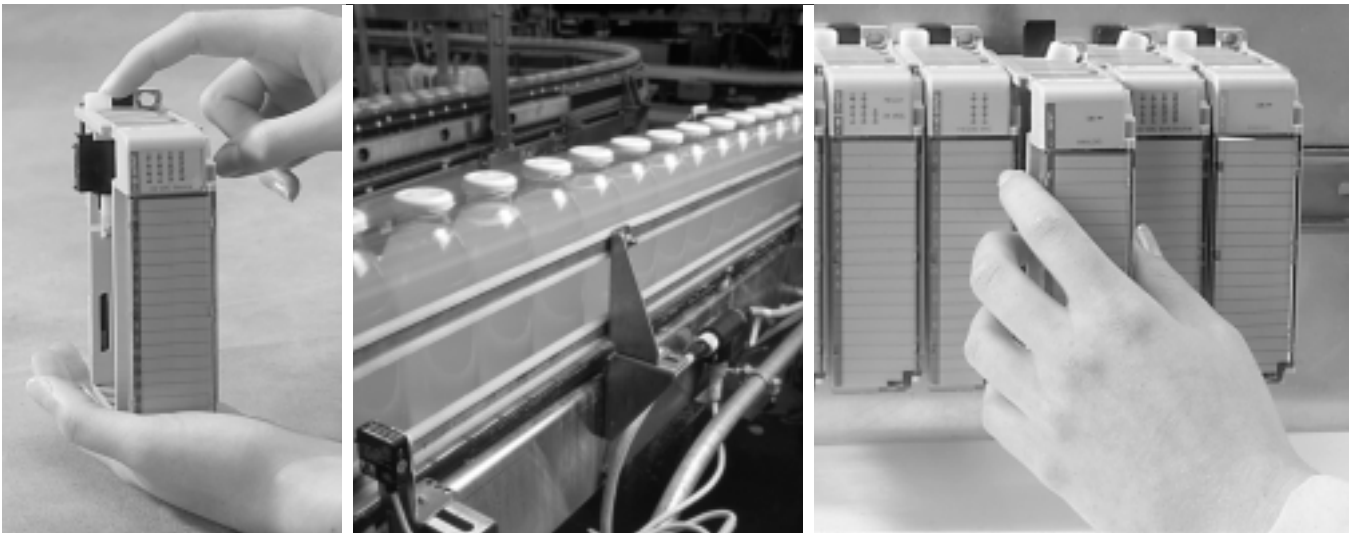




# 1769 Compact Discrete Input/Output Modules

(Bulletin 1769)



Compact I/O is a new PLC-style platform offering industry-leading price and performance. It utilizes the latest design technology for superior performance, excellent functionality, and ease of use.

## Value Focused

- rackless design eliminates added system costs and inventory
- modular, high-density footprint shrinks panel space requirements
- front insertion and removal cuts assembly and replacement time

## Innovative Design

- unique case ensures a strong, mechanical connection between modules
- integral high-performance I/O bus
- software keying to prevent incorrect positioning within the system

## Versatile Architecture

- modular system allows mixing modules to suit the application
- feature-rich I/O functionality to address a wide range of applications
- AC/DC relay, 24V dc, and 120/240V ac voltages

## Global Solution

- modules can be DIN rail or panel mounted
- removable terminal blocks with finger-safe covers
- UL and C-UL (CSA) certified — rated for use in Class I, Division 2 hazardous locations
- CE compliant for all applicable directives

## Contents

You will find the following information within this publication:

Discrete I/O Module Summary .....	2
Applications .....	3
Features and Benefits .....	4
I/O Module Operation .....	6
Terms Used in the Specification Tables .....	8
Specifications .....	10
Wiring Diagrams .....	17
Replacement Parts .....	21
Allen-Bradley Support .....	22

## Discrete I/O Module Summary

Compact I/O offers a variety of discrete I/O choices. They are listed below:

Voltage Category	Catalog Number	Input/Output	I/O Points	Module Description
<b>AC Modules</b>				
100/120V ac	<b>1769-IA16</b>	Input	16	120V ac Input Module
100/120V ac individually isolated	<b>1769-IA8I<sup>(1)</sup></b>	Input	8	Isolated 120V ac Input Module
200/240V ac	<b>1769-IM12</b>	Input	12	240V ac Input Module
100 to 240V ac	<b>1769-OA8</b>	Output	8	120/240V ac Output Module
<b>DC Modules</b>				
24V dc sinking/sourcing	<b>1769-IQ16</b>	Input	16	Current Sinking/Sourcing 24V DC Input Module
24V dc sinking/sourcing input AC/DC normally open relay outputs	<b>1769-IQ6XOW4</b>	Input/Output Combination	6 inputs 4 outputs	Combination Input/Output Module
24V dc sourcing	<b>1769-OB16</b>	Output	16	Current Sourcing 24V DC Output Module
24V dc sinking	<b>1769-OV16</b>	Output	16	Current Sinking 24V DC Output Module
<b>AC/DC Modules</b>				
AC/DC normally open relay	<b>1769-OW8</b>	Output	8	AC/DC Relay Output Module
AC/DC normally open relay individually isolated	<b>1769-OW8I<sup>(1)</sup></b>	Output	8	Isolated AC/DC Relay Output Module

<sup>(1)</sup> This is a new catalog item and may not be available until September 1999. Contact your local Allen-Bradley representative for availability.

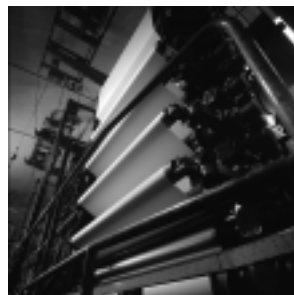
## Applications

Compact I/O enables expansion of MicroLogix™ 1500 packaged controllers to over 100 I/O points. Up to 8 modules can be directly addressed by the controller. Easy point-and-click I/O configuration is done using RSLogix 500™ programming software (Version 3.01 or later). In the future, 1769 Compact I/O will be available for distributed applications using DeviceNet™ and ControlNet™ adapters.



When used with the appropriate controller, Compact I/O provides solutions for the following industries.

