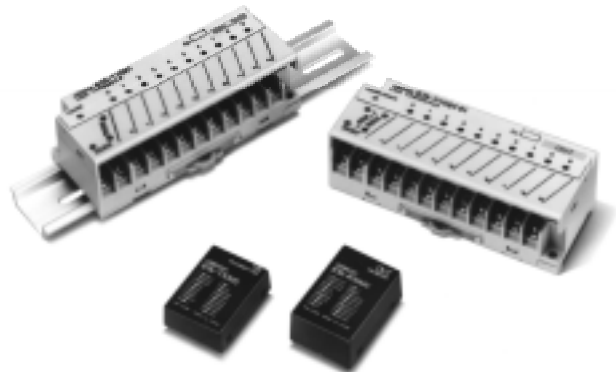


Transistor I/O Link Module

B7A-□10

Save Space and Reduce Wiring
Back to PLC Rack for 10 I/O Points

- Transmit 10 input signals over just 2 wires (3 wires if only one terminal has a power supply)
- Connect 3-wire NPN output sensors to B7A screw terminal models (two-wire DC sensors cannot be connected)
- Transmission speed of 19.2 ms typical (normal I/O delay)
- Screw terminal and printed circuit board models available



Ordering Information

MODEL NUMBER LEGEND

Input Models

B7A - T 10 □ □
1 2 3 4

1. Input/Output Classification

T: Input

2. Number of I/O

10: 10

3. Appearance

S: Screw terminals

M: Printed circuit board model

4. Input Logic

4	Input logic	Internal I/O common	Remarks
1	NPN compatible	- common	Screw terminals only
2	TTL	---	Printed circuit board model only
3	NPN compatible	+/- common	Screw terminals only

Output Models

B7A - R 10 □ C □
1 2 3 4 5

1. Input/Output Classification

R: Output

2. Number of I/O

10: 10

3. Appearance

S: Screw terminals

M: Printed circuit board model

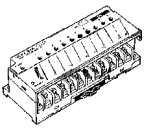
4. Output Logic

4	Output logic	Internal I/O common	Remarks
C	NPN open collector	+ common	Screw terminals only
		---	Printed circuit board model only

5. Output Capacity

5	Output capacity	Remarks
None	0.05 A	Printed circuit board model only
01	0.1 A	Screw terminals only

■ SCREW TERMINAL MODELS

Appearance	I/O classification	I/O configuration	Internal I/O common	Error processing (See Note 1)	Part number
	Input (See Note 2)	NPN compatible (No two-wire sensor can be connected.)	- common	---	B7A-T10S1
			+/- common	---	B7A-T10S3
	Output	NPN open collector 100 mA/point	+ common	HOLD	B7A-R10SC01

Note: 1. HOLD: The previous output condition will be on hold when an error occurs.

2. The 10-point B7A-T10S1 and 10-point B7A-T10S3 are different from each other in terminal configuration.

■ PRINTED CIRCUIT BOARD MODELS

Appearance	I/O classification	I/O configuration	Error processing (See Note)	Part number
	Input	TTL input	---	B7A-T10M2
	Output	NPN open collector 50 mA/point	HOLD	B7A-R10MC

Note: HOLD: The previous output condition will be on hold when an error occurs.

■ 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	S82K-00324
	0.3 A, 24 VDC	Use one to power two blocks from a single power supply	S82K-00724
	0.6 A, 24 VDC	Use this to power blocks connected to sensors, relays indicator lights	S82K-01524
	1.3 A, 24 VDC	Use one where excess power is needed	S82K-03024

Specifications

■ CHARACTERISTICS

General

Item	Normal speed
Communication method	Unidirectional, time-division multiplex
Transmission distance (See Note 1)	500 m max.
I/O delay	Typical: 19.2 ms; 31 ms max.
Minimum input time (See Note 2)	16 ms
Operating voltage range	12 to 24 VDC (10.8 to 26.4 VDC) (See Note 1)
Insulation resistance	100 MΩ min. (500 V) between each terminal and external parts
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between each terminal and external parts
Noise immunity	Noise level: 1.5 kV; pulse width: 100 ns to 1 μs (on transmission line due to coupling)
Vibration resistance	10 to 55 Hz, 1.5-mm double amplitude
Shock resistance	300 m/s ² (approx. 30G)
Ambient temperature	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
Ambient humidity	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. The minimum input time is required for the B7A/B7AS to read an input signal.

