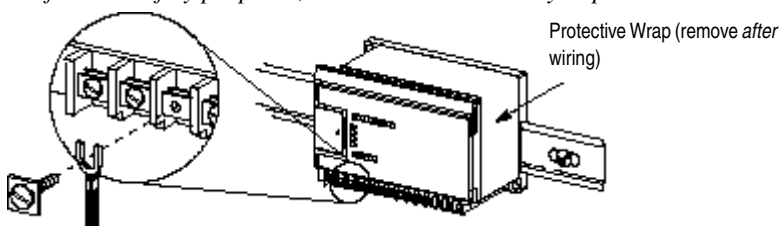


## Grounding Guidelines

In solid-state control systems, grounding helps limit the effects of noise due to electromagnetic interference (EMI). Use the heaviest wire gauge listed for wiring your controller with a maximum length of 152.4 mm (6 in.). Run the ground connection from the ground screw of the controller (third screw from left on output terminal rung) to the ground bus.

**Note:**

 This symbol denotes a functional earth ground terminal which provides a low impedance path between electrical circuits and earth for non-safety purposes, such as noise immunity improvement.



**ATTENTION:** All devices that connect to the user 24V power supply or the RS-232 channel must be referenced to chassis ground or floating. Failure to follow this procedure may result in property damage or personal injury.

**ATTENTION:** Chassis ground, user 24V ground, and RS-232 ground are internally connected. You must connect the chassis ground terminal screw to chassis ground prior to connecting any devices.

**ATTENTION:** On the 1761-L10BWB, 1761-L16BWB, 1761-L16BBB, 1761-L20BWB-5A, 1761-L32BBB, and 1761-L32BWB controllers, the user supply 24V dc IN and chassis ground are internally connected.

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You must also provide an acceptable grounding path for each device in your application. For more information on proper grounding guidelines, see the *Industrial Automation Wiring and Grounding Guidelines* publication 1770-4.1.

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**ATTENTION:** Remove the protective wrap before applying power to the controller. Failure to remove the wrap may cause the controller to overheat.

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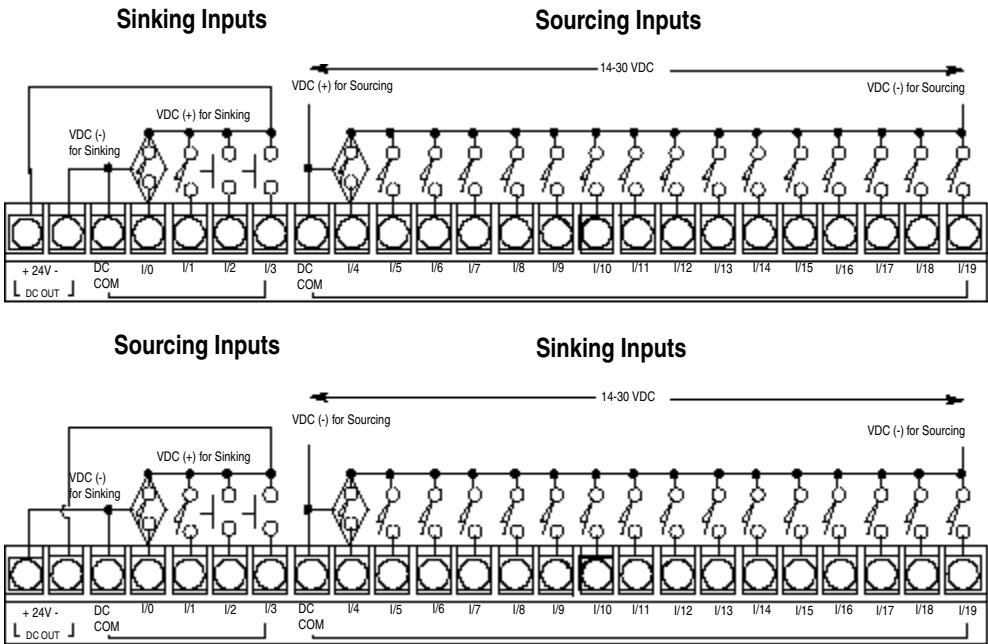
# Sinking and Sourcing Circuits

Any of the MicroLogix 1000 DC inputs can be configured as sinking or sourcing depending on how the DC COM is wired on the MicroLogix.

