

## Mixed I/O Link Module

B7AM-8□

### Compact B7A Module Provides 8 Input and 8 Output Points

- Saves space in control panels, measures just 114.5 mm (4.51 in) wide
- Compatible with B7A 16-point mixed I/O terminal wiring block
- Normal I/O delay (19.2 ms typical) or short I/O delay (3 ms typical) models
- Output models offer Hold or Load Off options for handling transmission errors
- DIN rail or surface mounting



## Ordering Information

### MODEL NUMBER LEGEND

B7AM - 8 B □ □  
 1 2 3 4 5

#### 1. Classification

M: Mixed I/O model

#### 2. Number of I/O

8: Eight input points and eight output points

#### 3. Input/Output Configuration

B: NPN input and 100 mA NPN open collector output per point

F: PNP input and 100 mA PNP open collector output per point

#### 4. Error Processing

1: HOLD

3: LOAD OFF

#### 5. I/O Delay (Typical)

1: 19.2 ms (Screw terminals)

6: 3 ms (Screw terminals)

### MIXED I/O LINK MODULES

Appearance	I/O configuration	I/O delay (typical)	Error processing	Part number
	NPN compatible inputs/ NPN open collector outputs 100 mA/point	Normal speed 19.2 ms	HOLD	<b>B7AM-8B11</b>
			LOAD OFF	<b>B7AM-8B31</b>
	PNP compatible inputs/ PNP open collector outputs 100 mA/point	High speed 3 ms	HOLD	<b>B7AM-8B16</b>
			LOAD OFF	<b>B7AM-8B36</b>
	Normal speed 19.2 ms	LOAD OFF	<b>B7AM-8F31</b>	

### POWER SUPPLIES

Input voltage	Output rating	Application	Part number
120 to 240 VAC	0.13 A, 24 VDC	Use one to power each input or output block	<b>S82K-00324</b>
	0.3 A, 24 VDC	Use one to power two blocks from a single power supply	<b>S82K-00724</b>
	0.6 A, 24 VDC	Use this to power blocks connected to sensors, relays indicator lights	<b>S82K-01524</b>
	1.3 A, 24 VDC	Use one where excess power is needed	<b>S82K-03024</b>

# Specifications

## ■ CHARACTERISTICS

### General

Item	Normal speed	High speed
<b>Communication method</b>	Unidirectional, time-division multiplex	
<b>Transmission distance</b> (See Note 1)	500 m max.	100 m max. (See Note 2)
<b>I/O delay</b>	Typical: 19.2 ms; 31 ms max.	Typical: 3 ms; 5 ms max.
<b>Minimum input time</b> (See Note 3)	16 ms	2.4 ms
<b>Operating voltage range</b>	12 to 24 VDC (10.8 to 26.4 VDC) (See Note 1)	
<b>Insulation resistance</b>	100 MΩ min. (500 V) between each terminal and external parts	
<b>Dielectric strength</b>	1,000 VAC, 50/60 Hz for 1 min between each terminal and external parts	
<b>Noise immunity</b> (See Note 4)	Noise level: 1.5 kV; pulse width: 100 ns to 1 μs (on transmission line due to coupling)	
<b>Vibration resistance</b>	10 to 55 Hz, 1.5-mm double amplitude	
<b>Shock resistance</b>	300 m/s <sup>2</sup> (approx. 30G)	
<b>Ambient temperature</b>	Operating: -10°C to 55°C (14°F to 131°F) with no icing Storage: -25°C to 65°C (-13°F to 149°F) with no icing	
<b>Ambient humidity</b>	Operating: 35% to 85% with no condensation	

- Note: 1. The transmission distance values stated in this table are based on one power supply attached to each Input or Output Link Terminal. If two Input or Output Link Terminals share one power supply, the transmission distance will be derated, and the voltage must be 24 VDC ±10%. The derated transmission distance for normal-speed models is 100 m maximum and that of a high-speed model is 50 m maximum
2. A shielded transmission cable or a twisted-pair or VCTF cable with a thickness of 0.75 mm<sup>2</sup> minimum must be used for signal transmission. If the VCTF cable is used, however, the transmission distance will be 10 m maximum regardless of whether or not independent power supplies for the Input and the Output Link Terminals are used.
3. The minimum input time is required for the B7AM to read an input signal.
4. As for the high-speed models, these values are possible without grounding the shielded line.

