

## Link Master Adapter

B7A-□□□3/8

### Connect High-Density I/O PLC Modules to 16-Point B7A Modules

- Adapter for Omron high-density I/O PLC modules connects 32 points, eliminates need for a second Link Interface module
- Transmits 16 input signals over 2 wires; 32 input signals over just 3 wires
- Normal I/O delay (19.2 ms typical) or short I/O delay (3 ms typical) models
- 16- and 32-point connectors available
- Output models offer Hold or Load Off options for handling transmission errors



## Ordering Information

### MODEL NUMBER LEGEND

#### Input Models

B7A - T □ E □  
1 2 3 4

**1. Input/Output Classification**  
T: Input

**2. Number of I/O**  
6: 16  
3: 32

**3. Input Configuration**  
E: NPN compatible

**4. I/O Delay (Typical)**  
3: 19.2 ms  
8: 3 ms

#### Output Models

B7A - R □ A □ □  
1 2 3 4 5

**1. Input/Output Classification**  
R: Output

**2. Number of I/O**  
6: 16  
3: 32

**3. Output Configuration/ Capacity**  
A: NPN open collector/  
50 mA/point

**4. Error Processing**  
1: HOLD  
3: LOAD OFF

**5. I/O Delay (Typical)**  
3: 19.2 ms  
8: 3 ms

### LINK MASTER ADAPTERS FOR HIGH-DENSITY I/O PLC MODULES

#### 16-point Adapters

| Appearance                                                                          | I/O classification | I/O configuration                 | I/O delay (typical)  | Error processing | Part number |
|-------------------------------------------------------------------------------------|--------------------|-----------------------------------|----------------------|------------------|-------------|
|  | Input              | NPN compatible                    | Normal speed 19.2 ms | ---              | B7A-T6E3    |
|                                                                                     |                    |                                   | High speed 3 ms      | ---              | B7A-T6E8    |
|                                                                                     | Output             | NPN open collector<br>50 mA/point | Normal speed 19.2 ms | HOLD             | B7A-R6A13   |
|                                                                                     |                    |                                   |                      | LOAD OFF         | B7A-R6A33   |
|                                                                                     |                    |                                   | High speed 3 ms      | HOLD             | B7A-R6A18   |
|                                                                                     |                    |                                   |                      | LOAD OFF         | B7A-R6A38   |

## 32-point Adapters

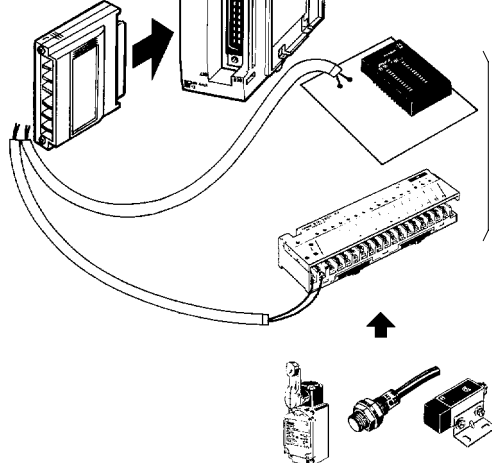
| Appearance                                                                        | I/O classification | I/O configuration                 | I/O delay (typical)  | Error processing | Part number |
|-----------------------------------------------------------------------------------|--------------------|-----------------------------------|----------------------|------------------|-------------|
|  | Input              | NPN compatible                    | Normal speed 19.2 ms | ---              | B7A-T3E3    |
|                                                                                   |                    |                                   | High speed 3 ms      | ---              | B7A-T3E8    |
|                                                                                   | Output             | NPN open collector<br>50 mA/point | Normal speed 19.2 ms | HOLD             | B7A-R3A13   |
|                                                                                   |                    |                                   |                      | LOAD OFF         | B7A-R3A33   |
|                                                                                   |                    |                                   | High speed 3 ms      | HOLD             | B7A-R3A18   |
|                                                                                   |                    |                                   |                      | LOAD OFF         | B7A-R3A38   |

## Application Examples

## CQM1 High-Density I/O Modules

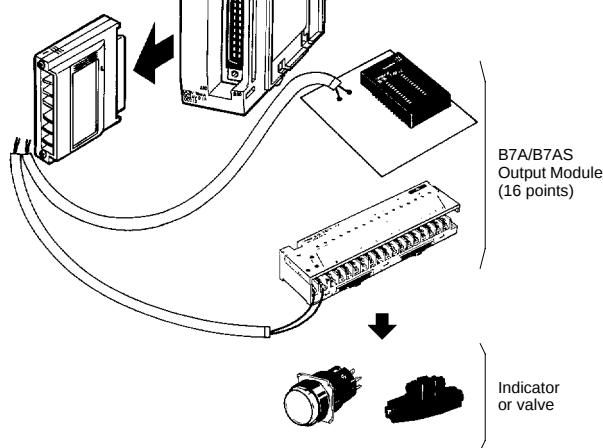
B7A Link Master Adapter (32 points)  
Output Module  
B7A-R3A13  
B7A-R3A33  
B7A-R3A18  
B7A-R3A38

CQM1-ID213  
Input Module



B7A Link Master Adapter (32 points)  
Input Module  
B7A-T3E3  
B7A-T3E8

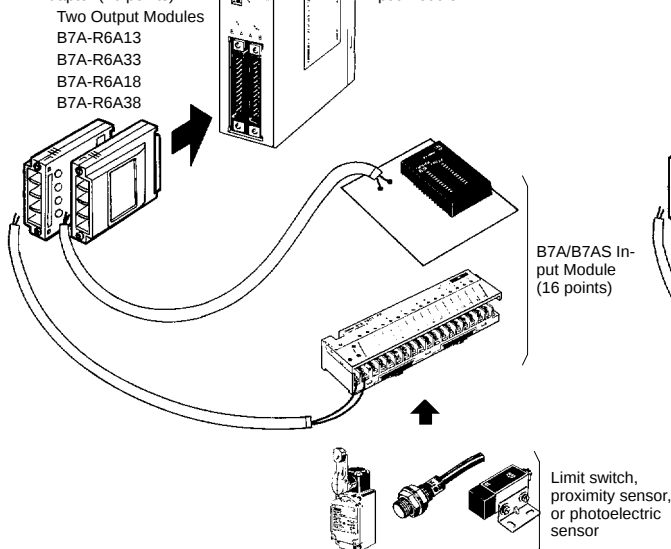
CQM1-OD213  
Output Module



## C200H High-Density I/O Modules

B7A Link Master Adapter (16 points)  
Two Output Modules  
B7A-R6A13  
B7A-R6A33  
B7A-R6A18  
B7A-R6A38