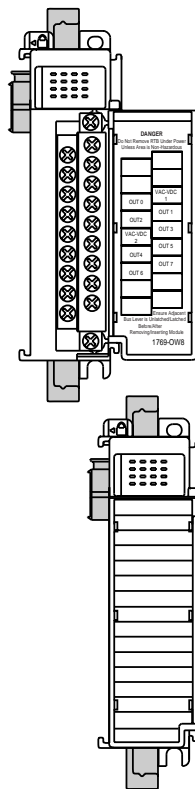
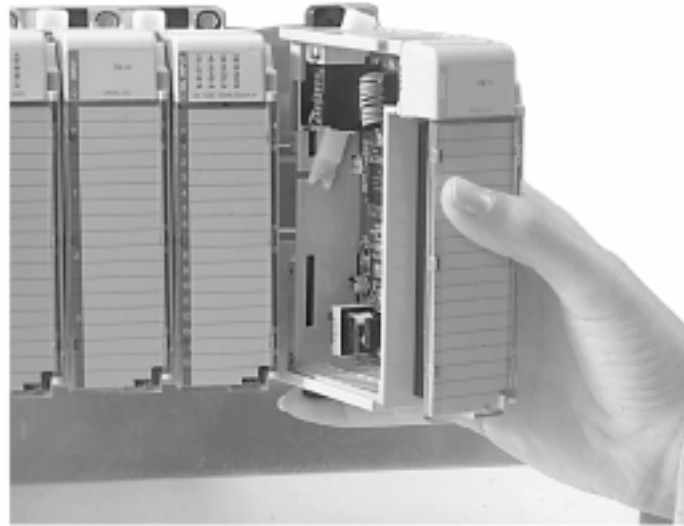
- Material Handling (Distributed Processing)
- Assembly Machines
- Food Processing
- Packaging
- RTU applications - (SCADA)
- Water/Waste Water - Pumping/Filtering
- HVAC/Energy Management
- Oven Control
- Pharmaceuticals



# AB Parts

## Features and Benefits

Rackless I/O provides many features and benefits. Since there is no rack to size (or buy!) this expansion platform grows to meet the requirements of your application. No other PLC-style system provides rackless I/O with front insertion and removal. Front insertion and removal speeds initial system assembly and module replacement. There is no need to buy separate parts such as module-to-module bus connectors or mounting plates.



**LEDs indicate the status of each I/O point.** LEDs illuminate to assist you in troubleshooting when the proper signal is received at an input terminal, or when power is applied to an output terminal.

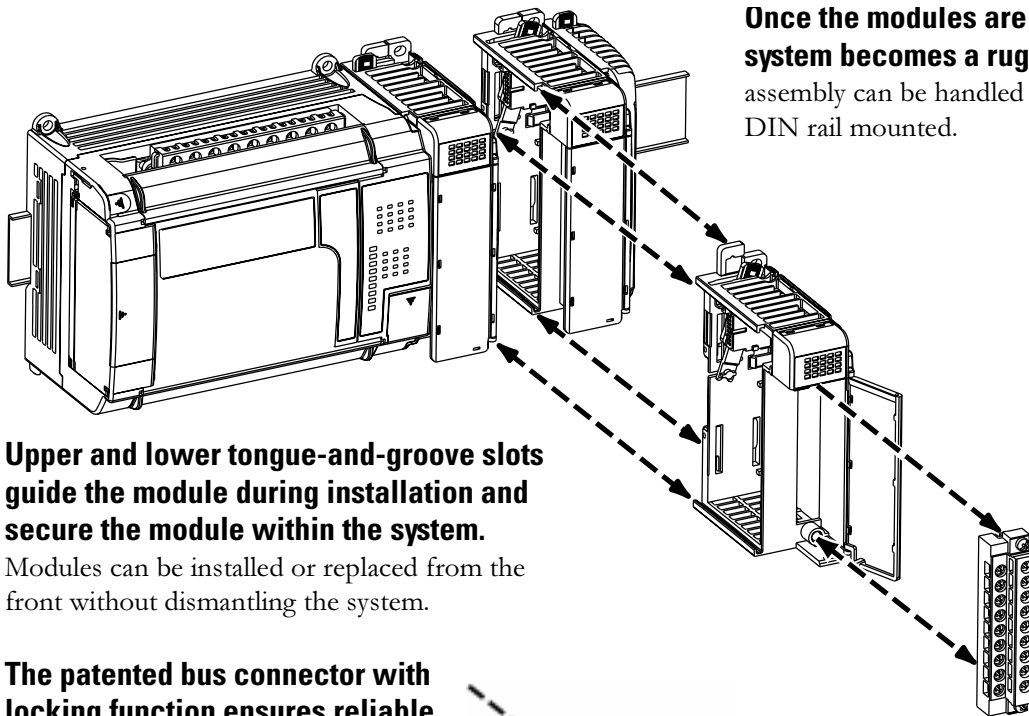
**Terminal identification diagrams on each module.** Terminal identification diagrams are located on each module, making terminal identification easier.

**Barrier-type terminal blocks provided on all modules.** Each terminal block features a barrier on three sides of each terminal to help prevent accidental shorting of field wiring.

**Module terminal blocks have finger-safe covers.** This style of terminal block meets U.S. and European market needs.

**The module door holds a write-on label.** The clear door and removable label allow you to put your own unique I/O information on the label and view it with the door closed.

**Modules have upper and lower panel mounting tabs, as well as latches for DIN rail mounting.** Upper and lower panel mounting tabs and DIN latches allow true front insertion and removal. DIN rail or panel mounting capability meets the needs of a world-wide market.



**Once the modules are locked together, the system becomes a rugged assembly.** The entire assembly can be handled as a unit until it is panel or DIN rail mounted.

**Upper and lower tongue-and-groove slots guide the module during installation and secure the module within the system.**

Modules can be installed or replaced from the front without dismantling the system.

**The patented bus connector with locking function ensures reliable module and system communication.**

The lever of the bus connector has a mechanical detent that latches and locks the lever in place. This system provides superior performance in vibration sensitive applications.



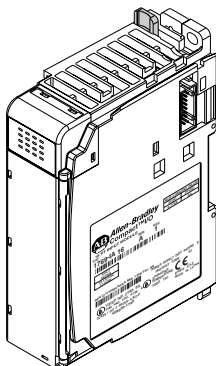
**Removable terminal blocks help ease the wiring task.** Removable terminal blocks allow you to replace the module without rewiring it.

