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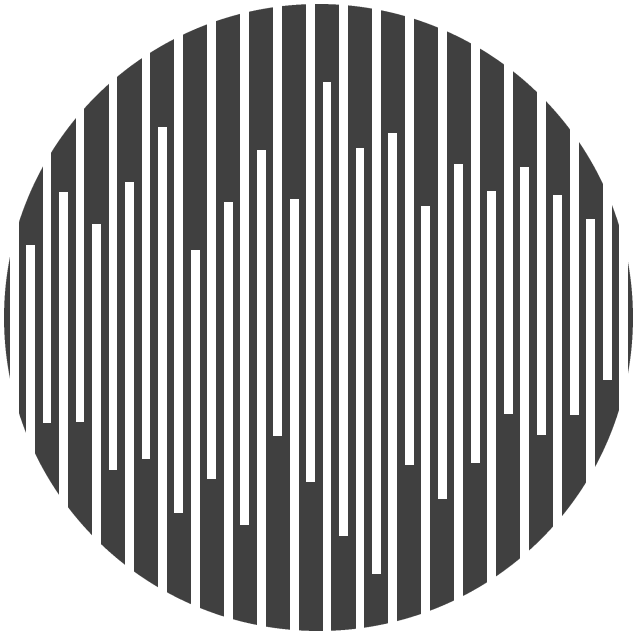
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Modicon
800 Series
Discrete I/O Modules
User Guide

GM–DISC–800 Rev. C

AEG SCHNEIDER AUTOMATION
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MODICON

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Modicon
800 Series Discrete I/O Modules
User Guide

GM–DISC–800 Rev. C

April, 1995

AEG SCHNEIDER AUTOMATION
Modicon • Square D • Telemecanique

AEG Schneider Automation, Inc.
One High Street
North Andover, MA 01845

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Chapter 1
800 Series I/O Modules

- ☐ Overview
- ☐ System Interface
- ☐ I/O Map
- ☐ Grounding Guidelines
- ☐ Installation
- ☐ Quick Start Test
- ☐ Generic Specifications

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1.1 Overview

- ☐ Status indicators
- ☐ Front accessible fuses
- ☐ A module handle permits easy installation and removal
- ☐ Safe, non- -conductive module front permits easy access of test probes
- ☐ Designed for harsh, plant- -floor environments
- ☐ Each point is electrically isolated from logic
- ☐ Removable without disturbing rigid field wiring system
- ☐ Satisfies SWC requirements of IEEE and ANSI guides

Each I/O point is electrically isolated from the controller by an optical coupler. The I/O signals can withstand the severe voltage transients normally encountered in industrial environments without damage to the I/O module or controller. Moreover, the modules satisfy surge withstand capability (SWC) of both IEEE and ANSI guides. All I/O points shut OFF in the event of a communication failure between a Modicon controller and the I/O module. This occurs within 300 ms of the signal loss. The module's ACTIVE indicator will also shut OFF.

The I/O modules can be inserted into any I/O location in the 800 series I/O structure. The module slides easily into the module housing and does not interfere with any other module's operation.

The module's protective case shields the logic circuitry from any electrical interference and minimizes the possibility of any noise being coupled from the user side of the circuitry to adjacent modules. A ground is automatically established when the module is inserted into the housing. This low impedance earth ground originates from the housing's backplane.

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1.2 System Interface

When used with a Modicon PLC in a remote configuration, the appropriate RIO Adapter module or RIO Adapter module with ASCII, must be present in the I/O rack. (See instructions shipped with the Modicon adapter modules.)

Indicators

The applicable indicators on the front of the module shows the status as listed below.

Indicator	Color	Meaning when ON or Blinking
Active	Green	The module has passed its power diagnostics without error—it remains ON until background diagnostics detect an error condition, loss of internal voltage, or loss of communication with PLC
Discrete I/O	Red	Power is available at the output of the module for use by field devices
Blown Fuse	Red	A fuse is blown
Over Range	Red	One or more inputs have exceeded the valid input range
Under Range	Red	One or more inputs have dropped below the valid input range
Field Power	Red	Field power is supplied, and OK

☞ **Note:** The active indicator does not represent the condition of the I/O points. The indicator may be lit with one or more of the I/O points not working properly.

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1.3 I/O Map

The I/O Map is used to direct the flow of data between the various I/O modules and the logic program. It is the tie between the references used in the logic program and the I/O module connection points.

1.3.1 800 Series Configuration

The 800 Series I/O Map lets you match the 984 controller I/O addresses with what will be installed or with what actually exists in the field. The I/O Map also tells the controller how to use an input signal in user logic, and, where to send an output signal. The format of register data (BCD -- binary coded decimal or BIN binary) is specified on this screen. The screen objective is to load the card selections and reference number selections to complete the I/O configuration.

In the Configuration Overview, you must specify the number of I/O drops and I/O modules. These numbers are checked when entries to the I/O Map are made. The Modsoft Runtime files contain descriptions of the different kinds of modules. GCNFTCOP.SYS includes the description of ”B8” modules, with module number, number of inputs, outputs descriptor and identifier. Refer to your Modsoft software.

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1.4 Grounding Guidelines

- To have proper case ground, the housing must be connected to earth ground
- When using shielded field circuit wires, do not ground the shield at both ends of the circuit (i.e., the module and the field device)
- Single point grounding should be used where possible
- Priority for shield grounding:
  - Field side device case, if metal
  - Earth ground, as close to the field side device or module as possible
  - From shield to frame

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1.5 Installation

Procedure **How to Install an 800 Series I/O Module**

Installation of your 800 Series module involves: unpacking the module, wiring the field connector, installing key pins in the housing, and mounting the module in the housing.

Step 1 Remove the module from its shipping box and check for damage. If damaged, contact your salesman or distributor for correct replacement procedure.

Step 2 Ensure power to housing is OFF.

Step 3 Designate the housing slot for this module.

Step 4 Locate the required connector assembly. (Modicon Part number AS--8534--000 or AS--8535--000). This assembly consists of one or two 20--pin connectors.

☞ **Note:** Remove the keying tabs on the connector prior to installing the module.

Step 5 Remove the old duct, if a different connector/cabling duct assembly is already present in the designated housing slot.

Step 6 (Optional Step) If there is a module to the immediate left of the slot designated for the module's installation, temporarily remove it.

Step 6 As shown in Figure 1, Mount the new field connector/duct assembly to the left of the module's designated housing slot and secure it to the housing top and bottom using the two Phillips head machine screws provided.

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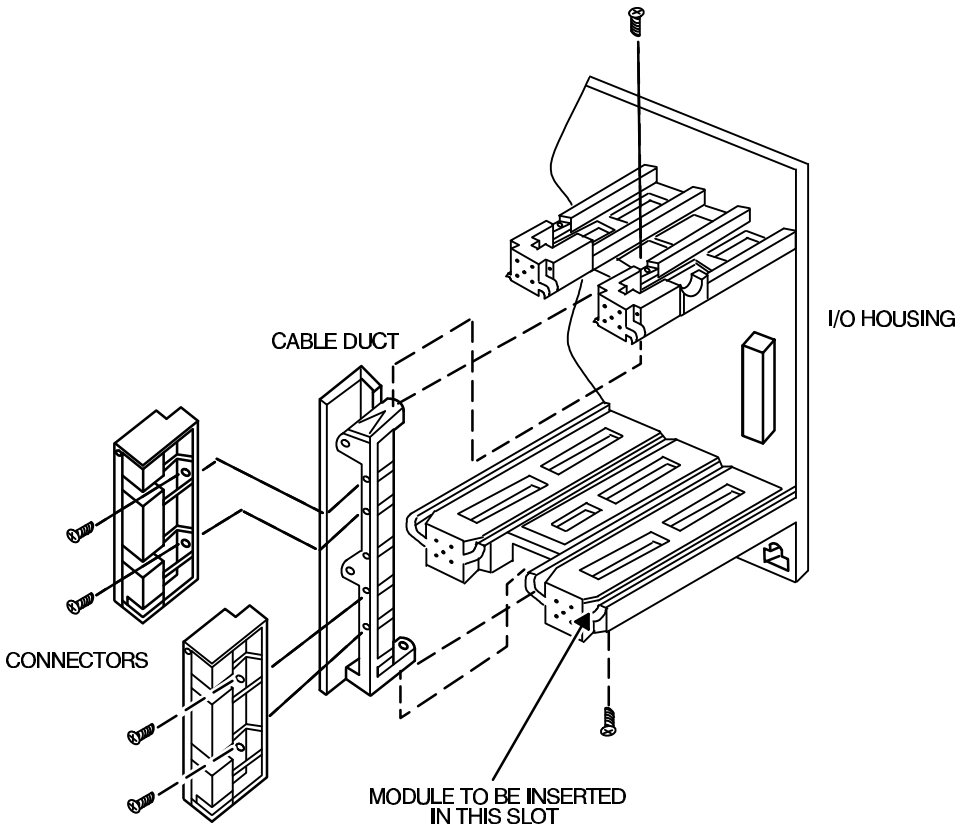


Figure 1 Cabling Duct/Field Connector Assembly

1.5.1 Field Connection

☞ **Note:** When performing this step, refer to the appropriate chapter in this manual of the 800 Series module you are installing for the appropriate connector type.

Step 7 Connect field side wiring to proper pins on the field connector.

☞ **Note:** Terminals accept either two 141 AWG size wires or one 12 AWG size wire/point.

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Caution: Neat and proper workmanship methods by qualified personnel must be employed when making connections to this module. Take extra precautions if you are using stranded wire. Ensure that loose or projecting strands do not short circuit or ground the other terminals. We recommend that you use solid wire.

Step 8 Re- -install any module temporarily removed.

Note: When performing this step, refer to Appendix A for illustrations of optional key pin patterns for the 800 Series module you are installing. This Appendix contains key pin patterns for all 800 series I/O modules.

Step 9 When using key pins (provided with housing shipment), install them above and below the housing slot selected for this module's installation.

Figure 2 shows this optional mechanical keying system used to match the module type with a particular slot in the housing to ensure proper module replacement.

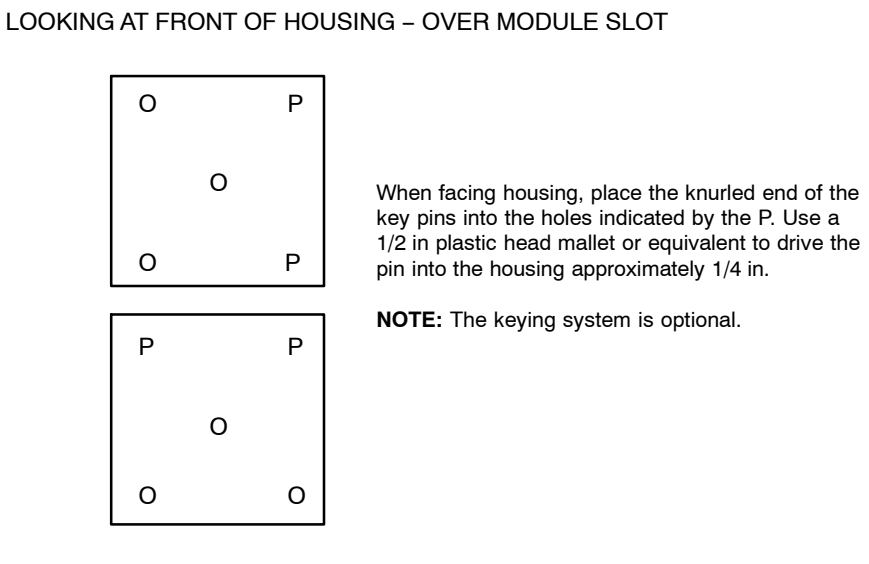


Figure 2 Example of Key Pin Location

Step 10 Insert module into housing, firmly but carefully, seating the edge connector in the backplane.

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☞ **Note:** First time installation of a module may be tight.

Step 11 Secure the module to housing using captive slotted mounting screws at the top and bottom of the module front panel.

Step 12 After confirming all modules are properly installed, apply applicable field power and re- -apply power to the programmable controller.

Step 13 I/O Map the module.

Step 14 Start the controller.

Step 15 Confirm that the module's active light is illuminated.

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1.6 Quick Start Test

Step 1 Determine which channel and slot location are being used for this module.

Step 2 Wire field device to the appropriate terminals (refer to the individual wiring diagrams/field connector drawings for that particular I/O module) on either the AS- -8534- -000 low density connector, or AS- -8535- -000 high density connector, (refer to the Specification section for your particular I/O module to determine which connector is required.)

Step 3 Stop the PLC.

Step 4 Install the I/O module.

Step 5 I/O Map the module, reference at the desired discrete or register reference.

Step 6 Start the PLC.

Step 7 Confirm that the modules active light is illuminated (may require Step 8 wiring first).

Step 8 To turn an input ON, apply the required power to the appropriate terminals (refer to the individual wiring diagrams/field connector drawings for your particular I/O module), and confirm that the red I/O light is illuminated after turning I/O point ON.

To turn an output ON enter the programming screen (P230 or equivalent) and call up the reference and disable this reference ON.

☞ **Note:** Refer to 984 System Manual for specifics on disabling coils.

See individual chapters for module specific Quick Starts.

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1.7 Generic Specifications

Generic Environmental Specifications

Operating	Temperature	0 ... 60°C (32 ... 140°F)
	Humidity	0 ... 95% (non–condensing) @ 60°C
Operating	Temperature	–40 ... 85°C (32 ... 140°F)
	Humidity	0 ... 95% (non–condensing) @ 60°C
Isolation	Field to System	2000 VAC steady state maximum @ 60 Hz for 1 min
	Between Groups	2500 VDC for 60 s without breakdown. Leakage current shall not exceed 1.5 mA
Shock	Operating	±15 G peak, 11 ms, half–sine wave
	Non–operating	±15 G peak, 11 ms, half–sine wave
Vibration	Operating	0.005 in D.A. Sine, from 10 to crossover frequency (57 ... 62 Hz)
		1.0 G from crossover frequency to 50 Hz
	Non–operating	0.029 G sq/Hz, 10 ... 50 Hz rolloff @ –8dB/octave from 50 ... 500 Hz
EMI		MIL–STD 461B
RFI		FCC Class A
Surge Withstand Capability		IEEE 472–1974 and ANSI C37.90A–1974

Generic Mechanical Specifications

Dimensions (W x H x D)	2.0 x 10.5 x 8.0 in
	50.8 x 266.7 x 203.2 mm
Weight	2.4 lbs. (1.1 kg)
Space Required	1 I/O slot

See individual chapters for module specific Specifications.

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Chapter 2
B802–008 115 Vac Output

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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2.1 Overview

The B802- -008 115 Vac (8 point) Output Module converts logic signals used within the PLC into eight independent 115 Vac outputs. Each output is capable of driving a relay, pilot lamp, motor starter, solenoid, or any other load up to 2.0 A.

The B802 is capable of handling a total continuous current of 12 A. The module uses triac switches to control loads connected to an external power source. These switches are designed to withstand the high surge currents typical of industrial loads.

2.1.1 Simplified Schematic

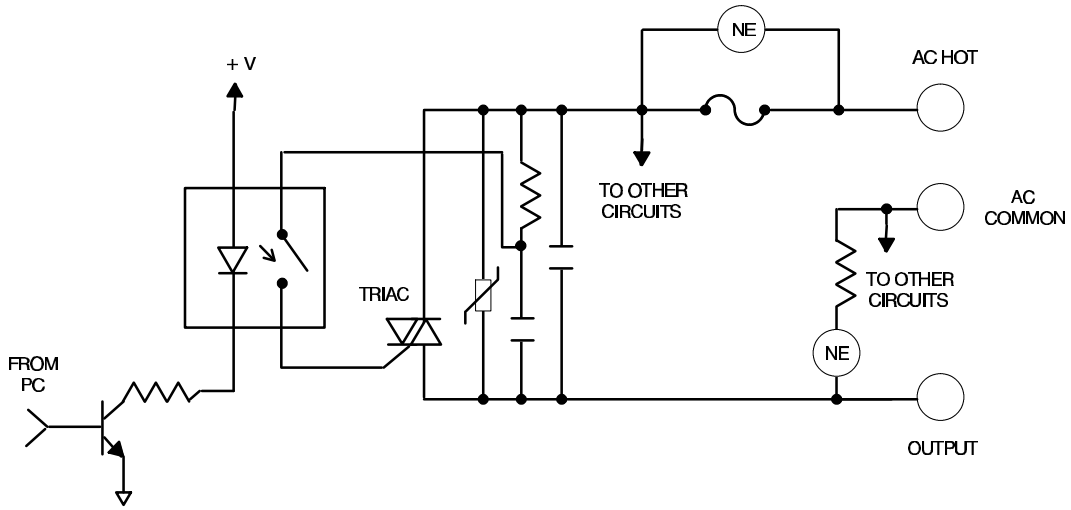


Figure 3 B802–008 Simplified Schematic

The module's eight outputs are separated into four groups of two outputs each. An LED indicator lights when an output is ON.

