat dissipation, max                         | 2.69 W                                                                                                                                                                     |
| Off-state leakage current, max <sup>(1)</sup> | 1.0 mA @ 26.4V DC                                                                                                                                                          |
| On-state current, min                         | 1.0 mA                                                                                                                                                                     |
| On-state voltage drop, max                    | 0.5V DC                                                                                                                                                                    |
| Current per point, max                        | 0.5 A @ 60 °C (140 °F)<br>1.0 A @ 30 °C (86 °F)                                                                                                                            |
| Current per module, max                       | 4.0 A @ 60 °C (140 °F)<br>8.0 A @ 30 °C (86 °F)                                                                                                                            |
| Surge current <sup>(2)</sup>                  | 2.0 A for 10 ms, repeatable every 1 s                                                                                                                                      |
| Isolation voltage                             | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, output point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                | 255 g (0.56 lb)                                                                                                                                                            |
| Dimensions (HxWxD), approx                    | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                   |
| Slot width                                    | 1                                                                                                                                                                          |
| Module location                               | DIN rail or panel mount                                                                                                                                                    |
| Power supply                                  | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                     |
| Power supply distance rating                  | 8 modules                                                                                                                                                                  |

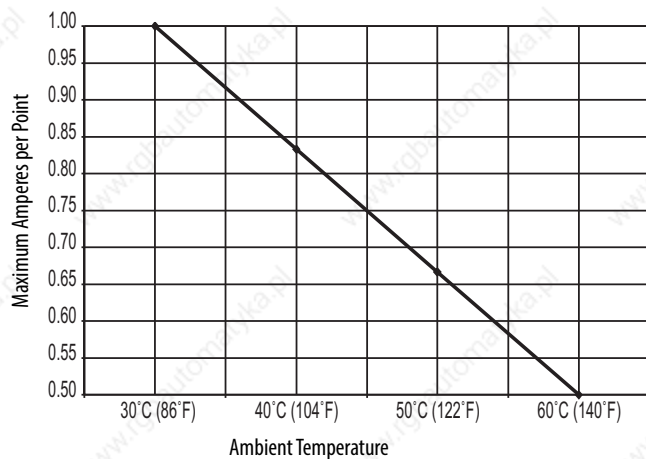
**Table 59 - Technical Specifications - 1769-OB16P**

| Attribute                  | 1769-OB16P                                    |
|----------------------------|-----------------------------------------------|
| Terminal screw torque      | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque     | 0.46 N•m (4.1 lb•in)                          |
| Wire size                  | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                  | Cu-90 °C (194 °F)                             |
| Replacement terminal block | 1769-RTBN18 (1 per kit)                       |
| Replacement door label     | 1769-RL1 (2 per kit)                          |
| Replacement door           | 1769-RD (2 per kit)                           |
| Vendor ID code             | 1                                             |
| Product type code          | 7                                             |
| Product code               | 91                                            |
| Enclosure type rating      | None (open style)                             |

- (1) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k $\Omega$ , 1/2 W resistor for transistor outputs, 24V DC operation.
- (2) Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads.

## Temperature Derating - 1769-OB16P

1769-OB16P Maximum Amperes per Point versus Temperature



1769-OB16P Maximum Amperes per Module versus Temperature

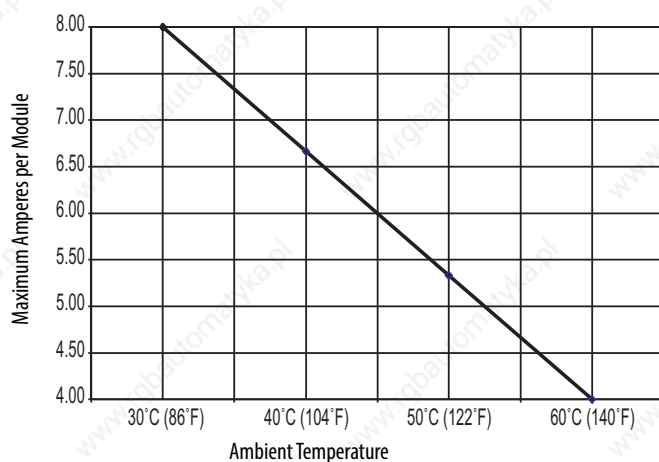


Table 60 - Certifications - 1769-OB16P

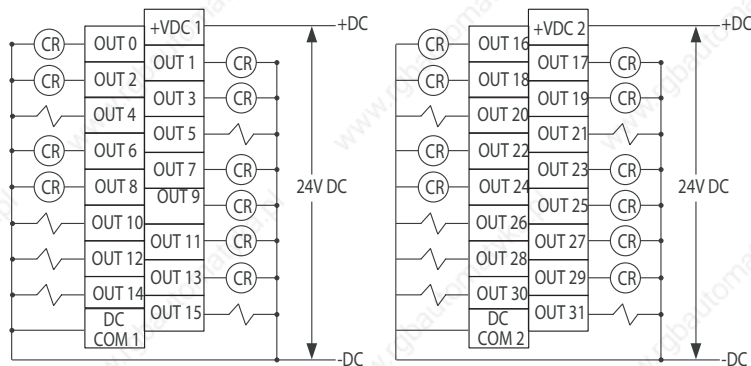
| Certification <sup>(1)</sup> | 1769-OB16P                                                                                                                                                                                    |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## 1769-0B32

Compact solid state 24V DC source output module

1769-0B32



Simplified Output Circuit Diagram

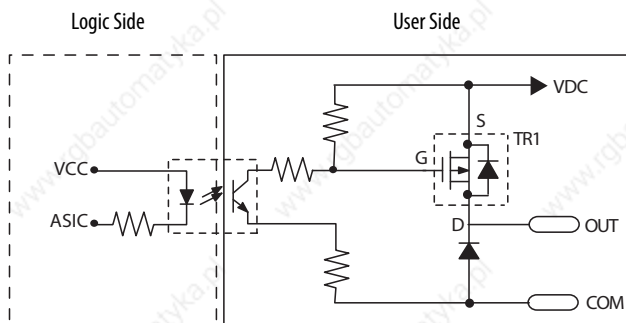


Table 61 - Technical Specifications - 1769-0B32

| Attribute                                     | 1769-0B32                                       |
|-----------------------------------------------|-------------------------------------------------|
| Outputs                                       | 32 (16 points/group)                            |
| Voltage category                              | 24V DC source                                   |
| Operating voltage range                       | 20.4...26.4V DC                                 |
| Output delay, on                              | 0.1 ms                                          |
| Output delay, off                             | 1.0 ms                                          |
| Current draw @ 5.1V                           | 300 mA                                          |
| Heat dissipation, max                         | 4.5 W                                           |
| Off-state leakage current, max <sup>(1)</sup> | 1.0 mA @ 26.4V DC                               |
| On-state current, min                         | 1.0 mA                                          |
| On-state voltage drop, max                    | 1.0V DC @ 1 A                                   |
| Current per point, max                        | 0.5 A @ 60 °C (140 °F)<br>1.0 A @ 30 °C (86 °F) |
| Current per module, max                       | 4.0 A @ 60 °C (140 °F)<br>8.0 A @ 30 °C (86 °F) |
| Surge current <sup>(2)</sup>                  | 2.0 A for 10 ms, repeatable every 2 s           |

**Table 61 - Technical Specifications - 1769-OB32**

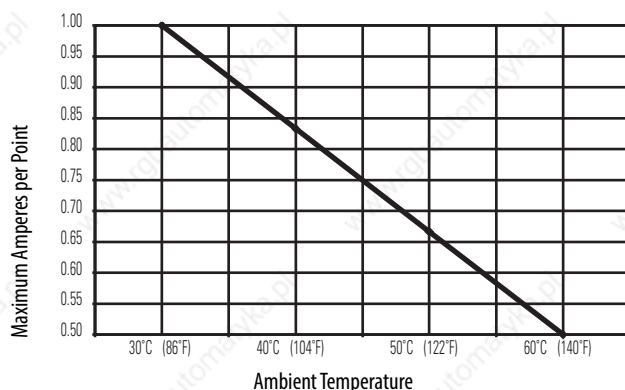
| Attribute                    | 1769-OB32                                                                                                                                                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Isolation voltage            | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, output point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 450 g (0.992 lb)                                                                                                                                                           |
| Dimensions (HxWxD), approx   | 118 x 52.5 x 87 mm (4.65 x 2.07 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                 |
| Slot width                   | 1.5                                                                                                                                                                        |
| Module location              | DIN rail or panel mount                                                                                                                                                    |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                     |
| Power supply distance rating | 6 modules                                                                                                                                                                  |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                                                                                                         |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                                                                                                       |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                                                              |
| Wire type                    | Cu-90 °C (194 °F)                                                                                                                                                          |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                                                                                                                                                    |
| Replacement door label       | 1769-RL1 (2 per kit)                                                                                                                                                       |
| Replacement door             | 1769-RD (2 per kit)                                                                                                                                                        |
| Vendor ID code               | 1                                                                                                                                                                          |
| Product type code            | 7                                                                                                                                                                          |
| Product code                 | 73                                                                                                                                                                         |
| Enclosure type rating        | None (open style)                                                                                                                                                          |

(1) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k $\Omega$ , 1/2 W resistor for transistor outputs, 24V DC operation.

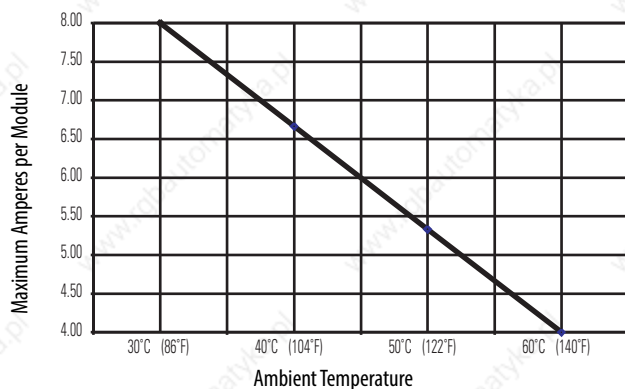
(2) Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads.

## Temperature Derating - 1769-OB32

1769-OB32 Maximum Amperes per Point versus Temperature



1769-OB32 Maximum Amperes per Module versus Temperature



**Table 62 -  
Certifications - 1769-OB32**

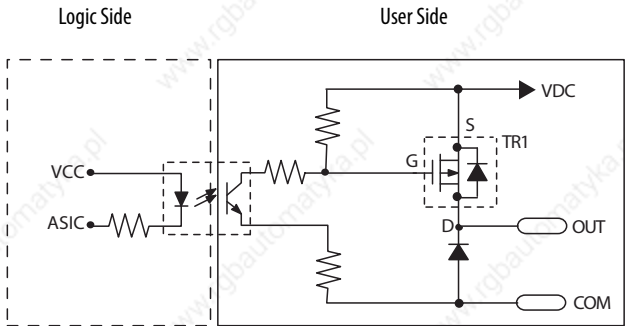
| Certification <sup>(1)</sup> | 1769-OB32                                                                                                                                                                                     |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-OB32T

Compact solid state 24V DC source, terminated output module

Simplified Output Circuit Diagram



1769-OB32T

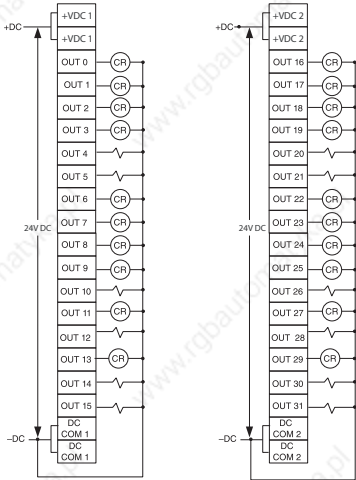


Table 63 - Technical Specifications - 1769-OB32T

| Attribute                                     | 1769-OB32T                                                                                                                                                                 |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                       | 32 terminated (16 points/group)                                                                                                                                            |
| Voltage category                              | 24V DC source                                                                                                                                                              |
| Operating voltage range                       | 10.2 ... 26.4V DC                                                                                                                                                          |
| Output delay, on                              | 0.5 ms                                                                                                                                                                     |
| Output delay, off                             | 4.0 ms                                                                                                                                                                     |
| Current draw @ 5.1V                           | 220 mA                                                                                                                                                                     |
| Heat dissipation, max                         | 4.76 W                                                                                                                                                                     |
| Off-state leakage current, max <sup>(1)</sup> | 0.1 mA @ 26.4V DC                                                                                                                                                          |
| On-state current, min                         | 1.0 mA                                                                                                                                                                     |
| On-state voltage drop, max                    | 0.3V DC @ 0.5 A                                                                                                                                                            |
| Current per point, max                        | 0.5 A                                                                                                                                                                      |
| Current per module, max                       | 4.0 A                                                                                                                                                                      |
| Surge current <sup>(2)</sup>                  | 2.0 A for 10 ms, repeatable every 2 s                                                                                                                                      |
| Isolation voltage                             | Verified by one of the following dielectric tests: 1200V AC for 2 s or 1697V DC for 2 s, output point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                | 230 g (0.51 lb)                                                                                                                                                            |
| Dimensions (HxWxD), approx                    | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                   |
| Slot width                                    | 1                                                                                                                                                                          |
| Module location                               | DIN rail or panel mount                                                                                                                                                    |
| Power supply                                  | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                     |

**Table 63 - Technical Specifications - 1769-OB32T**

| Attribute                    | 1769-OB32T                                    |
|------------------------------|-----------------------------------------------|
| Power supply distance rating | 8 modules                                     |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                          |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                    | Cu-90 °C (194 °F)                             |
| Replacement connector        | 1746-N3 (1 connector, 40 terminals)           |
| Vendor ID code               | 1                                             |
| Product type code            | 7                                             |
| Product code                 | 79                                            |
| Enclosure type rating        | None (open style)                             |

- (1) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k $\Omega$ , 1/2 W resistor for transistor outputs, 24V DC operation.
- (2) Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads.

**Certifications - 1769-OB32T**

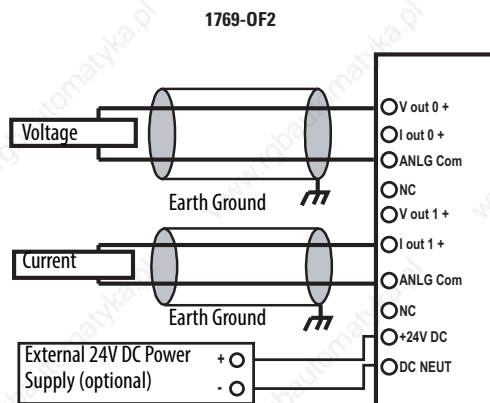
| Certification <sup>(1)</sup> | 1769-OB32T                                                                                                                                                 |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure           |

- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.



## 1769-0F2

Compact voltage/current output analog module



The external power supply must be rated Class 2, with a 24V DC range of 20.4...26.4V DC and 60 mA minimum. Series B and later modules support this option.

**Table 64 - Technical Specifications - 1769-0F2**

| Attribute                           | 1769-0F2                                                                                                                                                                                                                                                                                                                                                                                |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                             | 2 single-ended                                                                                                                                                                                                                                                                                                                                                                          |
| Output range                        | $\pm 10V$<br>$0 \dots 10V$<br>$0 \dots 5V$<br>$1 \dots 5V$<br>$0 \dots 20 \text{ mA}$<br>$4 \dots 20 \text{ mA}$                                                                                                                                                                                                                                                                        |
| Full scale range <sup>(1)</sup>     | $\pm 10.5V$<br>$-0.5 \dots 10.5V$<br>$-0.5 \dots 5.25V$<br>$0.5 \dots 5.25V$<br>$0 \dots 21 \text{ mA}$<br>$3.2 \dots 21 \text{ mA}$                                                                                                                                                                                                                                                    |
| Resolution                          | 14 bits (unipolar)<br>14 bits plus sign (bipolar)<br>$\pm 10V \text{ DC}$ : sign + 14 bits, 0.64 mV<br>$0 \dots 10V \text{ DC}$ : sign + 13 bits, 0.64 mV<br>$0 \dots 5V \text{ DC}$ : sign + 14 bits, 0.64 mV<br>$1 \dots 5V \text{ DC}$ : sign + 14 bits, 1.28 $\mu A$<br>$0 \dots 20 \text{ mA}$ : sign + 13 bits, 0.64 mV<br>$4 \dots 20 \text{ mA}$ : sign + 14 bits, 1.28 $\mu A$ |
| Current draw @ 5.1V                 | 120 mA                                                                                                                                                                                                                                                                                                                                                                                  |
| Current draw @ 24V                  | 120 mA                                                                                                                                                                                                                                                                                                                                                                                  |
| Converter type                      | Delta Sigma                                                                                                                                                                                                                                                                                                                                                                             |
| Heat dissipation, max               | 2.63 W                                                                                                                                                                                                                                                                                                                                                                                  |
| Conversion rate (all channels), max | 2.5 ms                                                                                                                                                                                                                                                                                                                                                                                  |
| Step response to 63% <sup>(2)</sup> | 2.9 ms                                                                                                                                                                                                                                                                                                                                                                                  |
| Current load on voltage output, max | 10 mA                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 64 - Technical Specifications - 1769-0F2**