## Mixed I/O Terminal Block

Item	B7AM-8B11/-8B31/-8B16/-8B36	B7AM-8F31
<b>Compatible inputs</b> (See Note 1)	Switches, two-wire sensors with DC output, three-wire NPN sensors	Switches, two-wire sensors with DC output, three-wire PNP sensors
<b>I/O delay</b>	B7AM-8B□1: standard (typical 19.2 ms); B7AM-8B□6: high speed (typical 3 ms)	Standard (typical 19.2 ms)
<b>Input logic</b>	Active low	Active high
<b>Current consumption</b>	120 mA max. with all input/output terminals ON (See Note 2)	
<b>Operating voltage range</b>	12 to 24 VDC	
<b>Input voltage range</b>	0 VDC to supply voltage	
<b>Input current range</b>	-6 to -3 mA/point (current flowing from input terminals)	3 to 6 mA/point (current flowing from input terminals)
<b>Minimum input time</b>	B7AM-8B□1: 16 ms; B7AM-8B□6: 2.4 ms	
<b>ON/OFF threshold</b>	No-contact input: ON voltage: 4 V max. OFF voltage: 6 V min. Contact input: ON discrimination resistance: 660 Ω max. OFF discrimination resistance: 2 kΩ min.	
<b>Output configuration</b>	NPN open collector	PNP open collector
<b>Rated load voltage</b>	5 to 24 VDC	
<b>Output residual voltage</b>	0.8 V max.	
<b>Output current</b>	Sink current, 100 mA max./point	Source current, 100 mA max./point
<b>Error processing</b>	B7AM-8B1□: HOLD; B7AM-8B3□: LOAD OFF	LOAD OFF
<b>Mounting strength</b>	No damage when 5 kgf (49 N) pull is applied for 1 min each in all directions	
<b>Terminal strength</b>	No damage when 5 kgf (49 N) pull is applied for 1 min each in all directions	
<b>Tightening torque</b>	8 to 12 kgf • cm (0.78 to 1.18 N • m)	
<b>Weight</b>	Approx. 140 g	

Note: 1. Power must be supplied to the three-wire sensor via the positive power supply terminal or from an independent power supply. Two-wire sensors must satisfy the following requirements:

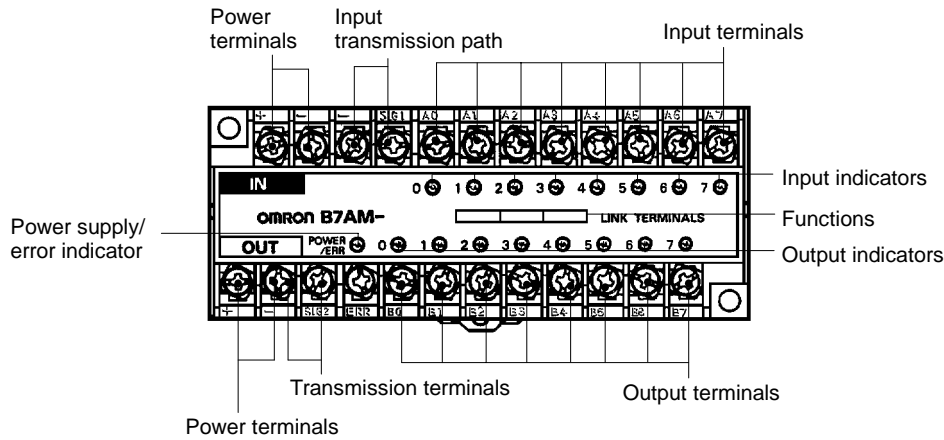
Residual voltage: 4 V max.

Current leakage: 1.5 mA max.

The lower limit of control output: 3 mA (Use a bleeder resistor to eliminate this restriction.)

2. Consumption when all 8 input/output points are ON. Excludes external sensor current for Input Terminals and external load current and error load current for Output Terminals.

# Nomenclature



## Indicator Operation

Indicator	Function
POWER/ERR	G Lit when power is supplied and the Terminal is operating without error.
	R Lit during transmission errors (SIG2).
	N Not lit when power is not supplied.
I/O	O Lit when the input signals are ON.
	N Not lit when the signals are OFF.