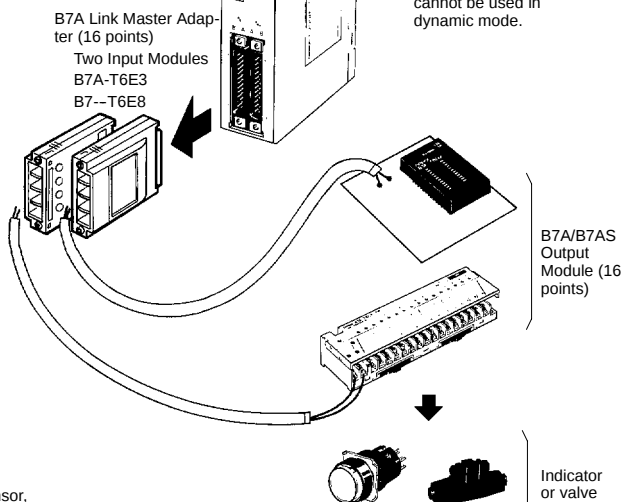
C200H-ID215  
Input Module



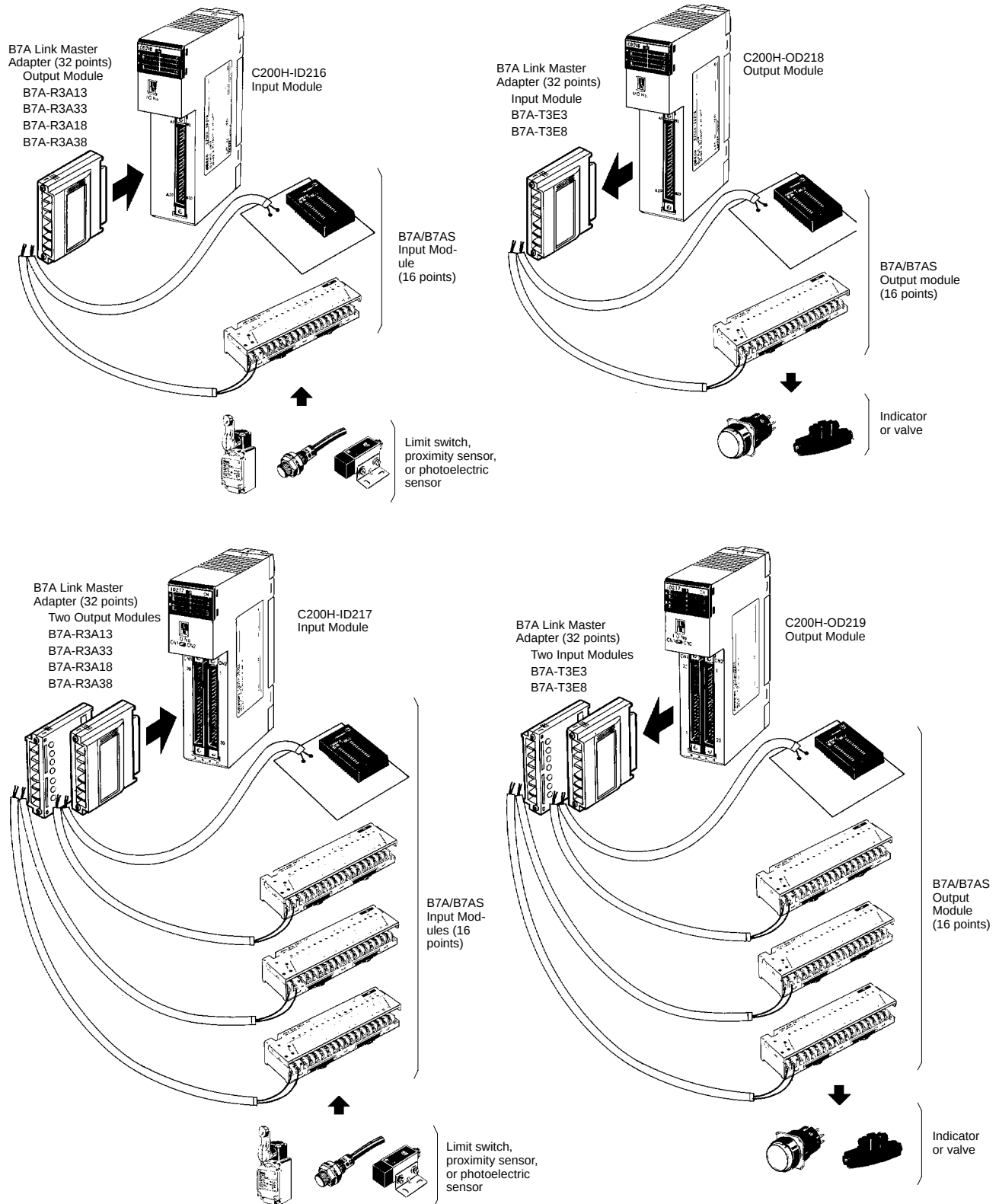
B7A Link Master Adapter (16 points)  
Two Input Modules  
B7A-T6E3  
B7--T6E8