| Attribute                                                         | 1769-0F2                                                                                                                                    |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Resistive load on current output                                  | 0...500 $\Omega$ (includes wire resistance)                                                                                                 |
| Load range on voltage output                                      | > 1 k $\Omega$ @ 10V DC                                                                                                                     |
| Inductive load (current outputs), max                             | 0.1 mH                                                                                                                                      |
| Capacitive load (voltage outputs), max                            | 1 $\mu$ F                                                                                                                                   |
| Field calibration                                                 | None required                                                                                                                               |
| Accuracy <sup>(3)</sup>                                           | Voltage: $\pm 0.5\%$ full scale @ 25 °C (77 °F)<br>Current: $\pm 0.35\%$ full scale @ 25 °C (77 °F)                                         |
| Accuracy drift with temperature                                   | Voltage: $\pm 0.0086\%$ per °C<br>Current: $\pm 0.0058\%$ per °C                                                                            |
| Output ripple <sup>(4)</sup>                                      | $\pm 0.05\%$ @ 0...50 kHz                                                                                                                   |
| Nonlinearity                                                      | $\pm 0.05\%$                                                                                                                                |
| Repeatability <sup>(5)</sup>                                      | $\pm 0.05\%$                                                                                                                                |
| Module error                                                      | Voltage: $\pm 0.8\%$<br>Current: $\pm 0.55\%$                                                                                               |
| Offset error                                                      | $\pm 0.05\%$                                                                                                                                |
| Output impedance                                                  | 15 $\Omega$                                                                                                                                 |
| Open and short-circuit protection                                 | Yes                                                                                                                                         |
| Short-circuit protection, max                                     | 21 mA                                                                                                                                       |
| Output overvoltage protection                                     | Yes                                                                                                                                         |
| Time to detect open wire condition (current mode)                 | 10 ms, typical<br>13.5 ms, max                                                                                                              |
| Output response at system powerup and power down                  | $\pm 5V$ DC spike for < 5 ms                                                                                                                |
| Rated working voltage <sup>(6)</sup>                              | 30V AC/30V DC                                                                                                                               |
| Isolation voltage                                                 | 500V AC or 710V DC for 1 min (qualification test), output group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                                    | 300 g (0.65 lb)                                                                                                                             |
| Dimensions (HxWxD), approx                                        | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                    |
| Slot width                                                        | 1                                                                                                                                           |
| Module location                                                   | DIN rail or panel mount                                                                                                                     |
| Power supply                                                      | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                      |
| Optional 24V DC Class 2 power supply voltage range <sup>(7)</sup> | 20.4...26.4V DC                                                                                                                             |
| Power supply distance rating                                      | 8 modules                                                                                                                                   |
| Terminal screw torque                                             | 0.68 N•m (6 lb•in)                                                                                                                          |
| Retaining screw torque                                            | 0.46 N•m (4.1 lb•in)                                                                                                                        |
| Wire size                                                         | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                               |
| Wire type                                                         | Cu-90 °C (194 °F)                                                                                                                           |
| Replacement terminal block                                        | 1769-RTBN18 (1 per kit)                                                                                                                     |
| Replacement door label                                            | 1769-RL2 (2 per kit)                                                                                                                        |
| Replacement door                                                  | 1769-RD (2 per kit)                                                                                                                         |
| Vendor ID code                                                    | 1                                                                                                                                           |

**Table 64 - Technical Specifications - 1769-OF2**

| Attribute             | 1769-OF2          |
|-----------------------|-------------------|
| Product type code     | 10                |
| Product code          | 32                |
| Enclosure type rating | None (open style) |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.
- (3) Includes offset, gain, nonlinearity, and repeatability error terms.
- (4) Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.
- (5) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (6) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (7) If the optional 24V DC Class 2 power supply is used, the 24V DC current draw from the bus is 0 mA.

**Table 65 - Certifications - 1769-OF2**

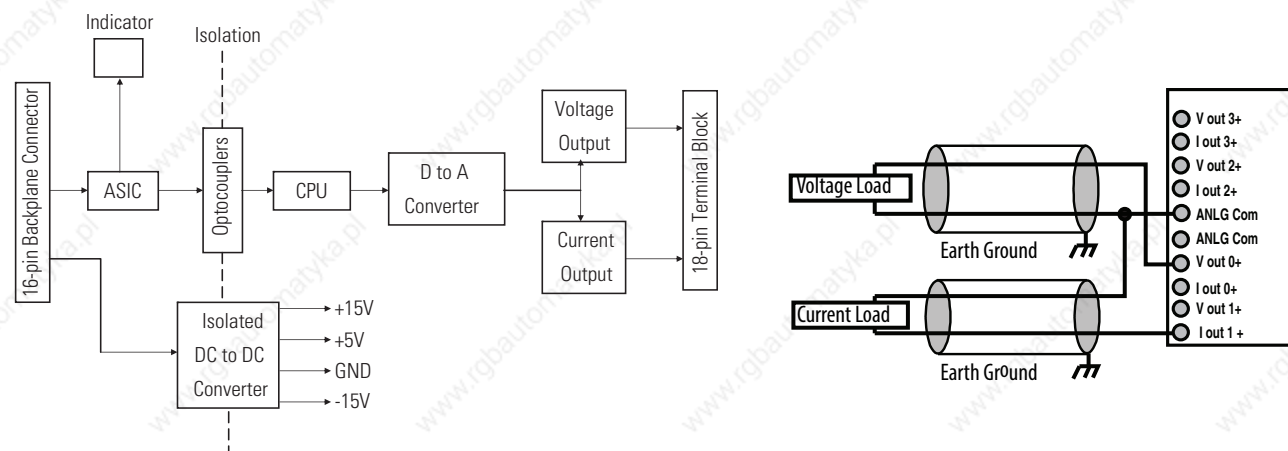
| Certification <sup>(1)</sup> | 1769-OF2                                                                                                                                                   |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| C-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure           |

- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-0F4

## Compact voltage/current output analog module

### Simplified Schematic



**Table 66 - Technical Specifications - 1769-0F4**

| Attribute                           | 1769-0F4                                                                                                                                                         |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                             | 4 single-ended                                                                                                                                                   |
| Output range                        | $\pm 10\text{V}$<br>$0 \dots 10\text{V}$<br>$0 \dots 5\text{V}$<br>$1 \dots 5\text{V}$<br>$0 \dots 20 \text{ mA}$<br>$4 \dots 20 \text{ mA}$                     |
| Full scale range <sup>(1)</sup>     | $\pm 10.5\text{V}$<br>$-0.5 \dots 10.5\text{V}$<br>$-0.5 \dots 5.25\text{V}$<br>$0.5 \dots 5.25\text{V}$<br>$0 \dots 21 \text{ mA}$<br>$3.2 \dots 21 \text{ mA}$ |
| Resolution                          | 15 bits plus sign unipolar and bipolar                                                                                                                           |
| Current draw @ 5.1V                 | 120 mA                                                                                                                                                           |
| Current draw @ 24V                  | 170 mA                                                                                                                                                           |
| Heat dissipation, max               | 2.86 W                                                                                                                                                           |
| Conversion rate (all channels), max | Interrupts not enabled: 2.5 ms<br>Interrupts enabled: 3.8 ms                                                                                                     |
| Step response to 63% <sup>(2)</sup> | 2.9 ms                                                                                                                                                           |
| Resistive load                      | Current: $0 \dots 600 \Omega$ (includes wire resistance)<br>Voltage: $1 \text{ K}\Omega$ or greater                                                              |
| Inductive load, max                 | 0.1 mH (current load)<br>1.0 $\mu\text{F}$ (voltage load)                                                                                                        |
| Field calibration                   | None required                                                                                                                                                    |
| Accuracy <sup>(3)</sup>             | 0.5% full scale at $25^\circ\text{C}$ ( $77^\circ\text{F}$ )                                                                                                     |
| Accuracy drift with temperature     | $\pm 0.0086\%$ of full scale per $^\circ\text{C}$                                                                                                                |
| Output ripple <sup>(4)</sup>        | $\pm 0.05\%$ @ $0 \dots 50 \text{ kHz}$                                                                                                                          |

**Table 66 - Technical Specifications - 1769-OF4**

| Attribute                                                         | 1769-OF4                                                                                                                                       |
|-------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------|
| Nonlinearity                                                      | ±0.05%                                                                                                                                         |
| Repeatability <sup>(5)</sup>                                      | ±0.05%                                                                                                                                         |
| Module error<br>0...60 °C (32...140 °F)                           | +/-0.8% of full scale                                                                                                                          |
| Output impedance                                                  | Voltage output: < 1 Ω<br>Current output: > 1 MΩ                                                                                                |
| Open and short-circuit protection                                 | Yes                                                                                                                                            |
| Short-circuit protection, max                                     | 40 mA                                                                                                                                          |
| Output overvoltage protection                                     | Yes                                                                                                                                            |
| Output response at system power up and power down                 | 2.5...-1.0V DC spike for < 15 ms                                                                                                               |
| Rated working voltage <sup>(6)</sup>                              | 30V AC/30V DC                                                                                                                                  |
| Isolation voltage                                                 | 510V AC or 720V DC for 1 minute (qualification test), output group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                                    | 280 g (0.61 lb)                                                                                                                                |
| Dimensions (HxWxD), approx                                        | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                       |
| Slot width                                                        | 1                                                                                                                                              |
| Module location                                                   | DIN rail or panel mount                                                                                                                        |
| Power supply                                                      | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                         |
| Optional 24V DC Class 2 power supply voltage range <sup>(7)</sup> | 20.4...26.4V DC                                                                                                                                |
| Power supply distance rating                                      | 8 modules                                                                                                                                      |
| Terminal screw torque                                             | 0.68 N•m (6 lb•in)                                                                                                                             |
| Retaining screw torque                                            | 0.46 N•m (4.1 lb•in)                                                                                                                           |
| Wire size                                                         | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                                  |
| Wire type                                                         | Cu-90 °C (194 °F)                                                                                                                              |
| Replacement terminal block                                        | 1769-RTBN18 (1 per kit)                                                                                                                        |
| Replacement door label                                            | 1769-RL2 (2 per kit)                                                                                                                           |
| Replacement door                                                  | 1769-RD (2 per kit)                                                                                                                            |
| Vendor ID code                                                    | 1                                                                                                                                              |
| Product type code                                                 | 10                                                                                                                                             |
| Product code                                                      | 48                                                                                                                                             |
| Input words                                                       | 5                                                                                                                                              |
| Output words                                                      | 5                                                                                                                                              |
| Configuration words                                               | 32                                                                                                                                             |
| Enclosure type rating                                             | None (open style)                                                                                                                              |

(1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.

(2) Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.

(3) Includes offset, gain, drift, nonlinearity, and repeatability error terms.

(4) Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.

- (5) Repeatability is the ability of the output module to reproduce output readings when the same controller value is applied to it consecutively, under the same conditions and in the same direction.
- (6) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (7) If the optional 24V DC Class 2 power supply is used, the 24V DC current draw from the bus is 0 mA.

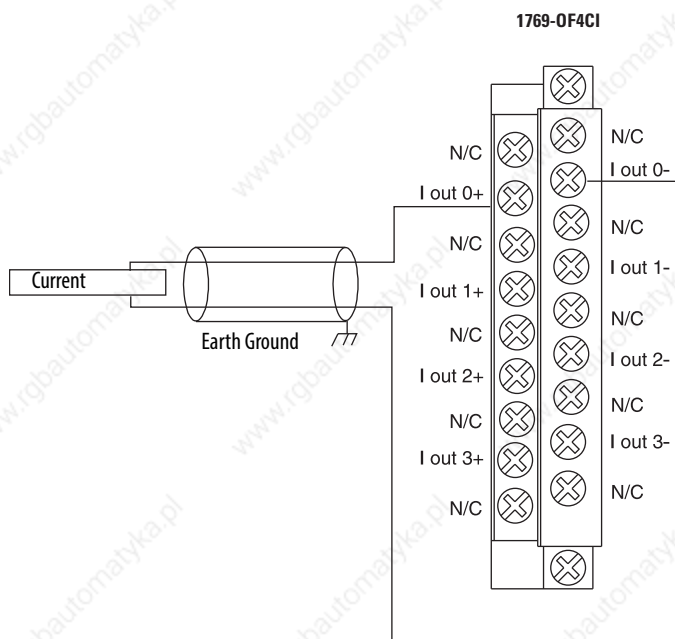
**Table 67 - Certifications - 1769-0F4**

| Certification <sup>(1)</sup> | 1769-0F4                                                                                                                                                                                        |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                      |
| CE                           | CE compliant for all applicable directives                                                                                                                                                      |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>• AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## 1769-0F4CI

Compact current output, individually-isolated analog module



**Table 68 - Technical Specifications - 1769-0F4CI**

| Attribute                              | 1769-0F4CI                                                                                                 |
|----------------------------------------|------------------------------------------------------------------------------------------------------------|
| Outputs                                | 4 differential, individually isolated                                                                      |
| Output range                           | 0...20 mA<br>4...20 mA                                                                                     |
| Full scale range <sup>(1)</sup>        | 0...21 mA<br>3.2...21 mA                                                                                   |
| Resolution                             | 16 bits (unipolar)<br>0...20 mA: 15.91 bits, 0.323 $\mu$ A/bit<br>4...20 mA: 15.59 bits, 0.323 $\mu$ A/bit |
| Bus current draw                       | 5V, 165 mA<br>124V, 110 mA                                                                                 |
| Heat dissipation, max                  | 2.68 W                                                                                                     |
| Conversion rate (all channels), max    | 110 ms                                                                                                     |
| Limited voltage/current <sup>(2)</sup> | < 2.9 ms                                                                                                   |
| Resistive load on current output       | 0...500 $\Omega$ (includes wire resistance)                                                                |
| Inductive load (current outputs), max  | 0.1 mH                                                                                                     |
| Field calibration                      | None required                                                                                              |
| Accuracy <sup>(3)</sup>                | $\pm 0.35\%$ full scale @ 25 $^{\circ}$ C (77 $^{\circ}$ F)                                                |
| Accuracy drift with temperature        | $\pm 0.0058\%$ FS per $^{\circ}$ C                                                                         |
| Output ripple <sup>(4)</sup>           | $\pm 0.05\%$ @ 0...50 kHz                                                                                  |
| Nonlinearity                           | $\pm 0.05\%$                                                                                               |

**Table 68 - Technical Specifications - 1769-0F4CI**

| Attribute                                        | 1769-0F4CI                                                                                                                                  |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Repeatability <sup>(5)</sup>                     | ±0.05%                                                                                                                                      |
| Module error                                     | ±0.55%                                                                                                                                      |
| Output impedance                                 | >1 MΩ                                                                                                                                       |
| Open and short-circuit protection                | Yes                                                                                                                                         |
| Short-circuit protection, max                    | 21 mA                                                                                                                                       |
| Output overvoltage protection                    | Yes                                                                                                                                         |
| Output response at system powerup and power down | No current glitch                                                                                                                           |
| Rated working voltage <sup>(6)</sup>             | 30V AC/30V DC                                                                                                                               |
| Isolation voltage                                | 500V AC or 710V DC for 1 min (qualification test), output group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                   | 270 g (0.60 lb)                                                                                                                             |
| Dimensions (HxWxD), approx                       | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                    |
| Slot width                                       | 1                                                                                                                                           |
| Module location                                  | DIN rail or panel mount                                                                                                                     |
| Power supply                                     | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                      |
| Power supply distance rating                     | 8 modules                                                                                                                                   |
| Terminal screw torque                            | 0.68 N•m (6 lb•in)                                                                                                                          |
| Retaining screw torque                           | 0.46 N•m (4.1 lb•in)                                                                                                                        |
| Wire size                                        | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                               |
| Wire type                                        | Cu-90 °C (194 °F)                                                                                                                           |
| Recommended cable                                | Belden 8761 (shielded)                                                                                                                      |
| Replacement terminal block                       | 1769-RTBN18 (1 per kit)                                                                                                                     |
| Replacement door label                           | 1769-RL2 (2 per kit)                                                                                                                        |
| Replacement door                                 | 1769-RD (2 per kit)                                                                                                                         |
| Vendor ID code                                   | 1                                                                                                                                           |
| Product type code                                | 10                                                                                                                                          |
| Product code                                     | 45                                                                                                                                          |
| Input words                                      | 6                                                                                                                                           |
| Output words                                     | 5                                                                                                                                           |
| Configuration words                              | 32                                                                                                                                          |
| Enclosure type rating                            | None (open style)                                                                                                                           |

(1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.

(2) Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.

(3) Includes offset, gain, nonlinearity, and repeatability error terms.

(4) Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.

(5) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.

(6) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).



**Environmental Specifications - 1769-0F4CI**

| Attribute                                                     | 1769-0F4CI                                               |
|---------------------------------------------------------------|----------------------------------------------------------|
| Temperature, storage                                          | -40...85 °C (-40...185 °F)                               |
| Temperature, operating                                        | 0...60 °C (32...140 °F)                                  |
| Relative humidity                                             | 5...95% noncondensing                                    |
| Altitude, operating                                           | 2000 m (6561 ft)                                         |
| Vibration, operating                                          | 10...500 Hz, 5 g, 0.030 in. peak-to-peak                 |
| Shock, operating                                              | 30 g, 11 ms panel-mounted (20 g, 11 ms DIN rail-mounted) |
| Shock, nonoperating                                           | 40 g panel-mounted (30 g DIN rail-mounted)               |
| Radiated and conducted emissions<br>IEC 61000-6-4<br>CISPR 11 | Group 1, Class A                                         |
| ESD immunity<br>IEC 61000-4-2                                 | 4 kV contact<br>8 kV air<br>4 kV indirect                |
| Radiated immunity<br>IEC 61000-4-3                            | 10 V/m, 80...1000 MHz, 80% amplitude modulation          |
| Burst, fast transient<br>IEC 61000-4-4                        | 2 kV, 5 kHz                                              |
| Surge immunity<br>IEC 61000-4-5                               | 1 kV galvanic gun                                        |
| Conducted immunity <sup>(1)</sup><br>IEC 61000-4-6            | 10V DC, 0.15...80 MHz                                    |

(1) Conducted immunity frequency range may be 150...30 MHz if the Radiated immunity frequency range is 30...1000 MHz.