**Self-lifting field-wire pressure plates cut installation time.** Wiring terminals have self-lifting pressure plates to secure two #14 AWG field wires.

**A color bar is provided on the front of the module.** Modules are color coded according to voltage level and input or output function for quick identification.

**Digital and field circuits are optically isolated.** All modules feature isolation between digital and field circuits, resulting in increased noise immunity and limited damage to your system due to an electrical malfunction of the field device.

**All modules carry certification by UL and C-UL.** Certification includes Class I, Division 2 Hazardous Location, Groups A, B, C, D. All modules are also CE compliant for all applicable directives



# AB Parts

## I/O Module Operation

### Power Supply Requirements

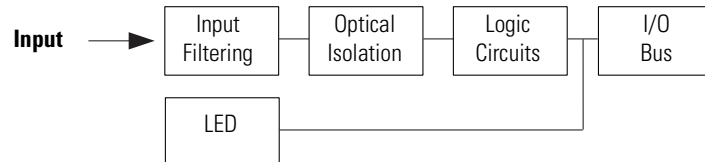
Discrete modules receive power through the I/O bus from the associated power supply. Refer to the individual module specifications for the current required from the power supply to operate the module. You should total the current requirements for all the modules in the system to avoid overloading the power supply.

### Input Modules

An input module responds to an input signal in the following manner:

1. 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.
2. Optical isolation shields logic circuits from possible damage due to electrical transients.
3. Logic circuits process the signal.
4. An input LED turns on or off indicating the status of the corresponding input device.

**Figure 1: Response to Input Signal**

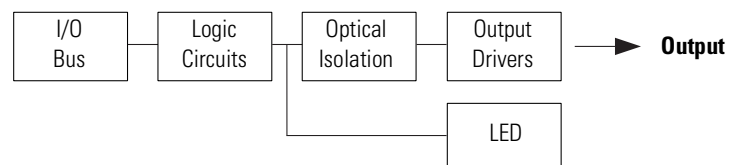


### Output Modules

An output module controls the output signal in the following manner:

1. Logic circuits determine the output status.
2. An output LED indicates the status of the output signal.
3. Optical isolation separates module logic and bus circuits from field power.
4. The output driver turns the corresponding output on or off.

**Figure 2: Control of Output Signal**



## Surge Suppression

Most output modules have built-in surge suppression to reduce the effects of high-voltage transients. However, we recommend that you use an additional suppression device if an output is being used to control inductive devices, such as:

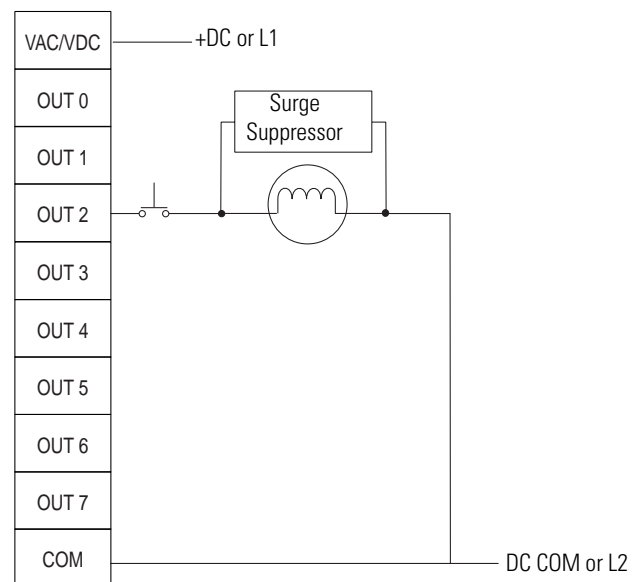
- relays
- motor starters
- solenoids
- motors

Additional suppression is especially important if your inductive device is in series with or parallel to hard contacts, such as:

- push buttons
- selector switches

By adding a suppression device directly across the coil of an inductive device, you reduce the effects of voltage transients caused by interrupting the current to that inductive device and prolong the life of the switch contacts. The diagram below shows an output module with a suppression device.

**Figure 3: AC or DC Output Module Surge Suppression**



Recommended surge suppressors are provided in the specification table on page 12.

## Terms Used in the Specification Tables

The following terms are used in the specification tables starting on page 10.

**Bus Current Draw (max.)** — The amount of current the module requires from the I/O bus power supply.

**Continuous Output Current per Common (max.)** — The maximum current for each common point. The sum of the output current for each point should not exceed this value.

**Continuous Output Current Per Module (max.)** — The maximum current for each module. The sum of the output current for each point should not exceed this value.

**Continuous Output Current per Point (max.)** — The maximum current each output is designed to continuously supply to a load.

**I/O Heat Dissipation** — The maximum heat in watts generated by an I/O module with all points energized.

**IEC Input Compatibility** — Defines the input on and off states for various input voltage ranges.

**Inrush Current (input max.)** — The temporary surge current drawn when an input is initially energized.

**Isolation** — A test voltage applied between circuits. The test voltage is based on the rated working voltage of the circuits.

**Nominal Impedance** — The average impedance of the input point.

**Off-State Current (max.)** — For input circuits, the maximum amount of leakage current allowed from an input device that will keep the module's input circuits in their off state.

**Off-State Leakage (max.)** — For output circuits, the maximum amount of current present at the output terminal when the output circuit is in its off state.

**Off-State Voltage (max.)** — The maximum input voltage level detected as an off condition by the input module.

**On-State Current (min.)** — The minimum (lowest) current at which an input point becomes energized.

**On-State Voltage (min.)** — The minimum (lowest) voltage at which an input point becomes energized.

**On-State Voltage Drop (max.)** — The voltage developed across the output driver circuit during the on state at maximum load current.

**Operating Voltage Range** — For inputs, the voltage range needed for the input to be in the on state. For outputs, the allowable range of user-supplied voltage.



---

**Power Supply Distance Rating** — The maximum number of modules that can separate the system power supply and the I/O module under review.

**Signal Delay (max.) – resistive load** — For inputs, the response time required to transmit the circuit status from the field logic to the digital logic. For outputs, the time required to transmit the circuit status from digital logic to the output driver.