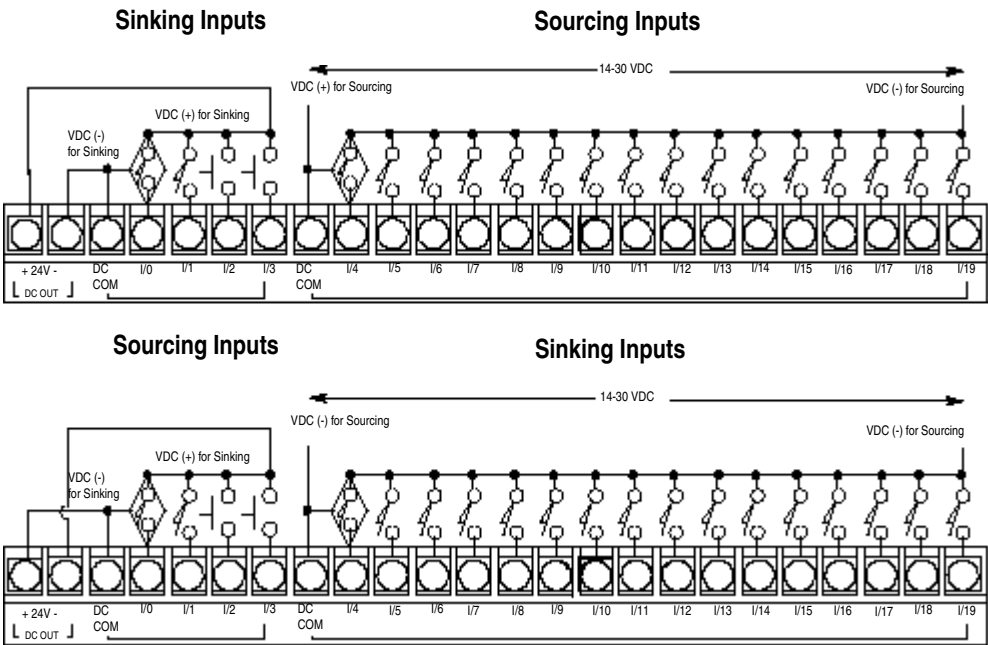
| Type           | Definition                                                                                                                                                    |
|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Sinking Input  | The input energizes when high-level voltage is applied to the input terminal (active high). Connect the power supply VDC (-) to the MicroLogix                |
| Sourcing Input | The input energizes when low-level voltage is applied to the input terminal (active low). Connect the power supply VDC (+) to the MicroLogix DC COM terminal. |

## Sinking and Sourcing Wiring Examples

1761-L32BWA (Wiring diagrams also apply to 1761-L20BWA-5A, -L16BWA, -L10BWA.)



1761-L32BWB, -L32BBB (Wiring Diagrams also apply to 1761-L20BWB-5A, -L16BWB, -L10BWB, -L16BBB.)



## Wiring Recommendations



**ATTENTION:** Before you install and wire any device, disconnect power to the controller system.

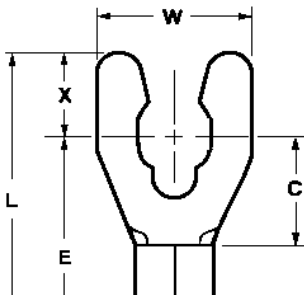
The following are general recommendations for wiring your controller system.

- Each wire terminal accepts 2 wires of the size listed below:

| Wire Type | Wire Size (2 wire maximum per terminal screw) |
|-----------|-----------------------------------------------|
| Solid     | #14 to #22 AWG                                |
| Stranded  | #16 to #22 AWG                                |

Refer to page 2-25 for wiring your high-speed counter.