C200H-OD215  
Output Module

**Note:** The C200H-OD215 cannot be used in dynamic mode.

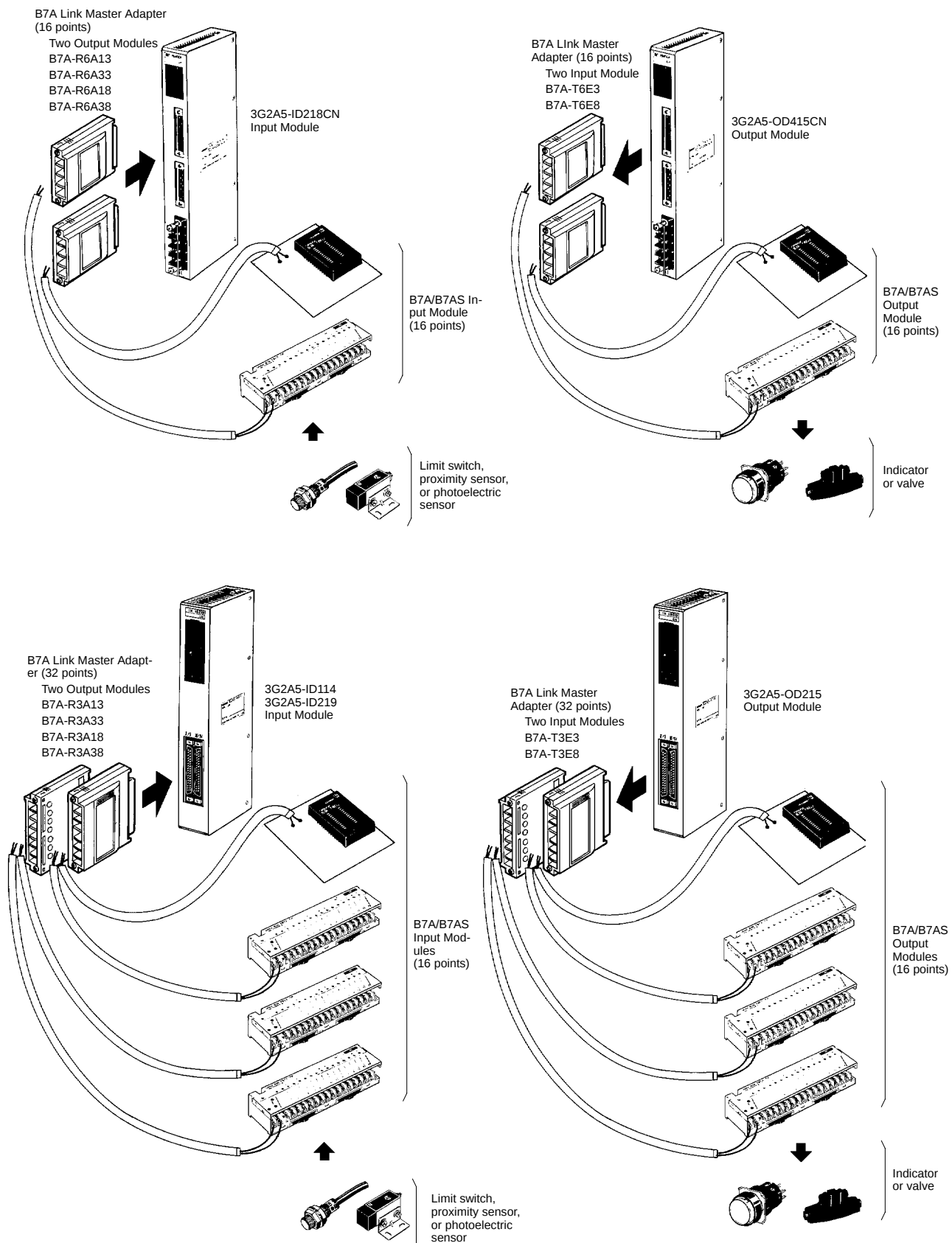


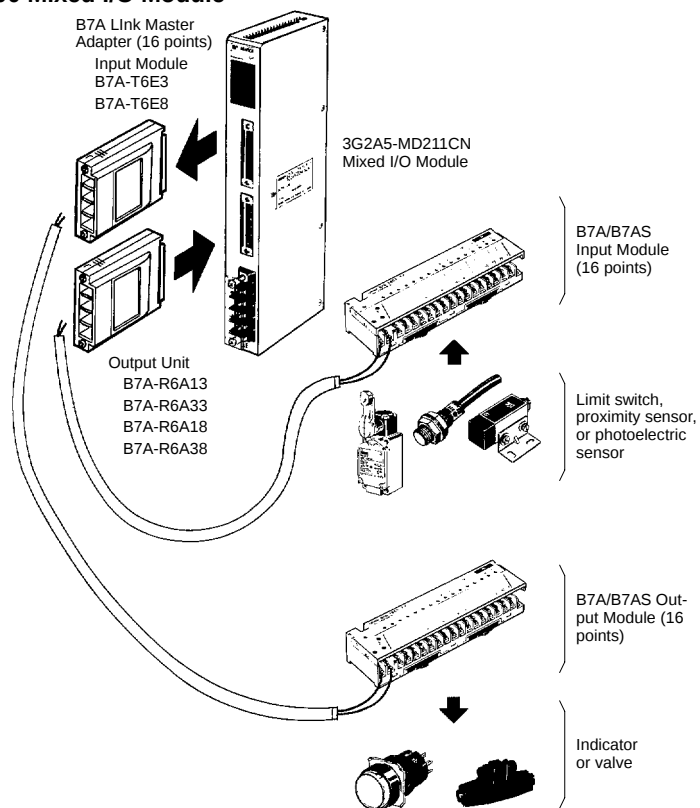
## C200H High-Density I/O Modules (Group 2)



## C500 High-Density I/O Modules

The 3G2A5-OD215 cannot be connected due to the difference in terminal arrangement.



**C500 Mixed I/O Module**

# Specifications

## ■ CHARACTERISTICS

### General

| Item                               | Normal speed                                                                                                    | High speed               |
|------------------------------------|-----------------------------------------------------------------------------------------------------------------|--------------------------|
| Communication method               | Unidirectional, time-division multiplex                                                                         |                          |
| Transmission distance (See Note 2) | 500 m max.                                                                                                      | 100 m max. (See Note 3)  |
| I/O delay                          | Typical: 19.2 ms; 31 ms max.                                                                                    | Typical: 3 ms; 5 ms max. |
| Minimum input time (See Note 4)    | 16 ms (See Note 5)                                                                                              | 2.4 ms                   |
| Operating voltage range            | 12 to 24 VDC (10.8 to 26.4 VDC) (See Note 2)                                                                    |                          |
| 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 (See Note 6)        | 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 <sup>2</sup> (approx. 30G)                                                                              |                          |
| Ambient temperature                | Operating: -10°C to 55°C (14°F to 131°F) with no icing<br>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. If there is a possibility of noise interference from the power supply, input, and/or output lines, add appropriate noise protection circuits. Refer to *Noise Protection Circuits* in B7A Technical Reference.
2. 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.
3. A shielded transmission cable or plain twisted pair cable with a thickness of 0.75 mm<sup>2</sup> minimum must be used for signal transmission. If twisted pair 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.
4. The minimum input time is required for the B7A to read an input signal.
5. Set the timer of the PLC to 0.02 s minimum if a normal-speed model is connected to the PLC.
6. For high-speed models, these values are possible without grounding the shielded line.

### Input Models

| Item                           | 16-point                                                                                                                                                                  | 32-point                                |
|--------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|
|                                | B7A-T6E3/-T6E8                                                                                                                                                            | B7A-T3E3/-T3E8                          |
| Compatible inputs              | PC (NPN output), switches, three-wire NPN sensors                                                                                                                         |                                         |
| Input logic                    | Active low                                                                                                                                                                |                                         |
| Current consumption (See Note) | 60 mA max. with all input terminals ON                                                                                                                                    | 100 mA max. with all input terminals ON |
| Input voltage range            | 0 VDC to supply voltage                                                                                                                                                   |                                         |
| Input current range            | -1.5 to -0.6 mA/point (current flowing from input terminals)                                                                                                              |                                         |
| ON/OFF threshold               | No-contact input: ON voltage: 1.6 V max.<br>OFF voltage: 5.5 V min.<br>Contact input: ON discrimination resistance: 1 kΩ max.<br>OFF discrimination resistance: 9 kΩ min. |                                         |
| Mounting strength              | No damage when 5-kgf (49 N) pull is applied for 1 min each in all directions                                                                                              |                                         |
| 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                         | 46 g                                                                                                                                                                      | 71 g                                    |

Note: Consumption when all 16/32 points are ON. Excludes external sensor current for Input Terminals.