Note: G: Green indicator lit; R: Red indicator lit;  
O: Orange indicator lit; N: Not lit

## Recommended Solderless Terminals

Wire	JIS specifications
0.75 mm <sup>2</sup> (AWG#18)	RAV 1.25 to 3.5 (vinyl-insulated round wire) or RAP 1.25 to 3.5
1.25 mm <sup>2</sup> (AWG#16)	(nylon-insulated round wire)

## Functions

Display	Description
	<b>I/O configuration</b> Indicates the compatible transistor type.
	<b>Output current</b> Indicates the rated output current value of the B7A per point.
	<b>I/O delay</b> Indicates the typical I/O delay time of the B7A. Use a combination of an Input and Output Link Terminal with the same I/O delay time.

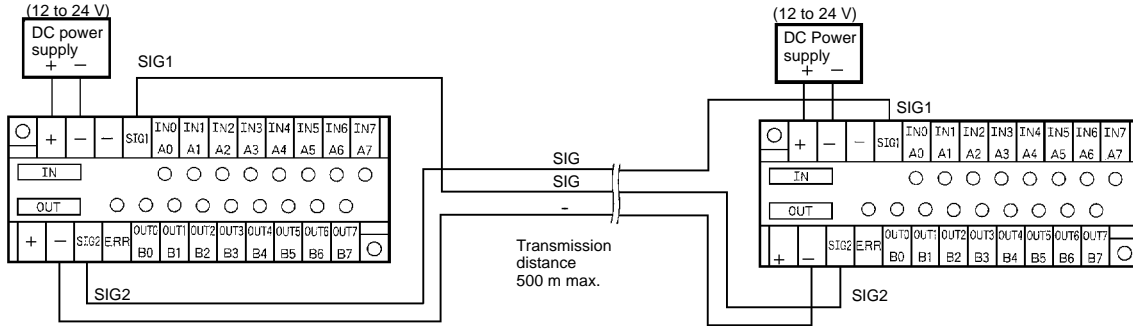
# Operation

## ■ POWER SUPPLY

The two positive and three negative terminals on the terminal block are internally connected. Use positive and negative terminals for the power supply terminals and another negative terminal for the negative signal line. Connect the SIG1 terminals to SIG2 terminals for the signal lines.

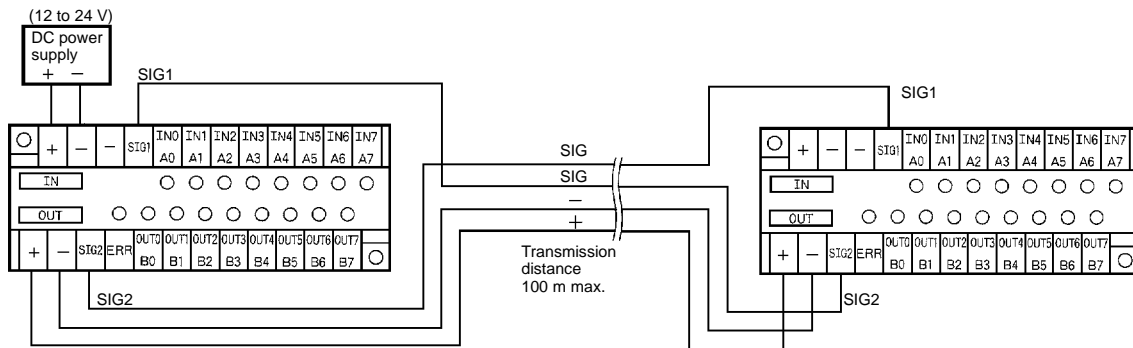
### I/O Delay: Normal Speed

#### Connection of Independent Power Supplies



Note: A twisted pair or VCTF cable with a thickness of 0.75 mm<sup>2</sup> min. must be used for signal transmission.