Input Models

Item	Screw terminal models		Printed circuit board models
	B7A-T10S1	B7A-T10S3	B7A-T10M2
Compatible inputs	Switches, three-wire NPN sensors (See Note 1)		TTLs, switches
Input logic	Active low		Active high
Current consumption (See Note 2)	80 mA max. with all input terminals ON		40 mA max. with all input terminals ON
Input voltage range	0 VDC to supply voltage		0 to 5 VDC ±10%
Operating voltage range	12 to 24 VDC		
Input current range	-4.4 to -1.1 mA/point (current flowing from input terminals)		1.7 to 2.2 mA/point
Minimum input time	16 ms (See Note 3)		
ON/OFF threshold	No-contact input: ON voltage: 1.6 V max. OFF voltage: 5.5 V min. Contact input: ON discrimination resistance: 140 Ω max. OFF discrimination resistance: 5 kΩ min.		ON voltage: 2.2 V min. OFF voltage: 0.8 V max.
Mounting strength	No damage when 5-kgf (49 N) pull is applied for 1 min each in all directions (except direction of DIN track)		---
Terminal strength	No damage when 5-kgf (49 N) pull is applied for 1 min each in all directions		---
Tightening torque	8 to 12 kgf • cm (0.78 to 1.18 N • m)		---
Weight	Approx. 100 g		Approx. 12 g

- Note: 1. The polarity of the B7A-TS10S1's B□ terminal is negative. Therefore, supply power to the three-wire sensor from the positive power supply terminal or a power supply.
2. Consumption when all 10 points are ON. Excludes external sensor current for Input Modules.
3. The minimum input time is required for the B7A to read an input signal.

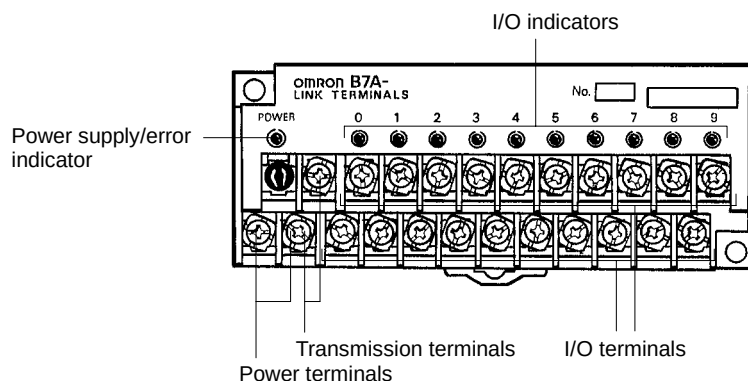
Output Models

Item	Screw terminal models	Printed circuit board models
	B7A-R10SC01	B7A-R10MC
Output configuration	NPN open collector	
Current consumption (See Note 1)	80 mA max. with all output terminals ON	40 mA max. with all output terminals ON
Operating voltage range	12 to 24 VDC	
Rated load voltage	5 to 24 VDC	
Output residual voltage	0.8 V max.	
Output current	Sink current, 100 mA max./point	Sink current, 50 mA max./point
Error processing	HOLD	
Mounting strength	No damage when 5 kgf (49 N) pull is applied for 1 min each in all directions (except in direction of DIN track)	---
Terminal strength	No damage when 5 kgf (49 N) pull is applied for 1 min each in all directions	---
Tightening torque	8 to 12 kgf • cm {0.78 to 1.18 N • m}	---
Output logic (See Note 2)	---	Active high (N/P terminals open) Active low (N/P terminals connected to 0 V)
Weight	Approx. 110 g	Approx. 21 g

Note: 1. Consumption when all 10 points are ON. Excludes external load current and error load current for Output Terminals.