**Sinking/Sourcing** — Describes a current signal flow relationship between field input and output devices in a control system and their power supply. Sourcing I/O modules supply (or source) current to sinking field devices. Sinking I/O modules receive (or sink) current from sourcing field devices. Field devices connected to the negative side (DC Common) of the field power supply are sinking field devices. Field devices connected to the positive side (+V) of the field supply are sourcing field devices.

**Surge Current (max.)** — The temporarily large current drawn by an inductive output device when it is initially energized.

**Voltage Category** — The nominal voltage used to describe the module.

## Specifications

### General Specifications

Specification	Value
Dimensions	118 mm (height) x 87 mm (depth) x 35 mm (width) height including mounting tabs is 138 mm  4.65 in. (height) x 3.43 in (depth) x 1.38 in (width) height including mounting tabs is 5.43 in.
Approximate Shipping Weight (with carton)	300g (0.66 lbs.)
Storage Temperature	-40°C to +85°C (-40°F to +185°F)
Operating Temperature	0°C to +60°C (32°F to +140°F)
Operating Humidity	5% to 95% non-condensing
Operating Altitude	2000 meters (6561 feet)
Vibration	Operating: 10 to 500 Hz, 5G, 0.015 in. peak-to-peak Relay Operation: 2G
Shock	Operating: 30G panel mounted (20G DIN rail mounted) Relay Operation: 7.5G panel mounted (5G DIN rail mounted) Non-Operating: 40G panel mounted (30G DIN rail mounted)
Agency Certification	C-UL certified (under CSA C22.2 No. 142) UL 508 listed CE compliant for all applicable directives
Hazardous Environment Class	Class I, Division 2, Hazardous Location, Groups A, B, C, D (UL 1604, C-UL under CSA C22.2 No. 213)
Radiated and Conducted Emissions	EN50081-2 Class A
<i>Electrical /EMC:</i>	<i>All discrete I/O modules have passed testing at the following levels:</i>
ESD Immunity (IEC1000-4-2)	4 kV contact, 8 kV air, 4 kV indirect
Radiated Immunity (IEC1000-4-3)	10 V/m, 80 to 1000 MHz, 80% amplitude modulation, +900 MHz keyed carrier
Fast Transient Burst (IEC1000-4-4)	2 kV, 5 kHz
Surge Immunity (IEC1000-4-5)	2 kV common mode, 1 kV differential mode
Conducted Immunity (IEC1000-4-6)	10V, 0.15 to 80 MHz <sup>(1)</sup>

<sup>(1)</sup> Conducted Immunity frequency range may be 150 kHz to 30 MHz if the Radiated Immunity frequency range is 30 MHz to 1000 MHz.

## Input Module Specifications

Specification	1769-IA16	1769-IA8I	1769-IM12	1769-IQ16
Voltage Category	100/120V ac	100/120V ac	200/240V ac	24V dc (sink/source)
Operating Voltage Range	79V ac to 132V ac at 47 Hz to 63 Hz	79V ac to 132V ac at 47 Hz to 63 Hz	159V ac to 265V ac at 47 Hz to 63 Hz	10 to 30V dc at 30°C (86°F) 10 to 26.4V dc at 60°C (140°F)
Number of Inputs	16	8	12	16
Bus Current Draw (max.)	115 mA at 5V dc (0.575W)	90 mA at 5V dc (0.45W)	100 mA at 5V dc (0.500W)	115 mA at 5V dc (0.575W)
Heat Dissipation <sup>(1)</sup>	3.30 Total Watts	1.81 Total Watts	3.65 Total Watts	3.55 Total Watts
Off-State Voltage (max.)	20V ac	20V ac	40V ac	5V dc
Off-State Current (max.)	2.5 mA	2.5 mA	2.5 mA	1.5 mA
On-State Voltage (min.)	79V ac	79V ac	159V ac	10V dc
On-State Current (min.)	5.0 mA at 79V ac	5.0 mA at 79V ac	5.0 mA at 159V ac	2.0 mA at 10V dc
Inrush Current (max.)	250 mA <sup>(2)</sup>	250 mA <sup>(2)</sup>	250 mA <sup>(3)</sup>	250 mA
Nominal Impedance	12K $\Omega$ at 50 Hz 10K $\Omega$ at 60 Hz	12K $\Omega$ at 50 Hz 10K $\Omega$ at 60 Hz	27K $\Omega$ at 50 Hz 23K $\Omega$ at 60 Hz	3K $\Omega$
IEC Input Compatibility	Type 1+	Type 1+	Type 1+	Type 1+
Power Supply Distance Rating	8 (The module may not be more than 8 modules away from the system power supply.)			

<sup>(1)</sup> The maximum heat in Watts generated by an I/O module with all points energized.

<sup>(2)</sup> 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 6.8K  $\Omega$  (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.

<sup>(3)</sup> 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 15K (1.5W 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 176V 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.