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2.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

2.2.1 Output Connections

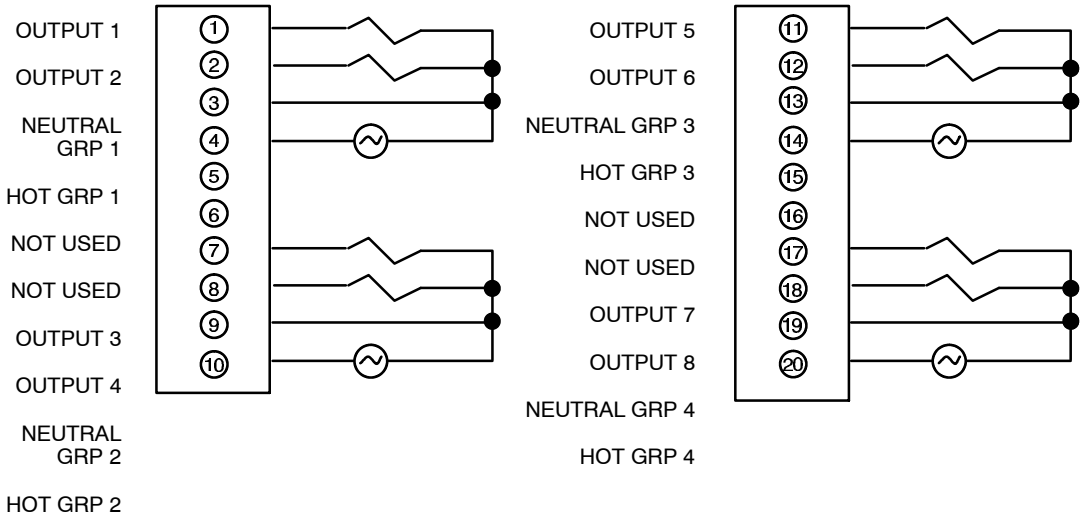


Figure 4 B802–008 Terminal Numbering and Output Connections

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2.3 Specifications

B802–008 Specifications

Description		115 Vac output
Number of Points		8
Operating Voltage		80 ... 130 Vac continuous / 47 ... 63 Hz
Number of Groups		4
Outputs/group		2
ON Current	Maximum/point	2 A continuous
	Maximum/module	12.0 A
Surge Current		50 A (max) 1 cycle / circuit
ON Voltage Drop		1.3 V @ 2.0 A
Maximum OFF	Leakage Current	3 mA @ 115 Vac
	Maximum ON Current	50 mA @ 115 Vac
Maximum Response Time	OFF → ON	8.3 ms @ 60 Hz
	ON → OFF	8.3 ms @ 60 Hz
dv/dt		100 V/μs
	Commutating	5 V/μs
Power Required	+5 V	76 mA
	+4.3 V	240 mA
	–5 V	0 mA
Terminal Connector		AS-8534-000
Fusing		One/group, Type 3 AG, 6 A (normal blow)

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Chapter 3
B803–008 115 Vac Input

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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3.1 Overview

The B803- -008 115 Vac (8 point) Input Module senses and converts switched input signals into logic voltage levels used by the PLC into 8 independent 115 Vac outputs. The module allows for up to eight independently sensed inputs. These inputs can be received from push buttons, limit and proximity switches, as well as other 115 Vac sources.

3.1.1 Simplified Schematic

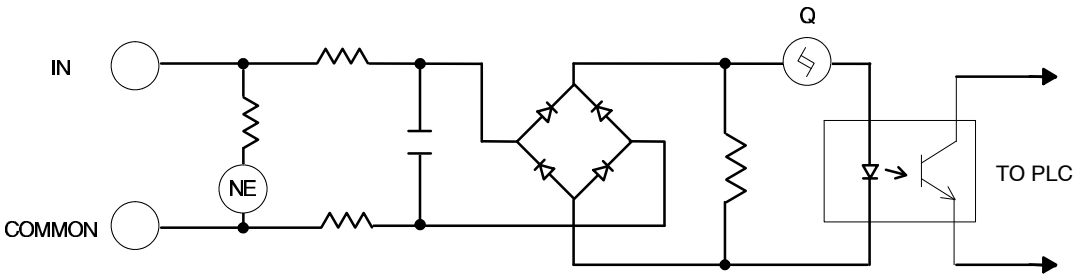


Figure 5 B803–008 Simplified Schematic

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3.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

3.2.1 Output Connections

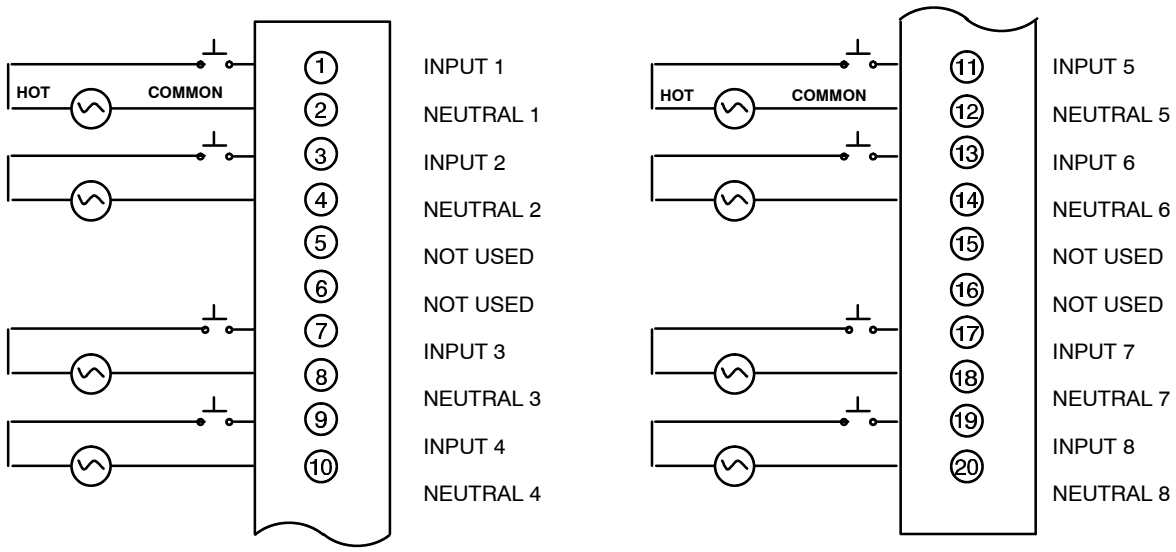


Figure 6 B803–008 Terminal Numbering and Input Connections

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3.3 Specifications

B803–008 Specifications

Description		115 Vac isolated input
Number of Points		8
Operating Range Voltage		80 ... 130 Vac / 47 ... 63 Hz
Number of Groups		8
Inputs / Group		1
Maximum Input Voltage	Continuous	130 Vac
	Surge	220 Vac for 1 cycle
ON Condition		80 ... 130 Vac (Source Impedance < 1kΩ)
OFF Condition	Maximum / Module	0 ... 35 Vac (Source Impedance = 0 Ω) 0 ... 130 Vac (Source Impedance ≥ 40kΩ)
”ON” Condition	Threshold Voltage	60 ± 15VRMS
ON Current		7 mA (typical) @ 115 Vac
Maximum Response Time	OFF → ON	6 ms (4 ms typical)
	ON → OFF	18 ms (12 ms typical)
Power Required	+5 V	27 mA
	+4.3 V	1 mA
	–5 V	2 mA
Terminal Connector		AS–8534–000

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Chapter 4
B804–116 115 Vac Output

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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4.1 Overview

The B804- -116 115 Vac (16 point) Output Module converts logic signals used in the PLC into 16 independent 115 Vac outputs. Each output is capable of driving a relay, pilot lamp, motor starter, solenoid, or any other load up to 2.0 A.

The B804 is capable of handling a total continuous current of 6 A/group of eight points and 12 A/module. The module uses triac switches to control loads connected to an external power source. These switches are designed to withstand the high surge currents typical of industrial loads.

4.1.1 Simplified Schematic

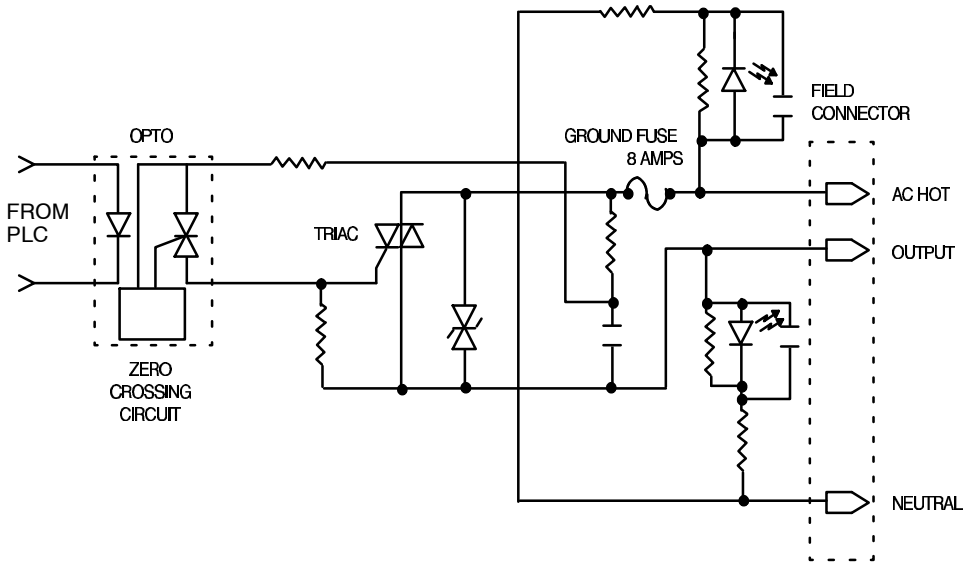


Figure 7 B804–116 Simplified Schematic

The module's 16 outputs are separated into two groups of eight outputs each.

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4.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

4.2.1 Output Connections

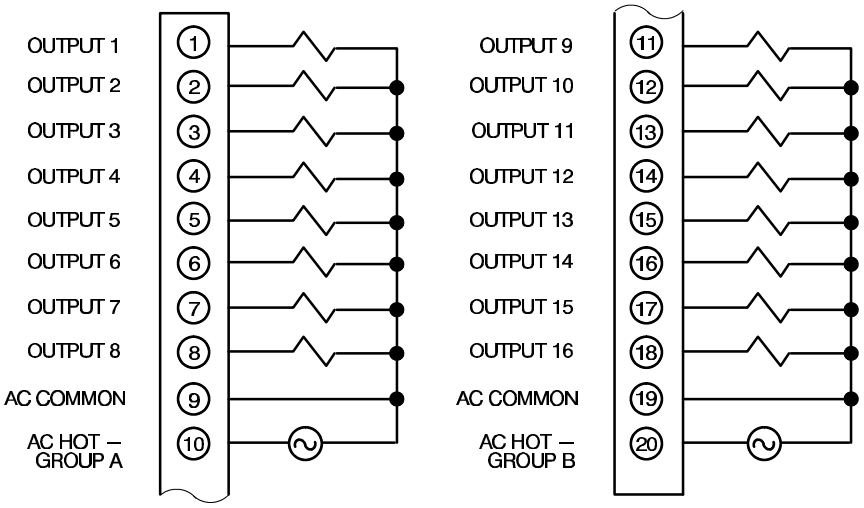


Figure 8 B804–116 Terminal Numbering and Output Connections

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4.3 Specifications

B804–116 Specifications

Description		115 Vac output
Number of Points		16
Operating Voltage		80 ... 130 Vac continuous / 47 ... 63 Hz
Number of Groups		2
Outputs / Group		8
ON Current	Maximum / Point	2 A continuous
	Surge Current	50 A 1 cycle
	Maximum / Group	6 A
	Maximum / Module	12.0 A
	Minimum Load Current	25 mA (B804-116)
	Minimum Load Current	50 mA (B804-016)
Maximum OFF	Leakage Current	3 mA @ 115 Vac
Voltage Drop		1.5 V @ 2.0 A
Maximum Response Time	OFF → ON	8.3 ms @ 60 Hz
	ON → OFF	8.3 ms @ 60 Hz
dv/dt		100 V/ms
Power Required	+5 V	76 mA
	+4.3 V	480 mA
	–5 V	0 mA
Terminal Connector		AS–8534–000
Fusing		Type 3AB, 8 A (normal blow)

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Chapter 5
B804–148 48 Vac Output

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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5.1 Overview

The B804- -148 48 Vac (16 point) Output Module converts logic signals used within the PLC into 16 independent 48 Vac outputs. Each output is capable of driving a relay, pilot lamp, motor starter, solenoid, or any other load up to 2.0 A. The module has 16 outputs, divided into two groups of eight discrete points.

5.1.1 Simplified Schematic

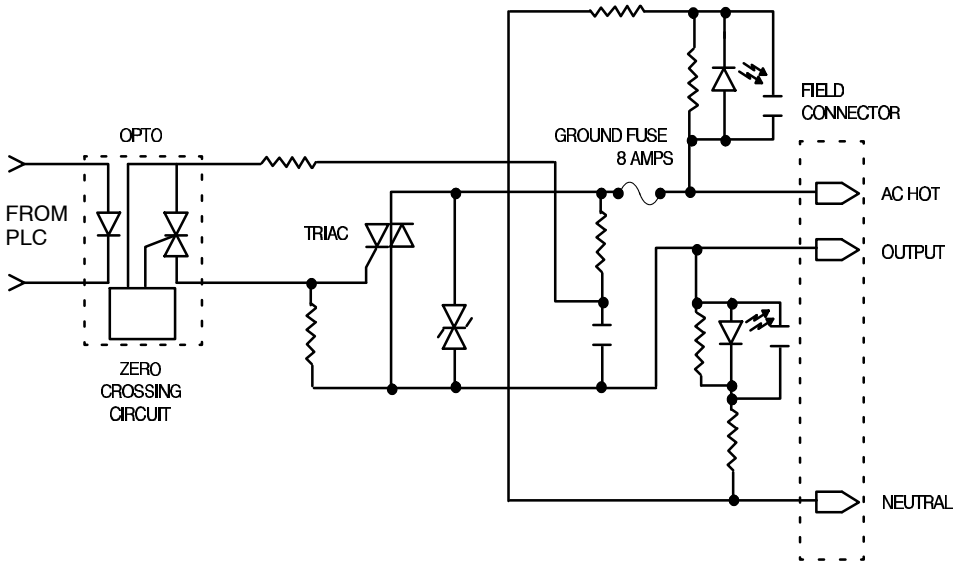


Figure 9 B804–148 Simplified Schematic

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5.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

5.2.1 Output Connections

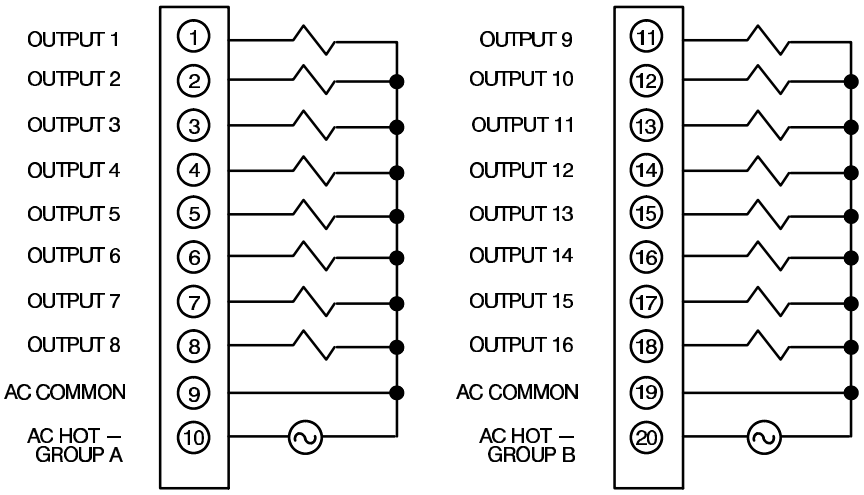


Figure 10 B804–148 Terminal Numbering and Output Connections

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5.3 Specifications

B804–148 Specifications

Description		48 Vac output
Number of Points		16
Operating Range Voltage		40 ... 56 Vac continuous / 47 ... 63 Hz
Number of Groups		2
Outputs/group		8
ON Current	Maximum/point	2 A continuous
	Surge Current	50 A 1 cycle
	Maximum/group	6 A
	Maximum/module	12.0 A
Maximum OFF		3 mA
Leakage Current		3 mA
Voltage Drop		1.5 V @ 2 A
Minimum Load Current		25 mA RMS
Maximum Response Time	OFF → ON	8.3 ms @ 60 Hz
	ON → OFF	8.3 ms @ 60 Hz
dv/dt		100 V/ms
	Commutating	5 V/ms
Power Required	+5 V	76 mA
	+4.3 V	480 mA
	–5 V	0 mA
Terminal Connector		AS–8534–000
Fusing		One / group, 8 A replaceable

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Chapter 6
B805–016 115 Vac Input

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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6.1 Overview

The B805- -016 115 Vac (16 point) Input Module senses and converts switched input signals into logic voltage levels used by the PLC. The module allows for up to 16 inputs in 2 groups of 8. These inputs can be received from push buttons, limit and proximity switches, as well as other 115 Vac sources.