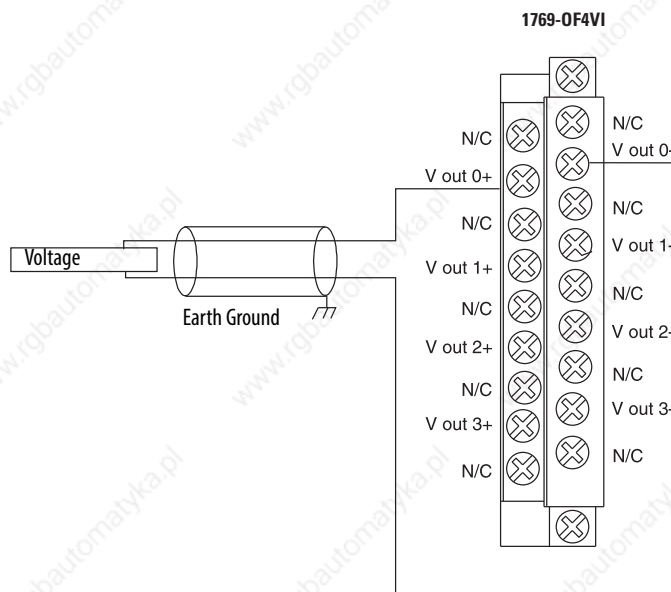
**Table 69 - Certifications - 1769-0F4CI**

| Certification <sup>(1)</sup> | 1769-0F4CI                                                                                                                                                                                      |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>UL listed for Class I, Division 2 Group A,B,C,D Hazardous Locations (ANSI/ISA 12.12.01-2007, 120-01, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                                                      |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>   |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## 1769-0F4VI

Compact voltage output, individually isolated analog module



### Technical Specifications - 1769-0F4VI

| Attribute                              | 1769-0F4VI                                                                                                                                                                     |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                | 4 differential, individually isolated                                                                                                                                          |
| Output range <sup>(1)</sup>            | ±10V DC<br>0...10V DC<br>0...5V DC<br>1...5V DC                                                                                                                                |
| Full scale range                       | ±10.5V DC<br>-0.5...10.5V DC<br>-0.5...5.25V DC<br>0.5...5.25V DC                                                                                                              |
| Resolution                             | 15 bits plus sign (bipolar)<br>±10V DC: 15.89 bits, 330 µV/bit<br>0...10V DC: 14.89 bits, 330 µV/bit<br>0...5V DC: 13.89 bits, 330 µV/bit<br>1...5V DC: 13.57 bits, 330 µV/bit |
| Bus current draw                       | 5V DC, 165 mA<br>24V DC, 110 mA                                                                                                                                                |
| Heat dissipation, max                  | 2.0 W (all points-10 V into 2 k - worst case calculated)                                                                                                                       |
| Conversion rate (all channels), max    | 120 ms                                                                                                                                                                         |
| Limited voltage/current <sup>(2)</sup> | < 2.9 ms                                                                                                                                                                       |
| Load output current, max               | 5 mA                                                                                                                                                                           |
| Load range output                      | ≥ 2 kΩ                                                                                                                                                                         |
| Capacitive load (voltage outputs), max | 1 µF                                                                                                                                                                           |

**Technical Specifications - 1769-OF4VI**

| Attribute                                        | 1769-OF4VI                                                                                                                                  |
|--------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Field calibration                                | None required                                                                                                                               |
| Accuracy <sup>(3)</sup>                          | ±0.5% full scale @ 25 °C (77 °F)                                                                                                            |
| Accuracy drift with temperature                  | ±0.0086% FS per °C                                                                                                                          |
| Output ripple <sup>(4)</sup>                     | ±0.05% @ 0...50 kHz                                                                                                                         |
| Nonlinearity                                     | ±0.05%                                                                                                                                      |
| Repeatability <sup>(5)</sup>                     | ±0.05%                                                                                                                                      |
| Module error                                     | ±0.8%                                                                                                                                       |
| Output impedance                                 | < 1 Ω                                                                                                                                       |
| Open and short-circuit protection                | Yes                                                                                                                                         |
| Short-circuit protection, max                    | 35 mA typical<br>42 mA, max                                                                                                                 |
| Output overvoltage protection                    | Yes                                                                                                                                         |
| Output response at system powerup and power down | Powerup: ±1.2V DC spike for < 0.4 ms<br>Power down: ±1.2V DC spike for 21 ms                                                                |
| Rated working voltage <sup>(6)</sup>             | 30V AC/30V DC                                                                                                                               |
| Isolation voltage                                | 500V AC or 710V DC for 1 min (qualification test), output group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                   | 270 g (0.60 lbs)                                                                                                                            |
| Dimensions (HxWxD), approx                       | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                    |
| Slot width                                       | 1                                                                                                                                           |
| Module location                                  | DIN rail or panel mount                                                                                                                     |
| Power supply                                     | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                      |
| Power supply distance rating                     | 8 modules                                                                                                                                   |
| Terminal screw torque                            | 0.68 N•m (6 lb•in)                                                                                                                          |
| Retaining screw torque                           | 0.46 N•m (4.1 lb•in)                                                                                                                        |
| Wire size                                        | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                               |
| Wire type                                        | Cu-90 °C (194 °F)                                                                                                                           |
| Recommended cable                                | Belden 8761 (shielded)                                                                                                                      |
| Replacement terminal block                       | 1769-RTBN18 (1 per kit)                                                                                                                     |
| Replacement door label                           | 1769-RL2 (2 per kit)                                                                                                                        |
| Replacement door                                 | 1769-RD (2 per kit)                                                                                                                         |
| Vendor ID code                                   | 1                                                                                                                                           |
| Product type code                                | 10                                                                                                                                          |
| Product code                                     | 42                                                                                                                                          |
| Input words                                      | 6                                                                                                                                           |
| Output words                                     | 5                                                                                                                                           |
| Configuration words                              | 32                                                                                                                                          |
| Enclosure type rating                            | None (open style)                                                                                                                           |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.
- (3) Includes offset, gain, nonlinearity, and repeatability error terms.
- (4) Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.
- (5) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (6) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).

**Table 70 - Environmental Specifications - 1769-0F4VI**

| Attribute                                                     | 1769-0F4VI                                               |
|---------------------------------------------------------------|----------------------------------------------------------|
| Temperature, storage                                          | -40...85 °C (-40...185 °F)                               |
| Temperature, operating                                        | 0...60 °C (32...140 °F)                                  |
| Relative humidity                                             | 5...95% noncondensing                                    |
| Altitude, operating                                           | 2000 m (6561 ft)                                         |
| Vibration, operating                                          | 10...500 Hz, 5 g, 0.030 in. peak-to-peak                 |
| Shock, operating                                              | 30 g, 11 ms panel-mounted (20 g, 11 ms DIN rail-mounted) |
| Shock, nonoperating                                           | 40 g panel-mounted (30 g DIN rail-mounted)               |
| Radiated and conducted emissions<br>IEC 61000-6-4<br>CISPR 11 | Group 1, Class A                                         |
| ESD immunity<br>IEC 61000-4-2                                 | 4 kV contact<br>8 kV air<br>4 kV indirect                |
| Radiated immunity<br>IEC 61000-4-3                            | 10 V/m, 80...1000 MHz, 80% amplitude modulation          |
| Burst, fast transient<br>IEC 61000-4-4                        | 2 kV, 5 kHz                                              |
| Surge immunity<br>IEC 61000-4-5                               | 1 kV galvanic gun                                        |
| Conducted immunity <sup>(1)</sup><br>IEC 61000-4-6            | 10V DC, 0.15...80 MHz                                    |

- (1) Conducted immunity frequency range may be 150...30 MHz if the Radiated immunity frequency range is 30...1000 MHz.

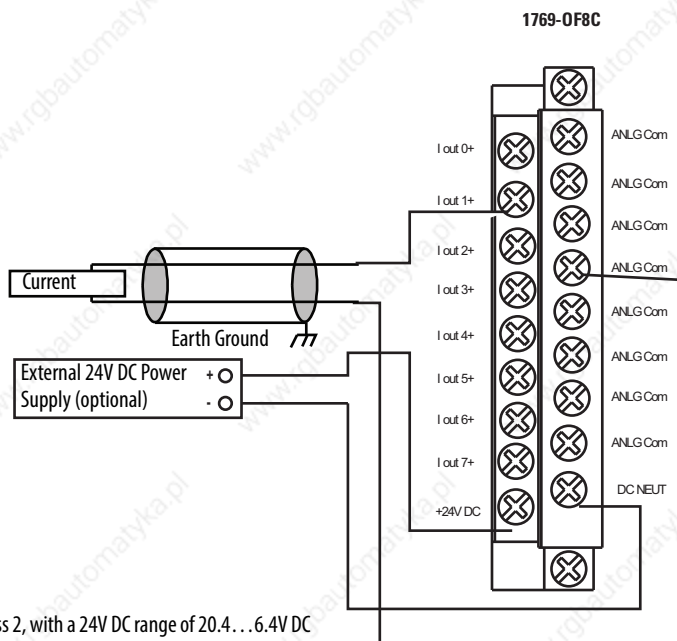
**Table 71 - Certifications - 1769-0F4VI**

| Certification <sup>(1)</sup> | 1769-0F4VI                                                                                                                                                                              |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>UL listed for Class I, Division 2 Group A,B,C,D Hazardous Locations (ANSI/ISA 12.12.01-2007, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                                              |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure                                        |

- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## 1769-0F8C

Compact current output analog module



The external power supply must be rated Class 2, with a 24V DC range of 20.4...6.4V DC and 60 mA minimum. Series B and later modules support this option.

**Table 72 - Technical Specifications - 1769-0F8C**

| Attribute                             | 1769-0F8C                                                                                                  |
|---------------------------------------|------------------------------------------------------------------------------------------------------------|
| Outputs                               | 8 single-ended                                                                                             |
| Output range                          | 0...20 mA<br>4...20 mA                                                                                     |
| Full scale range <sup>(1)</sup>       | 0...21 mA<br>3.2...21 mA                                                                                   |
| Resolution                            | 16 bits (unipolar)<br>0...20 mA: 15.91 bits, 0.323 $\mu$ A/bit<br>4...20 mA: 15.59 bits, 0.323 $\mu$ A/bit |
| Current draw @ 5.1V                   | 145 mA                                                                                                     |
| Current draw @ 24V                    | 140 mA                                                                                                     |
| Heat dissipation, max                 | 2.69 W                                                                                                     |
| Conversion rate (all channels), max   | 5 ms                                                                                                       |
| Step response to 63% <sup>(2)</sup>   | < 2.9 ms                                                                                                   |
| Resistive load on current output      | 0...500 $\Omega$ (includes wire resistance)                                                                |
| Inductive load (current outputs), max | 0.1 mH                                                                                                     |
| Field calibration                     | None required                                                                                              |
| Accuracy <sup>(3)</sup>               | $\pm 0.35\%$ full scale @ 25 $^{\circ}$ C (77 $^{\circ}$ F)                                                |

**Table 72 - Technical Specifications - 1769-0F8C**

| Attribute                                                         | 1769-0F8C                                                                                                                                   |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Accuracy drift with temperature                                   | $\pm 0.0058\%$ per °C                                                                                                                       |
| Output ripple <sup>(4)</sup>                                      | $\pm 0.05\%$ @ 0...50 kHz                                                                                                                   |
| Nonlinearity                                                      | $\pm 0.05\%$                                                                                                                                |
| Repeatability <sup>(5)</sup>                                      | $\pm 0.05\%$                                                                                                                                |
| Module error                                                      | $\pm 0.55\%$                                                                                                                                |
| Offset error                                                      | $\pm 0.05\%$                                                                                                                                |
| Output impedance                                                  | $> 1 \text{ M}\Omega$                                                                                                                       |
| Open and short-circuit protection                                 | Yes                                                                                                                                         |
| Short-circuit protection, max                                     | 21 mA                                                                                                                                       |
| Output overvoltage protection                                     | Yes                                                                                                                                         |
| Output response at system powerup and power down                  | $\pm 0.5\text{V}$ DC spike for $< 5 \text{ ms}$                                                                                             |
| Rated working voltage <sup>(6)</sup>                              | 30V AC/30V DC                                                                                                                               |
| Isolation voltage                                                 | 500V AC or 710V DC for 1 min (qualification test), output group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                                    | 281 g (0.62 lb)                                                                                                                             |
| Dimensions (HxWxD), approx                                        | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                    |
| Slot width                                                        | 1                                                                                                                                           |
| Module location                                                   | DIN rail or panel mount                                                                                                                     |
| Power supply                                                      | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                      |
| Optional 24V DC Class 2 power supply voltage range <sup>(7)</sup> | 20.4...26.4V DC                                                                                                                             |
| Power supply distance rating                                      | 8 modules                                                                                                                                   |
| Terminal screw torque                                             | 0.68 N•m (6 lb•in)                                                                                                                          |
| Retaining screw torque                                            | 0.46 N•m (4.1 lb•in)                                                                                                                        |
| Wire size                                                         | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                               |
| Wire type                                                         | Cu-90 °C (194 °F)                                                                                                                           |
| Replacement terminal block                                        | 1769-RTBN18 (1 per kit)                                                                                                                     |
| Replacement door label                                            | 1769-RL2 (2 per kit)                                                                                                                        |
| Replacement door                                                  | 1769-RD (2 per kit)                                                                                                                         |
| Vendor ID code                                                    | 1                                                                                                                                           |
| Product type code                                                 | 10                                                                                                                                          |
| Product code                                                      | 40                                                                                                                                          |
| Input words                                                       | 11                                                                                                                                          |
| Output words                                                      | 9                                                                                                                                           |
| Configuration words                                               | 64                                                                                                                                          |
| Enclosure type rating                                             | None (open style)                                                                                                                           |

(1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.

(2) Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.

- (3) Includes offset, gain, nonlinearity, and repeatability error terms.
- (4) Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.
- (5) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (6) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (7) If the optional 24V DC Class 2 power supply is used, the 24V DC current draw from the bus is 0 mA.

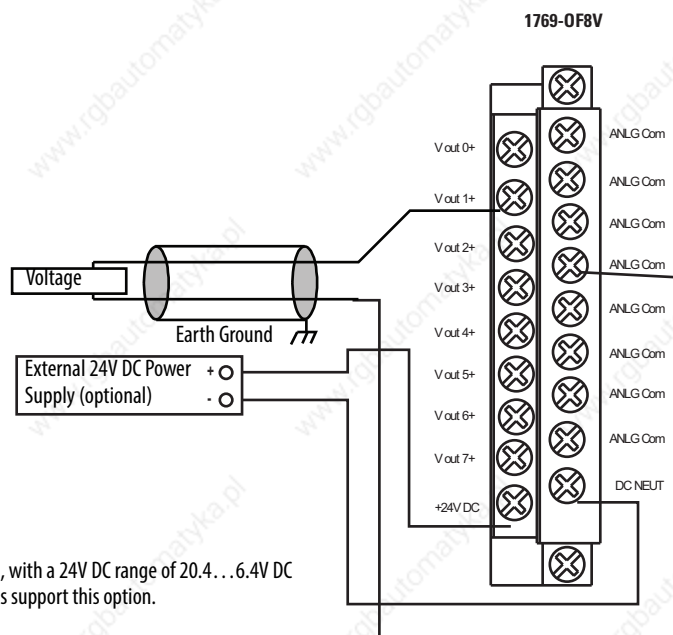
**Table 73 - Certifications - 1769-0F8C**

| Certification <sup>(1)</sup> | 1769-0F8C                                                                                                                                                                                     |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## 1769-0F8V

Compact voltage output analog module



The external power supply must be rated Class 2, with a 24V DC range of 20.4...6.4V DC and 60 mA minimum. Series B and later modules support this option.