2. Refer to *I/O Status* in the *B7A Technical Reference* for the relationship between the output logic and output ON/OFF status of the B7A.

Nomenclature



Indicator Operation

Indicator		Function
POWER (Input Terminal)	G	Lit when power is supplied and the Terminal is operating.
	N	Not lit when power is not supplied.
POWER/ERR (Output Terminal)	G	Lit when power is supplied and the Terminal is operating without error.
	R	Lit during transmission errors.
	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

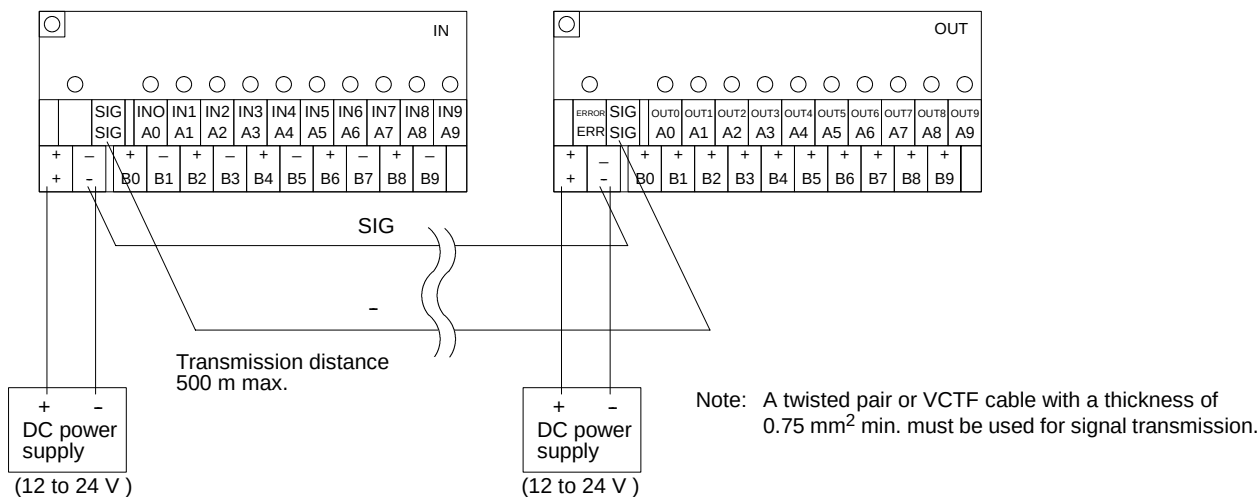
Wire	JIS specifications
0.75 mm ² (AWG#18)	RAV 1.25 to 3.5 (vinyl-insulated round wire) or RAP 1.25 to 3.5 (nylon-insulated round wire)
1.25 mm ² (AWG#16)	