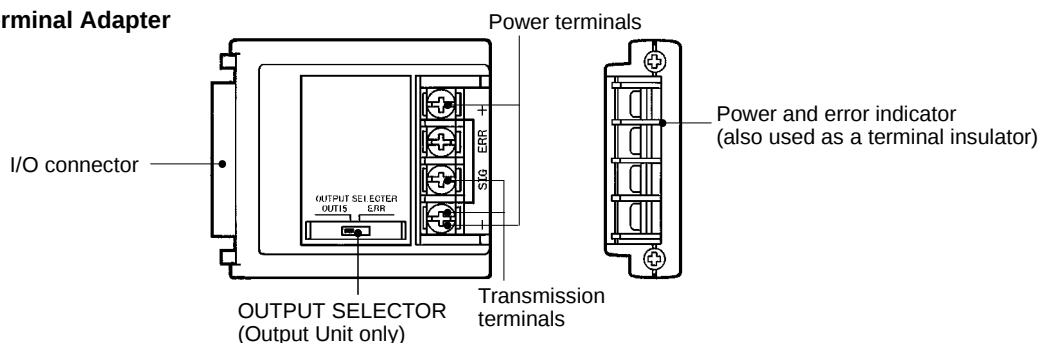
## Output Models

| Item                              | 16-point                                                                           | 32-point                               |
|-----------------------------------|------------------------------------------------------------------------------------|----------------------------------------|
|                                   | B7A-R6A13/-R6A18/-R6A33/-R6A38                                                     | B7A-R3A13/-R3A33/-R3A18/-R3A38         |
| Output configuration              | NPN open collector                                                                 |                                        |
| Current consumption<br>(See Note) | 50 mA max. with all input terminals ON                                             | 80 mA max. with all input terminals ON |
| Rated load voltage                | 5 to 24 VDC                                                                        |                                        |
| Output residual voltage           | 0.8 V max.                                                                         |                                        |
| Output current                    | Sink current, 50 mA max./point                                                     |                                        |
| Error output                      | Rated load voltage: 0 to 30 VDC<br>Output current: sink current, 100 mA max./point |                                        |
| Mounting strength                 | No damage when 5-kgf (49 N) pull is applied for 1 min each in all directions       |                                        |
| 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                            | 46 g                                                                               | 71 g                                   |

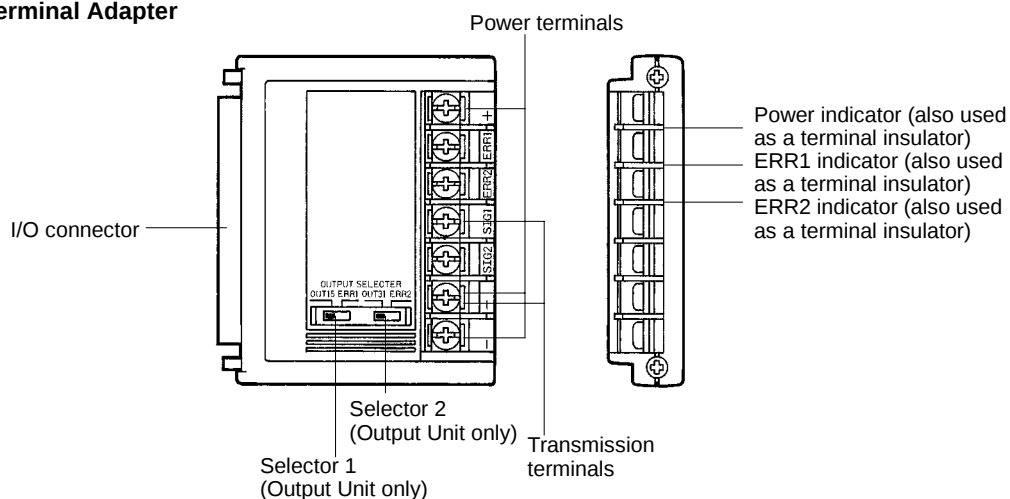
Note: Consumption when all 16/32 points are ON. Excludes external load current and error load current for Output Terminals.

## Nomenclature

## 16-point Terminal Adapter



## 32-point Terminal Adapter



## Indicator Operation

## 16-point Terminal Adapter

| Indicator                          | Function |                                                                         |
|------------------------------------|----------|-------------------------------------------------------------------------|
| <b>POWER (Input Terminal)</b>      | G        | Lit when power is supplied and the Terminal is operating.               |
|                                    | N        | Not lit when power is not supplied.                                     |
| <b>POWER/ERR (Output Terminal)</b> | 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.                                     |

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

## 32-point Terminal Adapter

| Indicator                          | Function |                                                                             |
|------------------------------------|----------|-----------------------------------------------------------------------------|
| <b>POWER (Input Terminal)</b>      | G        | Lit when power is supplied and the Terminal is operating.                   |
|                                    | N        | Not lit when power is not supplied.                                         |
| <b>ERR1/ERR2 (Output Terminal)</b> | N        | Not 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.                                         |

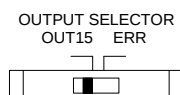
Note: G: Green indicator lit; R: Red indicator lit; N: Not lit

## 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)                                    |

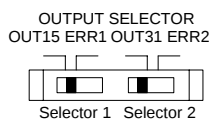
## Setting of Output Selector (Output Unit Only)

## 16-point Terminal Models



| Switch                        |                                                                                            |
|-------------------------------|--------------------------------------------------------------------------------------------|
| OUT15                         | ERR                                                                                        |
| Set the 16th output to OUT15. | Set the 16th output to ERR (the ERR output is ON only when there is a transmission error). |

## 32-point Terminal Models



| Switch 1                      |                                                                                            | Switch 2                      |                                                                                            |
|-------------------------------|--------------------------------------------------------------------------------------------|-------------------------------|--------------------------------------------------------------------------------------------|
| OUT15                         | ERR1                                                                                       | OUT31                         | ERR2                                                                                       |
| Set the 16th output to OUT15. | Set the 16th output to ERR (the ERR output is ON only when there is a transmission error). | Set the 32nd output to OUT31. | Set the 32nd output to ERR (the ERR output is ON only when there is a transmission error). |