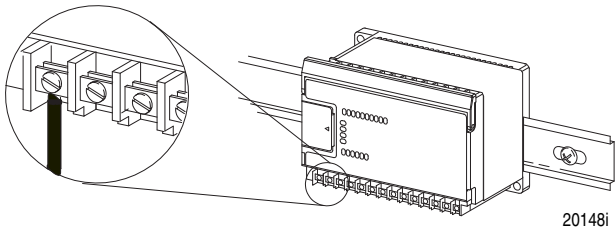
**Note:** *The diameter of the terminal screw heads is 5.5 mm (0.220 in.). The input and output terminals of the micro controller are designed for the following spade lugs:*



| Call-out | Dimension                    |
|----------|------------------------------|
| C        | 6.35 mm (0.250 in.)          |
| E        | 10.95 mm (0.431 in.) maximum |
| L        | 14.63 mm (0.576 in.) maximum |
| W        | 6.35 mm (0.250 in.)          |
| X        | 3.56 mm (0.140 in.)          |
| C+X      | 9.91 mm (0.390 in.) maximum  |

*We recommend using either of the following AMP spade lugs: part number 53120-1, if using 22-16 AWG, or part number 53123-1, if using 16-14 AWG.*

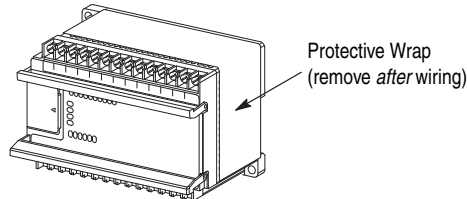
**Note:** *If you use wires without lugs, make sure the wires are securely captured by the pressure plate. This is particularly important at the four end terminal positions where the pressure plate does not touch the outside wall.*



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**ATTENTION:** Be careful when stripping wires. Wire fragments that fall into the controller could cause damage. Do not strip wires above a mounted controller if the protective wrap is removed.



**ATTENTION:** Remove the protective wrap before applying power to the controller. Failure to remove the wrap may cause the controller to overheat.

**ATTENTION:** Calculate the maximum possible current in each power and common wire. Observe all electrical codes dictating the maximum current allowable for each wire size. Current above the maximum ratings may cause wiring to overheat, which can cause damage.

**ATTENTION:** *United States Only:* If the controller is installed within a potentially hazardous environment, all wiring must comply with the requirements stated in the National Electrical Code 501-4 (b).

- Allow for at least 50 mm (2 in.) between I/O wiring ducts or terminal strips and the controller.
- Route incoming power to the controller by a path separate from the device wiring. Where paths must cross, their intersection should be perpendicular.

**Note:** *Do not run signal or communications wiring and power wiring in the same conduit. Wires with different signal characteristics should be routed by separate paths.*

- Separate wiring by signal type. Bundle wiring with similar electrical characteristics together.
- Separate input wiring from output wiring.
- Label wiring to all devices in the system. Use tape, shrink-tubing, or other dependable means for labeling purposes. In addition to labeling, use colored insulation to identify wiring based on signal characteristics. For example, you may use blue for dc wiring and red for ac wiring.

## Wiring Diagrams, Discrete Input and Output Voltage Ranges

The following pages show the wiring diagrams, discrete input voltage ranges, and discrete output voltage ranges. Controllers with dc inputs can be wired as either sinking or sourcing configurations. (Sinking and sourcing does not apply to ac inputs.)

**Note:**

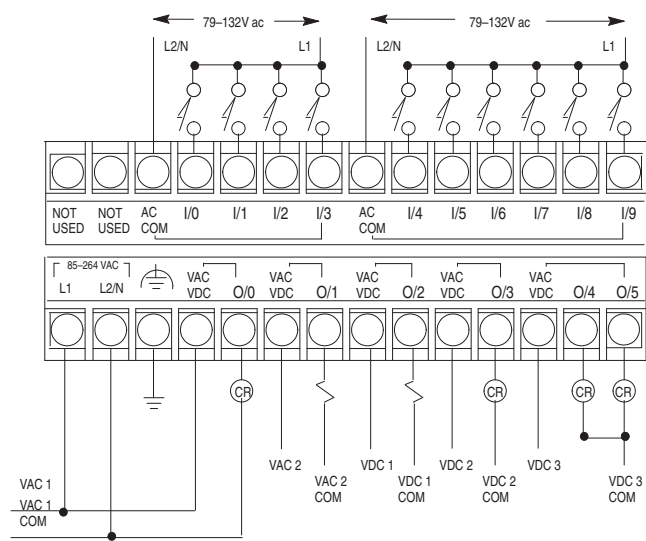
*This symbol denotes a functional earth ground terminal which provides a low impedance path between electrical circuits and earth for non-safety purposes, such as noise immunity improvement.*



**ATTENTION:** The 24V dc sensor power source should not be used to power output circuits. It should only be used to power input devices (e.g. sensors, switches). Refer to page 2-3 for information on MCR wiring in output circuits.

