

Ultra Miniature Link Terminal with B7A Communications Functions and 16 Output Points

- Equipped with B7A communications functions and enables wiring reductions in B7A connections (except for high-speed models).
- Power relay (G6D) models and power MOS FET relay (G3DZ) models available.
- Compact dimensions: 156 × 51 × 51 mm (W × D × H).
- The load is connected directly to the terminal block without the need for a relay terminal.
- Signal status can be confirmed at a glance with operation indicators.
- Incorporates surge absorbing diode.
- Equipped with Relay Removal Tool.
- Supports either screw mounting or DIN track mounting.



Ordering Information

■ Product List

Classification	Number of I/O points	Rated voltage	I/O delay time	Error processing	Model
Relay output	16 (SPST-NO × 16)	24 VDC	Normal (typical: 19.2 ms) (See note 1.)	HOLD (See note 2.)	G70D-R6R11-B7A
				LOAD OFF (See note 3.)	G70D-R6R31-B7A
Power MOS FET relay output	16 (SPST-NO × 16)	24 VDC	Normal (typical: 19.2 ms) (See note 1.)	HOLD (See note 2.)	G70D-R6M11-B7A
				LOAD OFF (See note 3.)	G70D-R6M31-B7A

- Note:**
1. Not connectable to high-speed B7A models.
 2. When an error occurs, the status of outputs just before the error occurred is maintained.
 3. When an error occurs, all the outputs are turned OFF.

Specifications

■ Characteristics

Communications Specifications

Communications method	Unidirectional, time-division multiplex
Transmission distance (see note)	500 m max.
I/O delay time	Typical: 19.2 ms; 31 ms max.

- Note:** Separate power supplies are required for inputs and outputs.

General

G70D-R6R□1-B7A (Relay Outputs)

Item		Specification
Contacts		16 SPST-NO contacts
Contact mechanism		Single
Contact material		Agco
Contact resistance (See note 1.)		100 mΩ max.
Operating time		10 ms max.
Release time		10 ms max.
Maximum switching frequency	Mechanical	18,000 operations/hour
	Rated load	1,800 operations/hour
Insulation resistance		100 MΩ min. (500 V)
Dielectric strength		1,000 VAC, 1 min between each terminal and external parts
Noise immunity		Power supply normal: 600 V, 10 min; pulse width: 100 ns to 1 μs Power supply common: 1.5 kV, 10 min; pulse width: 100 ns to 1 μs Transmission path wrapping: 1.5 kV, 10 min; pulse width: 100 ns to 1 μs Link Terminal wrapping: 600 V, 10 min; pulse width: 100 ns to 1 μs
Vibration resistance	Destruction	10 to 55 Hz, 1.0-mm double amplitude for 2 hours each in X, Y, and Z directions
	Malfunction	10 to 55 Hz, 0.75-mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance	Destruction	300 m/s ²
	Malfunction	100 m/s ²
Operating voltage range		24 VDC ^{+10%} / _{-15%}
Current consumption (See note 2.)		24 VDC, approx. 300 mA
Cable length (between Unit and connected device)		Depends on the load
Color of indicators		Operation indicator: orange Power supply indicator: green (red for errors)
Coil surge suppressor		Diode (400 V, 300 mA)
Ambient temperature		Operating: 0 to 55°C Storage: -20 to 65°C
Ambient humidity		Operating: 35% to 85%
Mounting strength		No damage when 49-N pull is applied for 1 s each in all directions (only 9.8-N pull in direction of DIN track)
Terminal strength		Tightening strength: 0.78 to 0.98 N·m Tensile strength: 49 N for 1 minute
Weight		Approx. 230 g

Note: 1. The values above are for the Terminal in its initial state.

2. The contact resistance given is for 1 A at 5 VDC.

3. The value given for current consumption is for when all points are ON and includes the relay coil current for the G6D. It does not include the current for external loads or error output.