**Table 74 - Technical Specifications - 1769-0F8V**

| Attribute                           | 1769-0F8V                                                                                                                                                                      |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                             | 8 single-ended                                                                                                                                                                 |
| Output range                        | ±10V<br>0...10V<br>0...5V<br>1...5V                                                                                                                                            |
| Full scale range <sup>(1)</sup>     | ±10.5V<br>-0.5...10.5V<br>-0.5...5.25V<br>0.5...5.25V                                                                                                                          |
| Resolution                          | 16 bits plus sign (bipolar)<br>±10V DC: 15.89 bits, 330 µV/bit<br>0...10V DC: 14.89 bits, 330 µV/bit<br>0...5V DC: 13.89 bits, 330 µV/bit<br>1...5V DC: 13.57 bits, 330 µV/bit |
| Current draw @ 5.1V                 | 145 mA                                                                                                                                                                         |
| Current draw @ 24V                  | 125 mA                                                                                                                                                                         |
| Heat dissipation, max               | 2.16 W                                                                                                                                                                         |
| Conversion rate (all channels), max | 5.0 ms                                                                                                                                                                         |
| Step response to 63% <sup>(2)</sup> | < 2.9 ms                                                                                                                                                                       |
| Load output current, max            | 10 mA                                                                                                                                                                          |



**Table 74 - Technical Specifications - 1769-0F8V**

| Attribute                                                         | 1769-0F8V                                                                                                                                   |
|-------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|
| Load range output                                                 | > 1 k $\Omega$                                                                                                                              |
| Capacitive load (voltage outputs), max                            | 1 $\mu$ F                                                                                                                                   |
| Field calibration                                                 | None required                                                                                                                               |
| Accuracy <sup>(3)</sup>                                           | $\pm 0.5\%$ full scale @ 25 °C (77 °F)                                                                                                      |
| Accuracy drift with temperature                                   | $\pm 0.0086\%$ per °C                                                                                                                       |
| Output ripple <sup>(4)</sup>                                      | $\pm 0.05\%$ @ 0...50 kHz                                                                                                                   |
| Nonlinearity                                                      | $\pm 0.05\%$                                                                                                                                |
| Repeatability <sup>(5)</sup>                                      | $\pm 0.05\%$                                                                                                                                |
| Module error                                                      | $\pm 0.8\%$                                                                                                                                 |
| Offset error                                                      | $\pm 0.05\%$                                                                                                                                |
| Output impedance                                                  | < 1 $\Omega$                                                                                                                                |
| Open and short-circuit protection                                 | Yes                                                                                                                                         |
| Short-circuit protection, max                                     | 30 mA                                                                                                                                       |
| Output overvoltage protection                                     | Yes                                                                                                                                         |
| Output response at system powerup and power down                  | $\pm 0.5$ V DC spike for < 5 ms                                                                                                             |
| Rated working voltage <sup>(6)</sup>                              | 30V AC/30V DC                                                                                                                               |
| Isolation voltage                                                 | 500V AC or 710V DC for 1 min (qualification test), output group to bus<br>30V AC/30V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                                    | 263 g (0.58 lb)                                                                                                                             |
| Dimensions (HxWxD), approx                                        | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                    |
| Slot width                                                        | 1                                                                                                                                           |
| Module location                                                   | DIN rail or panel mount                                                                                                                     |
| Power supply                                                      | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                      |
| Optional 24V DC Class 2 power supply voltage range <sup>(7)</sup> | 20.4...26.4V DC                                                                                                                             |
| Power supply distance rating                                      | 8 modules                                                                                                                                   |
| Terminal screw torque                                             | 0.68 N•m (6 lb•in)                                                                                                                          |
| Retaining screw torque                                            | 0.46 N•m (4.1 lb•in)                                                                                                                        |
| Wire size                                                         | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                               |
| Wire type                                                         | Cu-90 °C (194 °F)                                                                                                                           |
| Replacement terminal block                                        | 1769-RTBN18 (1 per kit)                                                                                                                     |
| Replacement door label                                            | 1769-RL2 (2 per kit)                                                                                                                        |
| Replacement door                                                  | 1769-RD (2 per kit)                                                                                                                         |
| Vendor ID code                                                    | 1                                                                                                                                           |
| Product type code                                                 | 10                                                                                                                                          |
| Product code                                                      | 39                                                                                                                                          |
| Input words                                                       | 11                                                                                                                                          |

**Table 74 - Technical Specifications - 1769-OF8V**

| Attribute             | 1769-OF8V         |
|-----------------------|-------------------|
| Output words          | 9                 |
| Configuration words   | 64                |
| Enclosure type rating | None (open style) |

- (1) The over- or under-range flag will come on when the normal operating range (over/under) is exceeded. The module will continue to convert the analog input up to the maximum full scale range. The flag automatically resets when within the normal operating range.
- (2) Step response is the period of time between when the D/A converter was instructed to go from minimum to full range until the device is at 63% of full range.
- (3) Includes offset, gain, nonlinearity, and repeatability error terms.
- (4) Output ripple is the amount a fixed output varies with time, assuming a constant load and temperature.
- (5) Repeatability is the ability of the input module to register the same reading in successive measurements for the same input signal.
- (6) Rated working voltage is the maximum continuous voltage that can be applied at the input terminal, including the input signal and the value that floats above ground potential (for example, 10V DC input signal and 20V DC potential above ground).
- (7) If the optional 24V DC Class 2 power supply is used, the 24V DC current draw from the bus is 0 mA.

**Table 75 - Certifications - 1769-OF8V**

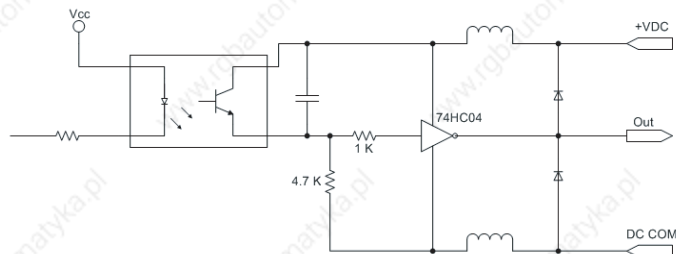
| Certification <sup>(1)</sup> | 1769-OF8V                                                                                                                                                                                     |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

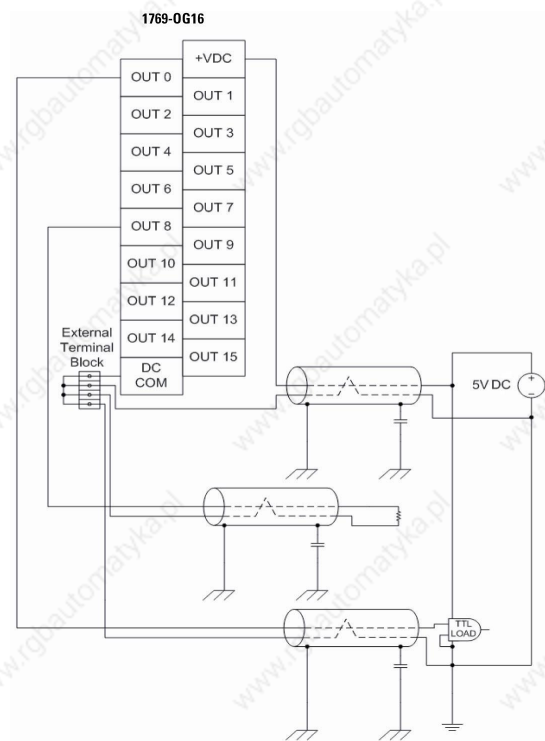
## 1769-0G16

### Compact TTL output module

#### Simplified Output Circuit Diagram



- Use Belden 8761, or equivalent, shielded wire.
- Do not connect more than two wires to any single terminal.
- DC power cable and I/O cables should not exceed 10 m (30 ft).
- The capacitors shown above must be 0.01  $\mu$ F and rated for 2000V min.
- User power supply must be rated Class 2 with a 5V DC range of 4.5...5.5V DC.



### Low to True Format - 1769-0G16

- 0...0.4V DC = Output guaranteed to be in on-state
- 0.4...4.5V DC = Output state not guaranteed
- 4.5...5.5V DC = Output guaranteed to be in off-state

**Table 76 - Technical Specifications - 1769-0G16**

| Attribute                  | 1769-0G16                                      |
|----------------------------|------------------------------------------------|
| Outputs                    | 16                                             |
| Voltage category           | 5V DC TTL (Low=True) <sup>(1)</sup>            |
| Operating voltage range    | 4.5...5.5V DC<br>50 mV peak-to-peak ripple max |
| Output delay, off to on    | 0.25 ms                                        |
| Output delay, on to off    | 0.50 ms                                        |
| Current draw @ 5.1V        | 200 mA                                         |
| Heat dissipation, max      | 1.2 W                                          |
| Off-state voltage, typical | 4.5...5.5V DC                                  |
| On-state voltage           | 0...0.4V DC                                    |
| Load current, min          | 0.15 mA                                        |

**Table 76 - Technical Specifications - 1769-0G16**

| Attribute                    | 1769-0G16                                                                                                                                                                  |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current per point, max       | 24 mA                                                                                                                                                                      |
| Isolation voltage            | Verified by one of the following dielectric tests: 1200V AC for 2 s or 1697V DC for 2 s, output point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 250 g (0.55 lb)                                                                                                                                                            |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                   |
| Slot width                   | 1                                                                                                                                                                          |
| Module location              | DIN rail or panel mount                                                                                                                                                    |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                     |
| Power supply distance rating | 8 modules                                                                                                                                                                  |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                                                                                                         |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                                                                                                       |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded                                                                                                                              |
| Wire type                    | Cu-90 °C (194 °F)                                                                                                                                                          |
| Vendor ID code               | 1                                                                                                                                                                          |
| Product type code            | 7                                                                                                                                                                          |
| Product code                 | 78                                                                                                                                                                         |
| Input words                  | 1                                                                                                                                                                          |
| Output words                 | 1                                                                                                                                                                          |
| Configuration words          | 5                                                                                                                                                                          |
| Enclosure type rating        | None (open-style)                                                                                                                                                          |

(1) TTL inputs are inverted (-0.2 to +0.8 = low voltage = True = On.) Use a NOT instruction in your program to convert to traditional True = High logic.

**Certifications - 1769-0G16**

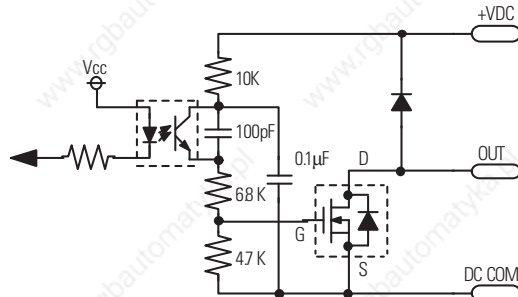
| Certification <sup>(1)</sup> | 1769-0G16                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-0V16

Compact solid state 24V DC sink output module

Simplified Output Circuit Diagram



1769-0V16

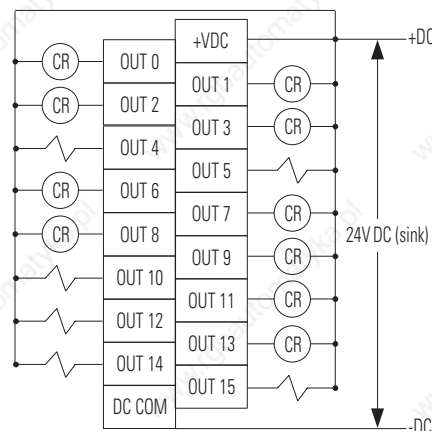


Table 77 - Technical Specifications - 1769-0V16

| Attribute                                     | 1769-0V16                                                                                                                                                                  |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                       | 16 (16 points/group)                                                                                                                                                       |
| Voltage category                              | 24V DC sink                                                                                                                                                                |
| Operating voltage range                       | 20.4...26.4V DC                                                                                                                                                            |
| Output delay, on                              | 0.1 ms                                                                                                                                                                     |
| Output delay, off                             | 1.0 ms                                                                                                                                                                     |
| Current draw @ 5.1V                           | 200 mA                                                                                                                                                                     |
| Heat dissipation, max                         | 2.06 W                                                                                                                                                                     |
| Off-state leakage current, max <sup>(1)</sup> | 1.0 mA @ 26.4V DC                                                                                                                                                          |
| On-state current, min                         | 1.0 mA                                                                                                                                                                     |
| On-state voltage drop, max                    | 1.0V DC @ 1 A                                                                                                                                                              |
| Current per point, max                        | 0.5 A @ 60 °C (140 °F)<br>1.0 A @ 30 °C (86 °F)                                                                                                                            |
| Current per module, max                       | 4.0 A @ 60 °C (140 °F)<br>8.0 A @ 30 °C (86 °F)                                                                                                                            |
| Surge current <sup>(2)</sup>                  | 2.0 A for 10 ms, repeatable every 2 s                                                                                                                                      |
| Isolation voltage                             | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, output point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                | 280 g (0.61 lb)                                                                                                                                                            |
| Dimensions (HxWxD), approx                    | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                   |
| Slot width                                    | 1                                                                                                                                                                          |
| Module location                               | DIN rail or panel mount                                                                                                                                                    |
| Power supply                                  | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                     |

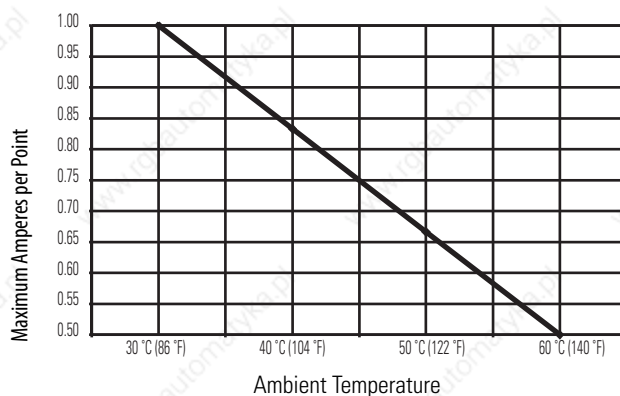
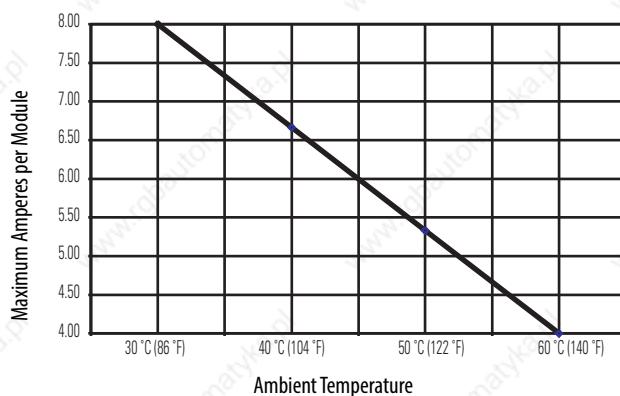
**Table 77 - Technical Specifications - 1769-0V16**

| Attribute                    | 1769-0V16                                     |
|------------------------------|-----------------------------------------------|
| Power supply distance rating | 8 modules                                     |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                          |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                    | Cu-90 °C (194 °F)                             |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                       |
| Replacement door label       | 1769-RL1 (2 per kit)                          |
| Replacement door             | 1769-RD (2 per kit)                           |
| Vendor ID code               | 1                                             |
| Product type code            | 7                                             |
| Product code                 | 72                                            |
| Enclosure type rating        | None (open style)                             |

(1) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k $\Omega$ , 1/2 W resistor for transistor outputs, 24V DC operation.

(2) Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads.

## Temperature Derating - 1769-0V16

**1769-0V16 Maximum Amperes per Point versus Temperature****1769-0V16 Maximum Amperes per Module versus Temperature**

**Certifications - 1769-0V16**

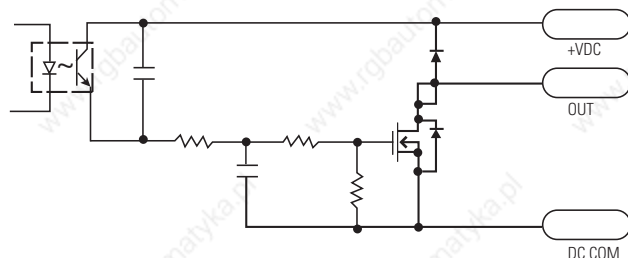
| <b>Certification<sup>(1)</sup></b> | <b>1769-0V16</b>                                                                                                                                                                              |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                               | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                                 | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                             | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-0V32T

Compact solid state 24V DC sink, terminated output module

Simplified Output Circuit Diagram



1769-0V32T

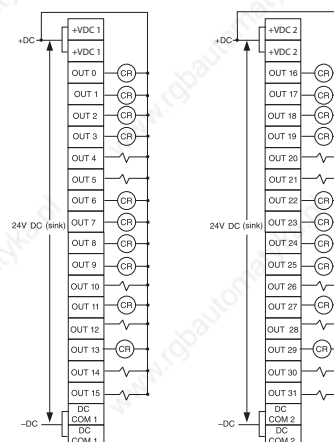


Table 78 - Technical Specifications - 1769-0V32T

| Attribute                                     | 1769-0V32T                                                                                                                                                                 |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                       | 32 terminated (16 points/group)                                                                                                                                            |
| Voltage category                              | 24V DC sink                                                                                                                                                                |
| Operating voltage range                       | 10.2...26.4V DC                                                                                                                                                            |
| Output delay, on                              | < 16V, 1.5 ms<br>>= 16V, 1.0 ms                                                                                                                                            |
| Output delay, off                             | 4.0 ms                                                                                                                                                                     |
| Current draw @ 5.1V                           | 300 mA                                                                                                                                                                     |
| Heat dissipation, max                         | 4.5 W                                                                                                                                                                      |
| Off-state leakage current, max <sup>(1)</sup> | 1.0 mA @ 26.4V DC                                                                                                                                                          |
| On-state current, min                         | 1.0 mA                                                                                                                                                                     |
| On-state voltage drop, max                    | 0.3V DC @ 0.5 A                                                                                                                                                            |
| Current per point, max                        | 0.5 A                                                                                                                                                                      |
| Current per module, max                       | 4.0 A                                                                                                                                                                      |
| Surge current <sup>(2)</sup>                  | 2.0 A for 10 ms, repeatable every 2 s                                                                                                                                      |
| Isolation voltage                             | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, output point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx                                | 450 g (0.992 lb)                                                                                                                                                           |
| Dimensions (HxWxD), approx                    | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                   |
| Slot width                                    | 1                                                                                                                                                                          |
| Module location                               | DIN rail or panel mount                                                                                                                                                    |
| Power supply                                  | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                     |



**Table 78 - Technical Specifications - 1769-0V32T**

| Attribute                    | 1769-0V32T                                    |
|------------------------------|-----------------------------------------------|
| Power supply distance rating | 8 modules                                     |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                          |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                    | Cu-90 °C (194 °F)                             |
| Replacement connector        | 1746-N3 (1 connector, 40 terminals)           |
| Vendor ID code               | 1                                             |
| Product type code            | 7                                             |
| Product code                 | 75                                            |
| Enclosure type rating        | None (open style)                             |

- (1) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6 k $\Omega$ , 1/2 W resistor for transistor outputs, 24V DC operation.
- (2) Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V DC inductive loads.