Operation

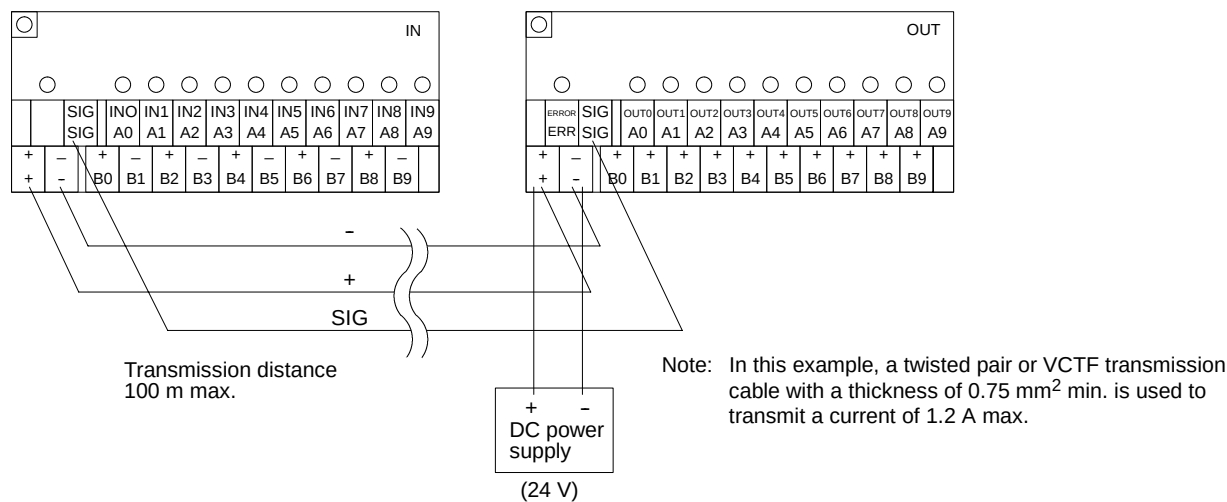
■ POWER SUPPLY

Screw Terminal Models

Connection of Independent Power Supplies

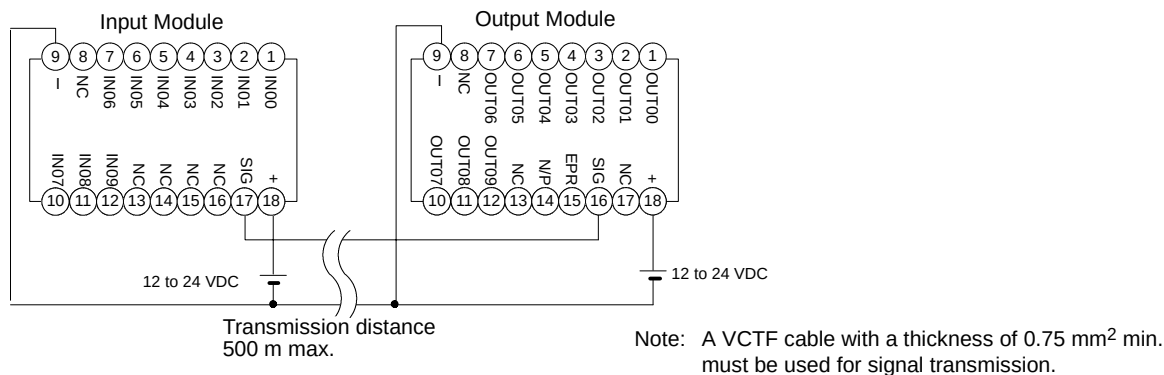


Connection of Single Power Supply to Two Input or Output Modules

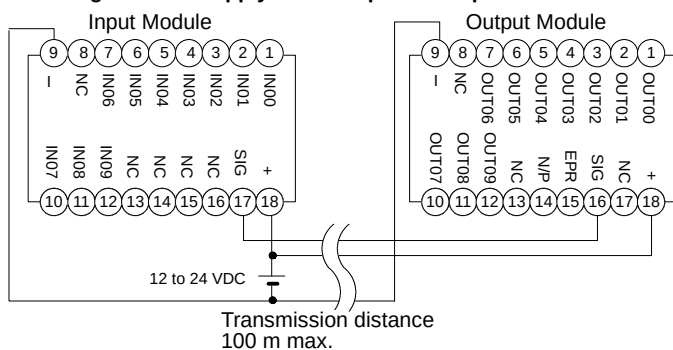


Printed Circuit Board Models

Connection of Independent Power Supplies



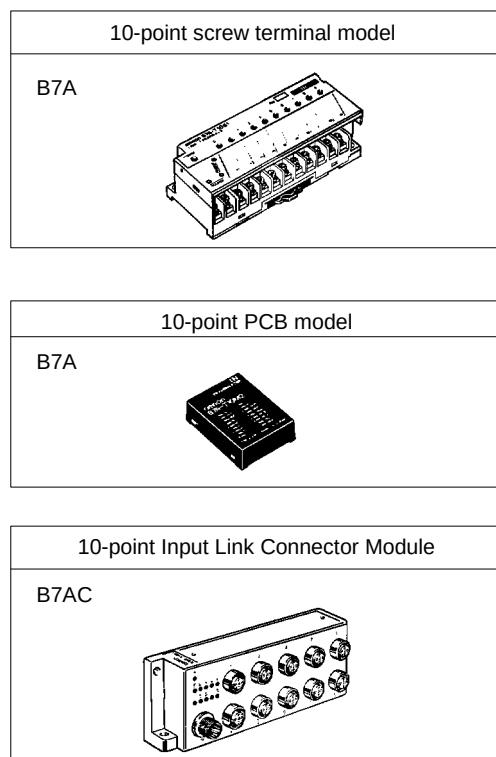
Connection of Single Power Supply to Two Input or Output Modules



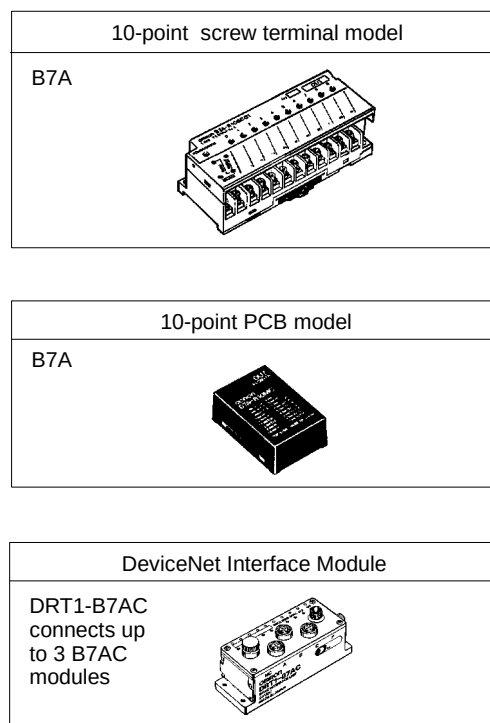
