Wiring Systems

OMRON

Wiring Systems

Introduction to I/O Blocks, I/O Terminals, and I/O Block Bases

G70D, G7TC, and G70A-ZOC16

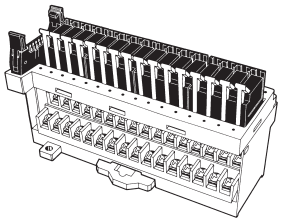
Unify Wiring with One Connecting Cable.
Simplify Connections to the Controller and Reduce Wiring in the Control Panel.
Improve Surge Suppression and Increase Capacity at the Same Time.

G70D

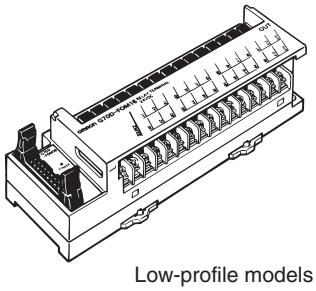
Compact Output Terminals Save Control Panel Space

- The G70D Series consists of 16-point Relay Output Terminals.
- Two configurations are available: The standard low-profile version is just 156 × 51 × 39 mm (W×D×H) and the vertical version is just 135 × 46 × 81 mm (W×D×H).
- Relay output models are equipped with G6D power relays (low-profile: SPST-NO 3 A/common; vertical: SPST-NO 3 A/output) and power MOSFET relay models are equipped with G3DZ power MOSFET relays (SPST-NO 0.3 A/output).
- The flat models have 2 common terminals. The vertical models have 16 independent outputs.

Note: See page 392 and page 387 for more details.



Vertical models
(G70D-VSOC16/VFOM16)



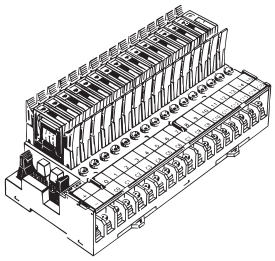
Low-profile models
(G70D-SOC16/FOM16)

G7TC

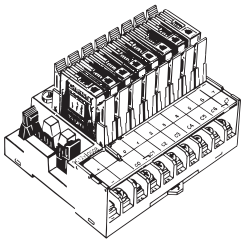
Both Input Blocks and Output Blocks are Available. G7TC I/O Blocks are Ideal as Controller Interfaces.

- Output Blocks with 8 or 16 outputs are available. Input Blocks with 16 inputs are available.
- The 16-point Output Blocks are available with PNP circuits.
- The 16-point models are just 182 × 85 × 68 mm (W×D×H) and the 8-point models are just 102 × 85 × 68 mm (W×D×H).
- Equipped with G7T I/O Relays (SPST-NO 5 A/output).
- G7TC models conform to UL and CSA standards.
- 16-point models with independent terminals.
- Models are also available with G3TA Solid State Relays.

Note: See page 398 for more details.



16-point model



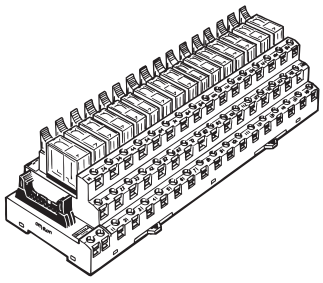
8-point model

G70A-ZOC16

High-capacity Relay Sockets can be Equipped with G2R (SPDT) Relays.

- Sixteen relay terminal sockets for output relays only.
- Models are available with PNP circuits.
- Compact case is just 234 × 75 × 64 mm (W×D×H).
- Install OMRON G2R Power Relays, G3R Solid State Relays, G3RZ Power MOSFET Relays, and H3RN Timers as required. (Relays and Timers are sold separately.)
- High-capacity 10-A Terminal Block
- Conforms to VDE standards.
- Sixteen independent terminals