**Certifications - 1769-0V32T**

| Certification <sup>(1)</sup> | 1769-0V32T                                                                                                                                                 |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure           |

- (1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-0W8

## Compact AC/DC relay contact module

Simplified Output Circuit Diagram

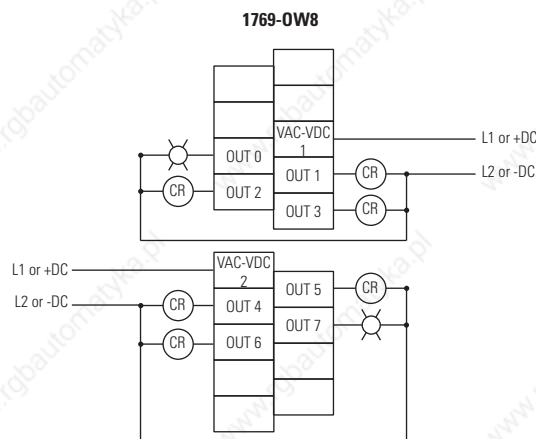
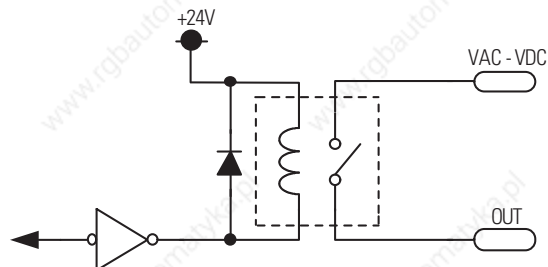


Table 79 - Technical Specifications - 1769-0W8

| Attribute                    | 1769-0W8                                                                                                                                                                                       |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                      | 8 normally open (4 points/group)                                                                                                                                                               |
| Operating voltage range      | 5...265V AC<br>5...125V DC                                                                                                                                                                     |
| Delay, on                    | 10 ms                                                                                                                                                                                          |
| Delay, off                   | 10 ms                                                                                                                                                                                          |
| Current draw @ 5.1V          | 125 mA                                                                                                                                                                                         |
| Current draw @ 24V           | 100 mA                                                                                                                                                                                         |
| Heat dissipation, max        | 2.83 W                                                                                                                                                                                         |
| Off-state leakage, max       | 0 mA                                                                                                                                                                                           |
| On-state current, min        | 10 mA @ 5V DC                                                                                                                                                                                  |
| Current per point, max       | 2.5 A                                                                                                                                                                                          |
| Current per module, max      | 16 A                                                                                                                                                                                           |
| Isolation voltage            | Verified by one of the following dielectric tests: 1836V AC for 1 s or 2596V DC for 1 s, output point to bus and group to group<br>265V AC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 280 g (0.61 lb)                                                                                                                                                                                |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                       |
| Slot width                   | 1                                                                                                                                                                                              |
| Module location              | DIN rail or panel mount                                                                                                                                                                        |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                                         |
| Power supply distance rating | 8 modules                                                                                                                                                                                      |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                                                                                                                                                                             |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                                                                                                                                                                           |

**Table 79 - Technical Specifications - 1769-OW8**

| Attribute                  | 1769-OW8                                      |
|----------------------------|-----------------------------------------------|
| Wire size                  | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                  | Cu-90 °C (194 °F)                             |
| Replacement terminal block | 1769-RTBN10 (1 per kit)                       |
| Replacement door label     | 1769-RL1 (2 per kit)                          |
| Replacement door           | 1769-RD (2 per kit)                           |
| Vendor ID code             | 1                                             |
| Product type code          | 7                                             |
| Product code               | 86                                            |
| Enclosure type rating      | None (open style)                             |

**Table 80 - Relay Contact Ratings - 1769-OW8**

| Volts, max | Continuous Amps per Point, max | Amperes <sup>(1)</sup> |        | Voltamperes |       | NEMA ICS 2-125 |
|------------|--------------------------------|------------------------|--------|-------------|-------|----------------|
|            |                                | Make                   | Break  | Make        | Break |                |
| 240V AC    | 2.5 A                          | 7.5 A                  | 0.75 A | 1800VA      | 180VA | C300           |
| 120V AC    |                                | 15 A                   | 1.5 A  |             |       |                |
| 125V DC    | 1.0 A                          | 0.22 A <sup>(2)</sup>  |        | 28VA        |       | R150           |
| 24V DC     | 2.0 A                          | 1.2 A <sup>(2)</sup>   |        | 28VA        |       | —              |

(1) Connecting surge suppressors across your external inductive load will extend the life of the relay contacts.

(2) For DC voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28VA by the applied DC voltage. For example,  $28\text{VA}/48\text{V DC} = 0.58\text{ A}$ . For DC voltage applications less than 48V, the make/break ratings for relay contacts cannot exceed 2 A.

**Certifications - 1769-OW8**

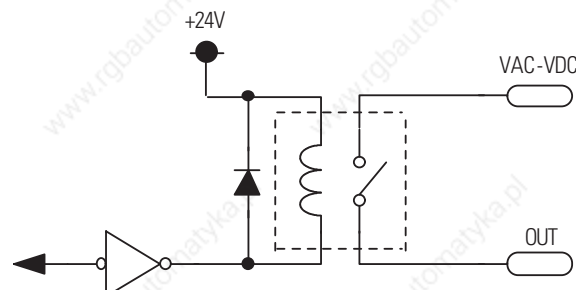
| Certification <sup>(1)</sup> | 1769-OW8                                                                                                                                                                                      |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-0W8I

Compact AC/DC individually isolated, relay contact module

Simplified Output Circuit Diagram



1769-0W8I

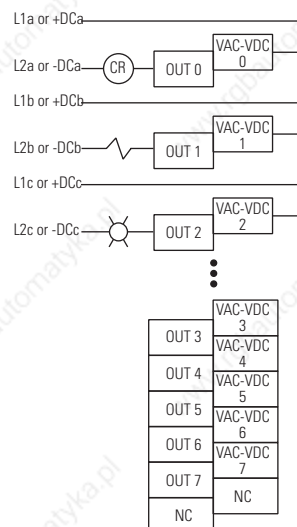


Table 81 - Technical Specifications - 1769-0W8I

| Attribute                  | 1769-0W8I                                                                                                                                                                                                                                                                                                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                    | 8 normally open, individually isolated (4 points/group)                                                                                                                                                                                                                                                                                                                                             |
| Operating voltage range    | 5...265V AC<br>5...125V DC                                                                                                                                                                                                                                                                                                                                                                          |
| Delay, on                  | 10 ms                                                                                                                                                                                                                                                                                                                                                                                               |
| Delay, off                 | 10 ms                                                                                                                                                                                                                                                                                                                                                                                               |
| Current draw @ 5.1V        | 125 mA                                                                                                                                                                                                                                                                                                                                                                                              |
| Current draw @ 24V         | 100 mA                                                                                                                                                                                                                                                                                                                                                                                              |
| Heat dissipation, max      | 2.83 W                                                                                                                                                                                                                                                                                                                                                                                              |
| Off-state leakage, max     | 0 mA                                                                                                                                                                                                                                                                                                                                                                                                |
| On-state current, min      | 10 mA @ 5V DC                                                                                                                                                                                                                                                                                                                                                                                       |
| Current per point, max     | 2.5 A                                                                                                                                                                                                                                                                                                                                                                                               |
| Current per module, max    | 16 A                                                                                                                                                                                                                                                                                                                                                                                                |
| Isolation voltage          | Verified by one of the following dielectric tests: 1836V AC for 1 s or 2596V DC for 1 s, output point to bus<br>265V AC working voltage (IEC Class 2 reinforced insulation)<br>Verified by one of the following dielectric tests: 1836V AC for 1 s or 2596V DC for 1 s, group to group<br>265V AC working voltage (basic insulation)<br>150V AC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx             | 290 g (0.64 lb)                                                                                                                                                                                                                                                                                                                                                                                     |
| Dimensions (HxWxD), approx | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                                                                                                                                                                                                                            |
| Slot width                 | 1                                                                                                                                                                                                                                                                                                                                                                                                   |

**Table 81 - Technical Specifications - 1769-OW8I**

| Attribute                    | 1769-OW8I                                     |
|------------------------------|-----------------------------------------------|
| Module location              | DIN rail or panel mount                       |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4        |
| Power supply distance rating | 8 modules                                     |
| Terminal screw torque        | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque       | 0.46 N•m (4.1 lb•in)                          |
| Wire size                    | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                    | Cu-90 °C (194 °F)                             |
| Replacement terminal block   | 1769-RTBN18 (1 per kit)                       |
| Replacement door label       | 1769-RL1 (2 per kit)                          |
| Replacement door             | 1769-RD (2 per kit)                           |
| Vendor ID code               | 1                                             |
| Product type code            | 7                                             |
| Product code                 | 87                                            |
| Enclosure type rating        | None (open style)                             |

**Table 82 - Relay Contact Ratings - 1769-OW8I**

| Volts, max | Continuous Amps per Point, max | Amperes <sup>(1)</sup> |        | Voltamperes |       | NEMA ICS 2-125 |
|------------|--------------------------------|------------------------|--------|-------------|-------|----------------|
|            |                                | Make                   | Break  | Make        | Break |                |
| 240V AC    | 2.5 A                          | 7.5 A                  | 0.75 A | 1800VA      | 180VA | C300           |
| 120V AC    |                                | 15 A                   | 1.5 A  |             |       |                |
| 125V DC    | 1.0 A                          | 0.22 A <sup>(2)</sup>  |        | 28VA        |       | R150           |
| 24V DC     | 2.0 A                          | 1.2 A <sup>(2)</sup>   |        | 28VA        |       | —              |

(1) Connecting surge suppressors across your external inductive load will extend the life of the relay contacts.

(2) For DC voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28VA by the applied DC voltage. For example, 28VA/48V DC = 0.58 A. For DC voltage applications less than 48V, the make/break ratings for relay contacts cannot exceed 2 A.

**Certifications - 1769-OW8I**

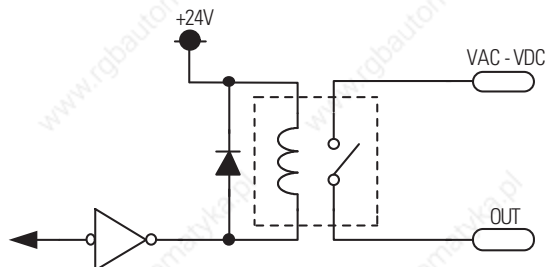
| Certification <sup>(1)</sup> | 1769-OW8I                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure           |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-0W16

## Compact AC/DC relay contact module

Simplified Output Circuit Diagram



1769-0W16

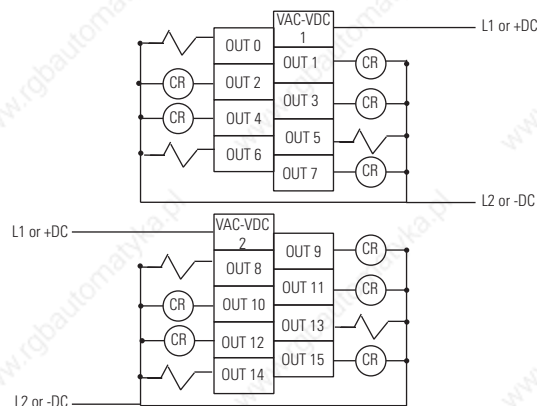


Table 83 - Technical Specifications - 1769-0W16

| Attribute                    | 1769-0W16                                                                                                                                                                                                                                                                                                                                                                                           |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                      | 16 normally open (8 points/group)                                                                                                                                                                                                                                                                                                                                                                   |
| Operating voltage range      | 5...265V AC<br>5...125V DC                                                                                                                                                                                                                                                                                                                                                                          |
| Delay, on                    | 10 ms                                                                                                                                                                                                                                                                                                                                                                                               |
| Delay, off                   | 10 ms                                                                                                                                                                                                                                                                                                                                                                                               |
| Current draw @ 5.1V          | 205 mA                                                                                                                                                                                                                                                                                                                                                                                              |
| Current draw @ 24V           | 180 mA                                                                                                                                                                                                                                                                                                                                                                                              |
| Heat dissipation, max        | 4.75 W                                                                                                                                                                                                                                                                                                                                                                                              |
| Off-state leakage, max       | 0 mA                                                                                                                                                                                                                                                                                                                                                                                                |
| On-state current, min        | 10 mA @ 5V DC                                                                                                                                                                                                                                                                                                                                                                                       |
| Current per point, max       | 2.5 A                                                                                                                                                                                                                                                                                                                                                                                               |
| Current per module, max      | 20 A                                                                                                                                                                                                                                                                                                                                                                                                |
| Isolation voltage            | Verified by one of the following dielectric tests: 1836V AC for 1 s or 2596V DC for 1 s, output point to bus<br>265V AC working voltage (IEC Class 2 reinforced insulation)<br>Verified by one of the following dielectric tests: 1836V AC for 1 s or 2596V DC for 1 s, group to group<br>265V AC working voltage (basic insulation)<br>150V AC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 450 g (0.99 lb)                                                                                                                                                                                                                                                                                                                                                                                     |
| Dimensions (HxWxD), approx   | 118 x 52.5 x 87 mm (4.65 x 2.07 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                                                                                                                                                                                                                                                          |
| Slot width                   | 1.5                                                                                                                                                                                                                                                                                                                                                                                                 |
| Module location              | DIN rail or panel mount                                                                                                                                                                                                                                                                                                                                                                             |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                                                                                                                                                                                                                                              |
| Power supply distance rating | 8 modules                                                                                                                                                                                                                                                                                                                                                                                           |

**Table 83 - Technical Specifications - 1769-0W16**

| Attribute                  | 1769-0W16                                     |
|----------------------------|-----------------------------------------------|
| Terminal screw torque      | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque     | 0.46 N•m (4.1 lb•in)                          |
| Wire size                  | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type                  | Cu-90 °C (194 °F)                             |
| Replacement terminal block | 1769-RTBN18 (1 per kit)                       |
| Replacement door label     | 1769-RL1 (2 per kit)                          |
| Replacement door           | 1769-RD (2 per kit)                           |
| Vendor ID code             | 1                                             |
| Product type code          | 7                                             |
| Product code               | 85                                            |
| Enclosure type rating      | None (open style)                             |

**Table 84 - Relay Contact Ratings - 1769-0W16**

| Volts, max | Continuous Amps per Point, max | Amperes <sup>(1)</sup> |        | Voltamperes |       | NEMA ICS 2-125 |
|------------|--------------------------------|------------------------|--------|-------------|-------|----------------|
|            |                                | Make                   | Break  | Make        | Break |                |
| 240V AC    | 2.5 A                          | 7.5 A                  | 0.75 A | 1800VA      | 180VA | C300           |
| 120V AC    |                                | 15 A                   | 1.5 A  |             |       |                |
| 125V DC    | 1.0 A                          | 0.22 A <sup>(2)</sup>  |        | 28VA        |       | R150           |
| 24V DC     | 2.0 A                          | 1.2 A <sup>(2)</sup>   |        | 28VA        |       | —              |

(1) Connecting surge suppressors across your external inductive load will extend the life of the relay contacts.

(2) For DC voltage applications, the make/break ampere rating for relay contacts can be determined by dividing 28VA by the applied DC voltage. For example, 28VA/48V DC = 0.58 A. For DC voltage applications less than 48V, the make/break ratings for relay contacts cannot exceed 2 A.

**Table 85 - Certifications - 1769-0W16**

| Certification <sup>(1)</sup> | 1769-0W16                                                                                                                                                  |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure           |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## 1769-ARM

### Compact address reserve module

Use the 1769-ARM address reserve module in CompactLogix systems to cost-effectively reserve module slots. After creating the CompactLogix system's I/O configuration and user program, any I/O module in the system can be removed and replaced with a 1769-ARM module once the removed module is inhibited by using RSLogix 5000 programming software. Inhibiting a module creates an I/O configuration and user program removing all references to that module.

To use the 1769-ARM module in MicroLogix systems, configure a generic module by using RSLogix 5000 programming software. Any user-program references to the slot position occupied by the 1769-ARM module must not use another module's parameters.

**Table 86 - Technical Specifications - 1769-ARM**

| Attribute                    | 1769-ARM                                                                                 |
|------------------------------|------------------------------------------------------------------------------------------|
| Current draw @ 5.1V          | 60 mA                                                                                    |
| Current draw @ 24V           | 0 mA                                                                                     |
| Heat dissipation, max        | 0.3 W                                                                                    |
| Weight, approx               | 280 g (0.62 lb)                                                                          |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.) |
| Slot width                   | 1                                                                                        |
| Module location              | DIN rail or panel mount                                                                  |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                   |
| Power supply distance rating | 8 modules                                                                                |
| Vendor ID code               | 1                                                                                        |
| Product type code            | 7                                                                                        |
| Product code                 | 74                                                                                       |
| Enclosure type rating        | None (open style)                                                                        |

**Table 87 - Certifications - 1769-ARM**

| Certification <sup>(1)</sup> | 1769-ARM                                                                                                                                                   |
|------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213) |
| CE                           | CE compliant for all applicable directives                                                                                                                 |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with:<br>• AS/NZS CISPR 11; Industrial Enclosure           |

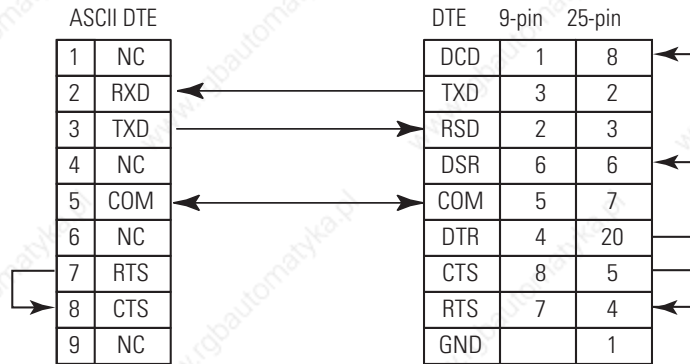
(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.