## Output Module Specifications

Specification	1769-OA8	1769-OB16	1769-OV16	1769-OW8	1769-OW8I
Voltage Category	100 to 240V ac	24V dc	24V dc	AC/DC normally open relay	AC/DC normally open relay
Operating Voltage Range	85V ac to 265V ac at 47 to 63 Hz	20.4V dc to 26.4V dc (source)	20.4V dc to 26.4V dc (sink)	5 to 265V ac 5 to 125V dc	5 to 265V ac 5 to 125V dc
Number of Outputs	8	16	16	8	8
Bus Current Draw (max.)	145 mA at 5V dc (0.725W)	200 mA at 5V dc (1.0W)	200 mA at 5V dc (1.0W)	125 mA at 5V dc (0.625W) 100 mA at 24V dc (2.4W)	125 mA at 5V dc (0.625W) 100 mA at 24V dc (2.4W)
Heat Dissipation <sup>(1)</sup>	2.12 Total Watts	2.11 Total Watts	2.06 Total Watts	2.83 Total Watts	2.83 Total Watts
Signal Delay (max.) – resistive load	turn-on = 1/2 cycle <sup>(2)</sup> turn-off = 1/2 cycle	turn-on = 0.1 ms turn-off = 1.0 ms	turn-on = 0.1 ms turn-off = 1.0 ms	turn-on = 10 ms turn-off = 10 ms	turn-on = 10 ms turn-off = 10 ms
Off-State Leakage (max.)	2.0 mA at 132V ac <sup>(3)</sup> 2.5 mA at 265V ac	1.0 mA at 26.4V dc <sup>(4)</sup>	1.0 mA at 26.4V dc <sup>(4)</sup>	0 mA	0 mA
On-State Current (min.)	10.0 mA	1.0 mA	1.0 mA	10 mA at 5V dc	10 mA at 5V dc
On-State Voltage Drop (max.)	1.5V dc at 0.5 A	1.0V dc at 1A	1.0V dc at 1.0A	n/a	n/a
Continuous Current per Point (max.)	0.25A at 60°C (140°F) 0.5A at 30°C (86°F)	0.5A at 60°C (140°F) 1.0A at 30°C (86°F)	0.5A at 60°C (140°F) 1.0A at 30°C (86°F)	2.5A (See "Relay Contact Ratings" on page 15.)	2.5A (See "Relay Contact Ratings" on page 15.)
Continuous Current per Common (max.)	n/a	n/a	n/a	8A	2.5A
Continuous Current Per Module (max.)	2.0 A at 60°C (140°F) 4.0 A at 30°C (86°F)	4.0A at 60°C (140°F) 8.0A at 30°C (86°F)	4.0A at 60°C (140°F) 8.0A at 30°C (86°F)	16A	16A
Surge Current (max.)	10.0A (Repeatability is once every 2 seconds for a duration of 25 msec.) <sup>(5)</sup>	2.0A (Repeatability is once every 2 seconds for a duration of 10 msec.) <sup>(6)</sup>	2.0A (Repeatability is once every 2 seconds for a duration of 10 msec.) <sup>(6)</sup>	n/a	n/a
Power Supply Distance Rating	8 (The module may not be more than 8 modules away from the system power supply.)				

<sup>(1)</sup> The maximum heat in Watts generated by an I/O module with all points energized.

<sup>(2)</sup> **Turn On Type** - Triac outputs turn ON at any point in the ac line cycle, and turn OFF at ac line zero cross.

<sup>(3)</sup> **Recommended Loading Resistor** - 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 15K  $\Omega$ , 2W resistor. For 240V ac operation use a 15K  $\Omega$ , 5W resistor.

<sup>(4)</sup> **Typical Loading Resistor** - To limit the effects of leakage current through solid state outputs, a loading resistor can be connected in parallel with your load. Use a 5.6K ohm, ½ watt resistor for transistor outputs, 24V dc operation.

<sup>(5)</sup> **Surge Suppression** - Connecting surge suppressors across your external load will extend the life of the triac outputs. For additional details, refer to Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

<sup>(6)</sup> **Recommended Surge Suppression** - Use a 1N4004 diode reverse-wired across the load for transistor outputs switching 24V dc inductive loads. For additional details, refer to Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

n/a = not applicable

## Input/Output Module Specifications

Specification	1769-IQ6XOW4
Voltage Category	24V dc (sink/source) inputs AC/DC normally open relay outputs
Operating Voltage Range	inputs: 10 to 30V dc at 30°C (86°F) inputs: 10 to 26.4V dc at 60°C (140°F) outputs: 5 to 265V ac outputs: 5 to 125V dc
Number of Inputs	6
Number of Outputs	4
Bus Current Draw (max.)	105 mA at 5V dc (0.525W) 50 mA at 24V dc (1.200W)
Heat Dissipation	2.75 Total Watts
Off-State Voltage (max.)	5V dc (inputs)
Off-State Current (max.)	1.5 mA (inputs)
On-State Voltage (min.)	10V dc (inputs)
On-State Current (min.)	2.0 mA (inputs)
Inrush Current (max.)	250 mA (inputs)
Nominal Impedance	3K $\Omega$ (inputs)
IEC Input Compatibility	Type 1+ (inputs)
Signal Delay (max.) – resistive load	turn-on = 10 ms turn-off = 10 ms (outputs)
Off-State Leakage (max.)	0 mA (outputs)
On-State Current (min.)	10 mA at 5V dc (outputs)
Continuous Current per Point (max.)	2.5A (outputs) Also see "Relay Contact Ratings" on page 15.
Continuous Current per Common (max.)	8A (outputs)
Power Supply Distance Rating	8 (The module may not be more than 8 modules away from the system power supply.)