6.1.1 Simplified Schematic

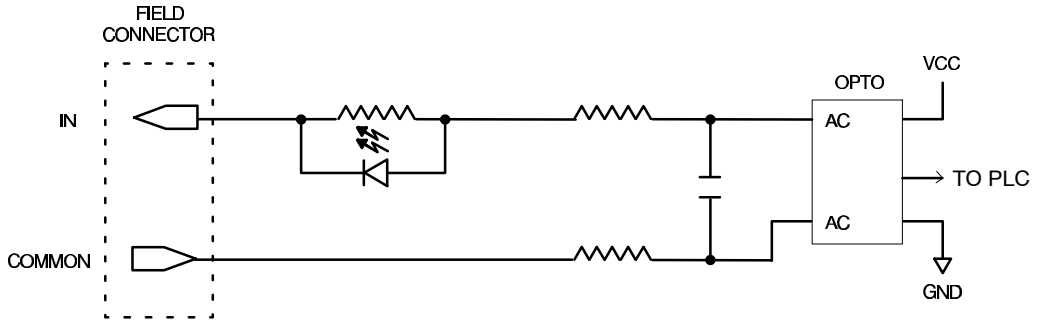


Figure 11 B805–016 Simplified Schematic

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6.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

6.2.1 Input Connections

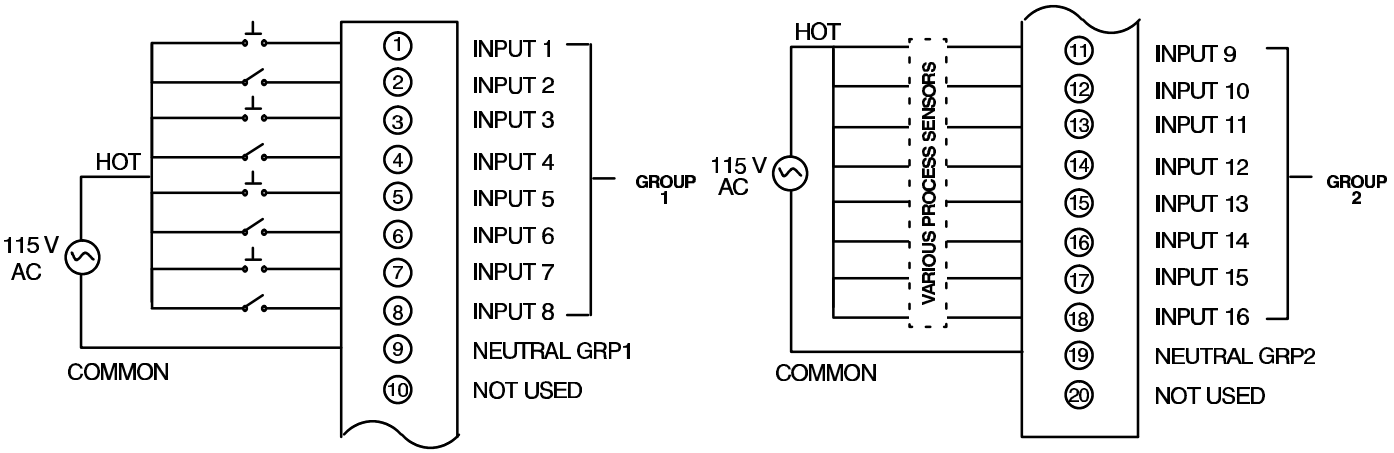


Figure 12 B805–016 Terminal Numbering and Input Connections

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6.3 Specifications

B805–016 Specifications

Description		115 Vac input
Number of Points		16
Operating Range		80 ... 130 Vac / 47 ... 63 Hz
Number of Groups		2
Inputs/group		8
Maximum Input Voltage	Continuous	130 Vac
	Surge	220 Vac for 1 cycle
ON Conditions		80 ... 130 Vac (Source Impedance =0 Ω)
OFF Conditions		0 ... 35 Vac (Source Impedance =1 kΩ)
		0 ... 130 Vac (Source Impedance ≥40 kΩ)
ON Current		6 mA (typical) @ 115 Vac
OFF Current		1.8 mA (max) @ 35 Vac RMS leakage for input sensors
		3.0 mA (Typ) @ 60Vac RMS
ON Condition	Threshold Voltage	60 ± 15 V RMS
Maximum Response Time	OFF→ ON	6 ms (4 ms typical)
	ON → OFF	18 ms (11 ms typical)
Power Required	+5 V	40 mA
	+4.3 V	1 mA
	–5 V	14 mA
Terminal Connector		AS–8534–000

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Chapter 7
B806–032 115 Vac Output

- ☐ Overview
- ☐ Field Connections
- ☐ Fusing Requirements
- ☐ Specifications

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7.1 Overview

The B806- -032 Vac Output Module (B806) has 32 outputs. The outputs can serve 120 Vac voltage relays, motor starters, solenoids, pilot lamps, valves, and other loads rated up to 1.0 A. The outputs are divided into two groups of 16 discrete points.

7.1.1 Simplified Schematic

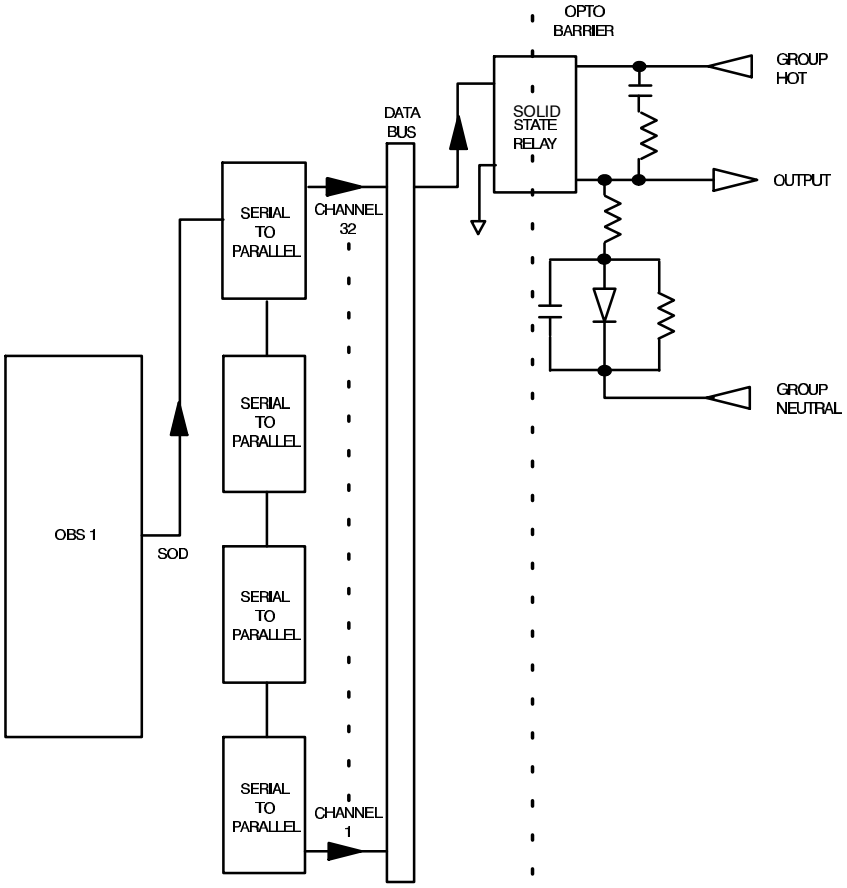


Figure 13 B806–032 Simplified Schematic

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7.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system /mits module insertion or removal without disturbing the wiring.

7.2.1 Output Connections

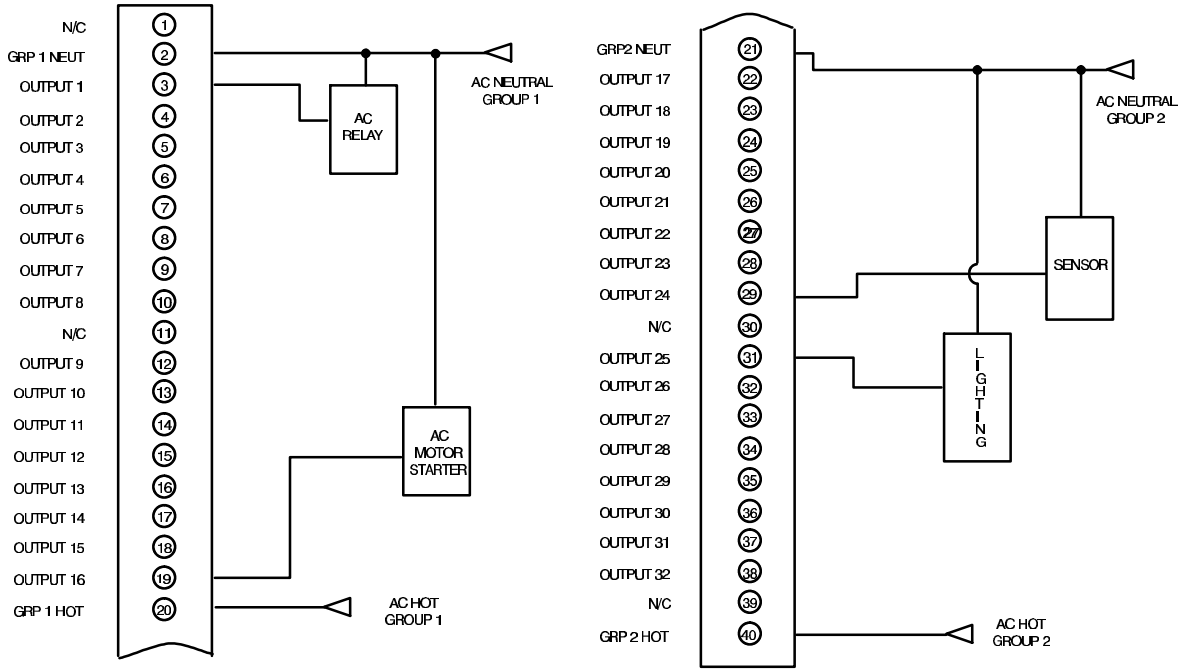


Figure 14 B806–032 Terminal Numbering and Output Connections

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7.3 B806–032 Fusing Guidelines

For reasons of safety and equipment performance, Modicon strongly recommends external fusing on each individual output point according to the following rating:

Fuse Rating	Very Fast Acting	2 A
Example Type	*Little Fuse*	3 AB

Note: A minimum voltage rating of 250 V is required for safe fuse operation. Voltage ratings can be found along with current ratings on the fuse end cap.

Warning! Failure to fuse these output modules, or to follow the recommended fuse ratings, could cause unpredictable results in module performance and/or damage to this and other equipment. Observe fusing guidelines.

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7.4 Specifications

B806–032 Specifications

Description		115 Vac output
Number of Points		32
Operating Voltage		80 ... 130 Vac continuous / 47 ... 63 Hz
Number of Groups		2
Outputs/group		16
On Current	Maximum/point	1 A continuous
	Surge Current	15 A 1 cycle
	Maximum/module	16 A
	Maximum/group	8 A
	Minimum Load Current	5 A
Maximum OFF	Leakage Current	2 mA @ 115 Vac
Voltage Drop		1.5 V RMS Maximum
Maximum Response Time	OFF → ON	8.3 ms @ 60 Hz
	ON → OFF	8.3 ms @ 60 Hz
dv/dt		600 V/μs
	Commutating	5 V/μs
Power Required	+5 V	210 mA
	+4.3 V	1 mA
	–5 V	0 mA
Terminal Connector		AS–8535–000

☞ **Note:** The B806 is powered by a standard 120 Vac field power supply.

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Chapter 8
B806–124 24 Vac Output

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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8.1 Overview

The B806- -124 Output Module (B806) has 32 outputs. The outputs can serve 24 Vac voltage relays, motor starters, solenoids, pilot lamps, valves, and other loads rated up to 1.0 A. The outputs are divided into two groups of 16 discrete points.

8.1.1 Simplified Schematic

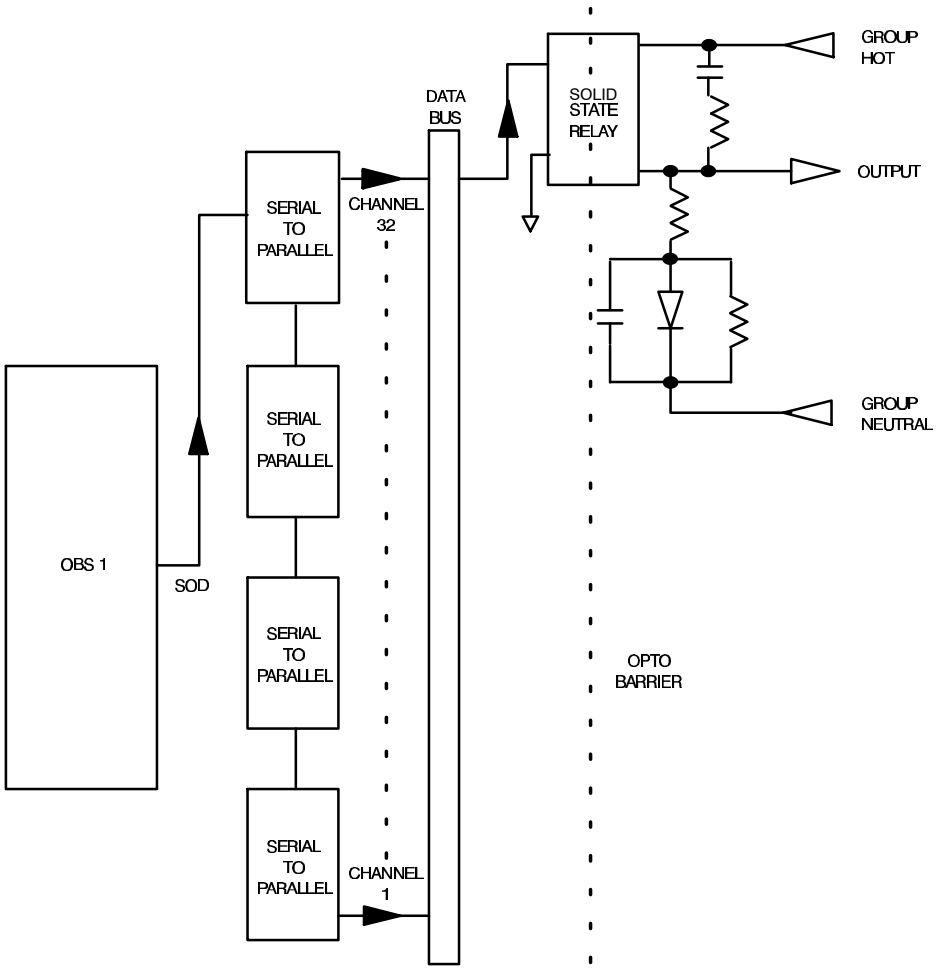


Figure 15 B806–124 Simplified Schematic

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8.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

8.2.1 Output Connections

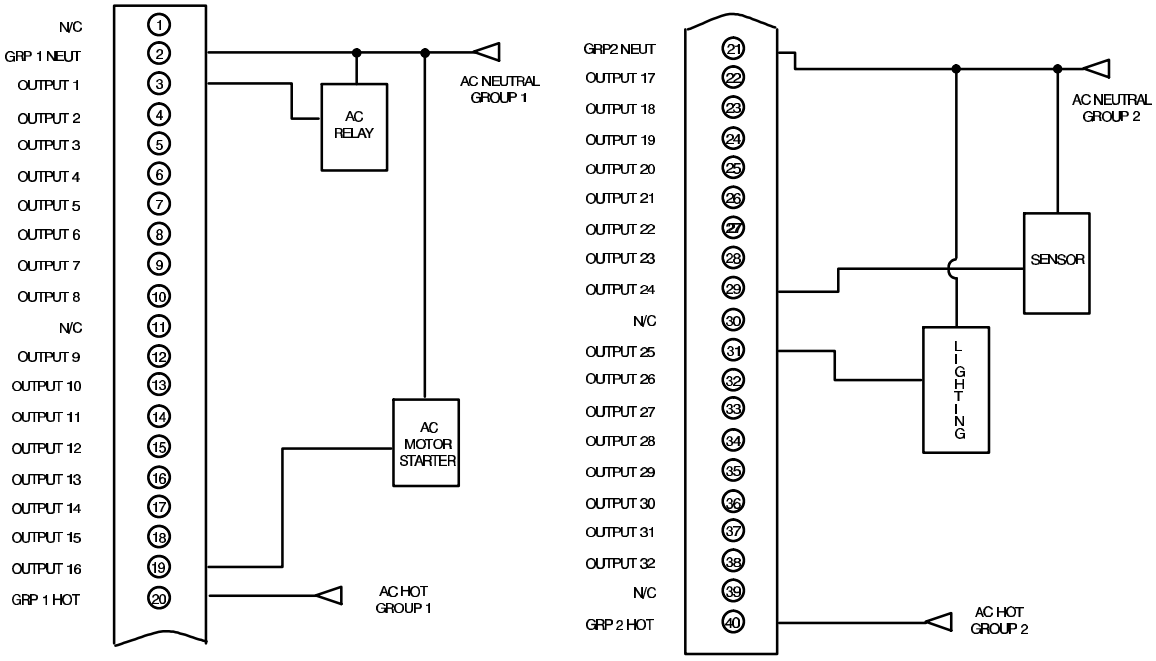


Figure 16 B806–124 Terminal Numbering and Output Connections

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8.3 Specifications

B806–124 Specifications

Description		24 Vac output
Number of Points		32
Operating Voltage		20 ... 28 Vac continuous / 47 ... 63 Hz
		32 Vac RMS max for 10 s
		42 Vac RMS max for 1 cycle
Number of Groups		2
Outputs/group		16
ON Current	Maximum/point	1 A continuous
	Surge Current	15 A 1 cycle
	Maximum/group	8 A
	Maximum/module	16 A
	Minimum Load Current	5 mA
Maximum OFF	Leakage Current	2 mA
Voltage Drop		1.5 V (max)
Maximum Response Time	OFF → ON	8.3 ms @ 60 Hz
	ON .→ OFF	8.3 ms @ 60 Hz
dv/dt		600 V/μs
	Commutating	5 V/μs
Power Required	+5 V	210 mA
	+4.3 V	1 mA
	–5 V	0 mA
Terminal Connector		AS–8535–000

☞ **Note:** The B806 is powered by standard 24 Vac field power supply.

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Chapter 9
B807–132 115 Vac Input

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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9.1 Overview

The B807- -132 115 Vac (32 point) Input Module senses and converts switched input signals into logic voltage levels used by the PLC. These inputs can be received from push buttons, limit and proximity switches, as well as other 115 Vac sources.