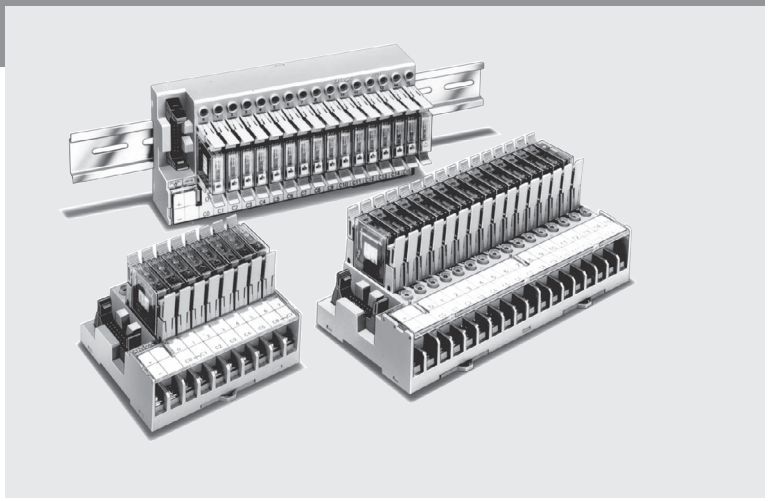
Note: See page 386 for more details.



*Relays are sold separately.

G7TC

Relay I/O terminal blocks



Unify PLC Wiring to a Single Cable to Reduce Wiring in the Control Panel and Save Space

- The 16-point Input and Output Blocks are just 182 × 85 × 68 mm (W × D × H) and the 8-point Output Block is just 102 × 85 × 68 mm (W × D × H).
- Also connects to an SBC with a simple snap-in connector.
- Surge suppressor circuit built-in.
- Operation indicators show each I/O signal's ON/OFF status at a glance.
- Mount to DIN rail.
- The G7TC-OC16 and G7TC-OC08 can be combined with a DRT1-OD32ML I/O Terminal for DeviceNet connectivity or an SRT2-VOD16ML Connector Terminal for CompoBus/S connectivity.
- G3TA I/O Solid-state Relays can be mounted.
- Conforms to UL and CSA standards.

Ordering Information

I/O classification	I/O points	Internal I/O circuit common	Rated voltage	Model
Input	16	NPN compatible (– common)	12 V DC	G7TC-ID16*
			24 V DC	
			100/110 V DC	
			100/110 V AC	G7TC-IA16*
			200/220 V AC	
Output	16	NPN compatible (+ common)	12 V DC	G7TC-OC16
			24 V DC	
		PNP compatible (– common)	12 V DC	G7TC-OC16-1*
			24 V DC	
	8	NPN compatible (+ common)	12 V DC	G7TC-OC08*
			24 V DC	
		PNP compatible (+ common)	24 V DC	G7TC-OC08-1*
		PNP compatible (- common)	24 V DC	

* This is a non-standard model and requires a special order. Contact your OMRON representative for details on availability.

Specifications

Coil Ratings (Common to Input/Output per Relay)

Item		Rated current (mA)		Coil resistance (Ω)	Must operate	Must release	Maximum voltage	Power consumption	
Rated voltage (V)		50 Hz	60 Hz		of rated voltage			per Relay	per 16 Relays
AC	100/110 200/220	8.2 4.1	7/7.7 3.5/3.88	8,700 33,300	80% max.	30% min.	105%	0.7 VA	11 VA
DC	12 24 100/110	42 21 5		290 1,150 20,000	80% max.	10% min.	105%	0.5 W	8 W

Note: 1. The rated current and coil resistance are measured at a coil temperature of +23°C with a tolerance of +15%/–20% for AC rated current and ±15% for coil resistance.

2. The operating characteristics are measured at a coil temperature of +23°C.

3. The value for maximum voltage is the maximum value within the allowable voltage fluctuation range for the relay coil's operating power supply. Continuous operation at this voltage is not within product specifications.

4. Approx. 4 mA flows into each LED indicator. To calculate the power supply capacity, add the current value of each LED indicator.