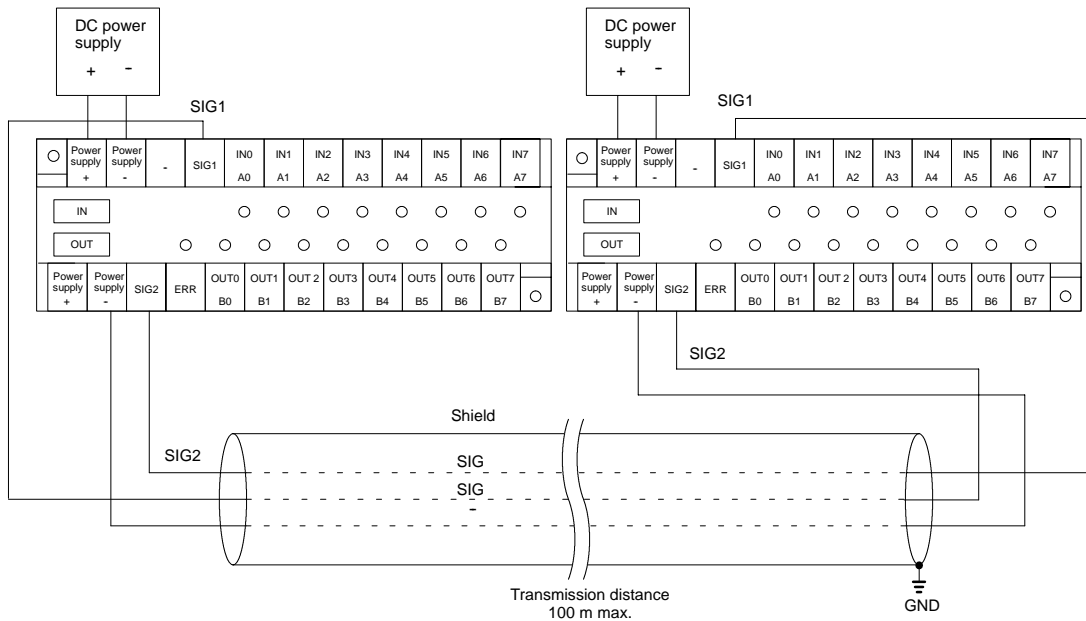
#### Connection of Single Power Supply to Two Mixed I/O Modules



Note: In this example, a twisted pair or VCTF transmission cable with a thickness of 0.75 mm<sup>2</sup> min. is used, through which a current of 1.8 A max. can be transmitted.

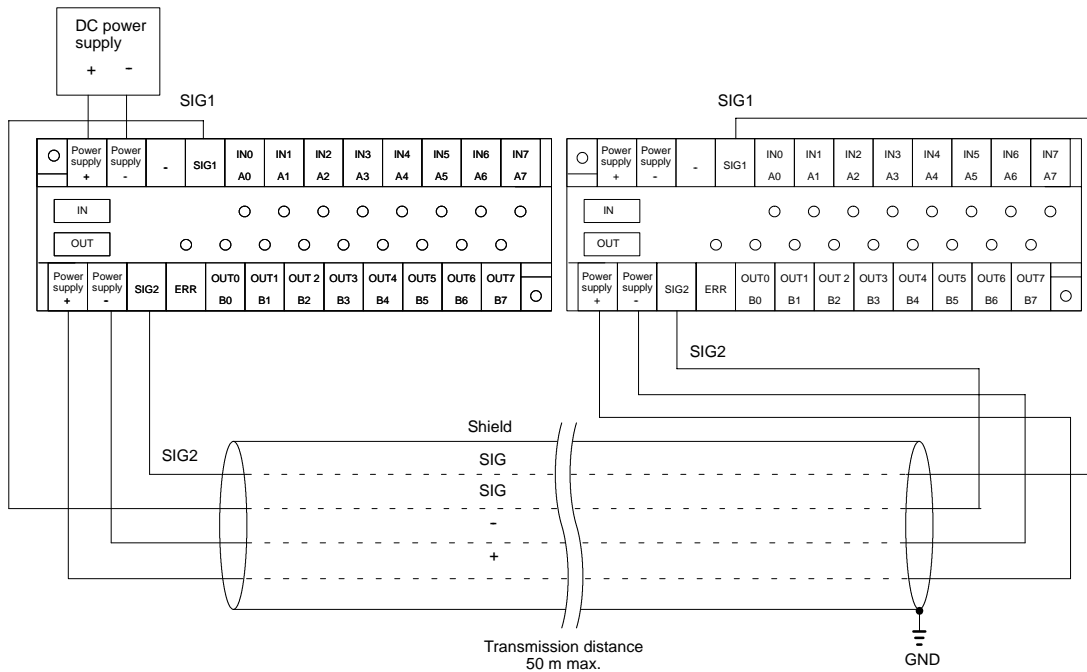
I/O Delay: High Speed

Connection of Independent Power Supplies



Note: A shielded cable with a thickness of 0.75 mm<sup>2</sup> min. must be used for signal transmission. It is recommended that the shield be grounded.  
 The maximum transmission distance is 10 m if a twisted pair or VCTF wire with a thickness of 0.75 mm<sup>2</sup> is used instead of a shielded cable for the transmission path.