9.1.1 Simplified Schematic

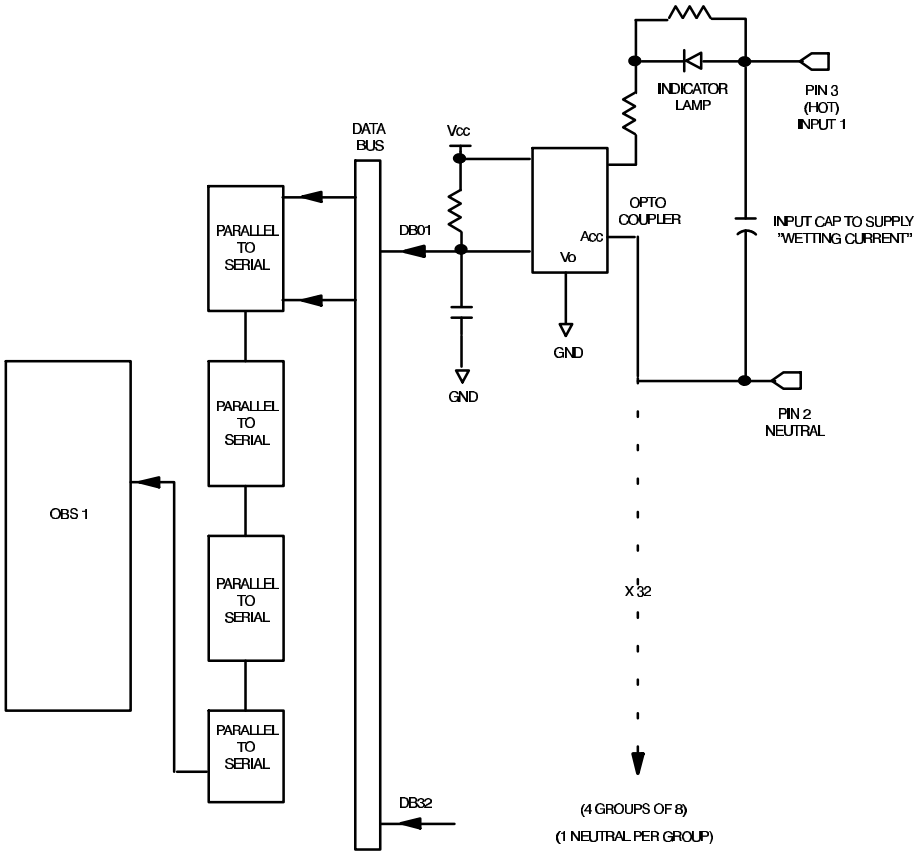


Figure 17 B807–132 Simplified Schematic

☞ **Note:** When using Binary and BCD inputs remember that input 1 is the MSB and input 32 is the LSB.

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9.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

9.2.1 Input Connections

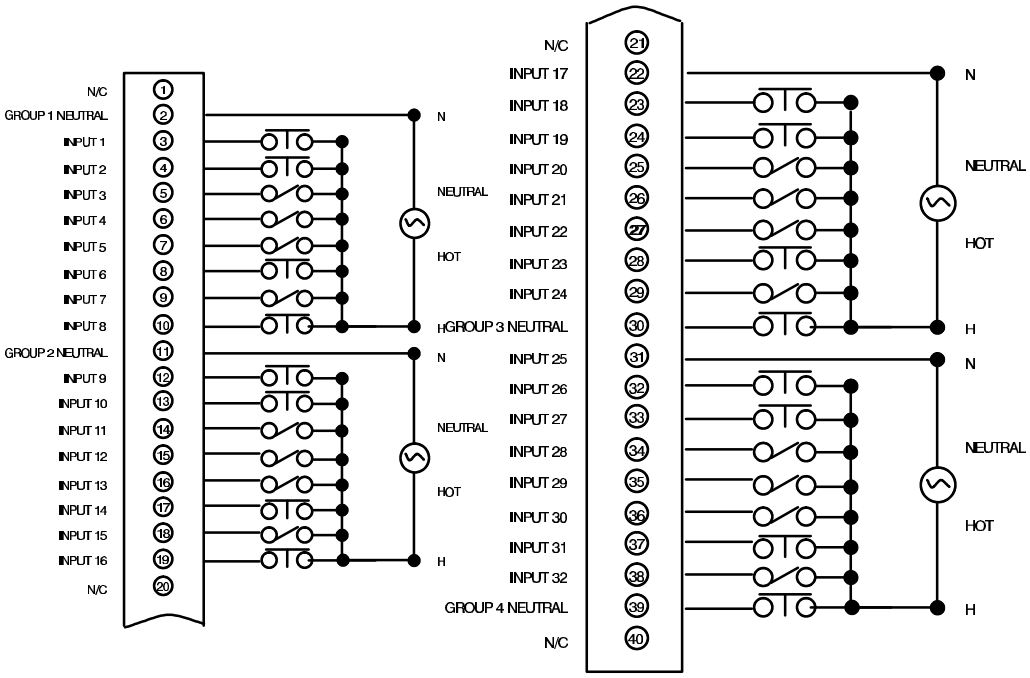


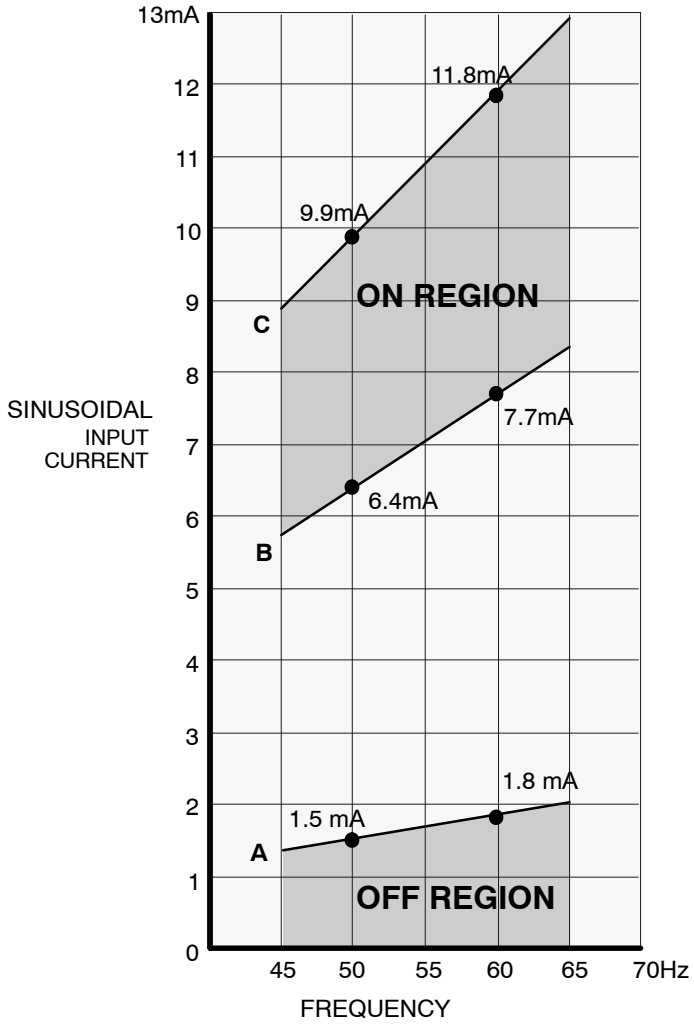
Figure 18 B807–132 Terminal Numbering and Input Connections

☞ **Note:** Pins 1, 20, 21, and 40 have no internal connections.

☞ **Note:** The module can operate from 47 ... 63 Hz. However, its use with proximity switches is recommended only at 60 Hz nominal line frequency. Leakage current through switching devices connected to the module may cause a false ON condition.

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9.2.2 Input Current-to-Frequency Relationship



A. MAXIMUM ALLOWABLE SINEWAVE LEAKAGE CURRENT (FROM EXTERNAL DEVICE) TO GUARANTEE AN OFF CONDITION (CALCULATED AT 35 Vac) AT B807 TERMINALS

B. MINIMUM REQUIRED INPUT CURRENT TO GUARANTEE AN ON CONDITION
NOTE: THE MODULE IS INTENDED TO BE USED WITH VOLTAGE INPUTS; VOLTAGE INPUTS GREATER THAN 80Vac RMS AT MODULE TERMINALS GUARANTEE AN ON CONDITION

C. MAXIMUM MODULE INPUT CURRENT AT 130 Vac

Figure 19 B807–132 Input Current to Frequency Chart

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9.3 Specifications

B807–132 Specifications

Description		115 Vac input
Number of Points		32
Operating Voltage		80 ... 130 Vac continuous / 47 ... 63 Hz
Number of Groups		4
Inputs/group		8
Maximum Input Voltage		150 Vac for 10 s
		200 Vac for 1 cycle
ON Condition		80 ... 130 Vac (Source Impedance <1 kΩ)
OFF Condition		0 ... 35 Vac (Source Impedance =0 Ω)
		0 ... 130 Vac (Source Impedance ≥90 kΩ)
ON Current		3.7 mA minimum @ 80 Vac, 50Hz input*
		6.4 mA minimum @ 115 Vac, 60Hz input*
Maximum External to Module Leakage Current		1.8 mA to guarantee an OFF condition @ 60Hz
Maximum Response Time	OFF → ON	6 ms
	ON → OFF	35 ms
Power Required	+5 V	80 mA
	+4.3 V	2 mA
	–5 V	0 mA
Terminal Connector		AS–8535–000
*Minimum input on current at stated voltage and frequency with less than 10 Ω source impedance		

☞ **Note:** All voltage and current specifications assume a sine wave form and are specified as RMS voltage and current.

☞ **Note:** Input LED brightness is a function of line voltage applied.

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Chapter 10
B808–016 230 Vac Output

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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10.1 Overview

The B808-016 230 Vac (16 point) Output Module converts logic signals used within the PLC into 16 independent 230 Vac outputs. Each output is capable of driving a relay, pilot lamp, motor starter, solenoid, or any other load up to 2.0 A. The B808 is capable of 6 A per group of eight and handling 12 A per module.

The module uses triac switches to control loads connected to an external power source. These switches are designed to withstand the high surge currents typical of industrial loads.

10.1.1 Simplified Schematic

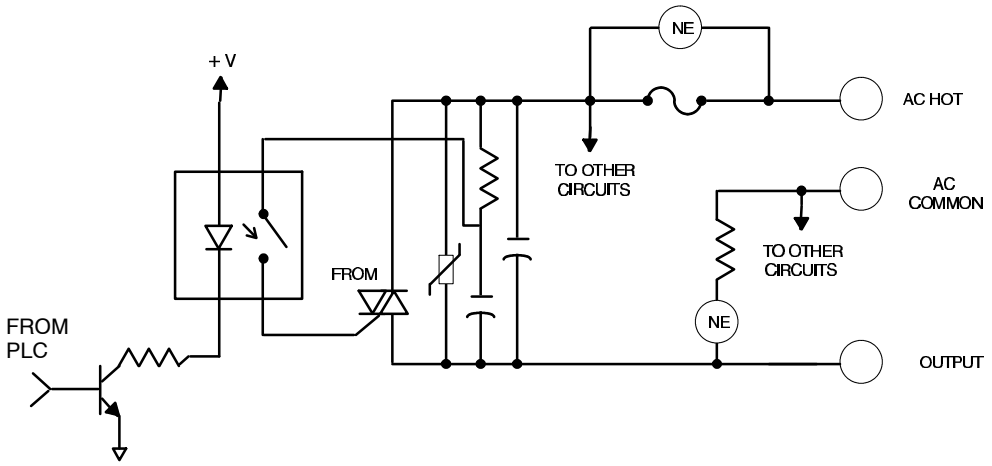


Figure 20 B808–016 Simplified Schematic

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10.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

10.2.1 Output Connections

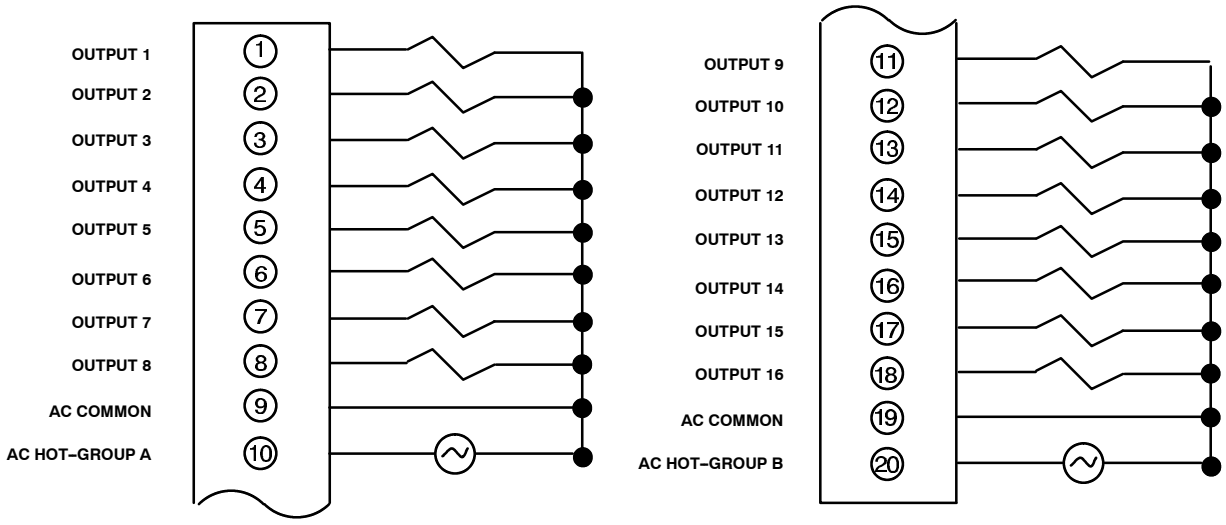


Figure 21 B808–016 Terminal Numbering and Output Connections

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10.3 Specifications

B808–016 Specifications

Description		230 Vac output
Number of Points		16
Operating Voltage		180 ... 260 Vac continuous / 47 ... 63 Hz
Number of Groups		2
Outputs/group		8
ON Current	Maximum/point	2 A continuous
	Surge Current	50 A (max) 1 cycle
	Maximum/group	6 A
	Maximum/module	12 A
ON Voltage Drop		1.3 V @ 2.0A
Maximum OFF	Leakage Current	8 mA @ 230 Vac
Maximum Response Time	OFF → ON	8.3 ms @ 60 Hz
	ON → OFF	8.3 ms @ 60 Hz
Applied dv/dt		100 V/μs
Power Required	+5 V	76 mA
	+4.3 V	480 mA
	–5 V	0 mA
Terminal Connector		AS–8534–000
Fusing		1 / group, Type 3 AB, 8 A (normal blow)

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Chapter 11
B809–016 230 Vac Input

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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11.1 Overview

The B809-016 230 Vac (16 point) Input Module senses and converts switched input signals into logic voltage levels used by the PLC. The module allows for up to 16 inputs in two groups of eight. These inputs can be received from push buttons, limit and proximity switches, as well as other 230 Vac sources.

11.1.1 Simplified Schematic

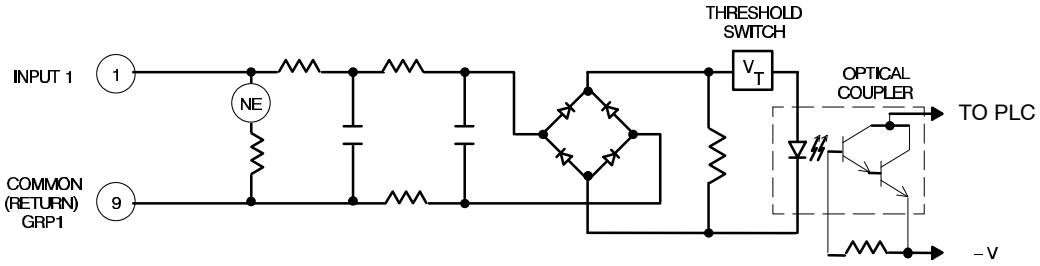


Figure 22 B809–016 Simplified Schematic

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11.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

11.2.1 Input Connections

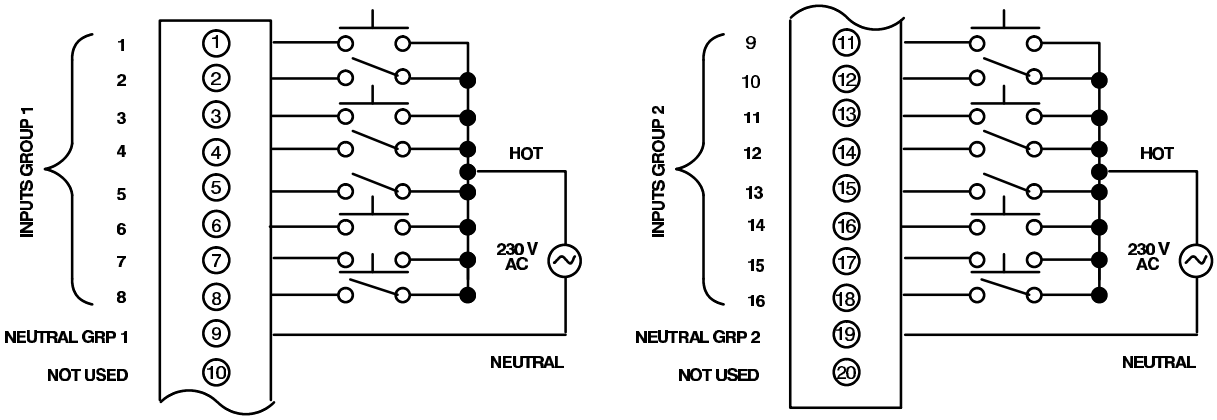


Figure 23 B809–016 Terminal Numbering and Input Connections

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11.3 Specifications

B809–016 Specifications

Description		230 Vac input
Number of Points		16
Operating Voltage		160 ... 260 Vac / 47 ... 63 Hz
Number of Groups		2
Outputs / Group		8
Maximum Input Voltage	Continuous	260 Vac
		300 Vac for 10 s
	Surge	400 Vac for 1 cycle
ON Conditions		160 ... 260 Vac (Source Impedance =1 kΩ)
ON Current		8.5 mA (typical) @ 230 Vac
OFF Conditions		0 ... 90 Vac (Source Impedance =0 Ω))
Peak inrush for 260VRMS (Rs=0) applied @ peak		1.7 A max
Maximum Response Time	OFF → ON	5 ms (3 ms typical)
	ON → OFF	18 ms (12 ms typical)
Power Required	+5 V	42 mA
	+4.3 V	1 mA
	–5 V	15 mA
Dimensions	Space Required	1 slot
	Weight	2.38 lbs (1.08 kg)
Terminal Connector		AS–8534–000

☞ **Note:** The B809- -016 input module is electrically compatible with the B808- -016 output module.