Contact Ratings (G7T I/O Relay)

Classification	For input		For output	
Item	Resistive load (cosϕ=1)	Inductive load (cosϕ=0.4 L/R=7 ms)	Resistive load (cosϕ=1)	Inductive load (cosϕ=0.4 L/R=7 ms)
Rated load	1 A at 24 V DC	0.5 A at 24 V DC	5 A at 24 V DC 2 A at 220 V AC	2 A at 24 V DC 1 A at 220 V AC
Rated carry current	1 A		5 A	
Max. switching voltage	250 V AC, 125 V DC			
Max. switching current	1 A	0.5 A	5 A	2 A
Min. permissible load (reference value) (See note.)	100 μA at 1 V		10 mA at 5 V	
Electrical life expectancy	10,000,000 operations (at 10 mA) 50,000 operations (at 1 A)	2,500,000 operations (at 10 mA) 20,000 operations (at 1 A)	1,000,000 operations (under rated load)	
Mechanical life expectancy	50,000,000 operations			

Note: The above values are for a switching frequency of 120 operations/min.

Characteristics

Model / Item		G7TC-IA16 (Input, AC coil)	G7TC-ID16 (Input, DC coil)	G7TC-OC16 (-1) (output, DC coil)	G7TC-OC08(-1) (output, DC coil)
Contact form		SPST-NO × 16			SPST-NO × 8
Contact mechanism		Bifurcated crossbar contact		Single contact	
Contact material		Au cladding + Ag		AgInSn	
Contact resistance (See note 2.)		50 mΩ max.			
Must Operate time (See note 3.)		15 ms max.			
Release time (See note 3.)		15 ms max.			
Max. switching frequency	Mechanical limit	18,000 operations/hour			
	At rated load	1,800 operations/hour			
Insulation resistance		100 MΩ (at 500 V DC)			
Dielectric strength	Between coil and contact	2,000 V AC, 50/60 Hz for 1 minute			
	Between same polarity contacts	1,000 V AC, 50/60 Hz for 1 minute			
	Between paired connectors	250 V AC, 50/60 Hz for 1 minute			
Vibration resistance		10 to 55 to 10 Hz with 0.5-mm single amplitude (1.0-mm double amplitude)			
Shock resistance		200 m/s^2			
Noise immunity		Noise level: 1.5 kV; pulse width: 100 ns to 1 μs			
Rated voltage between positive and negative terminal blocks		Rated voltage of controller's (PLC or other) input circuit		12 V DC ±5% (See note 5.) 24 V DC ±5%	
Rated current between positive and negative terminal blocks		Input circuit current of controller (PLC or other) × number of ON points		12 V DC: 46 mA × number of ON points 24 V DC: 25 mA × number of ON points	
Cable length (See note 4.)	To controller	5 m max. (reference value)			
	To I/O devices	50 m max. (reference value, for 2-mm^2 CVV cable)		Dependent on load	
Ambient operating temperature		0 to 55°C			
Ambient operating humidity		35% to 85% (with no icing or condensation)			
Tightening torque for external connections		0.78 to 1.18 N· m			
Tensile strength		No damage when a tensile force of 49 N is applied in each direction. In the direction of the track, the tensile strength is 9.8 N min.			
I/O terminal tightening torque		Tightening strength: 0.98 N· m; Tensile strength 49 N for 1 minute			
LED color		Red	Green		
Case color		Transparent red	Transparent green	Transparent	
Coil surge absorber		Varistor	Diode (1 A, 400 V)		
Weight		Approx. 640 g	Approx. 630 g	Approx. 670 g	Approx. 350 g

Note: 1. These are initial values.

2. Measurement condition: 1 A at 5 V DC.

3. Ambient temperature: 23°C.

4. Connecting cables up to 5 m are available as standard products. (See page 401.) For longer cables, enquire separately.