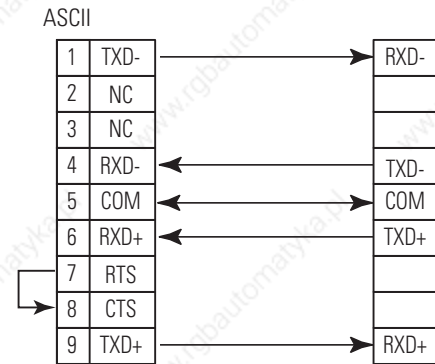
# 1769-ASCII

## Compact ASCII module

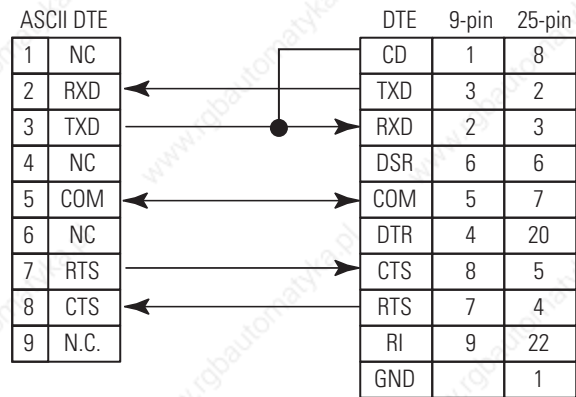
RS-232 Wiring Module to DTE Device (hardware handshaking disabled)



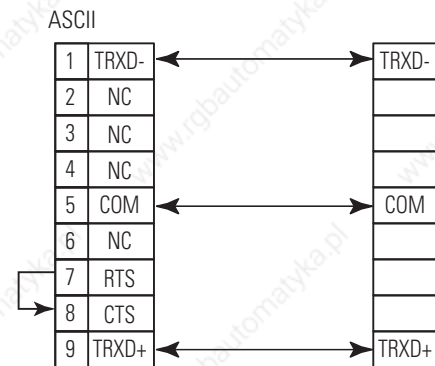
RS-422 Wiring



RS-232 Wiring - Module to Printer (hardware handshaking enabled, standard printer adapter cable)



RS-485 Wiring



**Table 88 - Technical Specifications - 1769-ASCII**

| Attribute                   | 1769-ASCII                                                                                                                                                          |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                      | 2 full duplex (RS-232, RS-422)<br>2 half duplex (RS-485)                                                                                                            |
| Serial input voltage signal | 3...25V DC with respect to signal ground (SG) 0, Asserted, ON, Space, Active<br>-3...-25V DC with respect to signal ground (SG) 1, Disasserted, OFF, Mark, Inactive |
| Current draw @ 5.1V         | 425 mA                                                                                                                                                              |
| Current draw @ 24V          | 0 mA                                                                                                                                                                |
| Power dissipation, max      | 2.13 W                                                                                                                                                              |
| Thermal dissipation, max    | 7.3 BTU/hr                                                                                                                                                          |
| Isolation voltage           | 30V<br>Tested to withstand 710V DC for 60 s                                                                                                                         |
| Transmit transaction ID     | 0...255                                                                                                                                                             |
| Handshaking                 | RTS/CTS hardware handshaking always enabled                                                                                                                         |
| Weight, approx              | 0.18 kg (0.40 lb)                                                                                                                                                   |

**Table 88 - Technical Specifications - 1769-ASCII**

| Attribute                    | 1769-ASCII                                                                               |
|------------------------------|------------------------------------------------------------------------------------------|
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.) |
| Slot width                   | 1                                                                                        |
| Module location              | DIN rail or panel mount                                                                  |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                   |
| Power supply distance rating | 4 modules                                                                                |
| Recommended cable            | Belden 876, shielded                                                                     |
| Serial port connectors       | Two DB-9 male with pins                                                                  |
| Wire category                | 2 - on communication ports <sup>(1)</sup>                                                |
| Vendor ID code               | 1                                                                                        |
| Product type code            | 109                                                                                      |
| Product code                 | 66                                                                                       |
| Input words                  | 108                                                                                      |
| Output words                 | 108                                                                                      |
| Configuration words          | 31                                                                                       |
| Enclosure type rating        | None (open style)                                                                        |

(1) Use this conductor category information for planning conductor routing as described in the system level installation manual. See the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

**Table 89 - Certifications - 1769-ASCII**

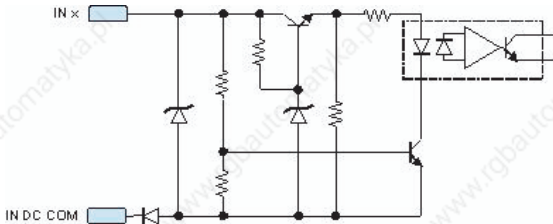
| Certification <sup>(1)</sup> | 1769-ASCII                                                                                                                                                                                                                                                                                               |
|------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL-us                      | UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada.                                                                                                                                                                                                      |
| CE                           | European Union 89/335/EEC EMC Directive, compliant with: <ul style="list-style-type: none"> <li>• EN 50082-2; Industrial Immunity</li> <li>• EN 61326; Meas./Control/Lab., Industrial Requirements</li> <li>• EN 61000-6-2; Industrial Immunity</li> <li>• EN 61000-6-4; Industrial Emissions</li> </ul> |
| C-Tick                       | <ul style="list-style-type: none"> <li>• Australian Radiocommunications Act, compliant with: AS/NZS CISPR 11; Industrial Emissions</li> </ul>                                                                                                                                                            |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

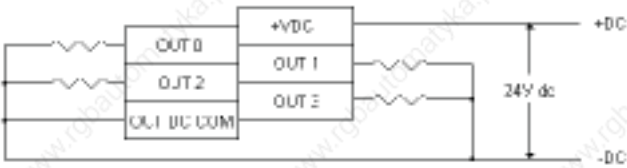
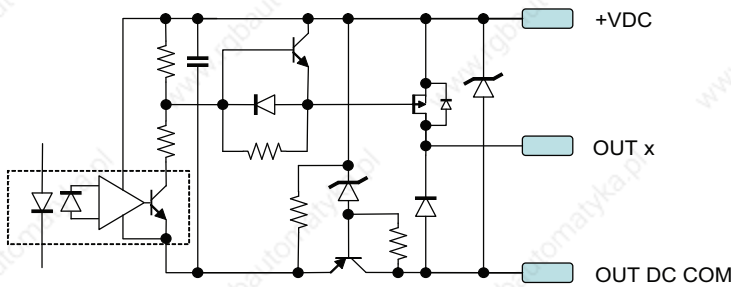
# 1769-BOOLEAN

Compact combination 24V DC sink input/source output BOOLEAN control module

Simplified Input Schematic



Simplified Output Schematic



Do not use the NC terminals as connection points.

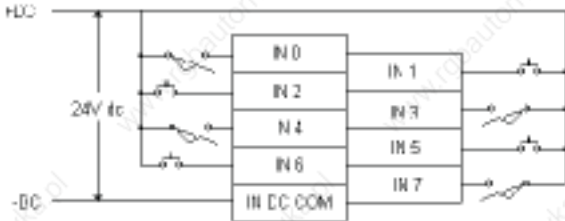


Table 90 - Technical Specifications - 1769-BOOLEAN

| Attribute                    | 1769-BOOLEAN                                                                                                                                          |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------|
| Current draw @ 5.1V          | 220 mA                                                                                                                                                |
| Current draw @ 24V           | 0 mA                                                                                                                                                  |
| Heat dissipation, max        | 3.55 W                                                                                                                                                |
| Closed loop time             | Output on-state current $\geq 5$ mA: 100 $\mu$ s max<br>Output on-state current $< 5$ mA: 150 $\mu$ s max                                             |
| Isolation voltage            | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s<br>75V DC working voltage (IEC Class 2 reinforced insulation) |
| Weight, approx               | 282 g (0.625 lb)                                                                                                                                      |
| Dimensions (HxWxD), approx   | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                              |
| Slot width                   | 1                                                                                                                                                     |
| Module location              | DIN rail or panel mount                                                                                                                               |
| Power supply                 | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                |
| Power supply distance rating | 8 modules                                                                                                                                             |

**Table 90 - Technical Specifications - 1769-BOOLEAN**

| Attribute              | 1769-BOOLEAN                                  |
|------------------------|-----------------------------------------------|
| Terminal screw torque  | 0.68 N•m (6 lb•in)                            |
| Retaining screw torque | 0.46 N•m (4.1 lb•in)                          |
| Wire size              | (22...14 AWG) solid<br>(22...16 AWG) stranded |
| Wire type              | Cu-90 °C (194 °F)                             |
| Vendor ID code         | 1                                             |
| Product type code      | 109                                           |
| Product code           | 37                                            |
| Enclosure type rating  | None (open-style)                             |

**Table 91 - 1769-BOOLEAN Input Specifications**

| Attribute                          | 1769-BOOLEAN                                                                                                                                                              |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs                             | 8 real<br>8 virtual                                                                                                                                                       |
| Voltage category                   | 24V AC sinking                                                                                                                                                            |
| Operating voltage range            | 10...30V DC @ 30 °C (86 °F)<br>10...26V DC @ 60 °C (140 °F)                                                                                                               |
| Digital filter, off to on          | 0 s, 100 µs, 200 µs, 500 µs, 1 ms, 2 ms, 4 ms, 8 ms                                                                                                                       |
| Digital filter, on to off          | 0 s, 100 µs, 200 µs, 500 µs, 1 ms, 2 ms, 4 ms, 8 ms                                                                                                                       |
| Input delay, off to on             | 10 µs                                                                                                                                                                     |
| Input delay, on to off             | 10 µs                                                                                                                                                                     |
| Current draw @ 5.1V                | 115 mA                                                                                                                                                                    |
| Off-state voltage, max             | 5V DC                                                                                                                                                                     |
| Off-state current, max             | 1.5 mA                                                                                                                                                                    |
| On-state voltage, min              | 10V DC                                                                                                                                                                    |
| On-state current, min              | 2 mA                                                                                                                                                                      |
| Inrush current, max <sup>(1)</sup> | 250 mA                                                                                                                                                                    |
| Input impedance, max               | 2.0 kΩ @ 24V DC<br>2.3 kΩ @ 30V DC                                                                                                                                        |
| IEC input compatibility            | Type 1+                                                                                                                                                                   |
| Isolation voltage                  | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, input point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |

(1) A current limiting resistor can be used to limit inrush current; however, the operating characteristics of the AC input circuit will be affected. If a 6.8 kΩ (2.5 W minimum) resistor is placed in series with the input, the inrush current is reduced to 35 mA. In this configuration the minimum on-state voltage increases to 92V AC. Before adding the resistor in a hazardous environment, be sure to consider the operating temperature of the resistor and the temperature limits of the environment. The operating temperature of the resistor must remain below the temperature limit of the environment.

**Table 92 - 1769-BOOLEAN Output Specifications**

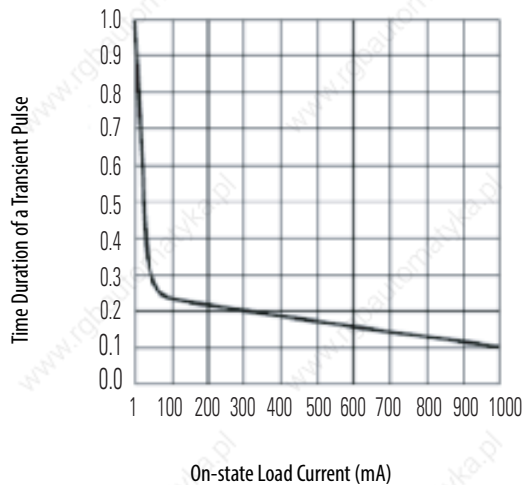
| Attribute                                     | 1769-BOOLEAN                                                                                                                                                               |
|-----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                       | 4                                                                                                                                                                          |
| Voltage category                              | 24V DC, sourcing                                                                                                                                                           |
| Operating voltage range                       | 20.4...26.4V DC                                                                                                                                                            |
| Output delay, on <sup>(1)</sup>               | 10 $\mu$ s, output on-state current $\geq 5$ mA                                                                                                                            |
| Output delay, off <sup>(1)</sup>              | 10 $\mu$ s, output on-state current $\geq 5$ mA                                                                                                                            |
| Off-state leakage current, max <sup>(2)</sup> | 1.0 mA @ 26.4V DC                                                                                                                                                          |
| On-state current, max                         | 1.0 mA                                                                                                                                                                     |
| On-state voltage drop, max                    | 1.0V DC @ 1 A                                                                                                                                                              |
| Current per point, max                        | 0.5 A @ 60 °C (140 °F)<br>1.0 A @ 30 °C (86 °F)                                                                                                                            |
| Surge current <sup>(3)</sup>                  | 2 A for 10 ms, repeatable every 2 s                                                                                                                                        |
| Isolation voltage                             | Verified by one of the following dielectric tests: 1200V AC for 1 s or 1697V DC for 1 s, output point to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |

(1) Triac outputs turn on and off at AC line zero cross.

(2) To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. For 120V AC operation, use a 15 k $\Omega$ , 2 W resistor. For 240V AC operation use a 5 k $\Omega$ , 5 W resistor.

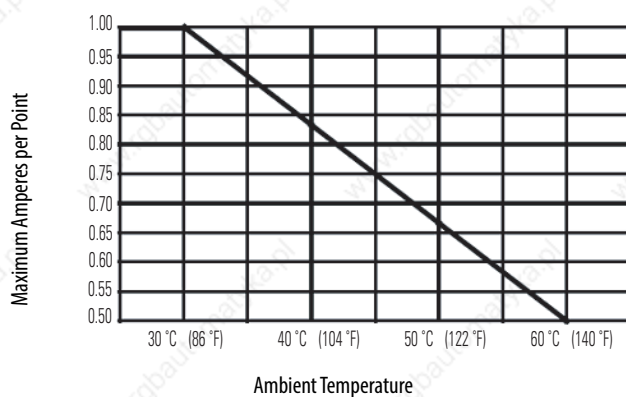
(3) Connecting surge suppressors across your external load will extend the life of the triac outputs.

## Transistor Output Transient Pulses - 1769-BOOLEAN



## Temperature Derating - 1769-B00LEAN

1769-B00LEAN Maximum Amperes per Point versus Temperature



1769-B00LEAN Maximum Amperes per Module versus Temperature

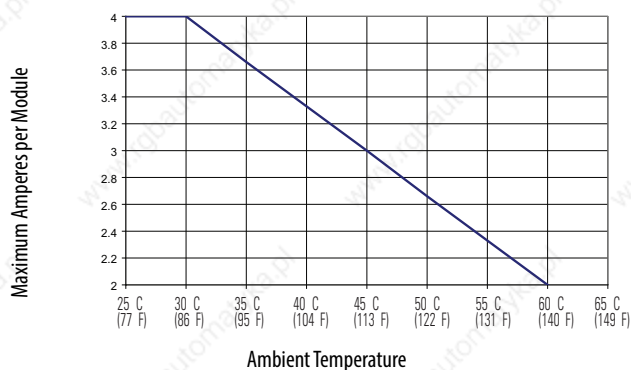


Table 93 - Certifications - 1769-B00LEAN

| Certification <sup>(1)</sup> | 1769-B00LEAN                                                                                                                                                                                  |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

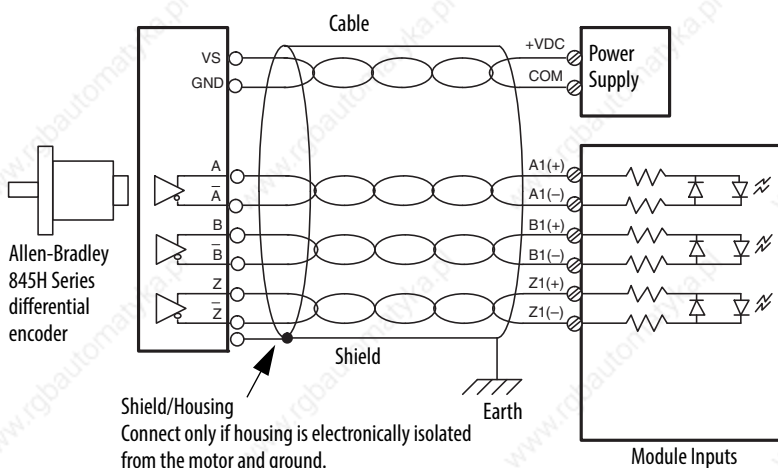
(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

# 1769-HSC

## Compact high-speed counter module

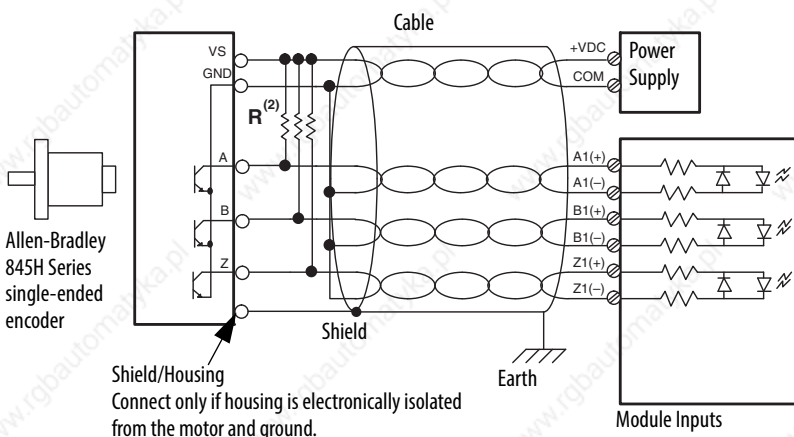
### Differential Encoder Wiring

See the encoder manual for proper cable type. The type of cable used should be twisted pair, individually shielded cable with a maximum length of 300 m (1000 ft).