Note: In this example, a VCTF transmission cable with a thickness of 0.75 mm² min. is used to transmit a current of 1.2 A max.

SYSTEM CONFIGURATION

Input (Transmission)



Output (Reception)

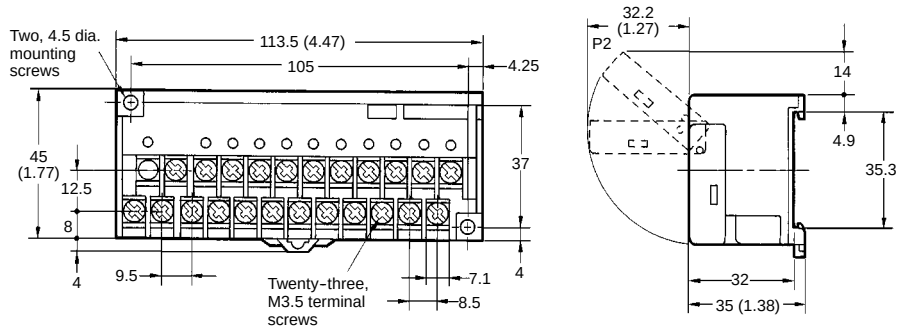
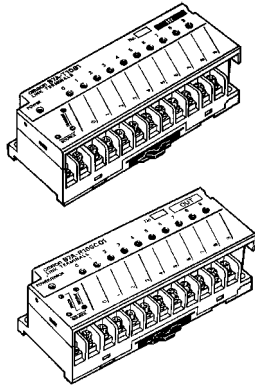


Note: The 10-point model has a normal I/O delay of 19.2 ms (typical); 10-point models with short I/O delay are not available. The transmission signals of the 16-point Terminal Link Adapters are not compatible with those of the 10-point model. Therefore 16-point Terminal Link Adapter models and 10-point models cannot be used in combination.