5. G7TC-OC08-01 is not available in 12 V DC type.

Accessories (Order Separately)

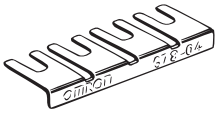
G79 Connecting Cables

Cable Type	Model
Cable with Loose Wire and Crimp Terminals	G79-Y□C
Cable with Loose Wires	G79-A□C
Cable with Three Connectors (1:3)	G79-□C-□-□
Cable with Two Connectors (1:2)	G79-□C-□
Cable with One Connector (1:1)	G79-□C

Note: See page 401 for more details.

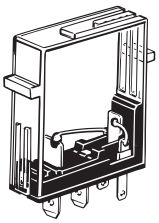
G78-04 Shorting Bar

Use this piece to short-circuit adjacent terminals.
Max. current flow: 20 A



G77-S Output Short-Circuit Module

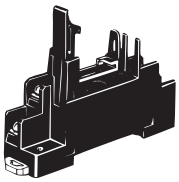
A G77-S Output Short-Circuit Module can be used to output directly without a relay. The G77-S Output Short-Circuit Module cannot be used for inputs.



P7TF-05 Socket

The G7T (SPST-NO, SPST-NC, and SPDT types) and the G3TA I/O Relays can be mounted on the P7TF-05 Socket.

The P7TF-05 can be used for applications involving sequences that require slim relays, or to enable use of SPDT relays with the I/O Block. To use part of the I/O Block with SPDT specifications, insert an Output Short-Circuit Module into the I/O Block, and use the P7TF-05 Socket in combination with an SPDT Relay for the Module's output.



Specifications

Contact resistance	10 mΩ max. (measured at 5 V DC, 1 A)
Dielectric strength	2,000 V AC for 1 minute
Insulation resistance	100 MΩ (at 500 V)
Vibration resistance	10 to 55 to 10 Hz with 0.5-mm single amplitude (1.0-mm double amplitude)
Shock resistance	200 m/s^2
Ambient temperature	Operating: 0 to 55° C
Ambient humidity	35% to 85%
Weight	Approx. 28 g

P70 Indicator Module and Surge Suppressor

Remove the transparent style strip of the P7TF-05 socket and mount this module and it will function as an operation indicator and surge suppressor.

Ordering Information

Model		Applicable relay coil voltage	Remarks
For AC relay	P70A	100 (110) V AC	Varistor surge suppression
		200 (220) V AC	
For DC relay	P70D	12/24 V DC	Diode surge suppression

Note: 1. Order the indicator module suitable for the relay coil voltage.
2. The indicator module for DC relays can be used with a 12-V or 2- V DC power supply.

Precautions

General

I/O Relays and I/O Block Bases can be combined as follows to form I/O Blocks:

	Combinations (See note.)	Block Base	I/O Relay	I/O SSR	
DC output	G7TC-OC16 G7TC-OC16-1 G7TC-OC08 G7TC-OC08-1	P7TF-OS16 P7TF-OS16-1 P7TF-OS08 P7TF-OS08-1	G7T-1112S	AC	G3TA-OA202SZ G3TA-OA202SL
				DC	G3TA-ODX02S G3TA-OD201S
DC input	G7TC-ID16	P7TF-IS16 (DC type)	G7T-1122S	DC	G3TA-IDZR02S (M)
AC input	G7TC-IA16	P7TF-IS16 (AC type)		AC	G3TA-IAZR02S

Note: The model numbers given under "Combinations" are for combinations with I/O Relays. To use I/O SSRs, either replace an I/O Relay with the SSR, or purchase an I/O Terminal (Block Base) and an I/O SSR (i.e., not the combined Unit).

- AC Input Relays/SSRs and DC Input Relays/SSRs cannot be used together in the same Terminal because of the specifications for coil surge suppression elements are different.

  Furthermore, Relays/SSRs with different voltage specifications cannot be used together in the same Terminal because the specifications of operation indicator circuits are different. (For example, a 100-V AC Input Relay and a 200-V AC Input Relay, or a 12-V DC Output Relay and a 24-V DC Output Relay cannot be used in the same Terminal.)

- Only use I/O Terminals, I/O Relays, and I/O SSRs with the same specifications for rated voltage.