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Chapter 12
B810–008 115 Vac Isolated Output

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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12.1 Overview

The B810-008 115 Vac (eight-point) Output Module converts logic signals used within the PLC into eight independent 115 Vac outputs. Each output is capable of driving a relay, pilot lamp, motor starter, solenoid, or any other load up to 2.0 A. The B808 is capable of 6 A/group of eight and handling 12 A/module. The module uses eight triac switches to control loads connected to an external power source. These switches are designed to withstand the high surge currents typical of industrial loads.

12.1.1 Simplified Schematic

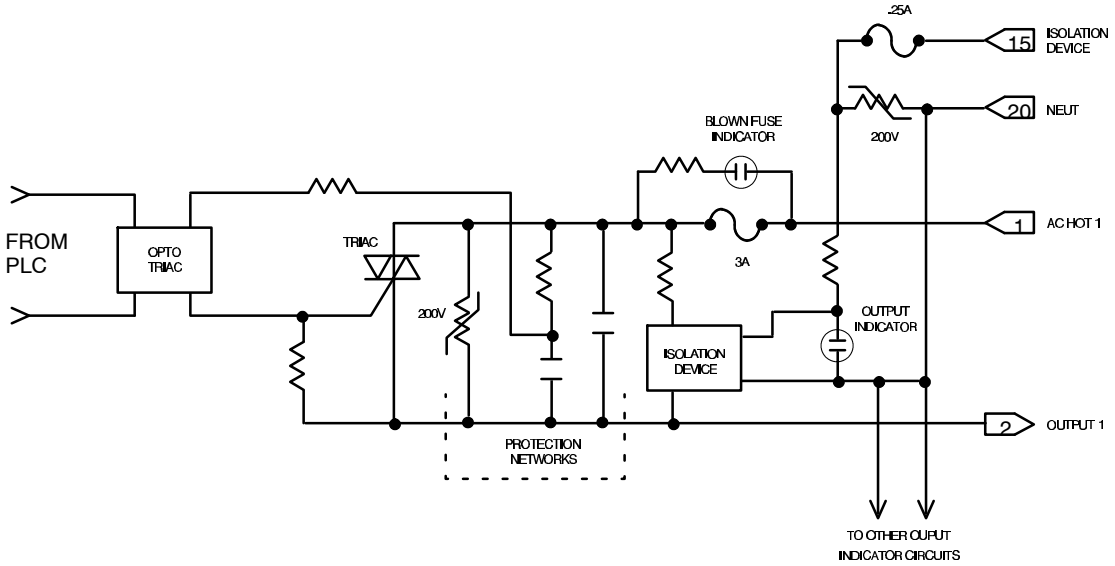


Figure 24 B810–008 Simplified Schematic

Zero- -cross threshold switching is incorporated into each output circuit. Upon controller command, outputs switch ON at the first line voltage zero- -crossing, and switch OFF at the first load current zero- -crossing.

Output status indicators are provided for each output circuit. These neon indicators will be ON when a load is connected and the output is ON, or *when there is no connected load*. These indicators are isolated from the triac output and require a separate lamp supply which is fused at 1/4 A. Blown fuse indicators are also provided for each output circuit. These indicators light (ON) when the corresponding fuse has blown.

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12.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

12.2.1 Output Connections

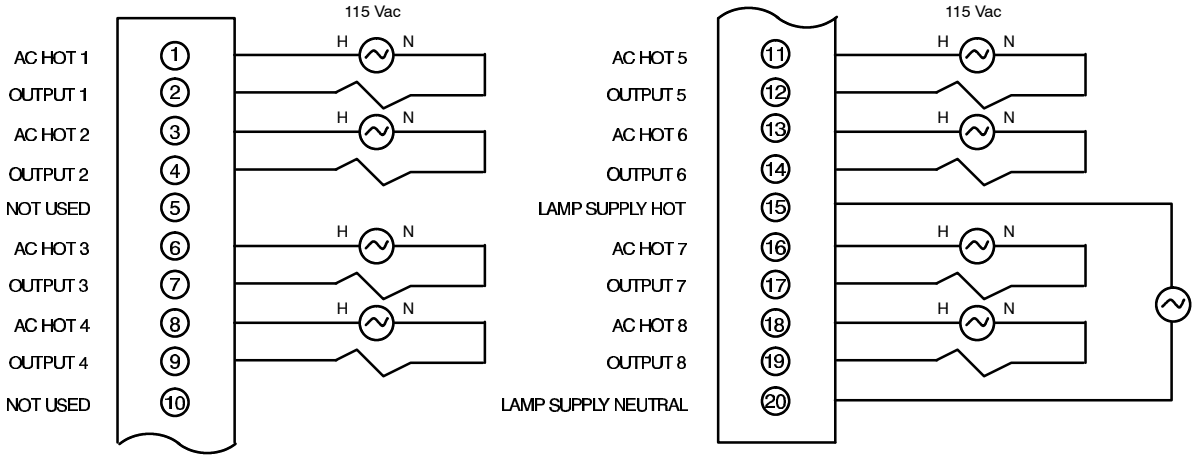


Figure 25 B810–008 Terminal Numbering and Output Connections

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12.3 Specifications

B810–008 Specifications

Description		115 Vac isolated output
Number of Points		8
Operating Voltage		80 ... 130 Vac continuous / 47 ... 63 Hz
Number of Groups		8
Outputs / Group		1
ON Current	Maximum/point	2 A continuous
	Surge Current	50 A (max) 1 cycle
	Maximum/group	2 A
	Maximum/module	12 A
	Minimum Load Current	50 mA
Maximum OFF	Leakage Current	3 mA @ 115 Vac
ON Voltage Drop		1.3V @ 2.0A max
Surge Voltage		150 Vac for 10 s
		200 Vac for 1 cycle
Maximum Response Time	OFF → ON	8.3 ms @ 60 Hz
	ON → OFF	8.3 ms @ 60 Hz
dv/dt		100 V/μs
	Commutating	5 V//μs
Power Required	+5 V	50 mA
	+4.3 V	240 mA
	–5 V	0 mA
Terminal Connector		AS–8534–000
Fusing		One/group, Type 3 AG, 3 A (normal blow)

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Chapter 13
B814–108 Relay Output

- ☐ Overview
- ☐ Configuration
- ☐ Field Connections
- ☐ Specifications

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13.1 Overview

The B814-108 Relay Output Module converts signals from the PLC to eight independent relay outputs. Each output is capable of driving a relay, pilot lamp, motor starter, solenoid, or any other load up to 5.0 A. Each of the eight outputs is electrically isolated from the I/O bus and from the other seven outputs by the relay coil. The module is designed to withstand the high surge currents typical of industrial loads.

The module is user- -configurable as to setting for normally- -open or normally- -closed operation of the relays as described below, and is compatible with other Modicon input modules. Assuming a normally- -open configuration, when the relay coil is energized, the relay contacts will conduct current from output A terminal to output B terminal (see Figure 26).

13.1.1 Simplified Schematic

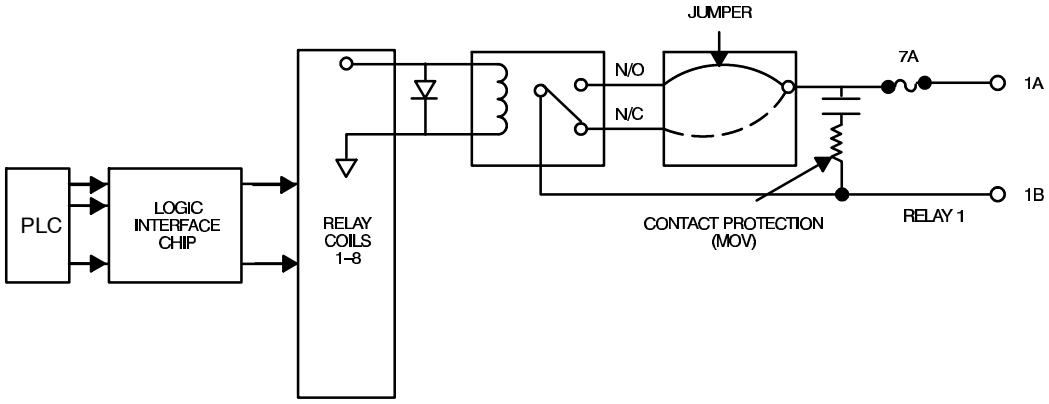


Figure 26 B814–108 Simplified Schematic

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13.2 Configuration

The B814 is initially shipped with all eight channels jumpered for the normally- -open configuration. You may optionally wire any of the channels for normally- -closed operation if desired. This is done by transferring a wire jumper from one tab to another on the printed circuit board. Refer to the label on the side of the module.

B814–108 User Configuration Wire/Tab Designations

Channel	N.O.	N.C.
1	W1-E2	W1-E1
2	W2-E4	W2-E3
3	W3-E6	W3-E5
4	W4-E8	W4-E7
5	W5-E10	W5-E9
6	W6-E12	W6-E11
7	W7-E14	W7-E13
8	W8-E16	W8-E15

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13.3 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

13.3.1 Output Connections

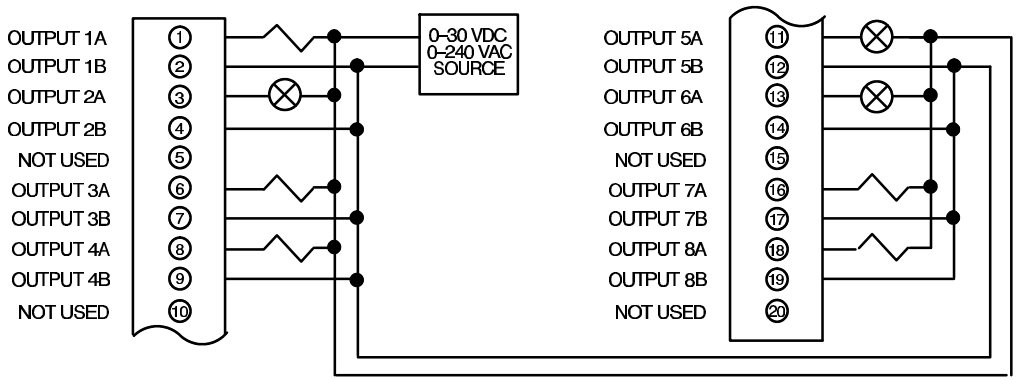


Figure 27 B814–108 Typical Circuit Connections for Power Applications

☞ **Note:** Since each output is isolated from the remaining outputs, separate power sources can be used for each load. Each output can be wired for current source or current sink operations.

☞ **Note:** It is possible to have the ACTIVE indicator lit with one or more output channels working improperly.

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13.4 Specifications

B814–108 Specifications

Description		Relay (NO/NC) output
Number of Points		8
Operating Voltage		0 ... 30 Vdc
		0 ... 240 Vac / 47 ... 63 Hz
Number of Groups		8
Outputs/group		1
ON Current	Maximum/point	5 A @ 30 Vdc/120 Vac
		4 A @ 240 Vac
	Maximum/module	40 A @ 30 Vdc/120 Vac
Switching Capability		960 VA maximum, or 150 W dc maximum
Contact Resistance		< 300 mΩ (including fuse, wire, connectors, and contacts)
OFF State	Leakage Current	.5 mA (typical) @ 240 Vac/60 Hz
Relay Life Rating		100,000 operations, and 50,000 operations with inductive loads @ 25°C
Maximum Response Time	OFF → ON	15 ms (6 ms typical)
	ON → OFF	15 ms (6 ms typical)
Power Required	+5 V	107 mA
	+4.3 V	800 mA
	–5 V	0 mA
Terminal Connector		AS–8534–000
Fusing		One / output, 7 A

☞ **Note:** For 48 Vdc operation, the maximum load is 1 A.

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Chapter 14
B817–116 and B817–216 115/230 Vac Isolated Input

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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14.1 Overview

The B817- -116 (115 Vac) and B817- -216 (230 Vac) Isolated Input Modules sense OFF and ON input voltages from its field circuitry, converting them to dc logic levels used in the logic program by a Modicon PLC.

The module's 16 input circuits are individually isolated from one another. As each input circuit uses a neutral return wire, none has a definite relationship to system ground unless established in the user's field circuitry. The module's logic circuitry is shielded from radiated signals or interference originating in the field, and its field inputs are optically isolated from the system logic.

14.1.1 Simplified Block Diagram

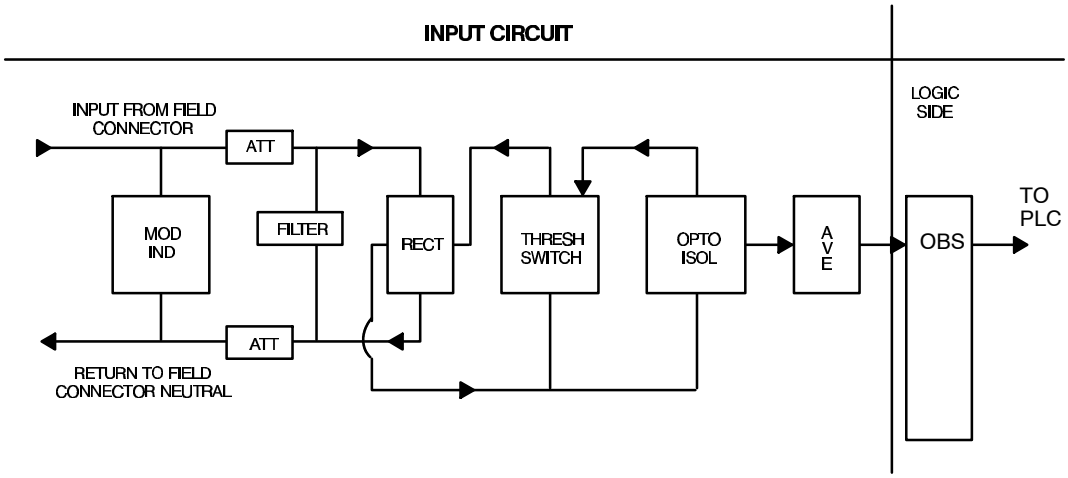


Figure 28 B817–116 and B817–216 Simplified Block Diagram

When the voltage exceeds the threshold circuits voltage requirement, current will flow through the threshold switch and opto- -isolator via the precision attenuator and the bridge rectifier. The output pulses coupled through the isolator are averaged so that a steady state dc voltage representation of the inner circuit's ON-state condition is sensed by the Ourbus chip (OBS) on the logic side of the module.

The Ourbus output register is set to represent the field ON state. As long as the field input status remains true, the module will communicate this status each time it is polled by the PLC.

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14.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

14.2.1 Terminal Numbering and Input Functions

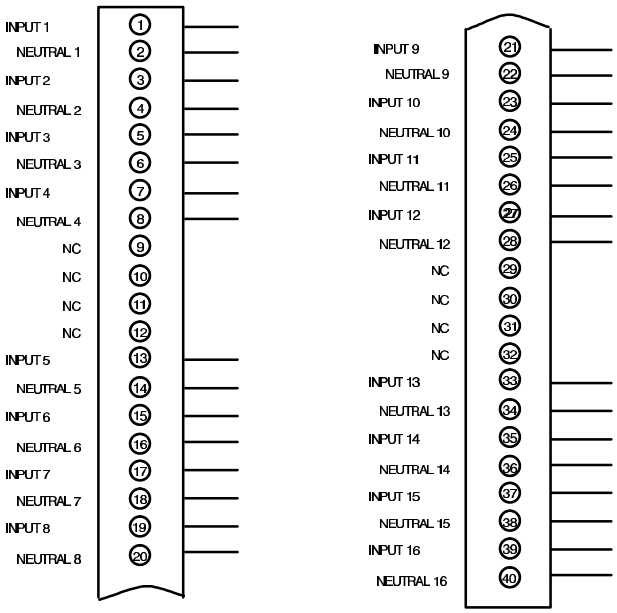


Figure 29 B817–116 and B817–216 Terminal Numbering

Figure 30 and Figure 31 shows typical circuitry connected to the user side of the field connector.