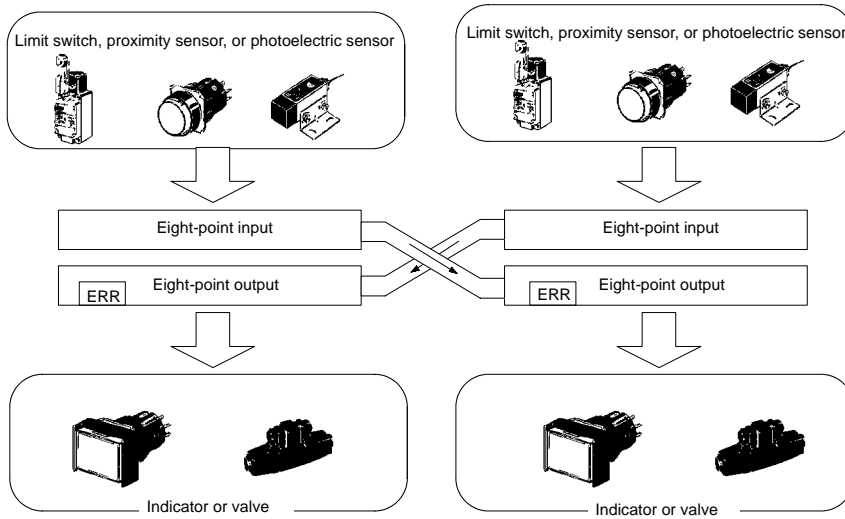
Connection of Single Power Supply to Two Mixed I/O Modules



Note: In this example, a shielded transmission cable with a thickness of 0.75 mm<sup>2</sup> min. is used, through which a current of 1.8 A max. can be transmitted. It is recommended that the shield be grounded.  
 The maximum transmission distance is 10 m if a twisted pair or VCTF wire with a thickness of 0.75 mm<sup>2</sup> is used instead of a shielded cable for the transmission path.

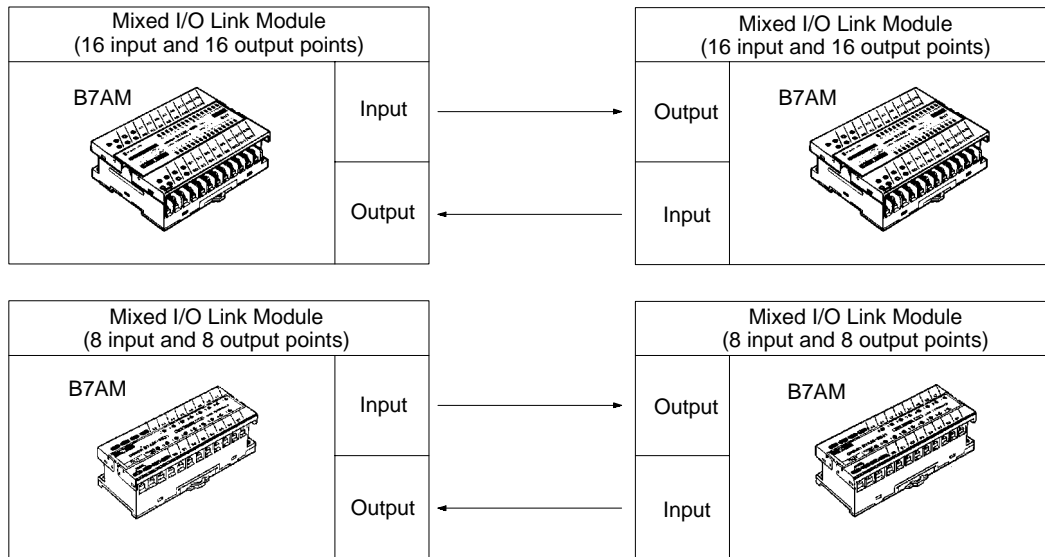
■ CONFIGURATION

Device Connection



Note: The B7AM transmits input signals from SIG1 (input terminal) to SIG2 (output terminal). If an error results while the B7AM is transmitting input signals, an error signal is output from the output side only.