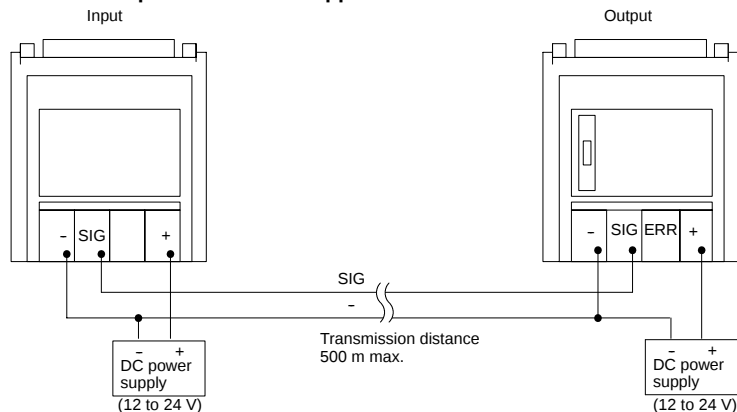
# Operation

## ■ POWER SUPPLY

### 16-point Terminal Adapters

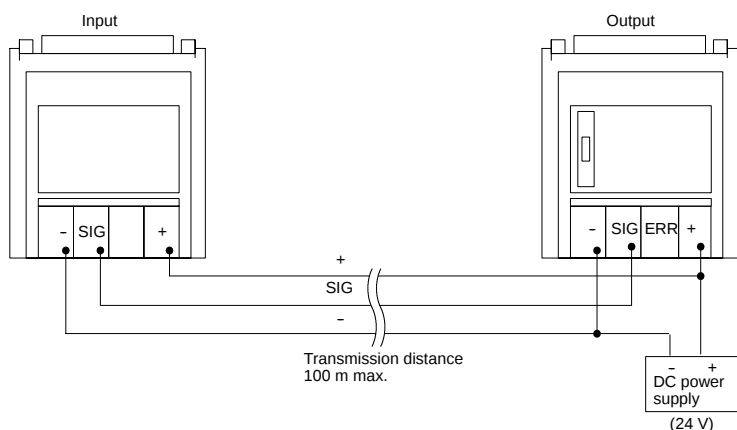
#### I/O Delay: Normal Speed

##### 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.

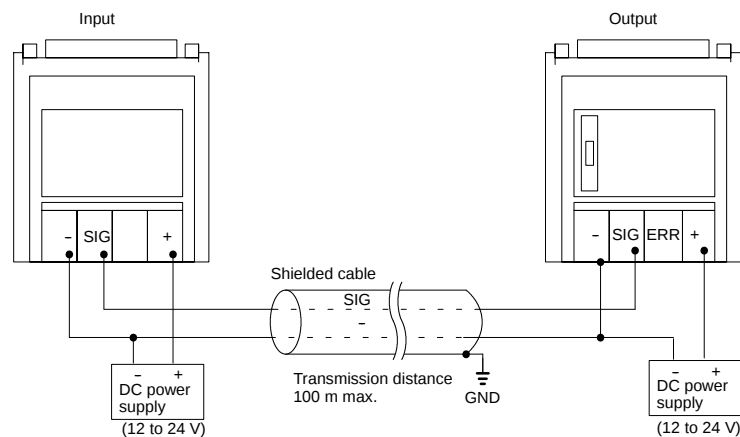
##### Connection of Single Power Supply to Two Input or Output Terminals



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.

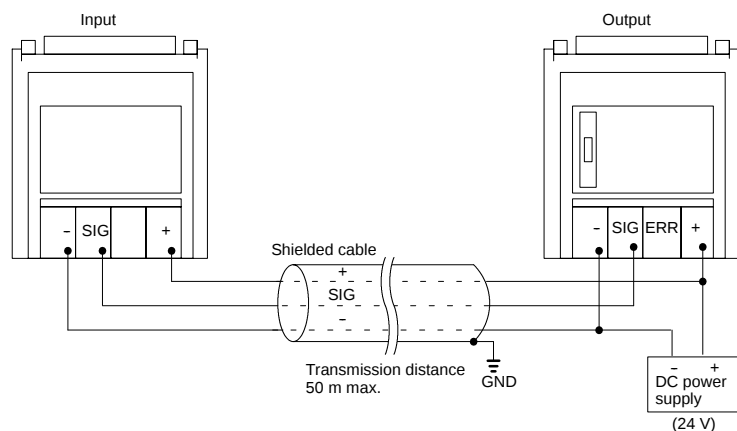
#### I/O Delay: High Speed

##### 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.

### Connection of Single Power Supply to Two Input or Output Terminals

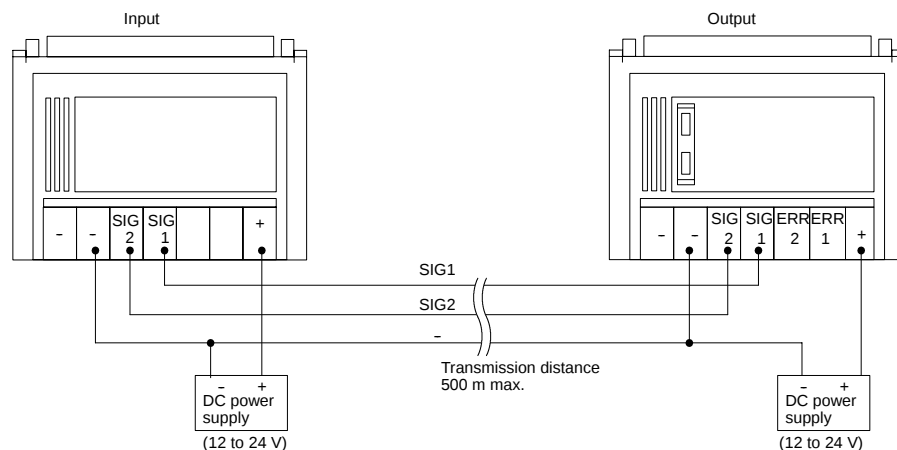


Note: In this example, a shielded transmission cable with a thickness of  $0.75 \text{ mm}^2$  min. is used, through which a current of 1.8 A max. can be transmitted. It is recommended that the shield be grounded.

### 32-point Terminal Adapters

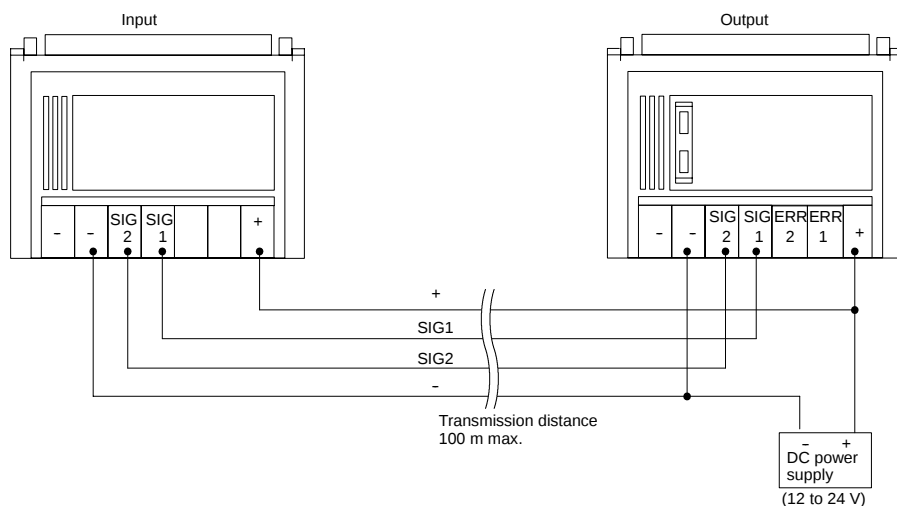
#### I/O Delay: Normal Speed

### Connection of Independent Power Supplies



Note: A VCTF cable with a thickness of  $0.75 \text{ mm}^2$  min. must be used for signal transmission.