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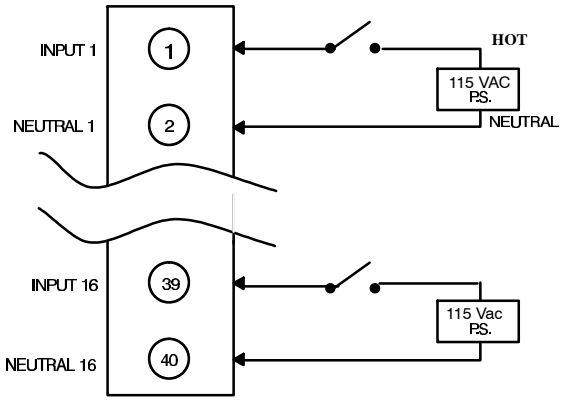


Figure 30 B817–116 Typical Field Circuit Connections

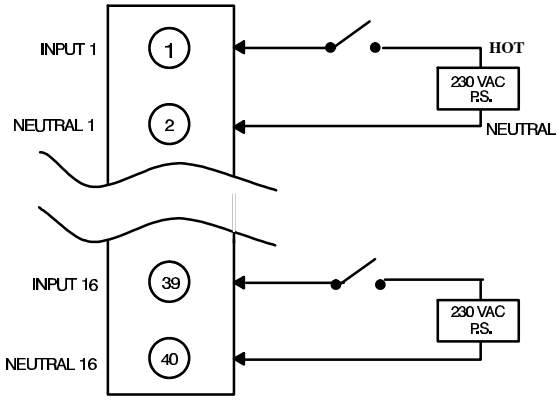


Figure 31 B817–216 Typical Field Circuit Connections

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14.3 Specifications

B817–x16 Specifications

Description		115 Vac isolated input (B817-116)
		230 Vac isolated input (B817-216)
Number of Points		16
Number of Groups		16
Inputs/group		1
Maximum Input Voltage	Continuous	130 Vac / 47 ... 63 Hz (B817–116)
		260 Vac / 47 ... 63 Hz (B817–216)
	Surge	200 Vac for 1 cycle (B817–116)
		400 Vac for 1 cycle (B817–216)
ON Conditions	B817–116	>80 Vac (Source Impedance <1 kΩ)
	B817–216	>160 Vac (Source Impedance <1 kΩ)
OFF Conditions		0 ... 35 Vac (Source Impedance = 0 Ω)
	B817–116	0 ... 130 Vac (Source Impedance >40 kΩ)
		0 ... 90 Vac (Source Impedance = 0 Ω)
	B817–216	0 ... 260 Vac (Source Impedance >80 kΩ)
Wetting Current	B817–116	0 ± 4 mA (typical) @115 Vac
	B817–216	8.2 ± 3 mA (typical) @ 230 Vac
Maximum Response Time (Module)	OFF → ON	6 ms
	ON → OFF	18 ms
Power Required	+5 V	25 mA
	+4.3 V	2 mA
	–5 V	8 mA
Terminal Connector		AS–8535–000

☞ **Note:** Scan time may increase response time when seen in user logic.

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Chapter 15
B820–008 10 ... 60 Vdc Output (True High)

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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15.1 Overview

The B820-008 10 ... 60 (eight-point) Output Module (True High) converts logic signals used within the PLC into eight independent 10 ... 60 Vdc outputs. Each output is capable of driving a relay, pilot lamp, motor starter, solenoid, or any other load up to 2.0 A.

The B820 is capable of handling a total continuous current of 12 A. The module uses transistor switches to control loads connected to an external power source. These switches are designed to withstand the high surge currents typical of industrial loads.

15.1.1 Simplified Schematic

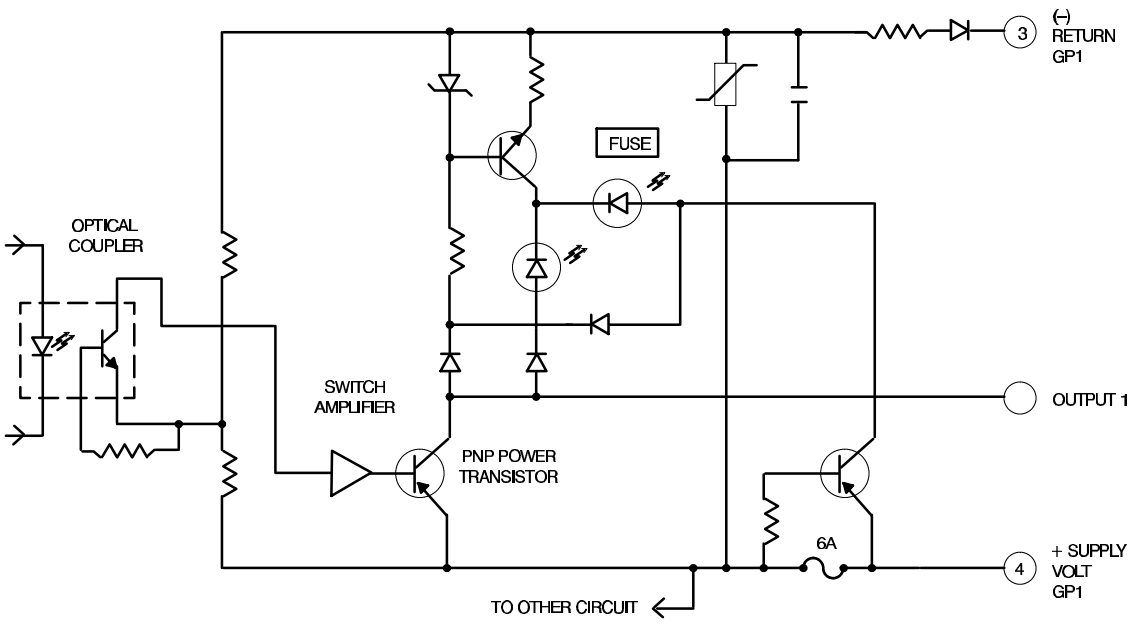


Figure 32 B820–008 Simplified Schematic

The module's eight outputs are separated into four groups of two outputs each.

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15.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

15.2.1 Output Connections

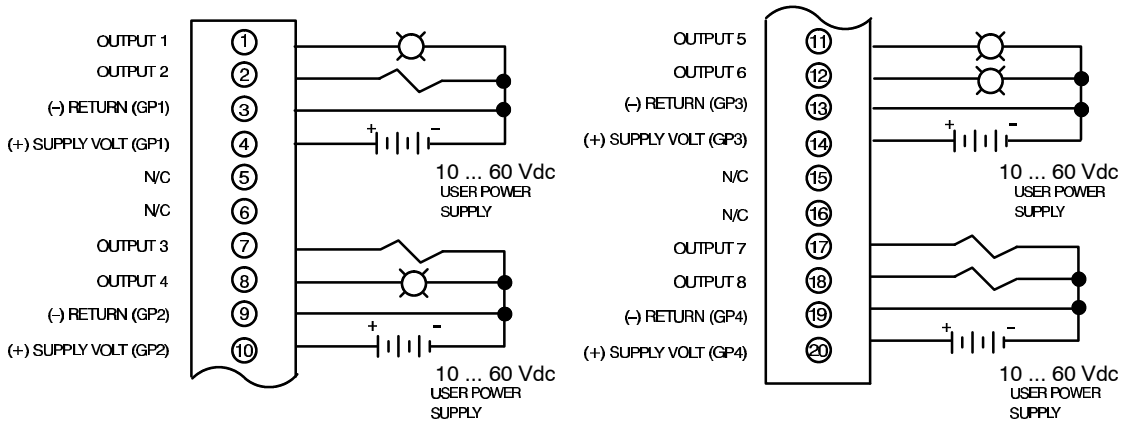


Figure 33 B820–008 Terminal Numbering and Output Connections

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15.3 Specifications

B820–008 Specifications

Description		10 ... 60 Vdc (true high) output
Number of Points		8
Operating Voltage		10 ... 60 Vdc
Number of Groups		4
Outputs / Group		2
ON State Voltage Drop		1.5 Vdc max @ 2A
ON Current	Maximum/point	2 A
	Maximum/group	6 A
	Maximum/module	12.0 A
	Surge Current	10 A/channel max for 10 ms at a repetition rate of 0.05%
Peak Voltage		80 Vdc max for 10 ms at a repetition rate of 0.05%
OFF State	Leakage Current	5 mA (max) @ 60 Vdc
Maximum Response Time	OFF → ON	1 ms (.1 ms typical)
	ON → OFF	1 ms (.1 ms typical)
dv/dt		200 V/μs
Power Required	+5 V	90 mA
	+4.3 V	80 mA
	–5 V	0 mA
External Power Supply		10 ... 60 Vdc, 500 mA max./group (Excluding field load current)
Terminal Connector		AS–8534–000
Fusing		One/group, 3 AG, 6 A (normal blow)

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Chapter 16
B821–108 10 ... 60 Vdc Input (True High)

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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16.1 Overview

The B821-108 10 ... 60 Vdc Input Module (True High) senses and converts switched input signals into logic voltage levels used by the PLC. The module allows for up to eight inputs in four groups of two. Each group shares a common reference voltage supply input. These inputs can be received from push buttons, limit and proximity switches, as well as other 10 ... 60 Vdc sources.

16.1.1 Simplified Schematic

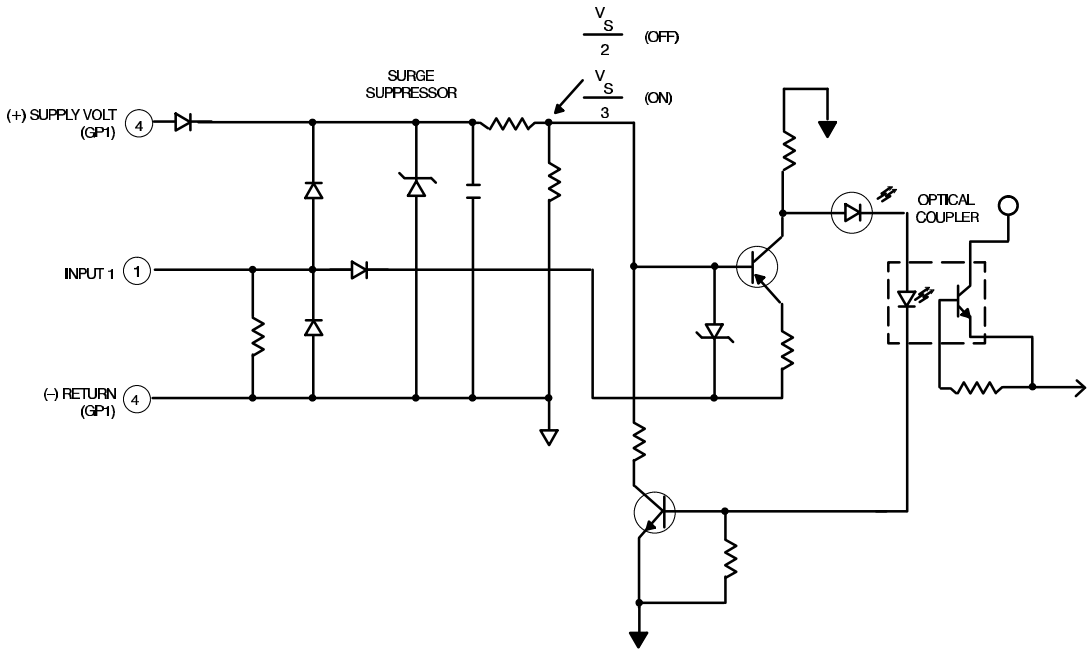


Figure 34 B821–108 Simplified Schematic

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16.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

16.2.1 Input Connections

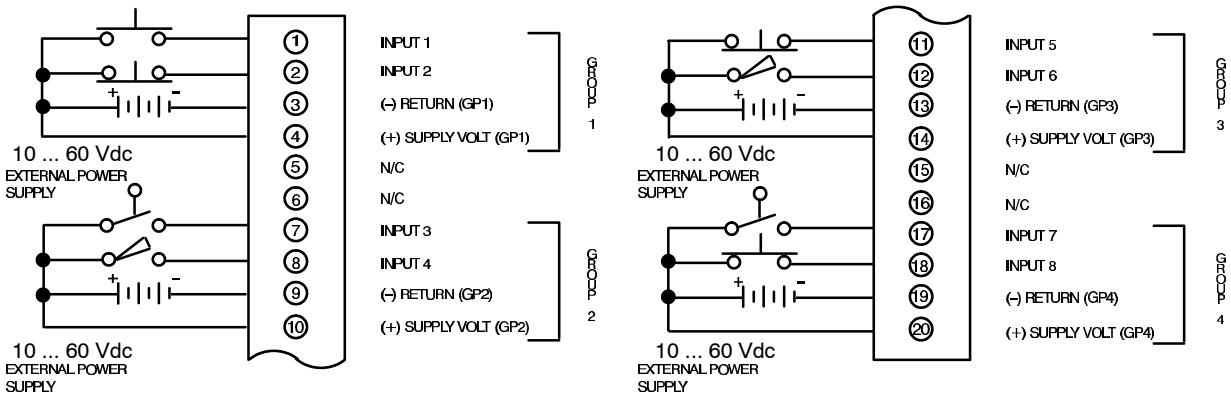


Figure 35 B821–108 Terminal Numbering and Input Connections

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16.3 Specifications

B821–108 Specifications

Description		10 ... 60 Vdc input module
Type of Operation		True high
Number of Points		8
Operating Voltage		10 ... 60 Vdc
Number of Groups		4
Inputs/group		2
ON Level	Input Voltage	If the applied input voltage is ≥ 70% of the external power supply, the input to the controller is guaranteed to be in an ON logic state. However, to achieve satisfactory margin, the input voltage should be 75% of the supply voltage. Once the input to the controller is in the ON state, it remains ON as long as the input voltage is ≥ 60% of the power voltage.

☞ **Note** When designing or selecting a drive circuit for the B821, take into consideration the values listed for input currents that follow.

Inputs Current	Supply Volt (Vdc)	Input Volt Vdc)	Max Input Current (mA)
	10	10	10
	24	24	15
	48	48	25
	60	60	32
OFF Level	Input Voltage	If the applied input voltage is ≤ 40% of the supply voltage, the input to the controller is guaranteed to be in an OFF logic state. However, to achieve satisfactory margin, the input voltage should be ≤ 25% of the supply voltage.	

☞ **Note** When designing or selecting a drive circuit for the B821, take into consideration the values listed for source resistance that follow.

Source Resistance	Supply Volt (Vdc)	Input Volt (Vdc)	Max Source Resistance (Ω)
	10	10	200
	60	60	500

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Maximum Input Voltage	Continuous	10 ... 60 Vdc
Maximum Response Time	OFF → ON	2.5 ms min, 11 ms max
	ON → OFF	2.5 ms min, 11 ms max
Power Required	+5 V	27 mA
	+4.3 V	1 mA
	–5 V	10 mA
External Supply		10 ... 60 Vdc (Excluding Input Current)
External Supply Current/group		2 mA (max) @ 10 Vdc
		5 mA (max) @ 24 Vdc
		10 mA (max) @ 48 Vdc
		12 mA (max) @ 60 Vdc
Terminal Connector		AS–8534–000

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Chapter 17
B824–016 24 Vdc Output (True High)

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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17.1 Overview

The Modicon B824-016 24 Vdc True High Output Module consists of sixteen independent outputs divided into two groups of eight. The B824 converts signals used within the PLC into 16 independent outputs. Outputs are capable of driving motor starters, relays, and a variety of other loads.

There are 16 transistor switches which are used to control loads connected to external power source. The module's 16 outputs are in two groups, eight outputs per group. Each group is fused to protect the outputs from overload currents and polarity reversal.

17.1.1 Simplified Schematic

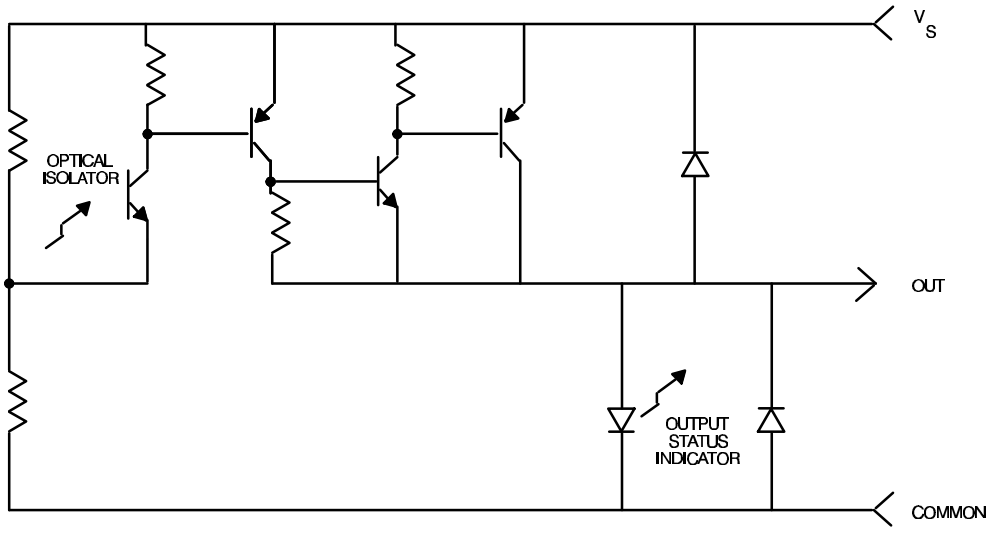


Figure 36 B824–016 Simplified Schematic

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17.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

17.2.1 Output Connections

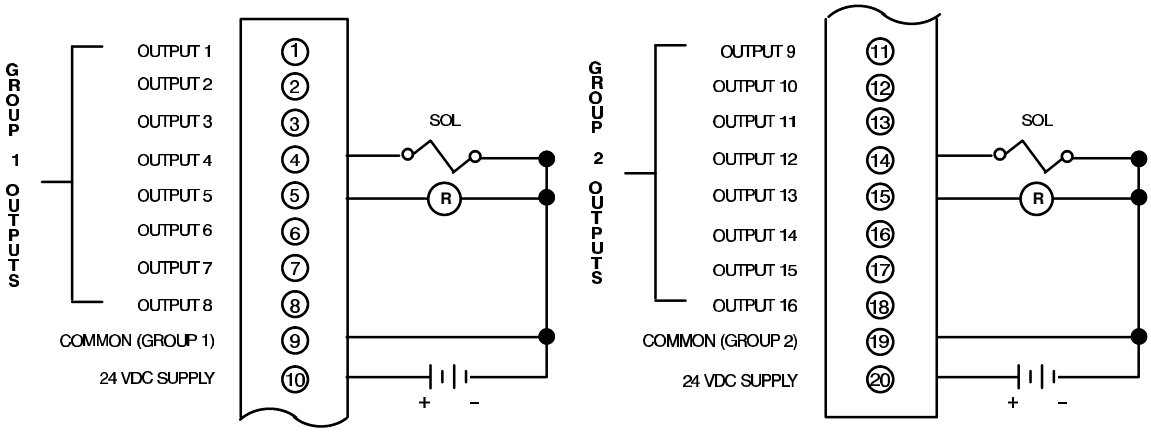


Figure 37 B824–016 Terminal Numbering and Output Connections

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17.3 Specifications

B824–016 Specifications

Description		24 Vdc output
Type of Operation		True high
Number of Points		16
Operating Voltage		20 ... 28 Vdc
Number of Groups		2
Outputs/group		8
On Current	Maximum/point	2 A continuous
	Maximum Surge	5 A for 10 ms
	Maximum/group	6 A
	Maximum/module	12 A
ON State	Voltage Drop	1.8 Vdc @ 2 A
OFF State	Leakage Current	1 mA (max) @ 24 Vdc
Maximum Response Time	OFF → ON	1 ms
	ON → OFF	1 ms
Power Required	+5 V	32 mA
	+4.3 V	260 mA
	–5 V	0 mA
External Power Supply		24Vdc $\pm$4 V, 175 mA – Polarity Protected (Excluding field load current)
Terminal Connector		AS–8534–000
Fusing		One / group, 8 A

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Chapter 18
B825–016 24 Vdc Input (True High)

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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18.1 Overview

The Modicon B825- -016 24 Vdc True High Input Module consists of a single group of 16 independent inputs. The B825 senses and converts switched input signals into logic voltage levels used by the PLC.