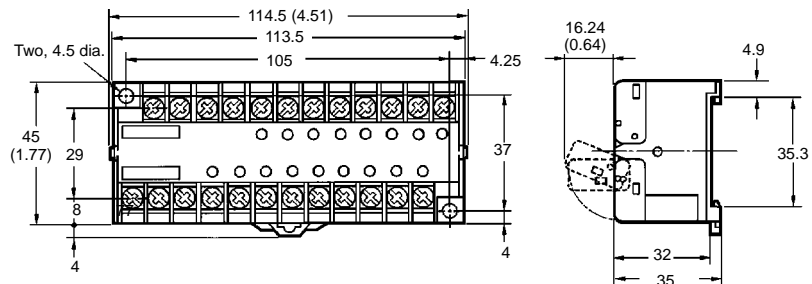
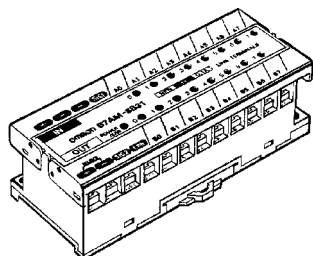
B7A System Configuration



Note: The Mixed I/O Link Terminals are either 3 ms (typical, for high-speed models) or 19.2 ms (typical, for normal-speed models). Use a combination of an Input and an Output Link Terminal with the same transmission speed (I/O delay time).

Dimensions

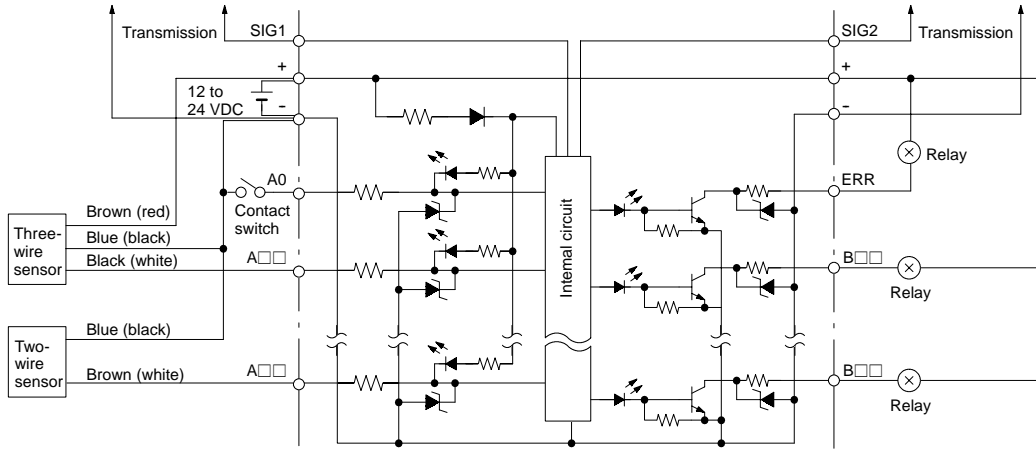
Unit: mm (inch)



# Installation

## INTERNAL CIRCUITS AND TERMINAL ARRANGEMENT

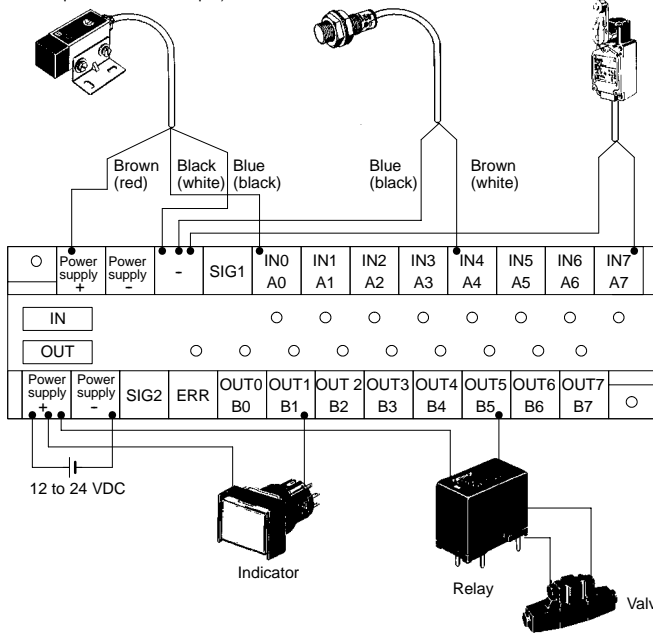
**B7AM-8B11/-8B16/-8B31/-8B36**  
(Input, Active Low/Output, NPN Open Collector)