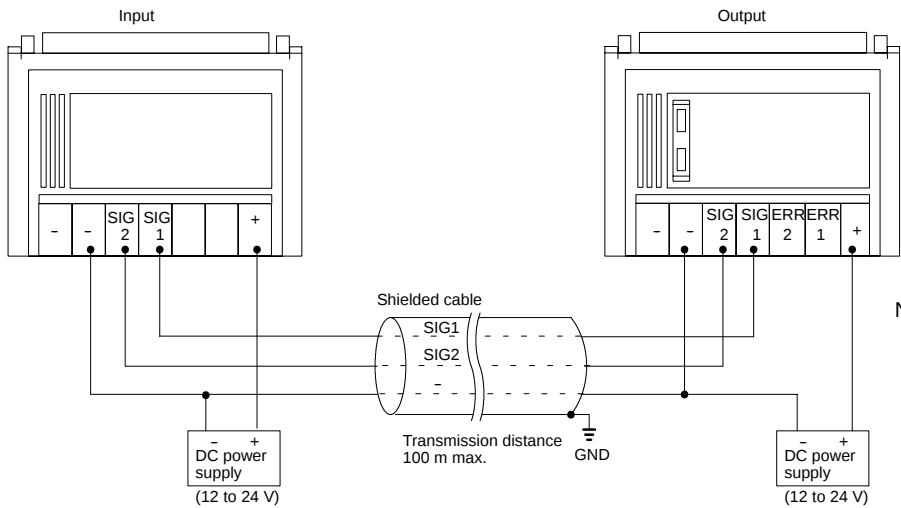
### Connection of Single Power Supply to Two Input or Output Terminals



Note: In this example, a VCTF transmission cable with a thickness of  $0.75 \text{ mm}^2$  min. is used, through which a current of 1.8 A max. can be transmitted.

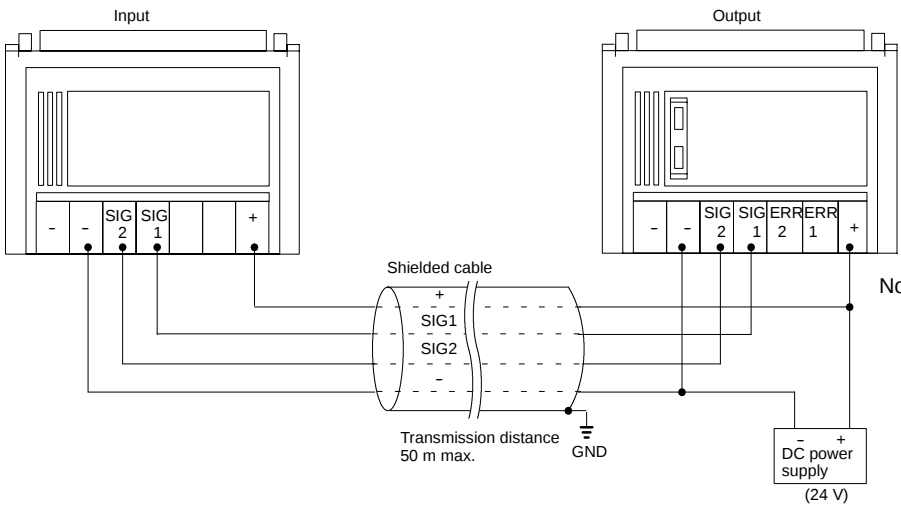
I/O Delay: High Speed

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.

Connection of Single Power Supply to Two Input or Output Terminals



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.

■ B7A LINK MASTER ADAPTERS WITH HIGH-DENSITY PLC I/O MODULES

Input

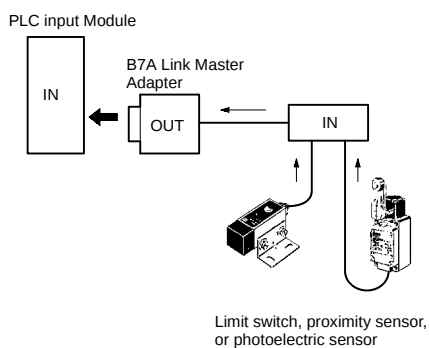
| Model    | I/O points | I/O delay | Input configuration | CQM1  | C200H |       |       |       |       | C500    |         |       |
|----------|------------|-----------|---------------------|-------|-------|-------|-------|-------|-------|---------|---------|-------|
|          |            |           |                     | OD213 | MD115 | MD215 | OD215 | OD218 | OD219 | MD211CN | OD415CN | OD213 |
| B7A-T6E3 | 16         | 19.2 ms   | NPN compatible      | ---   | Yes   | Yes   | Yes   | ---   | ---   | Yes     | Yes     | ---   |
| B7A-T6E8 |            | 3 ms      |                     | ---   | Yes   | Yes   | Yes   | ---   | ---   | Yes     | Yes     | ---   |
| B7A-T3E3 | 32         | 19.2 ms   |                     | Yes   | ---   | ---   | ---   | Yes   | Yes   | ---     | ---     | Yes   |
| B7A-T3E8 |            | 3 ms      |                     | Yes   | ---   | ---   | ---   | Yes   | Yes   | ---     | ---     | Yes   |

## Output

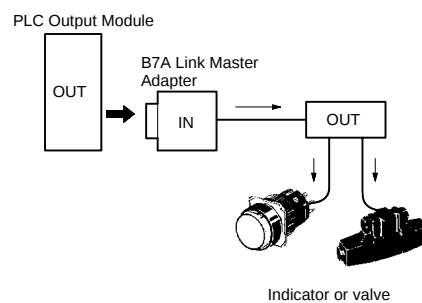
| Model     | I/O points | I/O delay | Error processing | C200H |       |       |       |       | C500    |         |       |       | CQM1  |
|-----------|------------|-----------|------------------|-------|-------|-------|-------|-------|---------|---------|-------|-------|-------|
|           |            |           |                  | MD115 | MD215 | ID215 | ID216 | ID217 | ID218CN | MD211CN | ID114 | ID219 | ID213 |
| B7A-R6A13 | 16         | 19.2 ms   | HOLD             | Yes   | Yes   | Yes   | ---   | ---   | Yes     | Yes     | ---   | ---   | ---   |
| B7A-R6A33 |            |           | LOAD OFF         | Yes   | Yes   | Yes   | ---   | ---   | Yes     | Yes     | ---   | ---   | ---   |
| B7A-R6A18 |            | 3 ms      | HOLD             | Yes   | Yes   | Yes   | ---   | ---   | Yes     | Yes     | ---   | ---   | ---   |
| B7A-R6A38 |            |           | LOAD OFF         | Yes   | Yes   | Yes   | ---   | ---   | Yes     | Yes     | ---   | ---   | ---   |
| B7A-R3A13 | 32         | 19.2 ms   | HOLD             | ---   | ---   | ---   | Yes   | Yes   | ---     | ---     | Yes   | Yes   | Yes   |
| B7A-R3A33 |            |           | LOAD OFF         | ---   | ---   | ---   | Yes   | Yes   | ---     | ---     | Yes   | Yes   | Yes   |
| B7A-R3A18 |            | 3 ms      | HOLD             | ---   | ---   | ---   | Yes   | Yes   | ---     | ---     | Yes   | Yes   | Yes   |
| B7A-R3A38 |            |           | LOAD OFF         | ---   | ---   | ---   | Yes   | Yes   | ---     | ---     | Yes   | Yes   | Yes   |