The module provides 16 inputs that share an external power supply. Inputs can be received from push buttons, limit and proximity switches, and other 24 Vdc sources. Input voltages are sensed by comparing the incoming voltage against a fixed threshold. The threshold is a function of the user-supplied field voltage.

18.1.1 Simplified Schematic

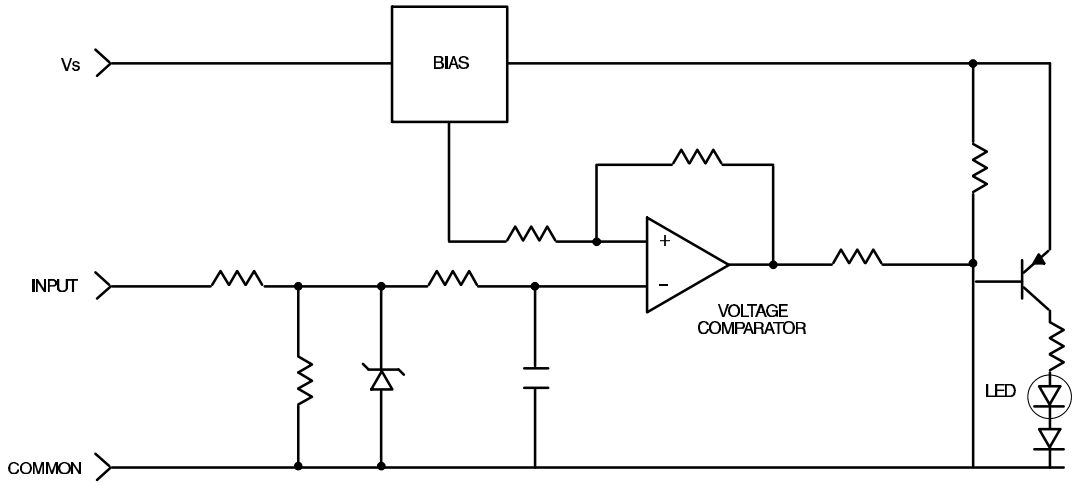


Figure 38 B825–016 Simplified Schematic

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18.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

18.2.1 Input Connections

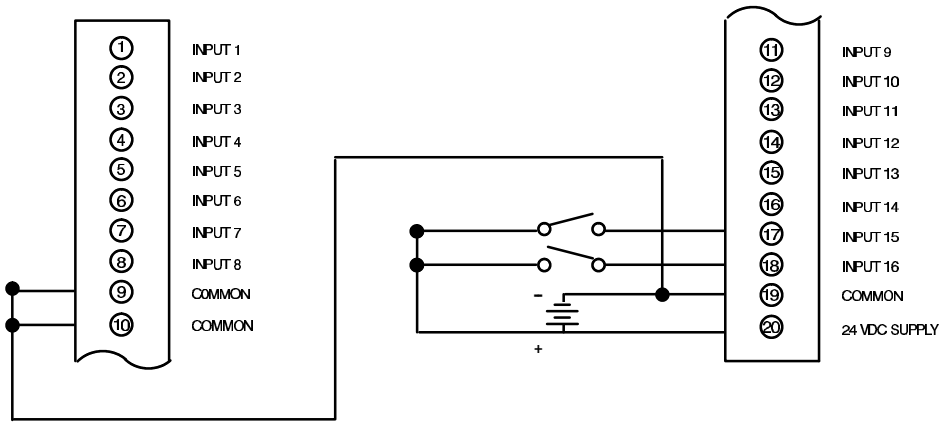


Figure 39 B825–016 Terminal Numbering and Input Connections

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18.3 Specifications

B825–016 Specifications

Description		24 Vdc input
Type of Operation		True high
Number of Points		16
Operating Voltage		20 ... 28 Vdc
Number of Groups		1
Inputs/group		16
Maximum Input Voltage	Continuous	30 Vdc
	Surge	500 Vdc for 3 ms
ON Conditions		≥ 21 Vdc or .75 of Vs, whichever is less. 1,000 Ω max resistance to common. Input indicator ON.
OFF Conditions		≤ 5 Vdc or .25 of Vs, whichever is greater. 25,000 Ω resistance to common. Input indicator OFF.
ON Current		6 mA (typical) @ 24 Vdc
Maximum Response Time	OFF → ON	11 ms (2.5 ms typical)
	ON → OFF	11 ms (2.5 ms typical)
Power Required	+5 V	27 mA
	+4.3 V	1.2 mA
	–5 V	15 mA
External Power Supply		24Vdc ±4 V@ 200 mA max (Vs)
Terminal Connector		AS–8534–000

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Chapter 19
B826–032 24 Vdc Output (True High)

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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19.1 Overview

The Modicon B826-032 24 Vdc True High Output Module consists of a single group of 32 independent outputs. The B826 converts logic signals used within the PLC into 32 independent 24 Vdc outputs. Outputs are capable of driving relays, pilot lamps, and other loads rated at $^{1}/_{4}$ A. The outputs share an external supply voltage and are protected against overload currents by a single fuse.

19.1.1 Simplified Schematic

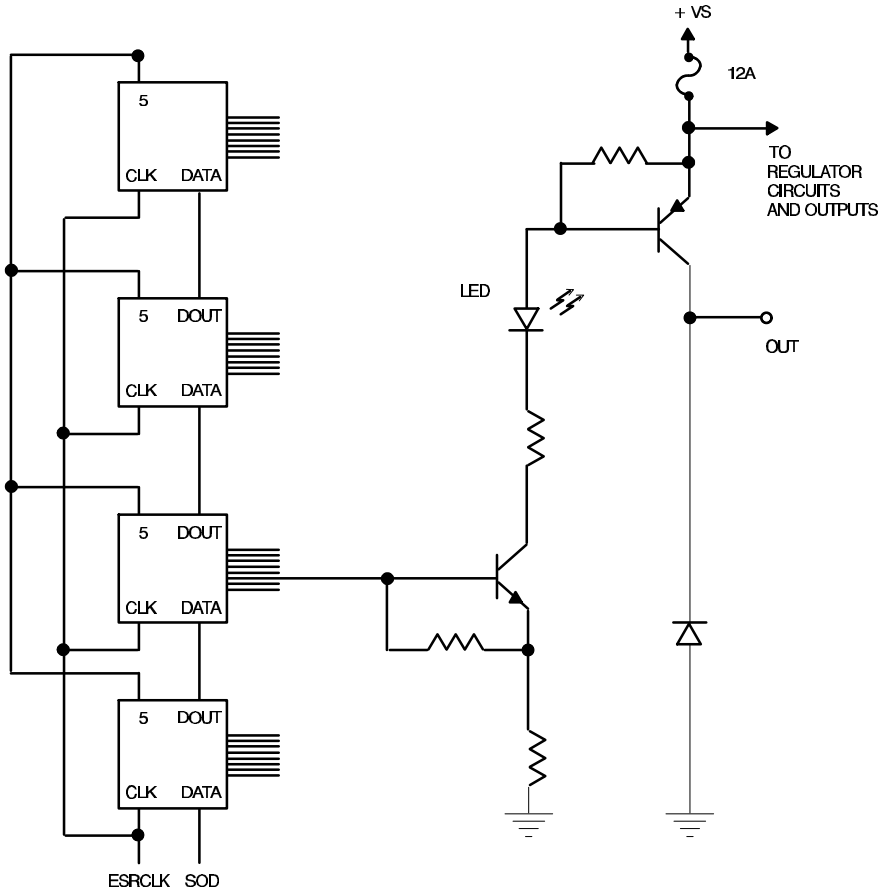


Figure 40 B826–032 Simplified Schematic

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☞ **Note:** Due to its high density and compact design, the module is specifically designed for use in applications such as driving individual pilot lamps, LED displays, or other *noncritical loads*.

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19.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

19.2.1 Output Connections

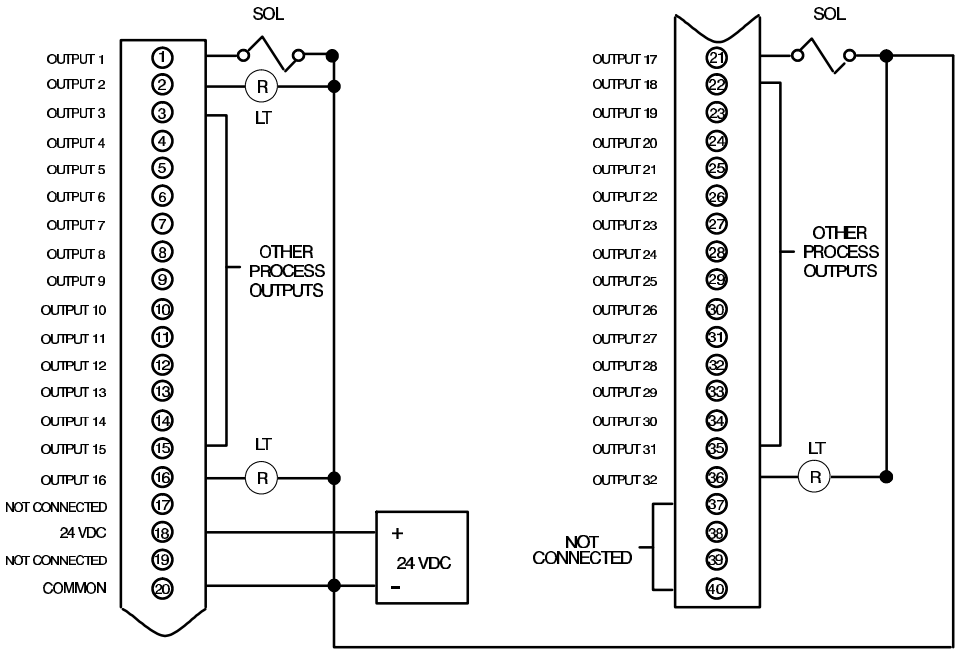


Figure 41 B826–032 Terminal Numbering and Output Connections

☞ **Note:** If any loads are polarity sensitive, their negative (- -) terminal must be connected to the common bus.

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19.3 Specifications

B826–032 Specifications

Description		24 Vdc output
Type of Operation		True high
Number of Points		32
Operating Voltage		20.4 ... 28.8 Vdc
Number of Groups		1
Outputs/group		32
On Current	Maximum/point	0.25 A
	Maximum/module	8 A
	Maximum/group	8 A
Surge Current		2.5A max for .5 mS
Off State Leakage Current		0.1 mA (typical) @ 24 Vdc
		0.75 mA max @ 28.8 Vdc
Maximum Response Time	OFF → ON	1 ms
	ON → OFF	1 ms
Ripple Voltage		± 1.2V max
Peak Voltage		32V max for 10 mS
On State Voltage Drop		0.7 Vdc max
Power Required	+5 V	90 mA
	+4.3 V	1 mA
	–5 V	0 mA
External Power Supply		24 Vdc, 600 mA max (Excluding field load current) 24 Vdc, 540 mA typical
Terminal Connector		AS–8535–000
Fuse		One/group, 12 A

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Chapter 20
B827–032 24 Vdc Input (True High)

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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20.1 Overview

The Modicon B827-032 24 Vdc True High Input Module consists of a single group of 32 independent inputs. The B827 senses and converts switched input signals into logic voltage levels used by the PLC. Inputs can be received from push buttons, limit and proximity switches, and other 24 Vdc sources.

The B827 provides 32 inputs that share an external supply voltage. Input voltages are sensed by comparing the incoming voltage against a fixed threshold. The threshold is a function of the user- -supplied field voltage.

20.1.1 Simplified Schematic

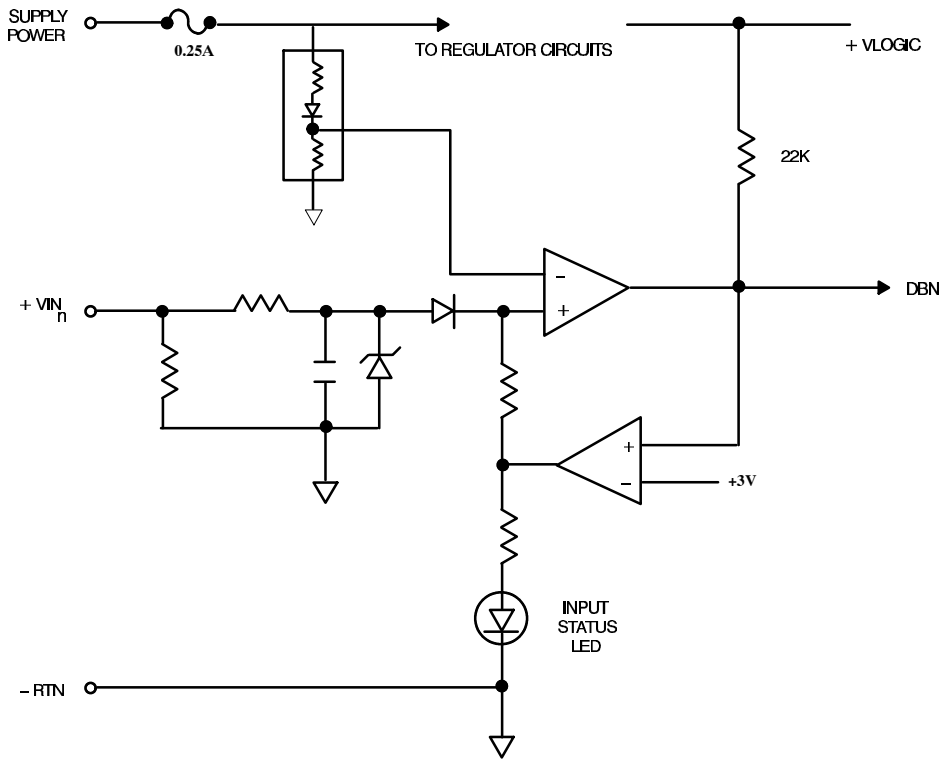


Figure 42 B827–032 Simplified Schematic

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20.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

20.2.1 Input Connections

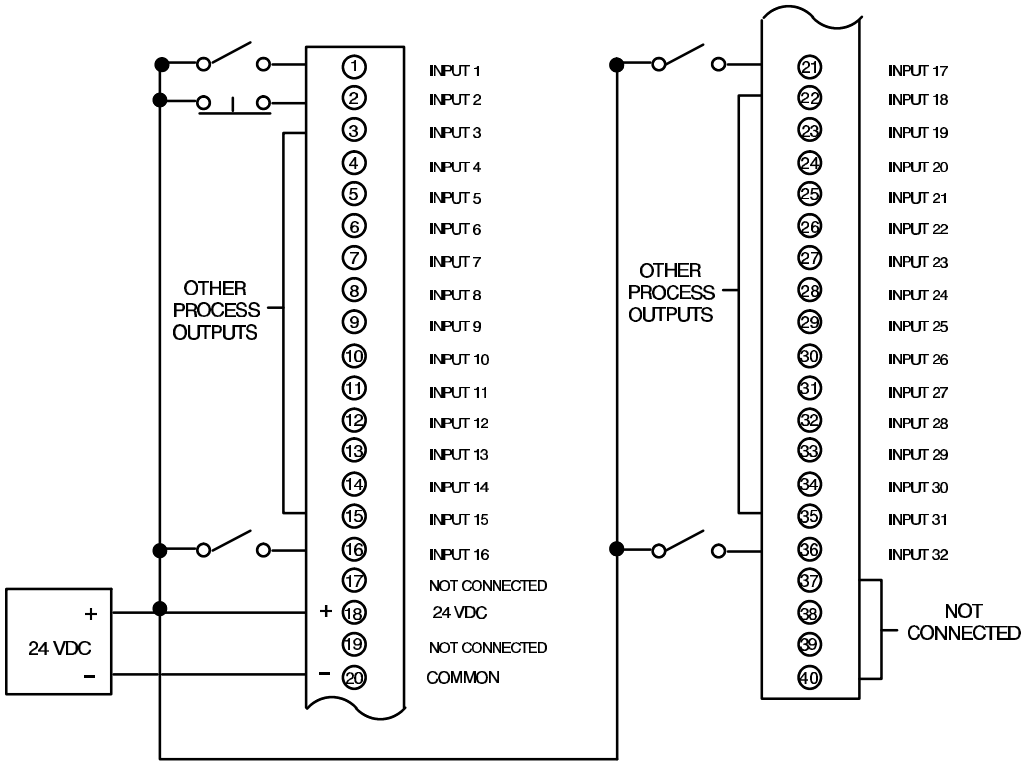


Figure 43 B827–032 Terminal Numbering and Input Connections

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20.3 Specifications

B827–032 Specifications

Description		24 Vdc high density input
Type of Operation		True high
Number of Points		32
Operating Voltage		18 ... 30 Vdc
Number of Groups		1
Outputs/group		32
ON Level Input Voltage		≥22.5 Vdc or .75 of Vs, whichever is less
OFF Level Input Voltage		≤4.5 Vdc or .25 of Vs, whichever is greater
Input Resistance	On State	8 ... 11 kΩ
	Off State	6 ... 8 kΩ
Maximum Response Time	OFF → ON	0.4 ms
	ON → OFF	1 ms
Power Required	+5 V	30 mA
	+4.3 V	1 mA
	–5 V	0 mA
External Power Supply	Supply Voltage	18 ... 30 Vdc continuous 40 Vdc peak for 10 ms surge
	Supply Current	60mA max over an 18 ... 30 Vdc range
Terminal Connector		AS–8535–000
Fuse		0.25 A

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Chapter 21
B828–016 5 V TTL Output

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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21.1 Overview

The B828-016 5 V TTL Output Module converts logic signals used within the controller into sixteen independent 5 V TTL outputs. These outputs are compatible with TTL and DTL logic as well as other loads such as LED displays. The module uses sixteen transistor switches which are capable of sinking load currents up to 75 mA supplied from an external 5 Vdc power source.