## Isolation

Catalog Number	Isolated Groups	Isolation Verified by One of the Following Dielectric Tests
1769-IA16	Group 1: inputs 0 to 15 (internally connected commons)	<b>Input Group to Bus Isolation:</b> 1517V ac for 1 sec. or 2145V dc for 1 sec. 132V ac working voltage (IEC Class 2 reinforced insulation)
1769-IA8I	8 individually isolated inputs	<b>Input Point to Bus Isolation:</b> 1517V ac for 1 sec. or 2145V dc for 1 sec. 132V ac working voltage (IEC Class 2 reinforced insulation) <b>Input Point to Input Point Isolation:</b> 1517V ac for 1 sec. or 2145V dc for 1 sec. 132V ac working voltage (IEC Class 2 reinforced insulation)
1769-IM12	Group 1: inputs 0 to 11 (internally connected commons)	<b>Input Group to Bus Isolation:</b> 1836V ac for 1 sec. or 2596V dc for 1 sec. 265V ac working voltage (IEC Class 2 reinforced insulation)
1769-IQ16	Group 1: inputs 0 to 7 Group 2: inputs 8 to 15 Isolated groups operate in either sink or source configurations.	<b>Input Group to Bus Isolation:</b> 1200V ac for 1 sec. or 1697V dc for 1 sec. 75V dc working voltage (IEC Class 2 reinforced insulation) <b>Input Group to Input Group Isolation:</b> 1200V ac for 1 sec. or 1697V dc for 1 sec. 75V dc working voltage (IEC Class 2 reinforced insulation)
1769-IQ6XOW4	Group 1: inputs 0 to 5 Isolated group operates in either sink or source configurations. Group 2: outputs 0 to 3	<b>Input Group to Bus Isolation:</b> 1200V ac for 1 sec. or 1697V dc for 1 sec. 75V dc working voltage (IEC Class 2 reinforced insulation) <b>Input Group to Output Group Isolation:</b> 1836V ac for 1 sec. or 2596V dc for 1 sec. 265V ac working voltage (basic insulation) 150V ac working voltage (IEC Class 2 reinforced insulation) <b>Output Group to Bus Isolation:</b> 1836V ac for 1 sec. or 2596V dc for 1 sec. 265V ac working voltage (IEC Class 2 reinforced insulation)
1769-OA8	Group 1: outputs 0 to 3 Group 2: outputs 4 to 7	<b>Output Group to Bus Isolation:</b> 1836V ac for 1 sec. or 2596V dc for 1 sec. 265V ac working voltage (IEC Class 2 reinforced insulation) <b>Output Group to Output Group Isolation:</b> 1836V ac for 1 sec. or 2596V dc for 1 sec. 265V ac working voltage (basic insulation) 150V ac working voltage (IEC Class 2 reinforced insulation)
1769-OB16	Group 1: outputs 0 to 15	<b>Output Group to Bus Isolation:</b> 1200V ac for 1 sec. or 1697V dc for 1 sec. 75V dc working voltage (IEC Class 2 reinforced insulation)
1769-OV16	Group 1: outputs 0 to 15	<b>Output Group to Bus Isolation:</b> 1200V ac for 1 sec. or 1697V dc for 1 sec. 75V dc working voltage (IEC Class 2 reinforced insulation)
1769-OW8	Group 1: outputs 0 to 3 Group 2: outputs 4 to 7	<b>Output Group to Bus Isolation:</b> 1836V ac for 1 sec. or 2596V dc for 1 sec. 265V ac working voltage (IEC Class 2 reinforced insulation) <b>Output Group to Output Group Isolation:</b> 1836V ac for 1 sec. or 2596V dc for 1 sec. 265V ac working voltage (basic insulation) 150V ac working voltage (IEC Class 2 reinforced insulation)
1769-OW8I	8 individually isolated outputs	<b>Output Point to Bus Isolation:</b> 1836V ac for 1 sec. or 2596V dc for 1 sec. 265V ac working voltage (IEC Class 2 reinforced insulation) <b>Output Point to Output Point Isolation:</b> 1836V ac for 1 sec. or 2596V dc for 1 sec. 265V ac working voltage (basic insulation) 150V ac working voltage (IEC Class 2 reinforced insulation)

## Relay Contact Ratings

Volts (max.)	Continuous Amps per Point (max.)	Amperes <sup>(1)</sup>		Voltamperes		IEC 947	NEMA ICS 2-125
		Make	Break	Make	Break		
240V ac	2.5A	7.5A	0.75A	1800 VA	180 VA	AC15	C300
120V ac		15A	1.5A				
125V dc	1.0A	0.22A <sup>(2)</sup>		28 VA		DC13	R150
24V dc	2.0A	1.2A <sup>(2)</sup>		28 VA		—	—

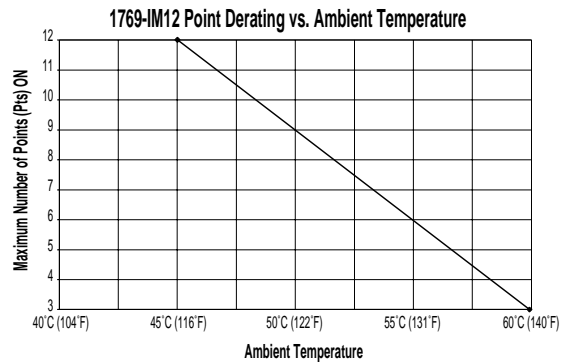
<sup>(1)</sup> **Surge Suppression** - Connecting surge suppressors across your external inductive load will extend the life of the relay contacts. For additional details, refer to Industrial Automation Wiring and Grounding Guidelines, Allen-Bradley publication 1770-4.1.

<sup>(2)</sup> 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 VA/48V dc = 0.58A. For dc voltage applications less than 48V, the make/break ratings for relay contacts cannot exceed 2A.

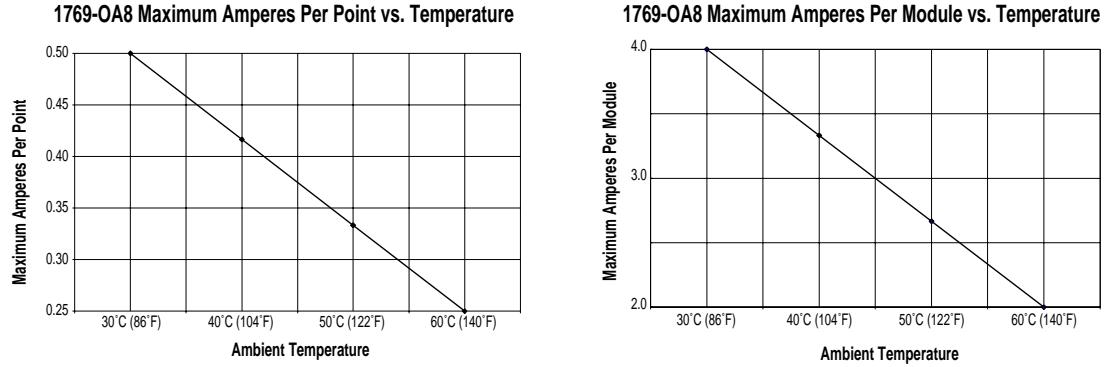
## Temperature Derating

The area within the curve represents the safe operating range for the module under various conditions of user supplied voltages and ambient temperatures.