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1761-L16AWA Wiring Diagram



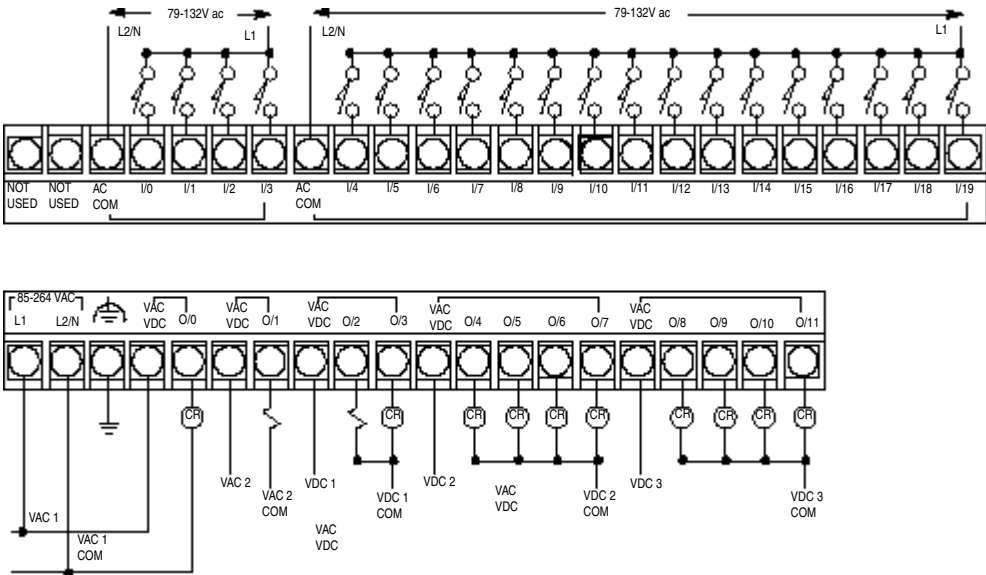
1761-L16AWA Input Voltage Range

| 0V ac | 20V ac | 79V ac | 132V ac |
|-------|--------|--------|---------|
| Off   | ?      | On     |         |

1761-L16AWA Output Voltage Range

| 0V ac | 5V ac           | 264V ac |
|-------|-----------------|---------|
| 0V dc | 5V dc           | 125V dc |
| ?     | Operating Range |         |

1761-L32AWA Wiring Diagram



1761-L32AWA Input Voltage Range

| 0V ac | 20V ac | 79V ac | 132V ac |
|-------|--------|--------|---------|
| Off   | ?      | On     |         |

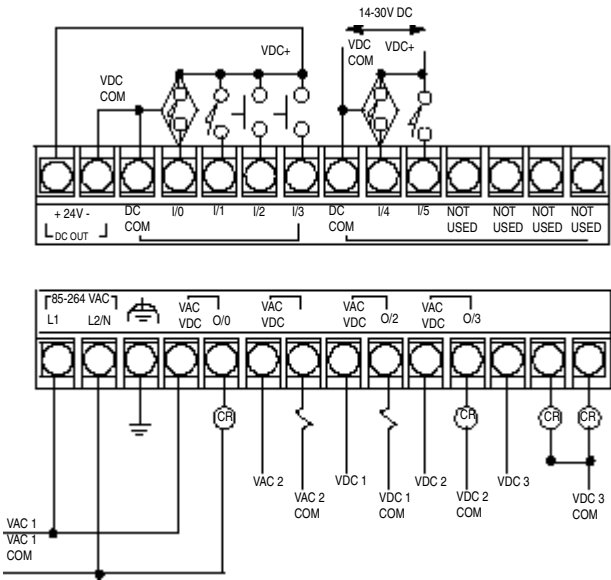
1761-L32AWA Output Voltage Range

| 0V ac | 5V ac           | 264V ac |
|-------|-----------------|---------|
| 0V dc | 5V dc           | 125V dc |
| ?     | Operating Range |         |



1761-L10BWA Wiring Diagram (Sinking Input Configuration)