## Connection with PLC

- Plug in the B7A Output Adapter to the receptacle on the PLC Input Module



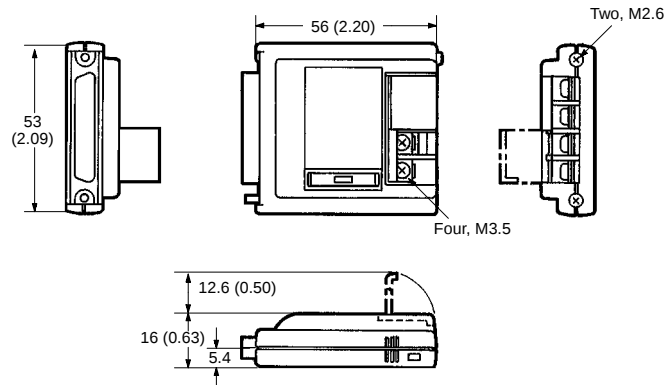
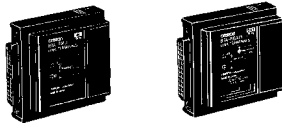
- Plug in the B7A Input Adapter to the receptacle on the PLC Output Module



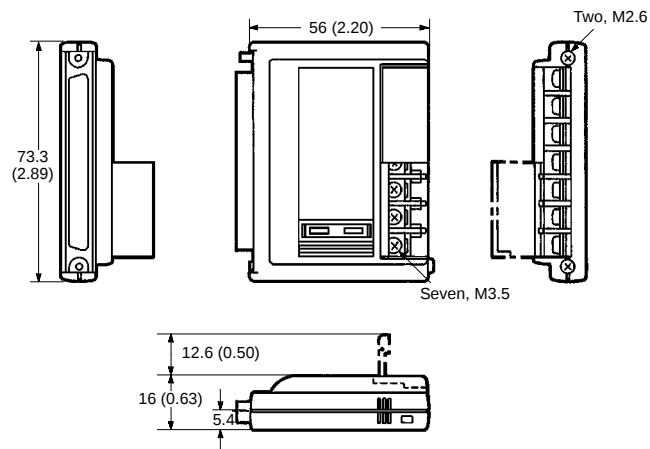
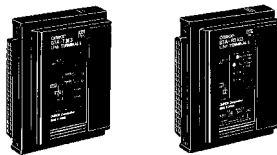
## Dimensions

Unit: mm (inch)

### 16-point Link Master Adapters



### 32-point Link Master Adapters

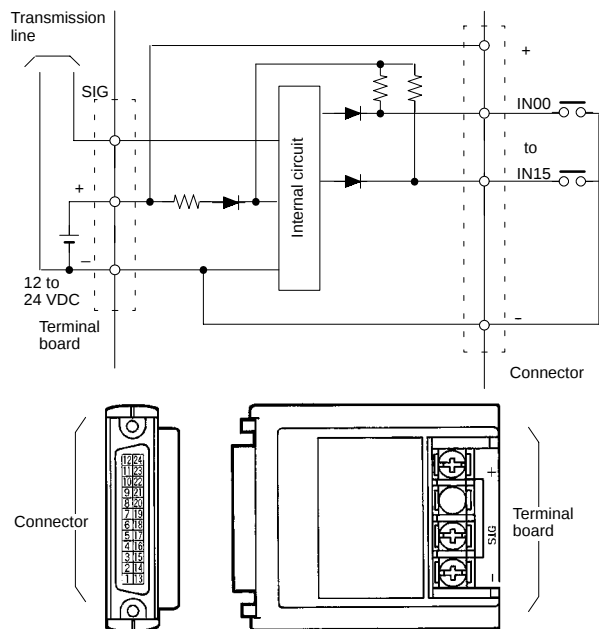


# Installation

## INTERNAL CIRCUITS AND TERMINAL ARRANGEMENT

### 16-point Link Master Adapters

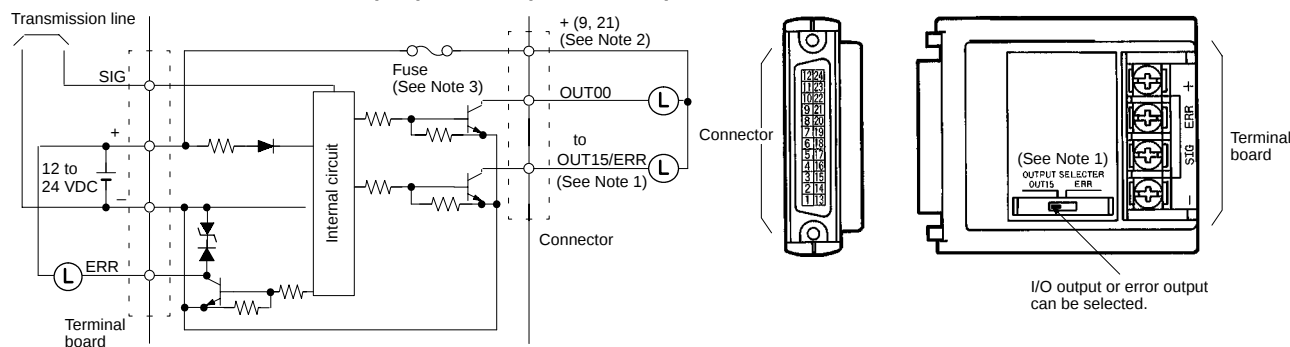
#### B7A-T6E3/-T6E8 (Input, Active Low)



| Terminal No. | Terminal  | Terminal No. | Terminal  |
|--------------|-----------|--------------|-----------|
| 1            | IN00      | 13           | IN08      |
| 2            | IN01      | 14           | IN09      |
| 3            | IN02      | 15           | IN10      |
| 4            | IN03      | 16           | IN11      |
| 5            | IN04      | 17           | IN12      |
| 6            | IN05      | 18           | IN13      |
| 7            | IN06      | 19           | IN14      |
| 8            | IN07      | 20           | IN15      |
| 9            | -         | 21           | -         |
| 10           | +         | 22           | +         |
| 11           | NC (open) | 23           | NC (open) |
| 12           | NC (open) | 24           | NC (open) |

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

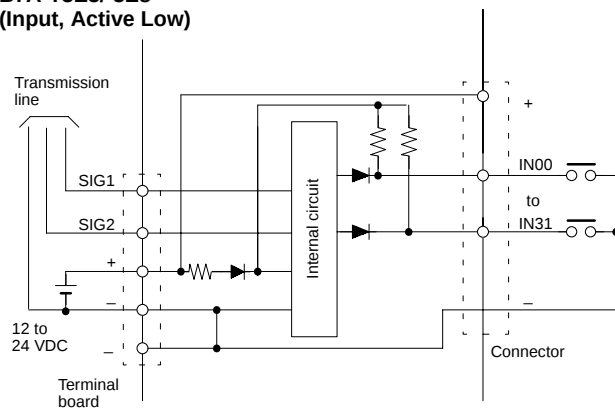
#### B7A-R6A13/-R6A18/-R6A33/-R6A38 (Output, NPN Open Collector)