G70D-R6M□1-B7A (Power MOS FET Relay Outputs)

Item		Specification
Contacts		16 SPST-NO contacts
Isolation method		Photocoupler
Operating time		6 ms max.
Release time		10 ms max.
Output ON resistance		2.4 Ω max.
Current leakage when the relay is closed		10 μ A max. (at 125 VDC)
Insulation resistance		100 M Ω min. (500 V)
Dielectric strength		1,000 VAC, 1 min between each terminal and external parts
Noise immunity		Power supply normal: 600 V, 10 min; pulse width: 100 ns to 1 μ s Power supply common: 1.5 kV, 10 min; pulse width: 100 ns to 1 μ s Transmission path wrapping: 1.5 kV, 10 min; pulse width: 100 ns to 1 μ s Link Terminal wrapping: 600 V, 10 min; pulse width: 100 ns to 1 μ s
Vibration resistance	Destruction	10 to 55 Hz, 1.0-mm double amplitude for 2 hours each in X, Y, and Z directions
	Malfunction	10 to 55 Hz, 0.75-mm double amplitude for 2 hours each in X, Y, and Z directions
Shock resistance	Destruction	300 m/s ²
	Malfunction	100 m/s ²
Operating voltage range		24 VDC ^{+10%} / _{-15%}
Current consumption (See note.)		24 VDC, approx. 300 mA
Cable length (between Unit and connected device)		Depends on the load
Color of indicators		Operation indicator: orange Power supply indicator: green (red for errors)
Coil surge suppressor		Diode (400 V, 300 mA)
Ambient temperature		Operating: 0 to 55°C Storage: -20 to 65°C
Ambient humidity		Operating: 35% to 85%
Mounting strength		No damage when 49-N pull is applied for 1 s each in all directions (only 9.8-N pull in direction of DIN track)
Terminal strength		Tightening strength: 0.78 to 0.98 N·m Tensile strength: 49 N for 1 minute
Weight		Approx. 230 g

Note: 1. The values above are for the Terminal in its initial state.

2. The value given for current consumption is for when all points are ON and includes the input current for the G3DZ. It does not include the current for external loads or error output.

■ Ratings

Relay Specifications

The following specifications are for the G6D when it is mounted on the G70D. They are not the specifications for the G6D by itself.

Coil Ratings (for each G6D Relay)

Rated voltage	Rated current	Coil resistance	Must-operate voltage	Must-release voltage	Maximum allowable voltage	Power consumption
24 VDC	10.5 mA	2,880 Ω	70% max. (See note 1.)	10% min.	130%	Approx. 200 mW

Note: 1. The must-operate voltage is 70% max. if the Relay is mounted upside down.

2. The values for rated current and coil resistance are for a coil temperature of 23°C with a tolerance of $\pm 10\%$.

3. The values for operating characteristics are for a coil temperature of 23°C.

4. The maximum allowable voltage is the maximum value of the allowable voltage range for the relay coil operating power supply. It does not apply in the case of continuous voltages.

5. The rated current includes the Link Terminal's rated current.

Contact Ratings (for each G6D Relay)

Load	Resistive load ($\cos\phi = 1$)
Rated load	250 VAC 3 A, 30 VDC 3 A
Rated carry current	3 A
Maximum switching voltage	250 VAC, 30 VDC
Maximum switching current	3 A
Maximum switching capacity (reference value)	750 VA, 90 W
Minimum permissible load (reference value; see note 2)	5 VDC, 10 mA
Electrical life	100,000 operations min. (at the rated load and a switching frequency of 1,800 operations/hour)
Mechanical life	20,000,000 operations min. (at a switching frequency of 18,000 operations/hour)

- Note:**
1. The maximum carry current for output power supply common terminals (B0 to B6) is 3 A.
 2. This value fulfills the P reference value for switching at a frequency of 120 times per minute (ambient operating environment and determination criteria according to JIS C5442).

Power MOS FET Relay Specifications

The following specifications are for the G3DZ when it is mounted on the G70D. They are not the specifications for the G3DZ by itself.