Photoelectric sensor, proximity sensor, (three-wire sensor with built-in amplifier and NPN output)

Two-wire DC proximity sensor

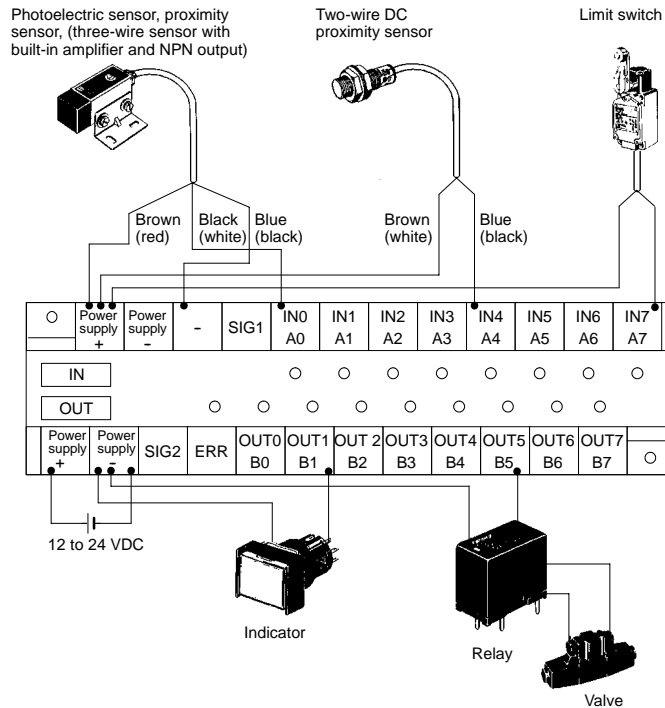
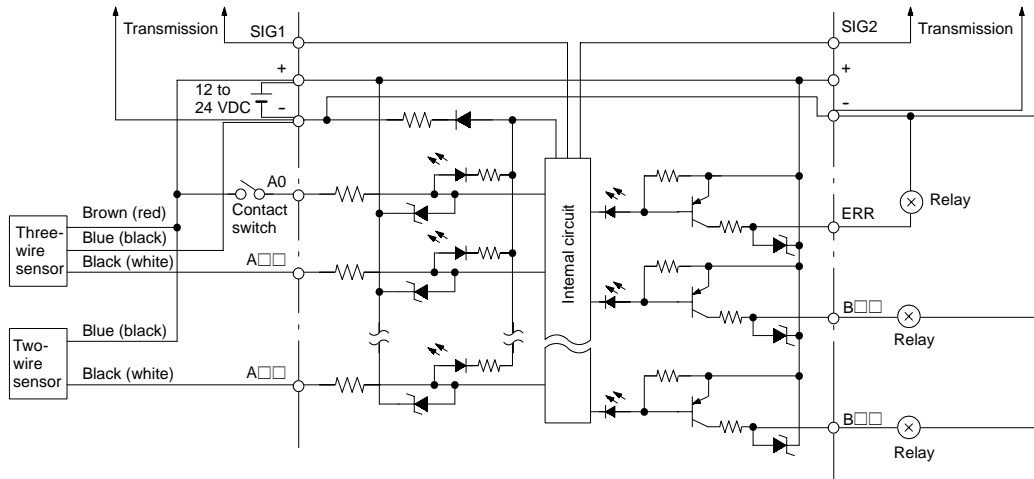
Limit switch



Note: IEC wire colors for photoelectric sensors and proximity sensors are shown first. The colors in parentheses refer to the old colors.



**B7AM-8F31**  
(Input, Active High/Output, PNP Open Collector)



Note: IEC wire colors for photoelectric sensors and proximity sensors are shown first. The colors in parentheses refer to the old colors.

**NOTE: DIMENSIONS SHOWN ARE IN MILLIMETERS. To convert millimeters to inches divide by 25.4.**

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