Unit: mm (inch)

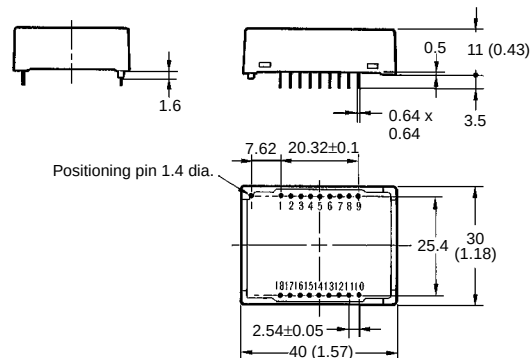
■ TRANSISTOR I/O LINK MODULES

Screw Terminal Models

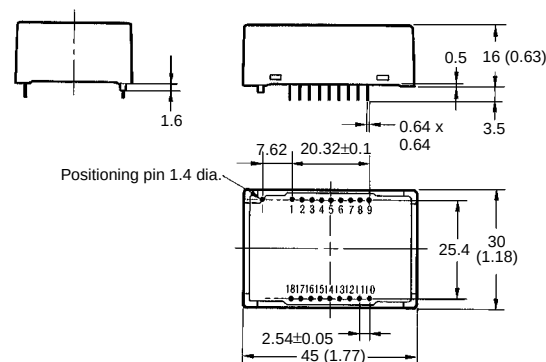


Printed Circuit Board Models

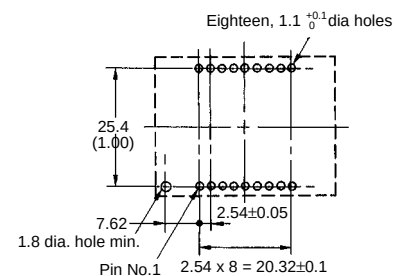
B7A-T10M2 (Input)



B7A-R10MC (Output)



Mounting Holes (Top View)

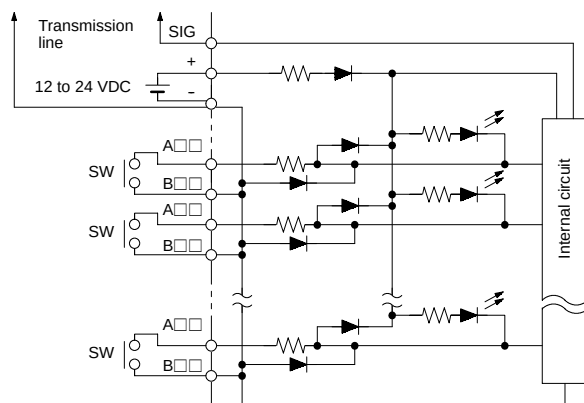


Installation

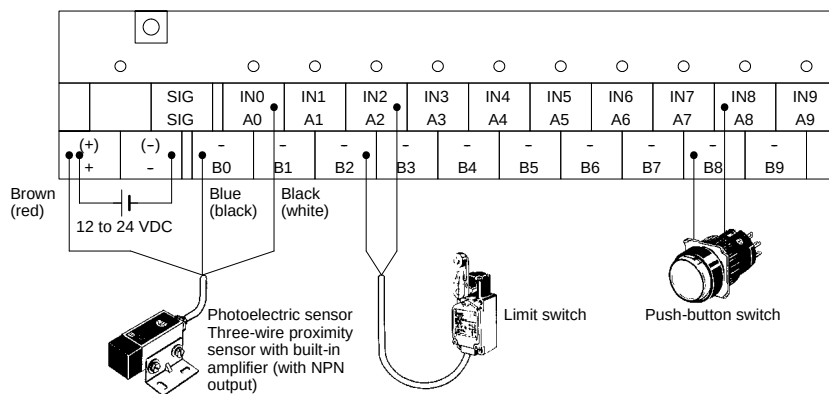
INTERNAL CIRCUITS AND TERMINAL ARRANGEMENT