21.1.1 Simplified Schematic

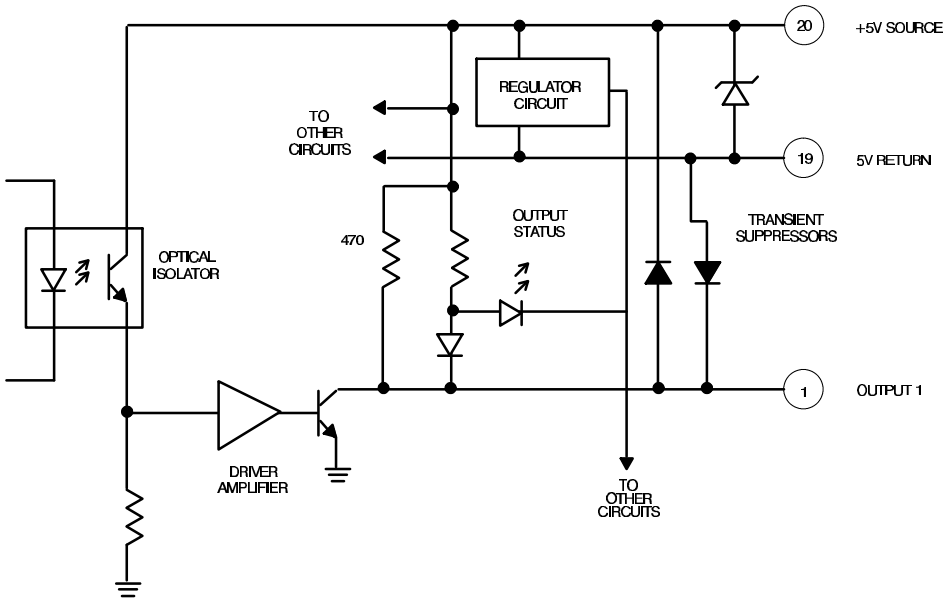


Figure 44 B828–016 Simplified Schematic

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21.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

21.2.1 Output Connections

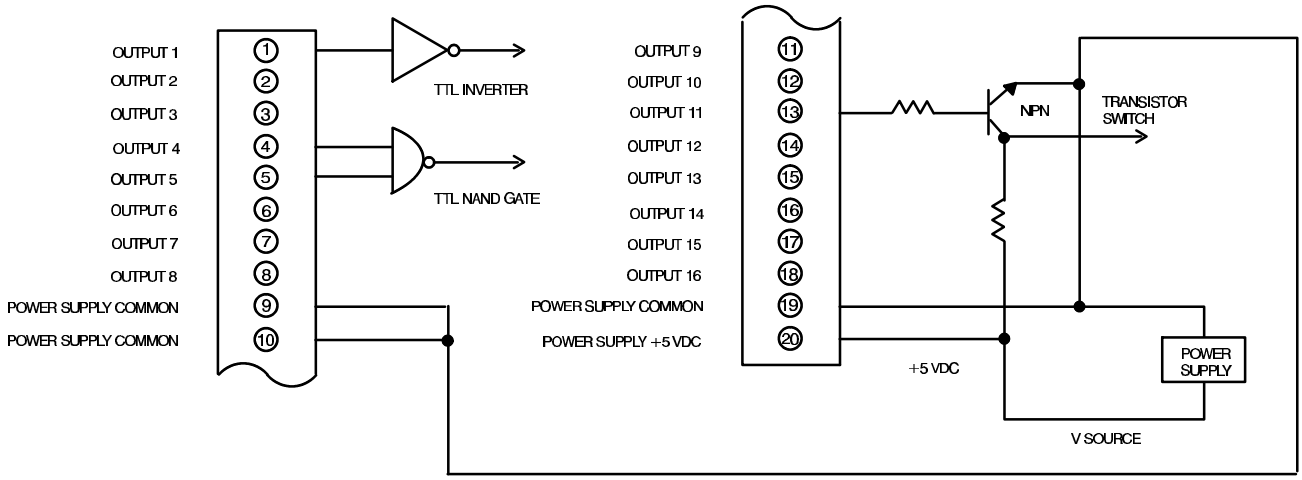


Figure 45 B828–016 Terminal Numbering and Output Connections

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21.3 Specifications

B828–016 Specifications

Description		5 V TTL output
Number of Points		16
Operating Voltage		5 V TTL
Number of Groups		1
Outputs / Group		16
ON Level		4.0 Vdc min @ 1mA source, 5 Vdc supply @ 4.75 Vdc
OFF Level		0.4 Vdc max @ 75 mA rated current: sinking 75 mA max., continuous, 100 mA peak (10 ms, 20% duty cycle)
Maximum Response Time	OFF → ON	1 ms
	ON → OFF	1 ms
Power Required	+5 V	32 mA
	+4.3 V	220 mA
	–5 V	0 mA
External Power Supply		5.0 ±0.25 Vdc 600 mA max outputs ON
Terminal Connector		AS–8534–000
Fusing		One/group, 1.5 A

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Chapter 22
B829–116 5 V TTL Input

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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22.1 Overview

The B829-116 fast response 5 V TTL Input Module converts signals from 16 independent 5 V logic-compatible inputs into signals used by the PLC. Each input is capable of conditioning signals from TTL devices or DTL devices for use by the PLC.

22.1.1 Simplified Schematic

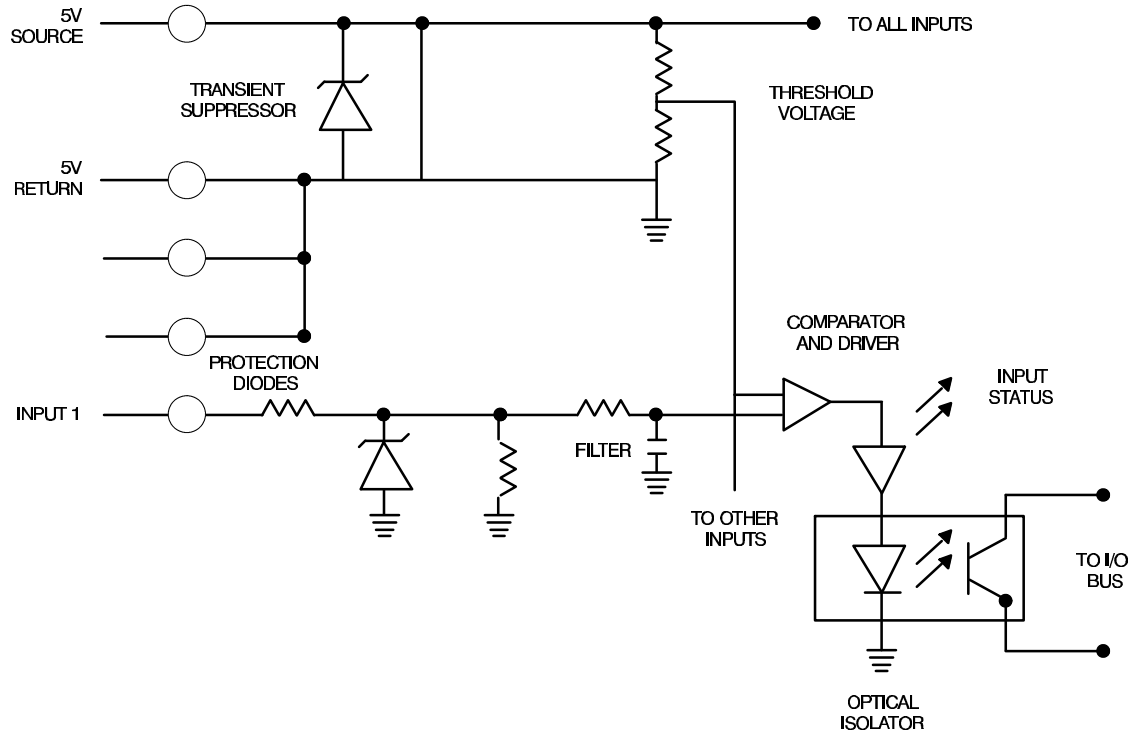


Figure 46 B829–116 Simplified Schematic

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22.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

22.2.1 Input Connections

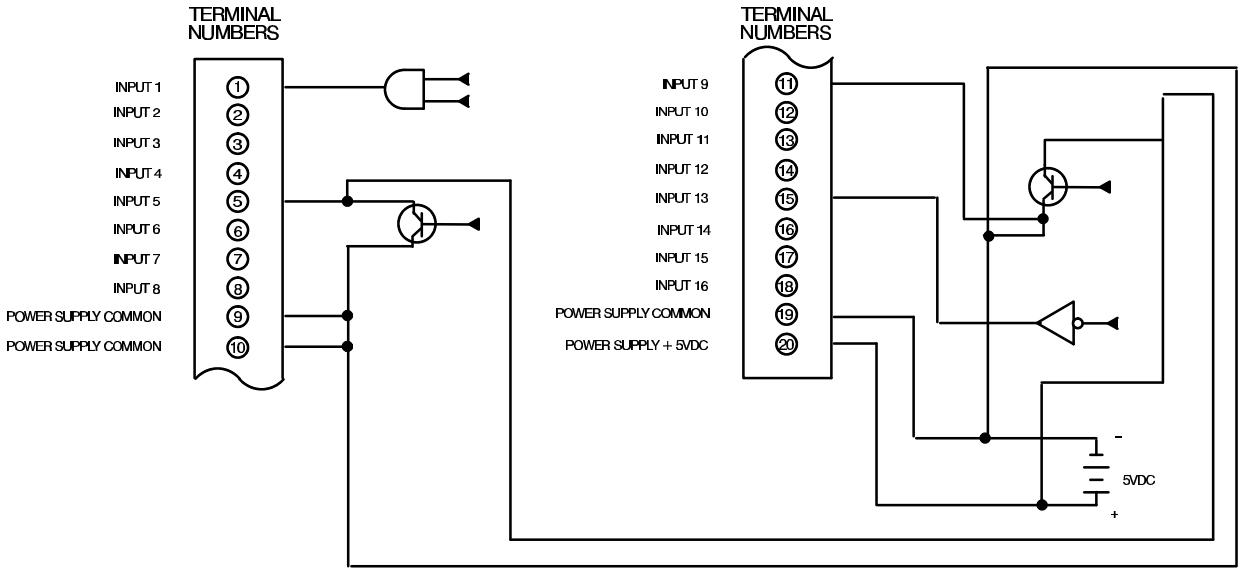


Figure 47 B829–116 Terminal Numbering and Input Connections

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22.3 Specifications

B829–116 Specifications

Description		5 V TTL16-point
Number of Points		16
Operating Voltage		5 V
Number of Groups		1
Outputs / Group		16
Input Ratings	ON Level	VIH = 2.0 Vdc (minimum)
		IIL = 0.1 mA (max) @ VIH = 5.5 Vdc
		V (source) = 5.0 Vdc
		V (max input) = 8.0 V
		I (max positive clamp) = 25 mA
	OFF Level	VIL = 0.8 Vdc (maximum)
		IIL = 1.1 mA (maximum) @ V
		(source) = 5.25 Vdc and VIL = 0.0 V
		V (max negative input) = –2 Vdc
		1 (max negative clamp) = 15 mA
Transient Voltage		100 V for 10 ms
Maximum Response Time	OFF → ON	1 ms
	ON → OFF	1 ms
Power Required	+5 V	21 mA
	+4.3 V	1 mA
	–5 V	0 mA
External Power Supply		5.0 ±0.25 Vdc, 325 mA all inputs ON
Terminal Connector		AS–8534–000

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Chapter 23
B832–016 24 Vdc Output (True Low)

- ☐ Overview
- ☐ Field Connections
- ☐ Specifications

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23.1 Overview

The Modicon B832-016 24 Vdc Output Module (True Low) consists of a single group of 16 independent outputs. The B832 converts signals used within the PLC into 16 independent 24 Vdc outputs. These outputs are capable of driving indicators, relays, and a variety of other loads. There are 16 transistor switches, which are used to control loads connected to an external power source.

23.1.1 Simplified Schematic

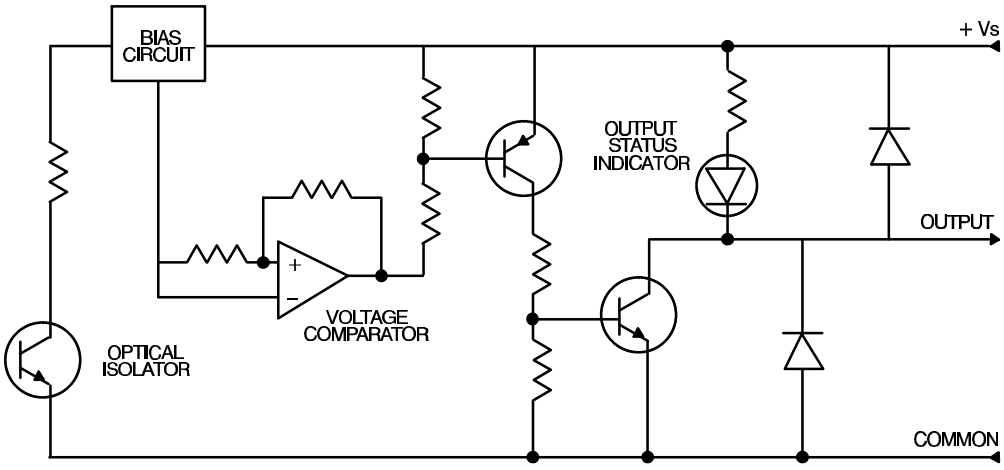


Figure 48 B832–016 Simplified Schematic

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23.2 Field Connections

User connections are made to a standard screw terminal strip and the rigid wiring system permits module insertion or removal without disturbing the wiring.

23.2.1 Output Connections

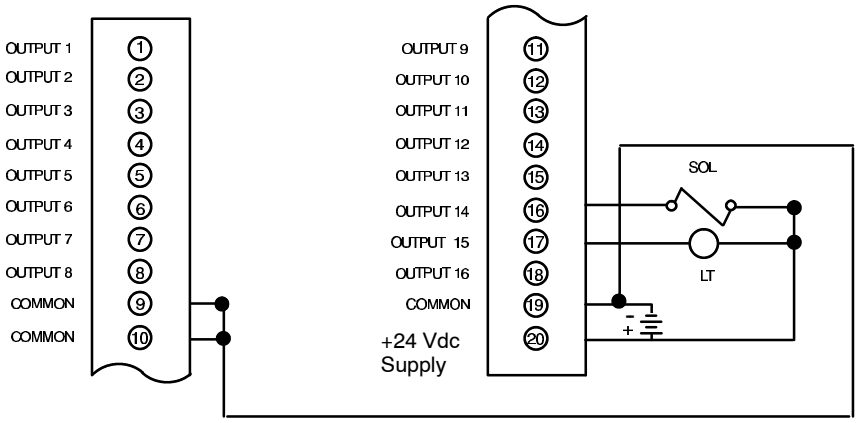


Figure 49 B832–016 Terminal Numbering and Output Connections

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23.3 Specifications

B832–016 Specifications

Description		24 Vdc output
Type of Operation		True low
Number of Points		16
Operating Voltage		20 ... 28 Vdc
Peak Voltage		33 Vdc for 1 s
Number of Groups		2
Outputs/group		8
On Current	Maximum/point	250 mA
	Surge Current	1 A for 10 ms
	Maximum/group	2 A
	Maximum/module	4 A
Off Current		0.5 mA maximum
On Voltage Drop		0.5 Vdc maximum/output @ 250 mA
Maximum Response Time	OFF → ON	1 ms
	ON → OFF	1 ms
Power Required	+5 V	32 mA
	+4.3 V	235 mA
	–5 V	0 mA
External Power Supply		24 Vdc ±4 V, 600 mA maximum (excluding field load current)
Terminal Connector		AS–8534–000
Fusing		1/module, 6 A

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