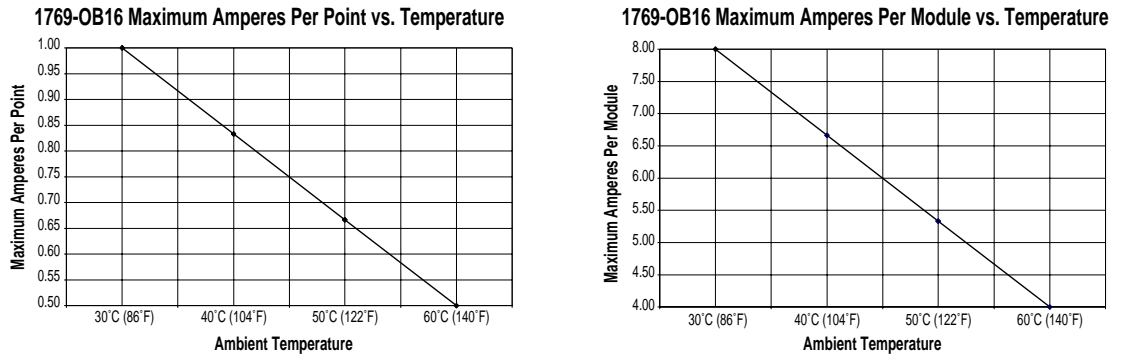
**Figure 4: 1769-IM12 Temperature Derating**



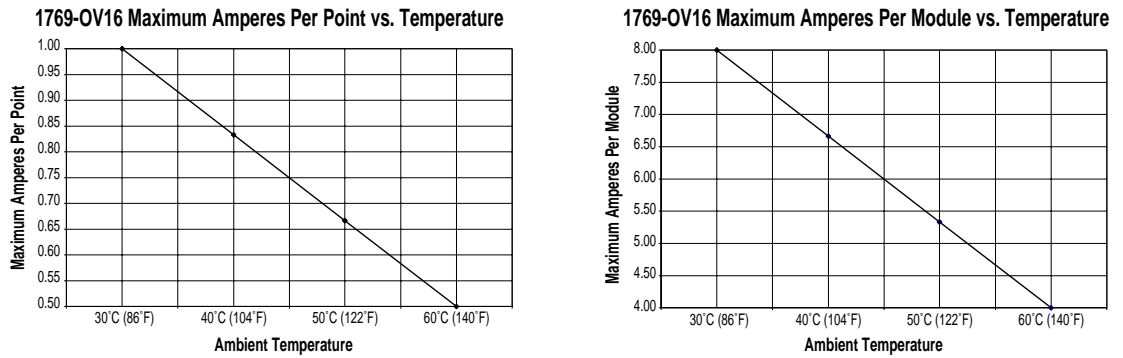
**Figure 5: 1769-OA8 Temperature Derating**



**Figure 6: 1769-OB16 Temperature Derating**



**Figure 7: 1769-OV16 Temperature Derating**


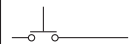






## Wiring Diagrams

## Wiring Symbols

The following symbols are used in the wiring diagrams.

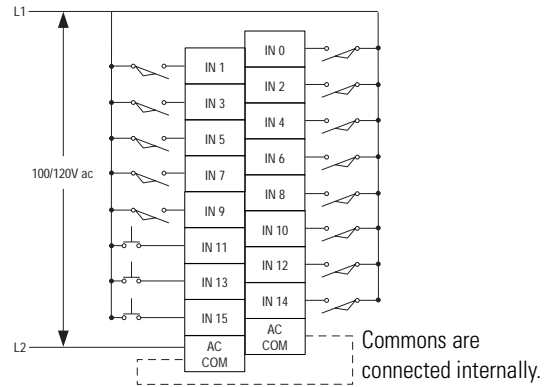
Symbol and Device Name	
	2-wire input device
	push button
	relay coil
	solenoid output

---

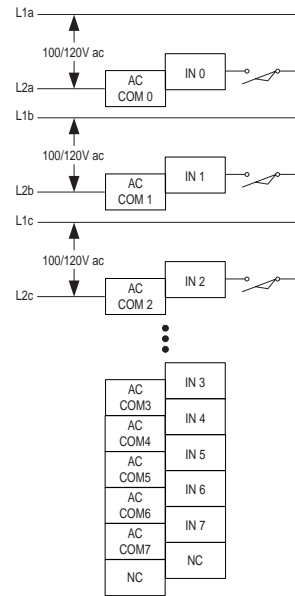
**Important:** The wiring diagrams in this document are examples only. It is not necessary to connect an I/O device to every terminal on an I/O module's terminal block.

---

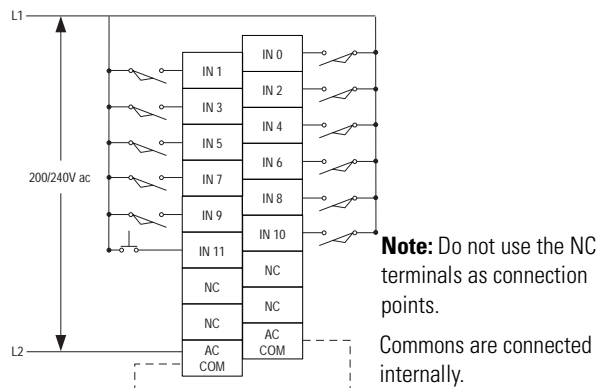
**Figure 8: 1769-IA16 100/120V ac 16-Point Input Module**



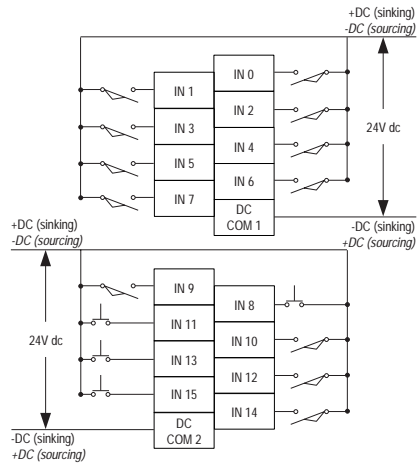
**Figure 9: 1769-IA8I 100/120V ac 8-Point Individually Isolated Input Module**



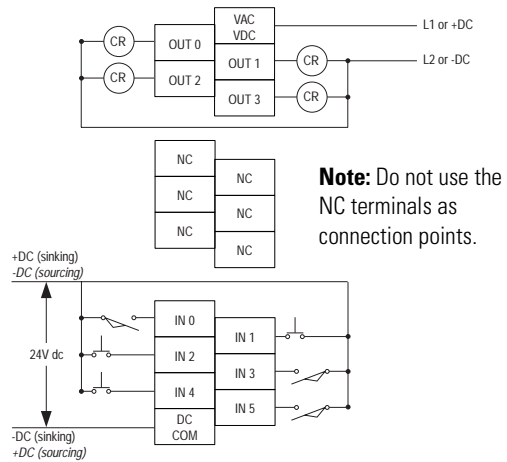
**Figure 10: 1769-IM12 200/240V ac 12-Point Input Module**