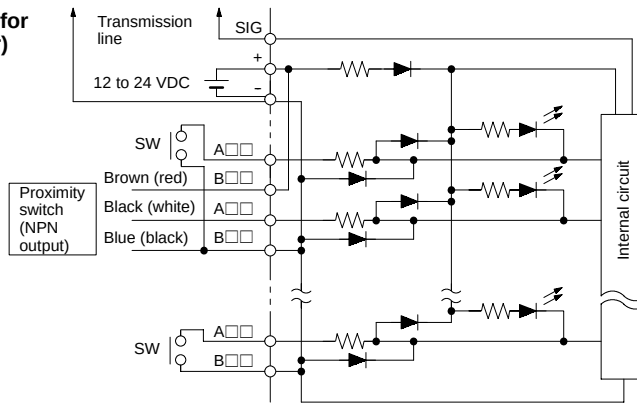
Screw Terminal Models

B7A-T10S1
(NPN Input,
Active Low)

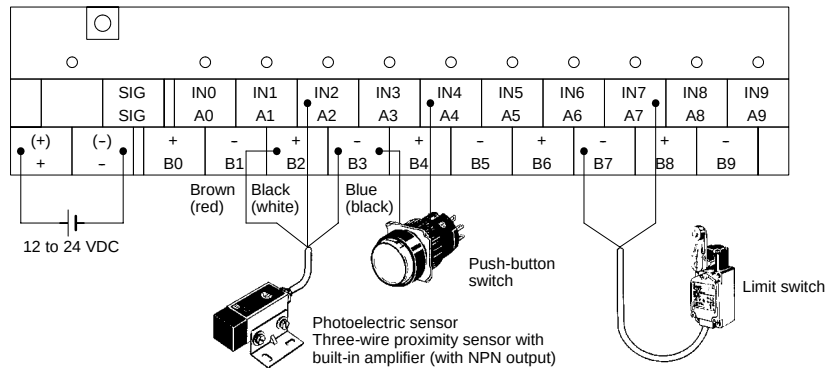
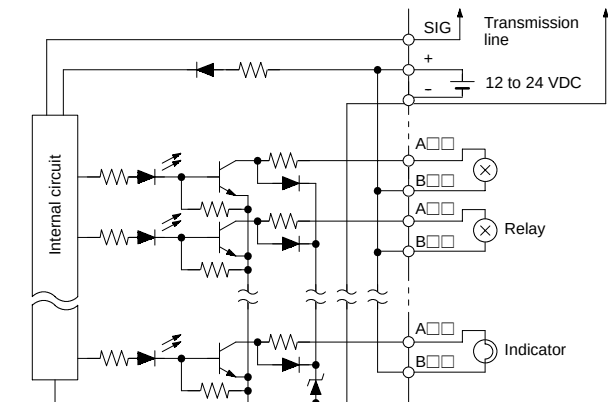


Note: A sensor with two-wire output cannot be connected.