Input (for each G3DZ Power MOS FET Relay)

Rated voltage	Operating voltage	Must-operate voltage level	Must-release voltage level	Input impedance	Rated current
24 VDC	19.2 to 28.8 VDC	19.2 VDC max.	1 VDC max.	4 k Ω $\pm$ 20%	8.2 mA $\pm$ 20%

Note: The rated current includes the Link Terminal's LED current.

Output (for each G3DZ Power MOS FET Relay)

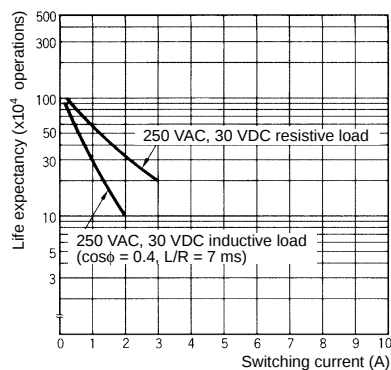
Load voltage	Load current	Inrush current
3 to 264 VAC 3 to 125 VDC	100 μ A to 0.3 A	6 A (10 ms)

Engineering Data

The following data was obtained from measurements of samples taken from the production line. Relays are mass produced and performance characteristics will differ from product to product. Therefore, use the following data as reference only.

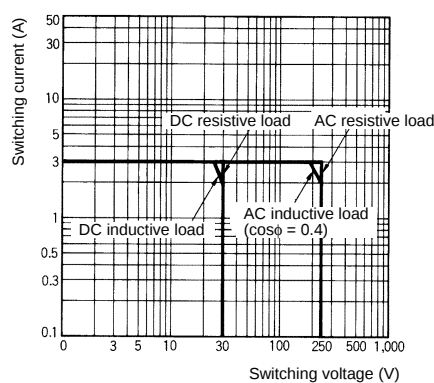
G6D-1A (24 VDC) (Power Relay Mounted to G70D-R6R□1-B7A)

Life Expectancy



Note: The above graph shows the characteristics for the Relay when it is mounted to the G70D.

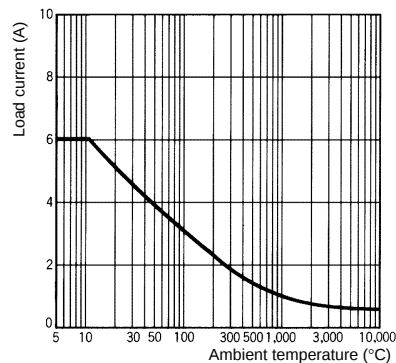
Maximum Switching Capacity



Note: The above graph shows the characteristics for the Relay when it is mounted to the G70D.

G3DZ-2R6PL (Power MOS FET Relay Mounted to G70D-R6M□1-B7A)

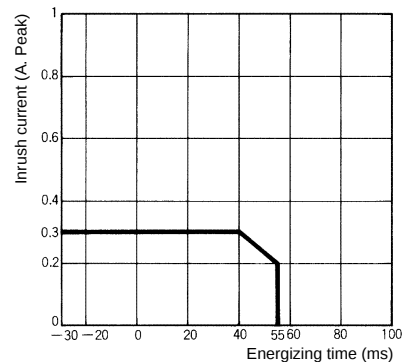
Load Current vs. Ambient Temperature



Note: The above graph shows the characteristics for the Relay when it is mounted to the G70D.

Inrush Current Resistivity (Non-repetitive)