**Note:** Refer to page 2-3 for additional configuration options.



1761-L10BWA Input Voltage Range

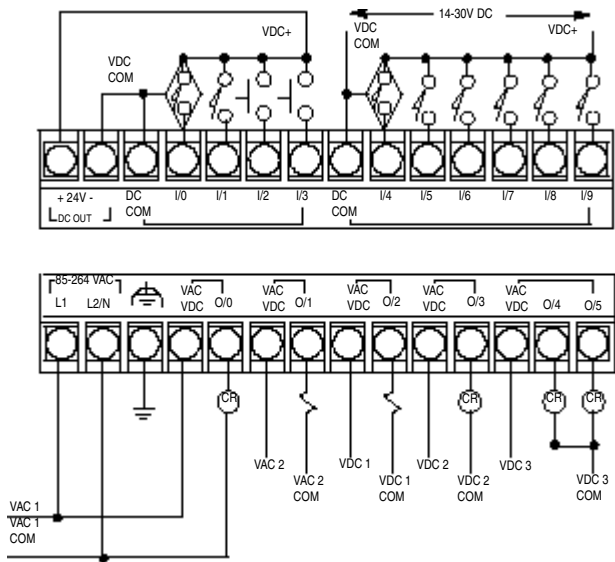
|       |       |        |                         |
|-------|-------|--------|-------------------------|
| 0V dc | 5V dc | 14V dc | 26.4V dc @ 55°C (131°F) |
| 0V dc | 5V dc | 14V dc | 30V dc @ 30°C (86°F)    |
| Off   | ?     | On     |                         |

1761-L10BWA Output Voltage Range

|       |                 |         |
|-------|-----------------|---------|
| 0V ac | 5V ac           | 264V ac |
| 0V dc | 5V dc           | 125V dc |
| ?     | Operating Range |         |

1761-L16BWA Wiring Diagrams (Sinking Input Configuration)

**Note:** Refer to page 2-3 for additional configuration options.



1761-L16BWA Input Voltage Range

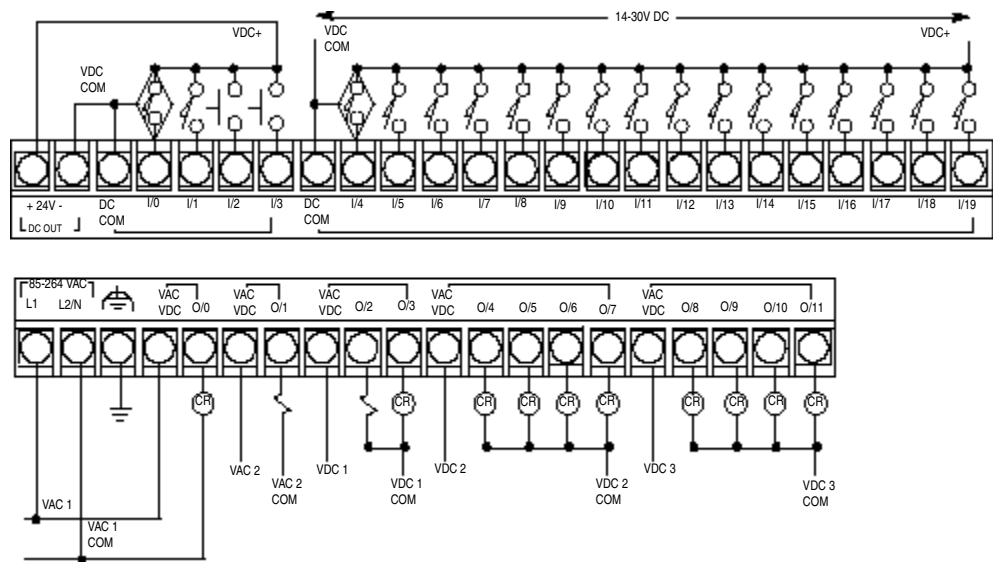
|       |       |        |                         |
|-------|-------|--------|-------------------------|
| 0V dc | 5V dc | 14V dc | 26.4V dc @ 55°C (131°F) |
| 0V dc | 5V dc | 14V dc | 30V dc @ 30°C (86°F)    |
| Off   | ?     | On     |                         |

1761-L16BWA Output Voltage Range

|       |                 |         |
|-------|-----------------|---------|
| 0V ac | 5V ac           | 264V ac |
| 0V dc | 5V dc           | 125V dc |
| ?     | Operating Range |         |