### Single-ended Encoder Wiring

See the encoder manual for proper cable type. The type of cable used should be twisted pair, individually shielded cable with a maximum length of 300 m (1000 ft).



External resistors are required if they are not internal to the encoder. The pull-up resistor (R) value depends on the power supply value. To calculate the maximum resistor value, the following formula:

$$R = \frac{(V_{dc} - V_{min})}{I_{min}}$$

where:

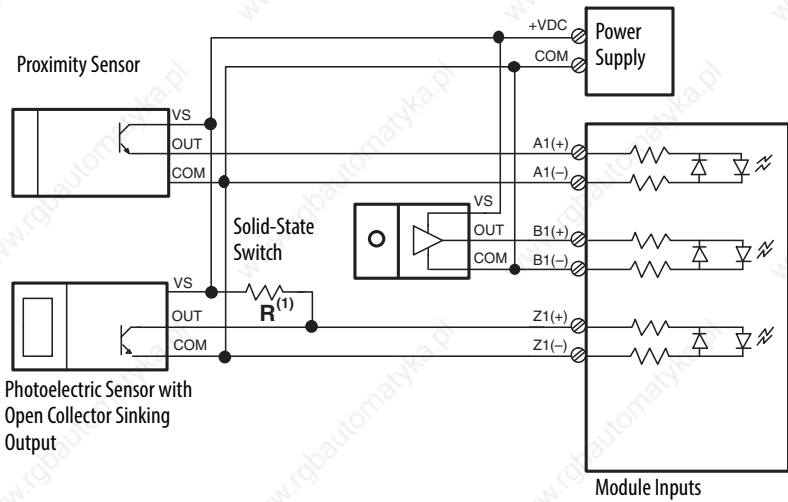
- R = maximum pull-up resistor value
- VDC = power supply voltage
- Vmin = 2.6V DC
- min = 6.8 mA

| Power Supply Voltage (V DC) | Pull-up Resistor Value Max (R) <sup>(1)</sup> |
|-----------------------------|-----------------------------------------------|
| 5V DC                       | 352 Ω                                         |
| 12V DC                      | 1382 Ω                                        |
| 24V DC                      | 3147 Ω                                        |

(1) Resistance values may change, depending upon your application.

The minimum resistor (R) value depends on the current sinking capability of the encoder.

Discrete Device Wiring



External resistors are required if they are not internal to the encoder. The pull-up resistor (R) value depends on the power supply value. To calculate the maximum resistor value, the following formula:

$$R = \frac{(V_{dc} - V_{min})}{I_{min}}$$

where:

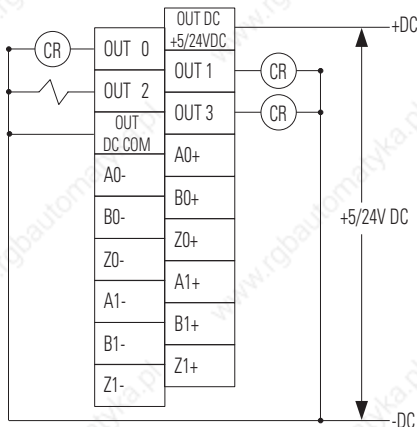
- R = maximum pull-up resistor value
- VDC = power supply voltage
- Vmin = 2.6V DC
- min = 6.8 mA

| Power Supply Voltage (V DC) | Pull-up Resistor Value Max (R) <sup>(1)</sup> |
|-----------------------------|-----------------------------------------------|
| 5V DC                       | 352 Ω                                         |
| 12V DC                      | 1382 Ω                                        |
| 24V DC                      | 3147 Ω                                        |

(1) Resistance values may change, depending upon your application.

The minimum resistor (R) value depends on the current sinking capability of the encoder.

Output Wiring





**Table 94 - Technical Specifications - 1769-HSC**

| Attribute                      | 1769-HSC                                                                                                                                                              |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bus current draw               | 425 mA, 5V DC<br>0 mA, 24V DC                                                                                                                                         |
| Heat dissipation, max          | 6.21 W, the Watts per point, plus the min Watts, with all points energized                                                                                            |
| Isolation voltage              | 75V (continuous), reinforced insulation type, channel-to-system and channel-to-channel<br>Type tested at 1200V AC for 2 s                                             |
| Weight, approx                 | 309 g (0.681 lb)                                                                                                                                                      |
| Dimensions (HxWxD), approx     | 118 x 35 x 87 mm (4.65 x 1.38 x 3.43 in.)<br>Height with mounting tabs 138 mm (5.43 in.)                                                                              |
| Slot width                     | 1                                                                                                                                                                     |
| Module location                | DIN rail or panel mount                                                                                                                                               |
| Power supply                   | 1769-PA2, 1769-PB2, 1769-PA4, 1769-PB4                                                                                                                                |
| Power supply distance rating   | 4 modules                                                                                                                                                             |
| Terminal screw torque          | 0.68 N•m (6 lb•in)                                                                                                                                                    |
| Retaining screw torque         | 0.46 N•m (4.1 lb•in)                                                                                                                                                  |
| Wire size                      | 0.32...2.1 mm <sup>2</sup> (22...14 AWG) solid copper wire or<br>0.32...1.3 mm <sup>2</sup> (22...16 AWG) stranded copper wire rated at 90 °C (194 °F) insulation max |
| Wire type                      | Cu-90 °C (194 °F)                                                                                                                                                     |
| Recommended cable              | Individually shielded, twisted-pair cable (or the type recommended by the encoder or sensor manufacturer)                                                             |
| Wiring Category <sup>(1)</sup> | 2 - on signal ports                                                                                                                                                   |
| Vendor ID code                 | 1                                                                                                                                                                     |
| Product type code              | 109                                                                                                                                                                   |
| Product code                   | 19                                                                                                                                                                    |
| Enclosure type rating          | None (open-style)                                                                                                                                                     |

(1) Use this Conductor Category information for planning conductor routing. Refer to the Industrial Automation Wiring and Grounding Guidelines, publication [1770-4.1](#).

**Table 95 - 1769-HSC Input Specifications**

| Attribute                          | 1769-HSC                               |
|------------------------------------|----------------------------------------|
| Inputs                             | 2 quadrature (ABZ) differential inputs |
| Input voltage range <sup>(1)</sup> | 2.6...30V DC                           |
| On-state voltage, max              | 30V DC                                 |
| On-state voltage, min              | 2.6V 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 current, max                 | 15 mA                                  |
| Input current, min                 | 6.8 mA                                 |
| Input impedance                    | 1950 Ω                                 |
| Pulse width, min                   | 250 ns                                 |

**Table 95 - 1769-HSC Input Specifications**

| Attribute             | 1769-HSC                                                                                                                                                                       |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Phase separation, min | 131 ns                                                                                                                                                                         |
| Input frequency, max  | 1 MHz                                                                                                                                                                          |
| Isolation voltage     | Verified by one of the following dielectric tests: 1200V AC or 1697V DC for 1 s, input to bus and input to input<br>75V DC working voltage (IEC Class 2 reinforced insulation) |

(1) See Compact I/O Modules Installation Instructions, publication [1769-IN088](#).

**Table 96 - 1769-HSC Output Specifications**

| Attribute                               | 1769-HSC                                                                                                                                                     |
|-----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Outputs                                 | 16 total, 4 physical and 12 virtual                                                                                                                          |
| Output voltage range                    | 5...30V DC                                                                                                                                                   |
| On-state voltage, max                   | User power - 0.1V DC                                                                                                                                         |
| On-state output current per point, max  | 1 A, 30V DC, 40 °C<br>0.5A, 5V DC, 60 °C                                                                                                                     |
| On-state output current per module, max | 4 A, 30V DC, 40 °C<br>2A, 5V DC, 60 °C                                                                                                                       |
| 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 <sup>(1)</sup>                                                                                                                                        |
| Turn-off time, max                      | 200 µs                                                                                                                                                       |
| Reverse polarity protection             | 30V DC                                                                                                                                                       |
| Isolation voltage                       | Verified by one of the following dielectric tests: 1200V AC or 1697V DC for 1 s, output to bus<br>75V DC working voltage (IEC Class 2 reinforced insulation) |

(1) Maximum turn-on time applies to output voltage range of 5...7V DC. For output voltages greater than 7V DC, the maximum turn-on time is 200 µs.

**Table 97 - Environmental Specifications - 1769-HSC**

| Attribute                                                                                                                                                                                                            | 1769-HSC                         |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------|
| Temperature, operating<br>IEC 60068-2-1 (Test Ad, Operating Cold),<br>IEC 60068-2-2 (Test Bd, Operating Dry Heat),<br>IEC 60068-2-14 (Test Nb, Operating Thermal Shock)                                              | 0...60 °C (32...140 °F)          |
| Temperature, surrounding air, max                                                                                                                                                                                    | 40 °C (104 °F)                   |
| Temperature, nonoperating<br>IEC 60068-2-1 (Test Ab, Unpackaged Nonoperating Cold),<br>IEC 60068-2-2 (Test Bb, Unpackaged Nonoperating Dry Heat),<br>IEC 60068-2-14 (Test Na, Unpackaged Nonoperating Thermal Shock) | -40...85 °C (-40...185 °F)       |
| Relative humidity<br>IEC 60068-2-30 (Test Db, Unpackaged Damp Heat)                                                                                                                                                  | 5...95% noncondensing            |
| Vibration, operating<br>IEC 60068-2-6 (Test Fc, Operating)                                                                                                                                                           | 5 g @ 10...500 Hz, peak-to-peak  |
| Vibration, relay operation<br>IEC 60068-2-6                                                                                                                                                                          | 2 g @ 10...500 Hz <sup>(1)</sup> |

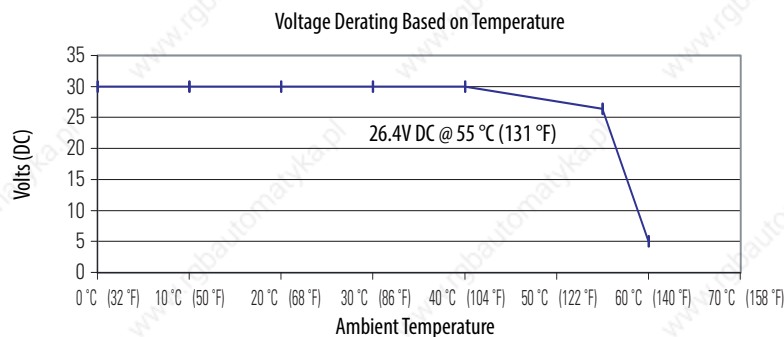
**Table 97 - Environmental Specifications - 1769-HSC**

| Attribute                                                         | 1769-HSC                                                                                                                                                                   |
|-------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Shock, operating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock)    | 30 g, 11 ms panel mounted<br>20 g, 11 ms DIN rail mounted                                                                                                                  |
| Shock, nonoperating<br>IEC 60068-2-27 (Test Ea, Unpackaged Shock) | 40 g, panel mounted<br>30 g, DIN rail mounted                                                                                                                              |
| Emissions<br>CISPR 11                                             | Group 1, Class A                                                                                                                                                           |
| ESD immunity<br>IEC 61000-4-2                                     | 6 kV contact discharges<br>8 kV air discharges                                                                                                                             |
| Radiated RF immunity<br>IEC 61000-4-3                             | 10V/m with 1 kHz sine-wave 80% AM from 80...2000 MHz<br>10V/m with 200 Hz 50% Pulse 100% AM at 900 and 1890 MHz<br>10V/m with 1 kHz sine-wave 80% AM from 2000...2700 MHz  |
| EFT/B immunity<br>IEC 61000-4-4                                   | ±2 kV at 5 kHz on power ports<br>±2 kV at 5 kHz on signal ports                                                                                                            |
| Surge transient immunity<br>IEC 61000-4-5                         | ±1 kV line-line (DM) and ±2 kV line-earth (CM) on power ports<br>±1 kV line-line (DM) and ±2 kV line-earth (CM) on signal ports<br>±1 kV line-earth (CM) on shielded ports |
| Conducted RF immunity<br>IEC 61000-4-6                            | 10V rms with 1 kHz sine-wave 80% AM from 150 kHz...80 MHz                                                                                                                  |

(1) This rating applies for your system if a relay module, such as the 1769-OW8, is used.

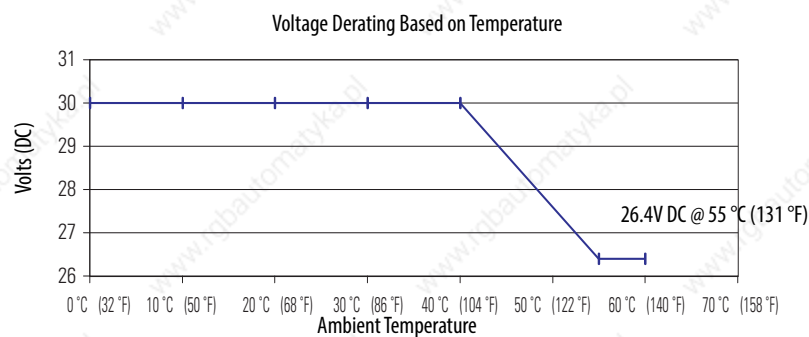
## Temperature Derating - 1769-HSC

### Maximum Input Voltage - 24V DC Operation

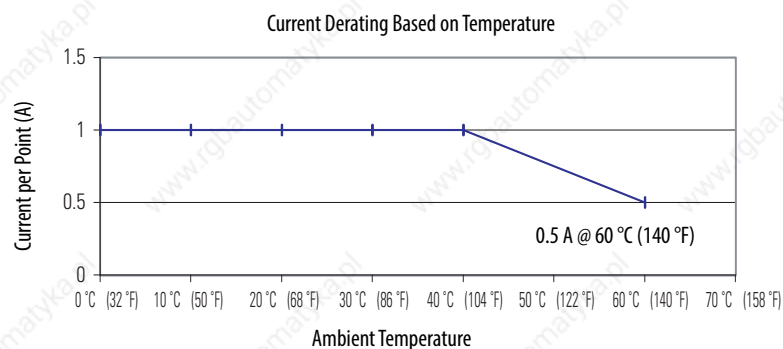


| Temperature             | Derated Voltage <sup>(1)</sup> |
|-------------------------|--------------------------------|
| 0...40 °C (32...104 °F) | 30V DC                         |
| 55 °C (131 °F)          | 26.4V DC                       |
| 60 °C (140 °F)          | 5V DC                       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

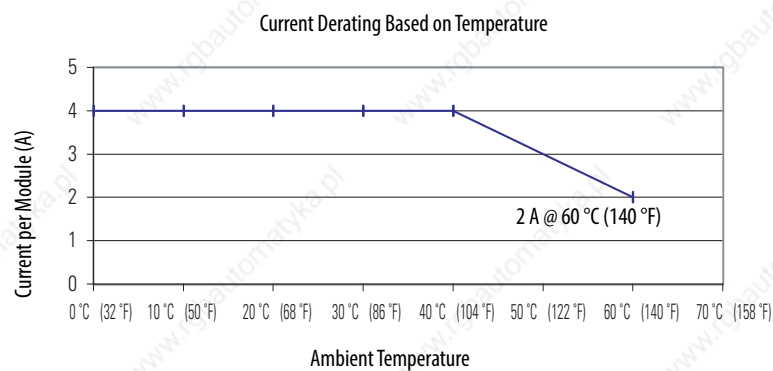
(1) Input voltage derating between 55°C and 60°C is achieved by using a dropping resistor.  
 For 24V DC input voltage, use a 2.4 kΩ, ½ Watt resistor.  
 For input voltages other than 24V DC, use a ½ Watt resistor with value:  $125 \times (V_{in} - 5V)$ .