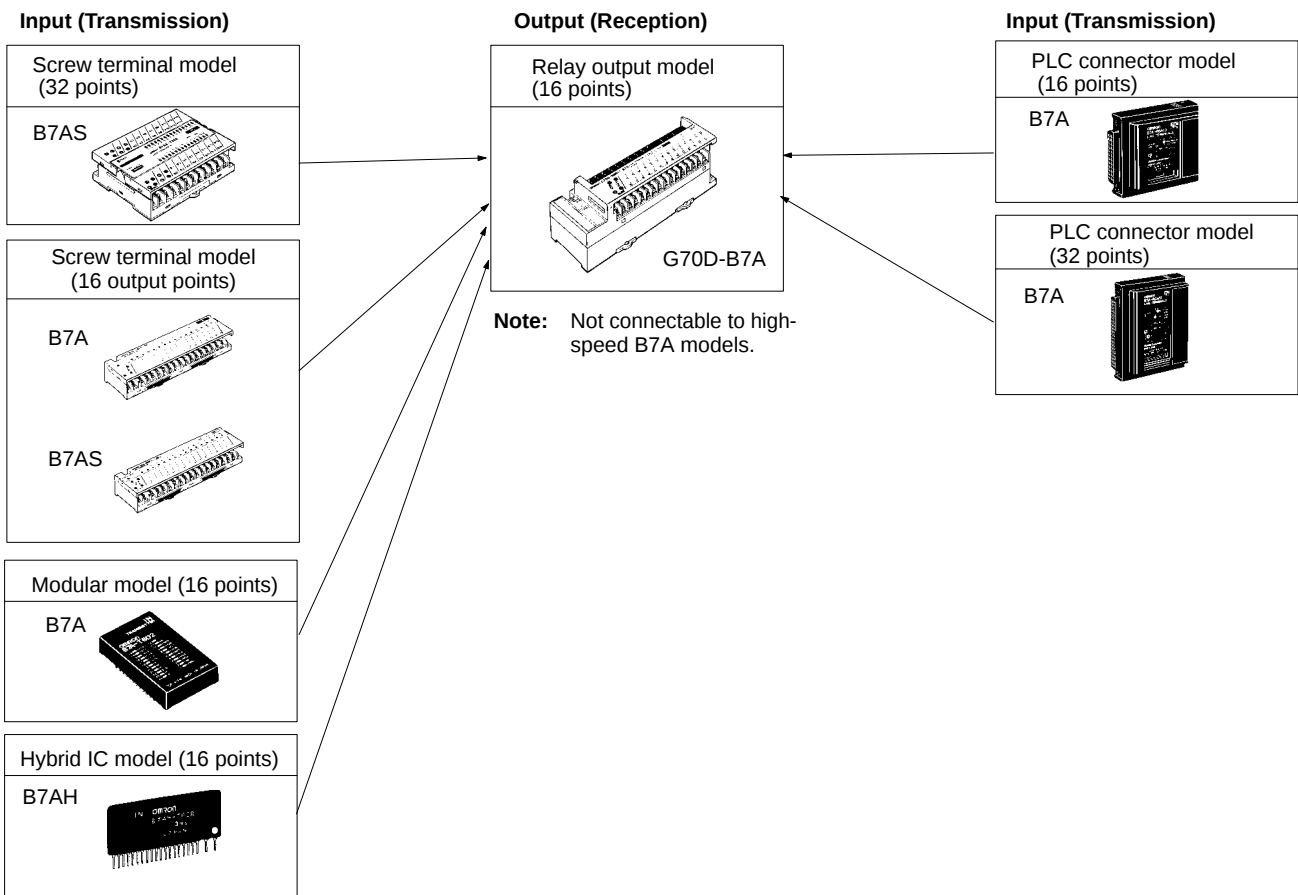
(The value will be less than half for repetitive inrush currents.)



Note: The above graph shows the characteristics for the Relay when it is mounted to the G70D.