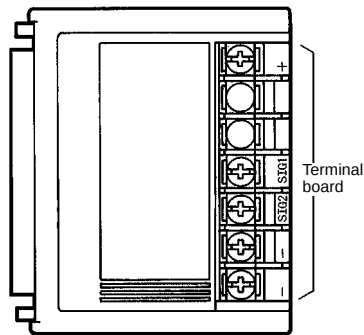
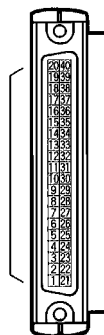
| Terminal No. | Terminal      | Terminal No. | Terminal                  |
|--------------|---------------|--------------|---------------------------|
| 1            | OUT00         | 13           | OUT08                     |
| 2            | OUT01         | 14           | OUT09                     |
| 3            | OUT02         | 15           | OUT10                     |
| 4            | OUT03         | 16           | OUT11                     |
| 5            | OUT04         | 17           | OUT12                     |
| 6            | OUT05         | 18           | OUT13                     |
| 7            | OUT06         | 19           | OUT14                     |
| 8            | OUT07         | 20           | OUT15/ERR<br>(See Note 1) |
| 9            | +(See Note 2) | 21           | +(See Note 2)             |
| 10           | NC (open)     | 22           | NC (open)                 |
| 11           | NC (open)     | 23           | NC (open)                 |
| 12           | NC (open)     | 24           | NC (open)                 |

- Note: 1. It is possible to select 16 I/O points or 15 I/O points and 1 error output point.  
 2. A maximum of 0.4 A can be supplied from each positive terminal.  
 3. The user cannot replace the fuse.  
 4. Do not short-circuit any output terminal with the positive terminal, or the internal elements of the B7A will be damaged.

## 32-point Link Master Adapters

**B7A-T3E3/-3E8**  
(Input, Active Low)

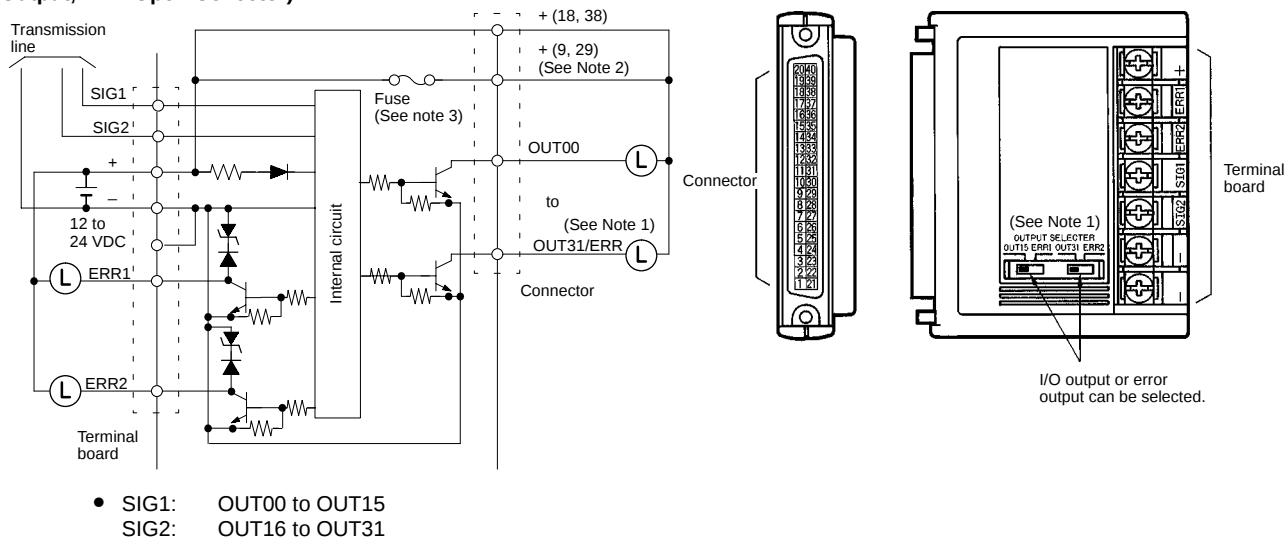
Connector



- SIG1: IN00 to IN15
- SIG2: IN16 to IN31

| Terminal No. | Terminal | Terminal No. | Terminal | Terminal No. | Terminal |
|--------------|----------|--------------|----------|--------------|----------|
| 1            | IN00     | 15           | IN12     | 29           | -        |
| 2            | IN01     | 16           | IN13     | 30           | +        |
| 3            | IN02     | 17           | IN14     | 31           | IN24     |
| 4            | IN03     | 18           | IN15     | 32           | IN25     |
| 5            | IN04     | 19           | -        | 33           | IN26     |
| 6            | IN05     | 20           | +        | 34           | IN27     |
| 7            | IN06     | 21           | IN16     | 35           | IN28     |
| 8            | IN07     | 22           | IN17     | 36           | IN29     |
| 9            | -        | 23           | IN18     | 37           | IN30     |
| 10           | +        | 24           | IN19     | 38           | IN31     |
| 11           | IN08     | 25           | IN20     | 39           | -        |
| 12           | IN09     | 26           | IN21     | 40           | +        |
| 13           | IN10     | 27           | IN22     |              |          |
| 14           | IN11     | 28           | IN23     |              |          |

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

**B7A-R3A13/-R3A33/-R3A18/-R3A38**  
**(Output, NPN Open Collector)**


| Terminal No. | Terminal       | Terminal No. | Terminal                  | Terminal No. | Terminal                  |
|--------------|----------------|--------------|---------------------------|--------------|---------------------------|
| 1            | OUT00          | 15           | OUT13                     | 29           | + (See Note 2)            |
| 2            | OUT01          | 16           | OUT14                     | 30           | OUT24                     |
| 3            | OUT02          | 17           | OUT15/ERR<br>(See Note 1) | 31           | OUT25                     |
| 4            | OUT03          | 18           | +                         | 32           | OUT26                     |
| 5            | OUT04          | 19           | NC (open)                 | 33           | OUT27                     |
| 6            | OUT05          | 20           | NC (open)                 | 34           | OUT28                     |
| 7            | OUT06          | 21           | OUT16                     | 35           | OUT29                     |
| 8            | OUT07          | 22           | OUT17                     | 36           | OUT30                     |
| 9            | + (See Note 2) | 23           | OUT18                     | 37           | OUT31/ERR<br>(See Note 1) |
| 10           | OUT08          | 24           | OUT19                     | 38           | +                         |
| 11           | OUT09          | 25           | OUT20                     | 39           | NC (open)                 |
| 12           | OUT10          | 26           | OUT21                     | 40           | NC (open)                 |
| 13           | OUT11          | 27           | OUT22                     |              |                           |
| 14           | OUT12          | 28           | OUT23                     |              |                           |

- Note: 1. It is possible to select 32 output points or 30 output points and two error output points.  
 2. A maximum of 0.4 A can be supplied from each positive terminal (9, 29).  
 3. The user cannot replace the fuse.

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

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