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

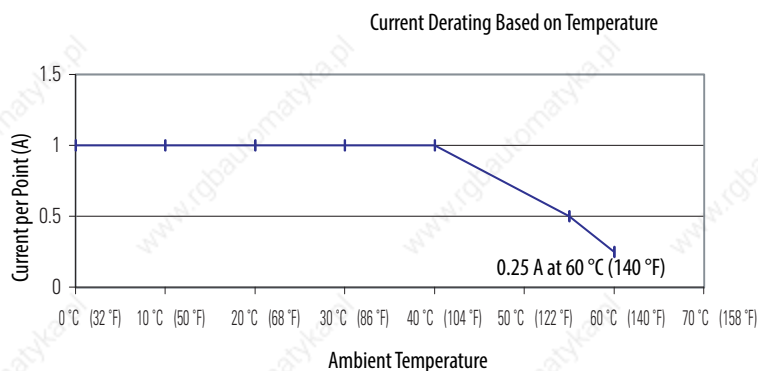
| Temperature               | Derated Voltage |
|---------------------------|-----------------|
| 0...40 °C (32...104 °F)   | 30V DC          |
| 55...60 °C (131...140 °F) | 26.4V DC        |

**Maximum Output Current per Point - 5V DC Operation**

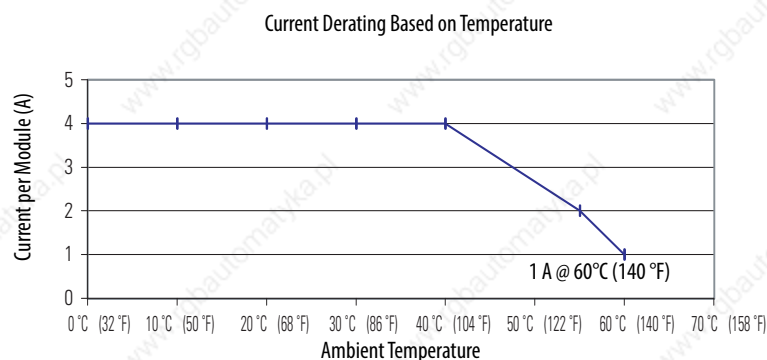
| Temperature             | Derated Current |
|-------------------------|-----------------|
| 0...40 °C (32...104 °F) | 1 A             |
| 60 °C (140 °F)          | 0.5 A           |

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

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

**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 Module - 24V 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             |

**Table 98 - Certifications - 1769-HSC**

| Certification <sup>(1)</sup> | 1769-HSC                                                                                                                                                                                                                                                           |
|------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL-us                      | UL Listed Industrial Control Equipment, certified for U.S. and Canada. See UL File E65584                                                                                                                                                                          |
| c-UL-us                      | UL Listed for Class I, Division 2 Group A,B,C,D Hazardous Locations, certified for U.S. and Canada. See UL File E321922                                                                                                                                            |
| CE                           | European Union 2004/108/EC EMC Directive, compliant with: <ul style="list-style-type: none"> <li>EN 61000-6-2; Industrial Immunity</li> <li>EN 61000-6-4; Industrial Emissions</li> <li>EN 61131-2; Programmable Controllers (Clause 8, Zone A &amp; B)</li> </ul> |
| C-Tick                       | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Emissions</li> </ul>                                                                                                                        |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## Compact I/O Accessories

| Category                   | Cat. No.    | Description                                                                                                               |
|----------------------------|-------------|---------------------------------------------------------------------------------------------------------------------------|
| End cap                    | 1769-ECL    | Left-end cap for Compact I/O system                                                                                       |
|                            | 1769-ECR    | Right-end cap for Compact I/O system                                                                                      |
| Expansion cable            | 1769-CLL1   | Left bank-to-left bank expansion 305 mm (1 ft)                                                                            |
|                            | 1769-CLL3   | Left bank-to-left bank expansion 1 m (3.28 ft)                                                                            |
|                            | 1769-CRR1   | Right bank-to-right bank expansion 305 mm (1 ft)                                                                          |
|                            | 1769-CRR3   | Right bank-to-right bank expansion 1 m (3.28 ft)                                                                          |
|                            | 1769-CRL1   | Right bank-to-left bank expansion 305 mm (1 ft)                                                                           |
|                            | 1769-CRL3   | Right bank-to-left bank expansion 1 m (3.28 ft)                                                                           |
| Replacement terminal block | 1769-RTBN10 | 10-pin NEMA terminal block                                                                                                |
|                            | 1769-RTBN18 | 18-pin NEMA terminal block                                                                                                |
| Replacement door labels    | 1769-RL1    | Replacement door labels for digital I/O, 2 per kit                                                                        |
|                            | 1769-RL2    | Replacement door labels for analog and specialty I/O, 2 per kit                                                           |
| Replacement doors          | 1769-RD     | Door replacement kit, 2 per kit                                                                                           |
| Replacement connector kit  | 1746-N3     | Connector kit to terminate a cable which connects field I/O devices to 32-point I/O modules, 1 connector and 40 terminals |

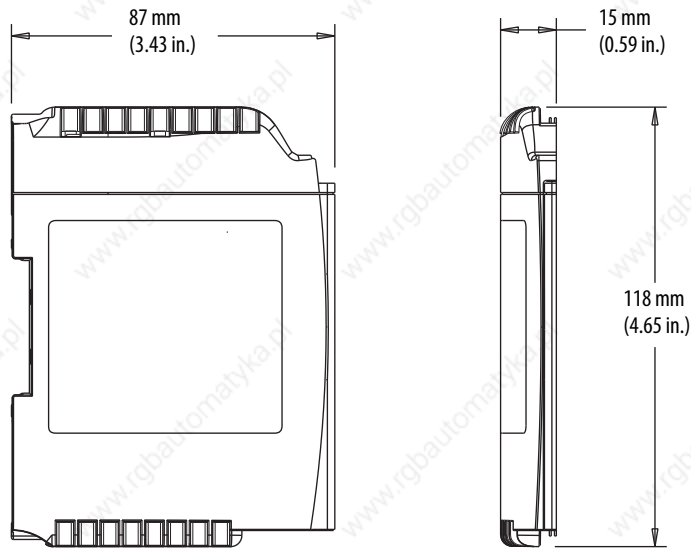
## End Caps

The final I/O bank in Compact system needs an end cap on the end without the expansion cable. The 1769-L23x controller comes with a right-end cap, so you do not need to order one separately.

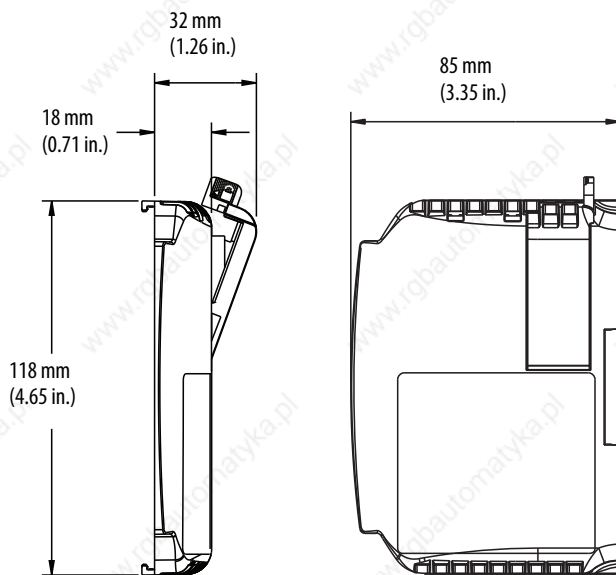
### Technical Specifications - 1769-ECL, 1769-ECR

| Attribute                       | 1769-ECL          | 1769-ECR          |
|---------------------------------|-------------------|-------------------|
| Current draw @ 5.1V             | 5 mA<br>0 mA      |                   |
| Current draw @ 24V              |                   |                   |
| Weight, approx                  | 130 g (0.286 lb)  |                   |
| Location                        | Left end          | Right end         |
| North American temperature code | T3C               |                   |
| IEC temperature code            | N/A               | T4                |
| Enclosure type rating           | None (open-style) | None (open-style) |

### Mounting Dimensions - 1769-ECL



### Mounting Dimensions - 1769-ECR



**Table 99 - Certifications - 1769-ECL, 1769-ECR**

| Certification <sup>(1)</sup> | 1769-ECL                                                                                                                                                                                  | 1769-ECR                                                                                                                                                                                                                                           |
|------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | UL Listed for Class I, Division 2 Group A, B, C, D Hazardous Locations, certified for U.S. and Canada. See UL File E10314                                                                 |                                                                                                                                                                                                                                                    |
| CE                           | European Union 2004/108/EC EMC Directive, compliant with: <ul style="list-style-type: none"> <li>EN 61000-6-2; Industrial Immunity</li> <li>EN 61000-6-4; Industrial Emissions</li> </ul> |                                                                                                                                                                                                                                                    |
| C-Tick                       | Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul>                                               | —                                                                                                                                                                                                                                                  |
| ATEX                         | —                                                                                                                                                                                         | European Union 94/9/EC ATEX Directive, compliant with: <ul style="list-style-type: none"> <li>EN 60079-15; Potentially Explosive Atmospheres, Protection “n” (II 3 G Ex nA IIC T4 X)</li> <li>EN 60079-0; General Requirements (Zone 2)</li> </ul> |

(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## Expansion Cables

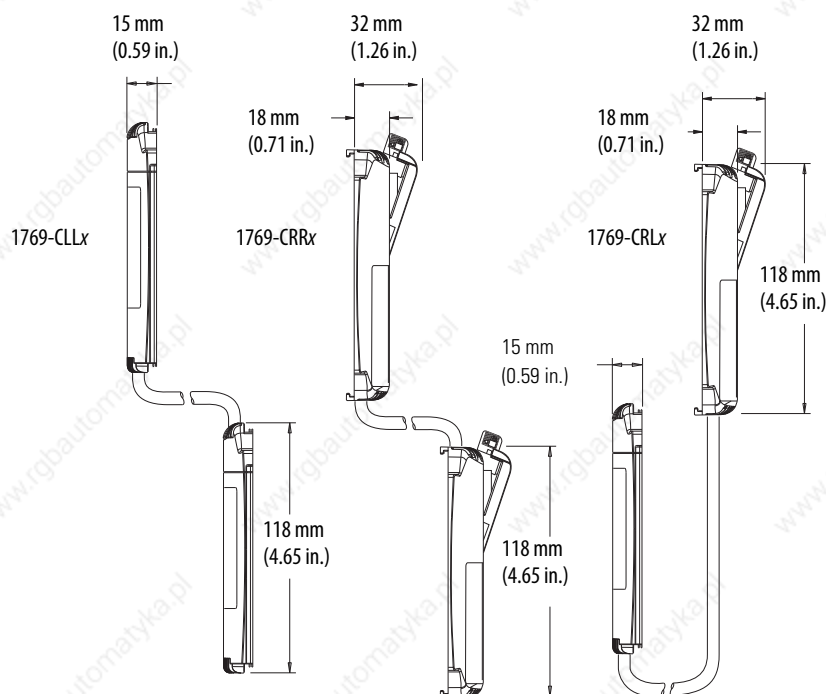
The 1769-CLL<sub>x</sub>, -CRR<sub>x</sub>, and -CRL<sub>x</sub> cables extend the 1769 bus communication lines. A maximum of two cables can be used in a 1769 system, allowing for three groups or banks of I/O modules. Each bank requires its own power supply.

**Table 100 - Technical Specifications - 1769-CLL<sub>x</sub>, 1769-CRR<sub>x</sub>, 1769-CRL<sub>x</sub>**

| Attribute      | 1769-CLL1, 1769-CRR1, 1769-CRL1 | 1769-CLL3, 1769-CRR3, 1769-CRL3 |
|----------------|---------------------------------|---------------------------------|
| Weight, approx | 300 g (0.66 lb)                 | 350 g (0.77 lb)                 |
| Length         | 305 mm (1 ft)                   | 1 m (3.28 ft)                   |



### Dimensions - 1769-CLLx, 1769-CRRx, 1769-CRLx



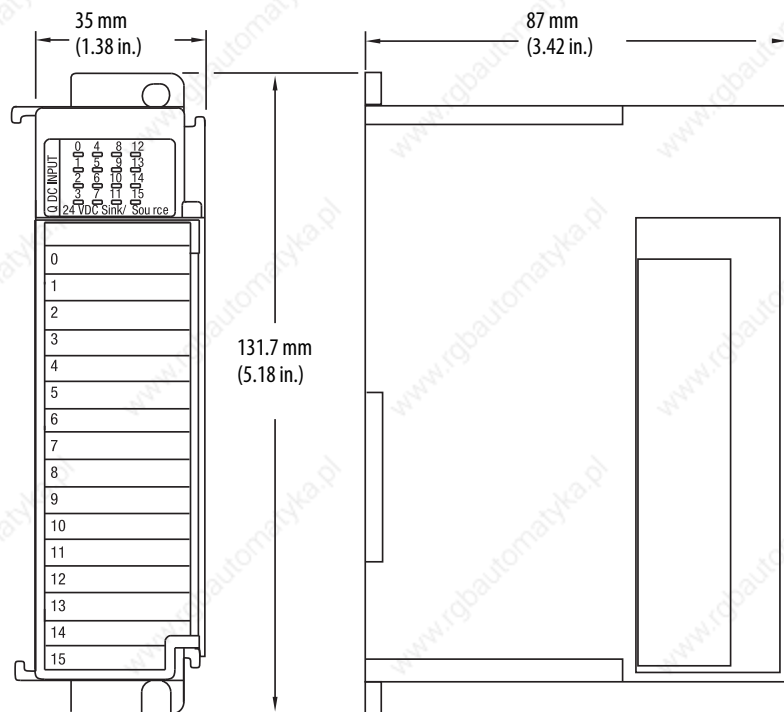
**Table 101 - Certifications - 1769-CLLx, 1769-CRRx, 1769-CRLx**

| Certification <sup>(1)</sup> | 1769-CLLx, 1769-CRRx, 1769-CRLx                                                                                                                                                               |
|------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| c-UL                         | C-UL certified (under CSA C22.2 No. 142)<br>UL 508 listed<br>Class I, Division 2 Group A,B,C,D Hazardous Locations (UL 1604, C-UL under CSA C22.2 No. 213)                                    |
| CE                           | CE compliant for all applicable directives                                                                                                                                                    |
| C-Tick                       | C-Tick compliant for all applicable directives<br>Australian Radiocommunications Act, compliant with: <ul style="list-style-type: none"> <li>AS/NZS CISPR 11; Industrial Enclosure</li> </ul> |

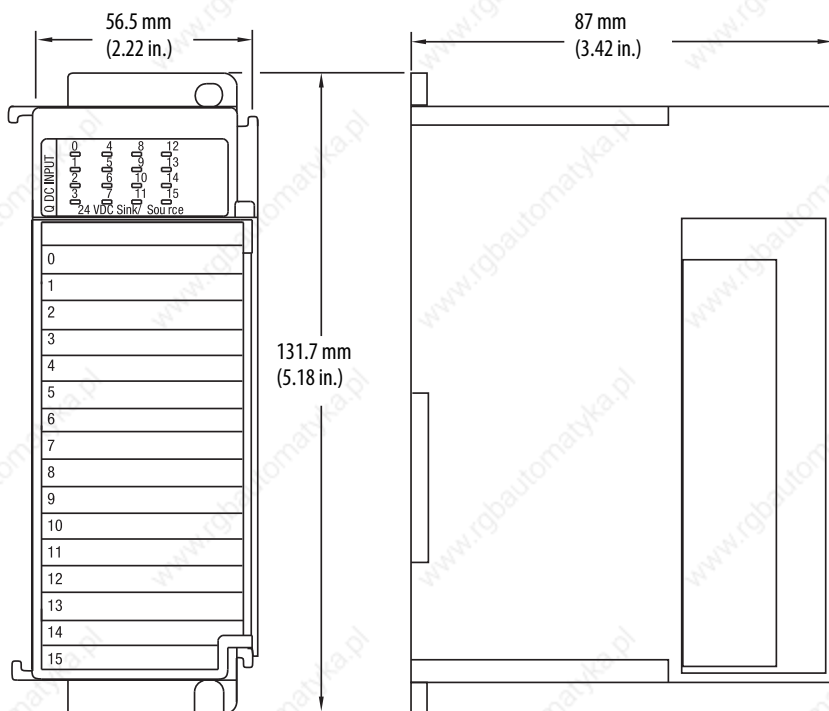
(1) When marked. See the Product Certification link at <http://www.ab.com> for Declarations of Conformity, Certificates, and other certification details.

## Compact I/O Mounting Dimensions

### Single 1769 Slot Dimensions



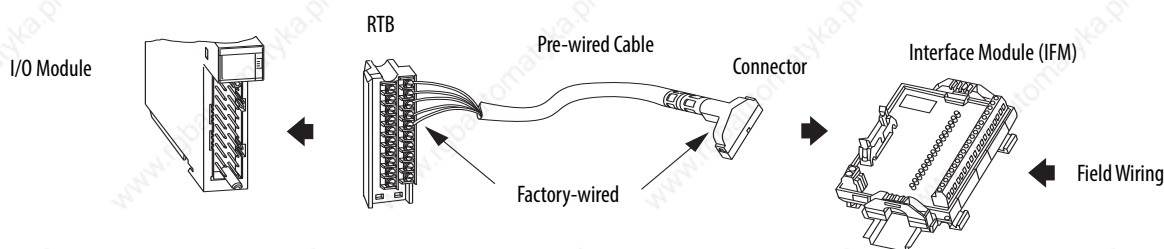
### One-and-a-half 1769 Slot Dimensions



## Wiring Systems

As an alternative to buying removable terminal blocks (RTBs) and connecting the wires yourself, you can buy a wiring system of:

- interface modules (IFMs) that provide the output terminal blocks for digital I/O modules. Use the pre-wired cables that match the I/O module to the IFM.
- analog interface modules (AIFMs) that provide the output terminal blocks for analog I/O modules. Use the pre-wired cables that match the I/O module to the AIFM.
- I/O module-ready cables. One end of the cable assembly is an RTB that plugs into the front of the I/O module. The other end has individually color-coded conductors that connect to a standard terminal block.



## Additional Resources

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

| Resource                                                                                    | Description                                                                         |
|---------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| Compact I/O Modules Installation Instructions, publication <a href="#">1769-IN088</a>       | Provides installation instructions for all 1769 Compact I/O modules.                |
| Industrial Automation Wiring and Grounding Guidelines, publication <a href="#">1770-4.1</a> | Provides general guidelines for installing a Rockwell Automation industrial system. |
| Product Certifications website, <a href="http://www.ab.com">http://www.ab.com</a>           | Provides declarations of conformity, certificates, and other certification details. |

You can view or download publications at <http://www.rockwellautomation.com/literature/>. To order paper copies of technical documentation, contact your local Allen-Bradley distributor or Rockwell Automation sales representative.

## Important User Information

Read this document and the documents listed in the additional resources section about installation, configuration, and operation of this equipment before you install, configure, operate, or maintain this product. Users are required to familiarize themselves with installation and wiring instructions in addition to requirements of all applicable codes, laws, and standards.

Activities including installation, adjustments, putting into service, use, assembly, disassembly, and maintenance are required to be carried out by suitably trained personnel in accordance with applicable code of practice.

If this equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

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