Operation

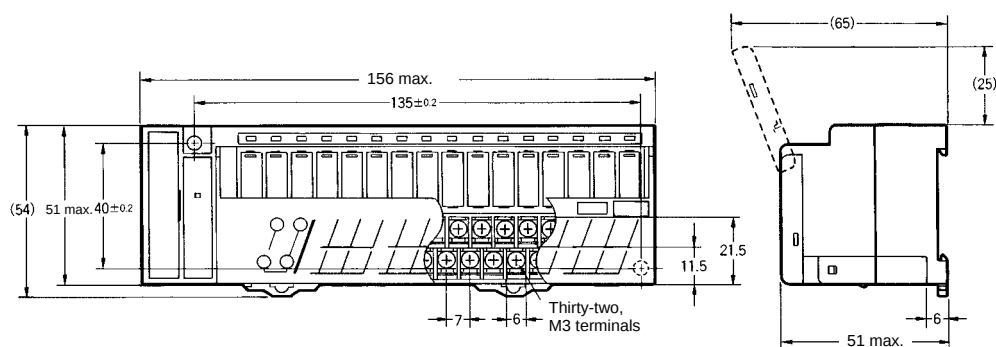
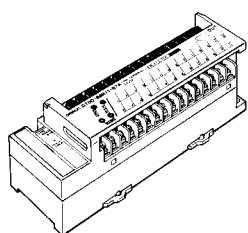
I/O Combinations



Dimensions

Note: All units are in millimeters unless otherwise indicated.

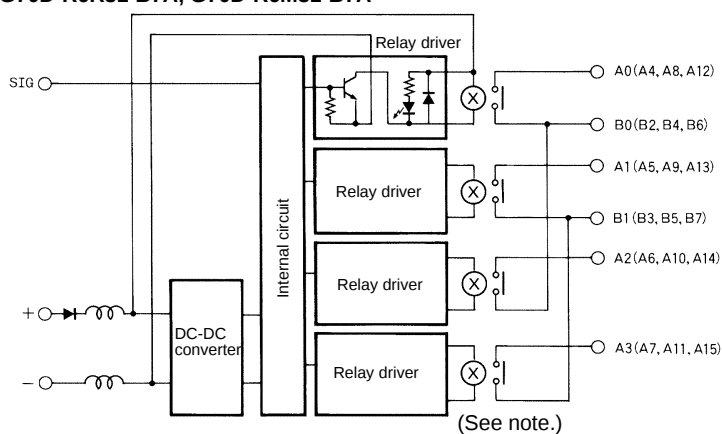
G70D-R6□□1-B7A



Installation

Internal Circuits

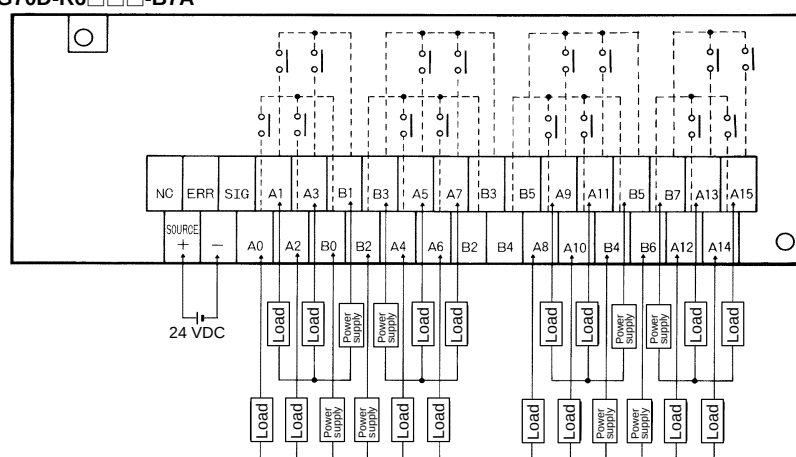
G70D-R6R11-B7A, G70D-R6M11-B7A
G70D-R6R31-B7A, G70D-R6M31-B7A



Note: The above diagram is for G70D-R6R□□1-B7A models (G6D-mounting). With G70D-R6M□□1-B7A models, G3DZ Power MOS FET Relays are used.

Terminal Arrangement

G70D-R6□□□-B7A



Note: 1. Internal connections are indicated by dotted lines in the above diagram.
2. Terminals B2, B3, B4, and B5 come in pairs. Connect the power supply to either terminal.

Precautions

General

Electric Shock

Do not touch charged parts of relay terminals or socket terminals while power is supplied. Doing so may result in electric shock.