1761-L32BWA Wiring Diagram (Sinking Input Configuration)

**Note:** Refer to page 2-4 for additional configuration options.



1761-L32BWA Input Voltage Range

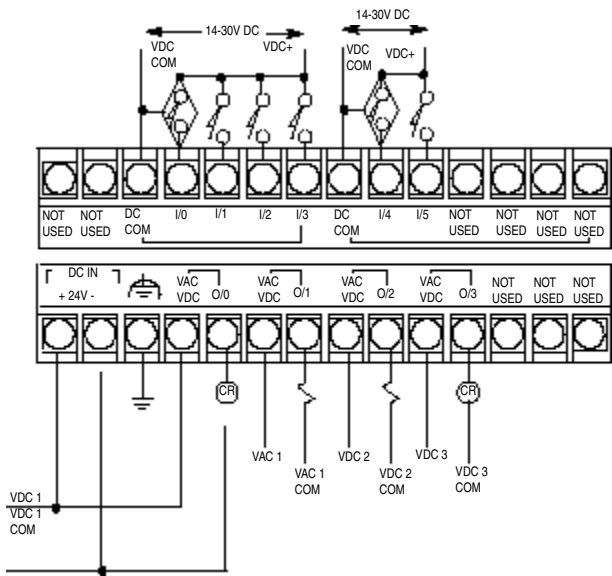
|       |       |        |                         |
|-------|-------|--------|-------------------------|
| 0V dc | 5V dc | 14V dc | 26.4V dc @ 55°C (131°F) |
| 0V dc | 5V dc | 14V dc | 30V dc @ 30°C (86°F)    |
| Off   | ?     | On     |                         |

1761-L32BWA Output Voltage Range

|       |                 |         |
|-------|-----------------|---------|
| 0V ac | 5V ac           | 264V ac |
| 0V dc | 5V dc           | 125V dc |
| ?     | Operating Range |         |

1761-L10BWB Wiring Diagram (Sinking Input Configuration)

**Note:** Refer to page 2-4 for additional configuration options.



1761-L10BWB Input Voltage Range

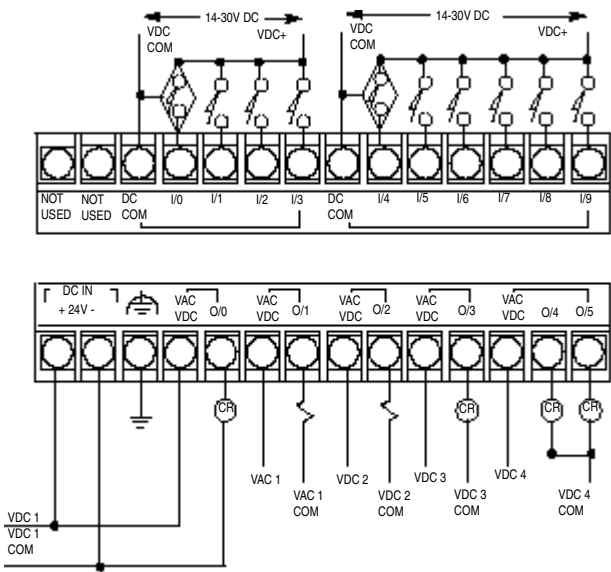
| 0V dc | 5V dc | 14V dc | 26.4V dc @ 55°C (131°F) |
|-------|-------|--------|-------------------------|
| Off   | ?     | On     |                         |

1761-L10BWB Output Voltage Range

| 0V ac<br>0V dc | 5V ac<br>5V dc  | 264V ac<br>125V dc |
|----------------|-----------------|--------------------|
| ?              | Operating Range |                    |

1761-L16BWB Wiring Diagram (Sinking Input Configuration)

**Note:** Refer to page 2-4 for additional configuration options.



1761-L16BWB Input Voltage Range

| 0V dc | 5V dc | 14V dc | 26.4V dc @ 55°C (131°F) |
|-------|-------|--------|-------------------------|
| Off   | ?     | On     |                         |

1761-L16BWB Output Voltage Range

| 0V ac<br>0V dc | 5V ac<br>5V dc  | 264V ac<br>125V dc |
|----------------|-----------------|--------------------|
| ?              | Operating Range |                    |