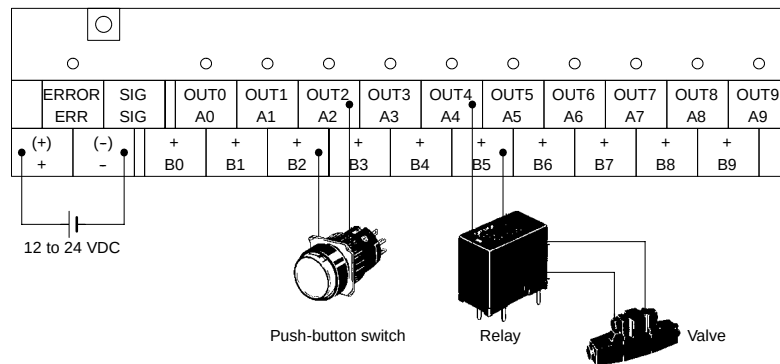


B7A-T10S3
 (Input, Active Low for
 NPN 3-wire Sensor)


- Note: 1. A sensor with two-wire output cannot be connected.
2. IEC wire colors for photoelectric sensors and proximity sensors are shown first. The colors in parentheses refer to old colors.
3. Do not short-circuit the SIG terminal with the positive power supply terminal, negative power supply terminal, or a B□□ terminal, or the internal elements of B7A will be damaged and no transmission will occur.

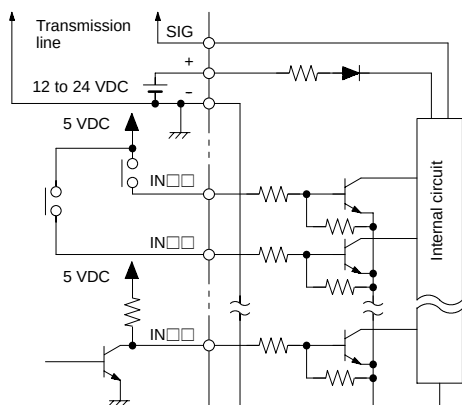

B7A-R10SC01
 (Output, NPN Open
 Collector)


- Note: Do not short-circuit any output A terminal with the corresponding B terminal, or the internal elements of B7A will be damaged.

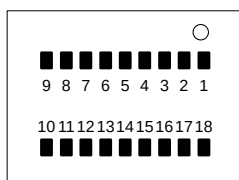


Printed Circuit Board Models

B7A-T10M2 (Input, Active High for TTL)



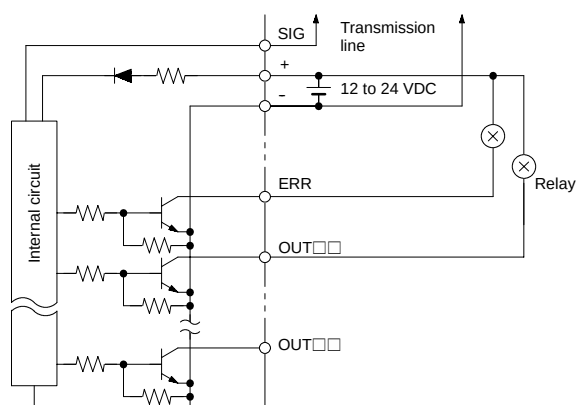
Top View



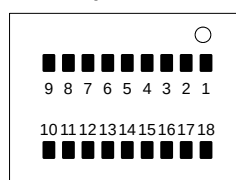
Note: Do not short-circuit the SIG terminal with the positive power supply terminal, negative power supply terminal, or the internal elements of B7A will be damaged and no transmission will occur.

No.	Terminal
1	IN00
2	IN01
3	IN02
4	IN03
5	IN04
6	IN05
7	IN06
8	NC
9	-
10	IN07
11	IN08
12	IN09
13	NC
14	NC
15	NC
16	NC
17	SIG
18	+

B7A-R10MC (Output, NPN Open Collector)



Top View



Note: Do not short-circuit any output A terminal with the corresponding B terminal, or the internal elements of B7A will be damaged.

No.	Terminal
1	OUT00
2	OUT01
3	OUT02
4	OUT03
5	OUT04
6	OUT05
7	OUT06
8	NC
9	-
10	OUT07
11	OUT08
12	OUT09
13	NC
14	N/P
15	ERR
16	SIG
17	NC
18	+

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

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