Wiring

Be sure to turn the power OFF before performing wiring. Do not touch the terminal block while power is supplied unless the cover is mounted. Doing so may result in electric shock.

Be sure to apply the specified voltage to input terminals. Applying an incorrect voltage may prevent the product from operating with its rated performance characteristics, or may cause damage or burning.

Relay Models

Do not use the product for loads that exceed the rated values for switching capacity (e.g., switching voltage and switching current). If the ratings are exceeded the product may not be able to operate with its rated performance characteristics due to factors such as insulation failure, contact failure, or contact welding. It may even result in damage to or burning of the relay.

The lifetime of relays varies significantly with the switching conditions. Be sure to confirm the required performance characteristics by testing the relay under actual operating conditions, and use the relay at a frequency at which it can perform with the required performance characteristics. Continued use of the relay in a state where it cannot maintain the rated characteristics may eventually result in damage to the insulation between circuits or burning of the relay.

Do not use the product in locations subject to flammable or explosive gases. Doing so may result in fire or explosion due to the arcing that accompanies the switching mechanism and heating up of the relay.

No-contact Output (Transistor, Power MOS FET Relay, and SSR Output)

Do not use the product for loads that exceed the rated output current. Doing so may damage output elements and result in short-circuiting or open circuits.

When using the product for DC inductive loads, connect a diode that will prevent reverse voltages. Not doing so may damage output elements and result in short-circuiting or open circuits.

Correct Use

Link Terminals with Relay Outputs

This Link Terminal is for relay output.

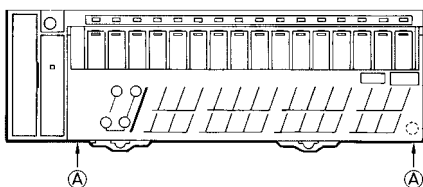
G70D-R6R□1-B7A Link Terminals use 24-VDC G6D-1A Relays and G70D-R6M□1-B7A Link Terminals use 24-VDC G3DZ-2R6PL Relays.

When replacing relays, use the yellow Relay Removal Tool at the corner of the screw terminal (except for G7TC).

Do not mount or dismount relays with the power supplied.

Opening the Front Cover (Rotating Type):

Hold the two bottom corners of the front cover (labelled A in the diagram below), and lift upwards to open.



Replacing Relays

Do not mount or dismount relays with the power supplied. Doing so may result in electric shock or malfunction.

When replacing relays, use the yellow Relay Removal Tool at the corner of the screw terminal (except for G7TC).

Relays must be inserted vertically so that the legs do not bend. Not inserting relays properly may result in malfunction or heating.

Wiring

Be sure that terminal polarity, wiring between the transmission lines and power supply, and the voltage specifications for I/O power supplies are correct.

Do not mount or remove connectors with the power supplied. Doing so may result in malfunction.

Locks for Connecting Cables

Ensure that the connectors for connecting cables are securely locked before supplying power.

Installation

Do not install the product in the following locations. Doing so may result in failure or malfunction.

- Locations subject to direct sunlight
- Locations subject to temperatures outside the range 0 to 55°C
- Locations subject to humidity outside the range 10% to 90%, or locations subject to condensation as the result of severe changes in temperature
- Locations subject to corrosive or flammable gases
- Locations subject to dust (especially iron dust) or salts
- Locations subject to shock or vibration
- Locations subject to exposure to water, oil, or chemicals

Tightening Torque for Mounting Screws

Tighten the mounting screws for all Units to the specified torques to prevent malfunction.

- Tightening torque for terminal screws:
0.78 to 1.18 N·m
- When directly mounting to panel with screws:
0.59 to 0.98 N·m

Cleaning

Do not use thinners to clean the product. Doing so will dissolve or discolor the surface of the product.

Mounting

Be sure not to drop the product or apply excessive shock to the product when mounting. Doing so will result in failure or malfunction.

Disassembly

Do not attempt to disassemble, repair, or modify the product. Any attempt to do so may result in incorrect operation or electric shock.