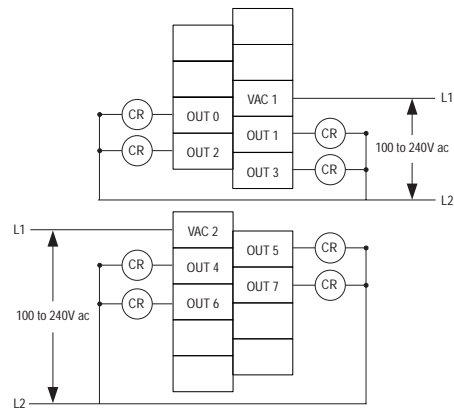
**Figure 11: 1769-IQ16 24V dc Sinking/Sourcing 16-Point Input Module**



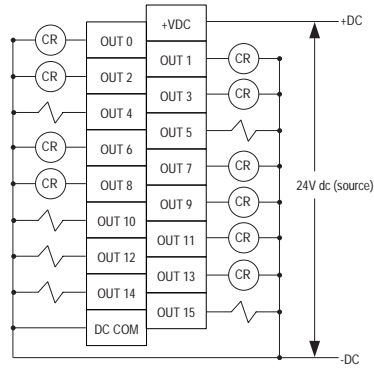
**Figure 12: 1769-IQ6XOW4 24V dc Sinking/Sourcing 6-Point Input, AC/DC 4-Point Normally Open Relay Output Module**



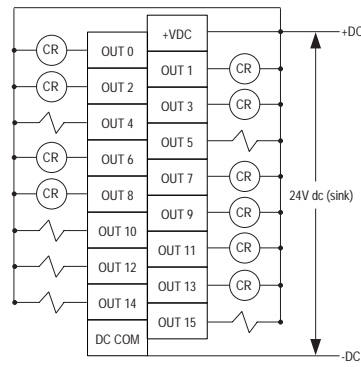
**Figure 13: 1769-OA8 100 to 240V ac 8-Point Output Module**



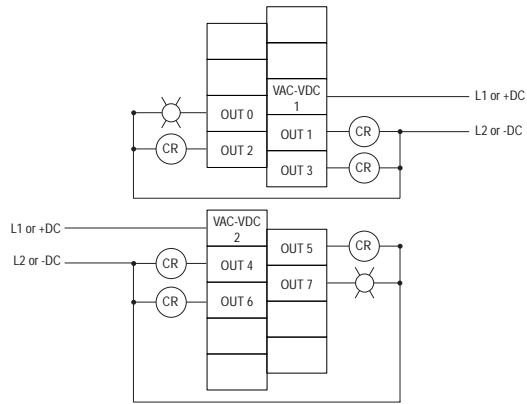
**Figure 14: 1769-OB16 24V dc Sourcing 16-Point Output Module**



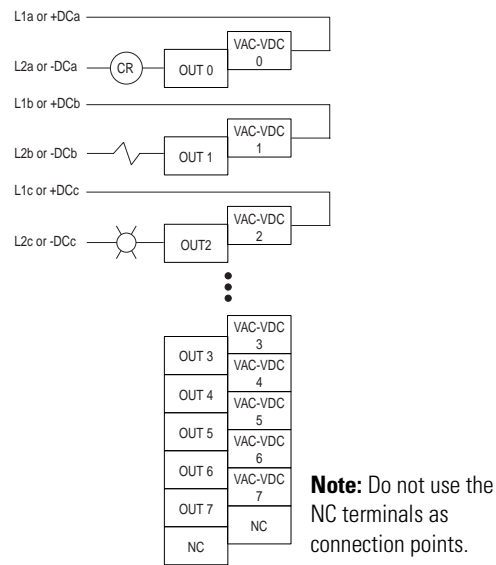
**Figure 15: 1769-OV16 24V dc Sinking 16-Point Output Module**



**Figure 16: 1769-OW8 AC/DC Normally Open Relay 8-Point Output Module**



**Figure 17: 1769-OW8I AC/DC Normally Open Relay Individually Isolated 8-Point Output Module**



## Replacement Parts

The following Compact I/O replacement parts are available:

Catalog Number	Description
1769-RD	Terminal Doors (2 doors per kit)
1769-RL1	Terminal Door Label Kit (includes 2 labels for all current discrete I/O modules)
1769-RL2	Terminal Door Label Kit (includes 2 labels for all analog and specialty I/O modules)
1769-RTBN10	10-Pin NEMA Removable Terminal Block (1 per carton)
1769-RTBN18	18-Pin NEMA Removable Terminal Block (1 per carton)

AB Parts

## Allen-Bradley Support

In today's competitive environment, when you buy any product, you expect that product to meet your needs. You also expect the manufacturer of that product to back it up with the kind of customer service and product support that will prove you made a wise purchase.

As the people who design, engineer, and manufacture your Industrial Automation Control equipment, Allen-Bradley has a vested interest in your complete satisfaction with our products and services.

Allen-Bradley offers support services worldwide, with over 75 Sales/Support Offices, 512 authorized Distributors, and 260 authorized Systems Integrators located throughout the United States alone, plus Allen-Bradley representatives in every major country in the world.

Contact your local Allen-Bradley representative for:

- sales and order support
- product technical training
- warranty support
- support service agreements

MicroLogix, ControlNet, and RSLogix are trademarks of Rockwell Automation.  
DeviceNet is a trademark of Open DeviceNet Vendor Association (ODVA).

---

**Reach us now at [www.rockwellautomation.com](http://www.rockwellautomation.com)**

Wherever you need us, Rockwell Automation brings together leading brands in industrial automation including Allen-Bradley controls, Reliance Electric power transmission products, Dodge mechanical power transmission components, and Rockwell Software. Rockwell Automation's unique, flexible approach to helping customers achieve a competitive advantage is supported by thousands of authorized partners, distributors and system integrators around the world.



**Americas Headquarters**, 1201 South Second Street, Milwaukee, WI 53204, USA, Tel: (1) 414 382-2000, Fax: (1) 414 382-4444  
**European Headquarters SA/NV**, avenue Herrmann Debroux, 46, 1160 Brussels, Belgium, Tel: (32) 2 663 06 00, Fax: (32) 2 663 06 40  
**Asia Pacific Headquarters**, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

**Rockwell  
Automation**

Publication 1769-2.1 - July 1999