

# Solid-state Star-delta Timers

# H3CR-G

CSM\_H3CR-G\_DS\_E\_2\_3

## DIN 48 × 48-mm Star-delta Timer

- A wide star-time range (up to 120 seconds) and star-delta transfer time range (up to 0.5 seconds).



## Model Number Structure

### Model Number Legend

H3CR - G 8 □ L □  
1 2 3 4 5

#### 1. Classification

G: Star-delta timer

#### 2. Configuration

8: 8-pin socket

#### 3. Outputs

None: Star-delta operation contact

E: Star-delta operation contact and instantaneous contact

#### 4. Dimensions

L: Long-body model

#### 5. Supply Voltage

100-120AC: 100 to 120 VAC

200-240AC: 200 to 240 VAC

## Ordering Information

### List of Models

| Outputs                                      | Supply voltage | 8-pin models        |
|----------------------------------------------|----------------|---------------------|
| Time-limit contact                           | 100 to 120 VAC | H3CR-G8L 100-120AC  |
|                                              | 200 to 240 VAC | H3CR-G8L 200-240AC  |
| Time-limit contact and instantaneous contact | 100 to 120 VAC | H3CR-G8EL 100-120AC |
|                                              | 200 to 240 VAC | H3CR-G8EL 200-240AC |

**Note:** Specify both the model number and supply voltage when ordering.

Example: H3CR-G8L 100-120AC

Supply voltage

## Accessories (Order Separately)

### ■ Accessories (Order Separately)

#### Adapter, Protective Cover, Setting Ring and Panel Cover

| Name/specifications    |                     | Models       |
|------------------------|---------------------|--------------|
| Flush Mounting Adapter |                     | Y92F-30      |
|                        |                     | Y92F-70 *1   |
|                        |                     | Y92F-71 *1   |
| Protective Cover       |                     | Y92A-48B *2  |
| Hold-down Clip         | For PF085A Socket   | Y92H-2       |
|                        | For PL08 Sockets    | Y92H-1       |
| Setting Ring A         |                     | Y92S-27 *3   |
| Setting Ring B and C   |                     | Y92S-28 *3   |
| Panel Cover            | Light gray (5Y7/1)  | Y92P-48GL *4 |
|                        | Black (N1.5)        | Y92P-48GB *4 |
|                        | Medium gray (5Y5/1) | Y92P-48GM *4 |

**Note:** Refer to page 11 to 12 for details on *Dimension*.

\*1 The Y92F-48B Front Cover and the Y92P-48G□ Panel Cover cannot be used at the same time.

\*2 The Y92A-48B Front Cover is made from hard plastic. Remove the Front Cover to change the set value. The Y92P-48G□ Panel Cover and the Y92F-70/-71 Flush Mounting Adapter also cannot be used at the same time.

\*3 The Y92S-27/-28 Setting Ring cannot be used alone. It must be used together with the Y92P-48G□ Panel Cover.

\*4 The Y92A-48B Front Cover and the Y92F-70/-71 Flush Mounting Adapter also cannot be used at the same time.

### Sockets

| Timer<br>Pin | Round Sockets    |                                       |           |
|--------------|------------------|---------------------------------------|-----------|
|              | Connection       | Terminal                              | Models    |
| 8-pin        | Front Connecting | DIN track mounting                    | P2CF-08   |
|              |                  | DIN track mounting (Finger-safe type) | P2CF-08-E |
|              |                  | DIN track mounting                    | PF085A    |
|              | Back Connecting  | Screw terminal                        | P3G-08    |
|              |                  | Solder terminal                       | PL08      |
|              |                  | Wrapping terminal                     | PL08-Q    |
|              |                  | PCB terminal                          | PLE08-0   |
|              |                  |                                       |           |

**Note:** 1. The P2CF-08-E has a finger-protection structure. Round crimp terminals cannot be used. Use forked crimp terminals.

2. The P3G-08 Socket can be used together with the Y92A-48G Terminal Cover to implement finger protection.

3. For details, refer to *Socket and DIN Track Products*.

### Terminal Cover

| Application                | Model    | Remarks                |
|----------------------------|----------|------------------------|
| For back connecting socket | Y92A-48G | For P3G-08 and P3GA-11 |

**Note:** For details, refer to *Socket and DIN Track Products*.

# Specifications

## ■ General

| Item                   | H3CR-G8L                                                                                                                                 | H3CR-G8EL                                                                                                   |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------|
| Functions              | Star-delta timer                                                                                                                         | Star-delta timer with instantaneous output                                                                  |
| Pin type               | 8-pin                                                                                                                                    |                                                                                                             |
| Operating/Reset method | Time-limit operation/Self-reset                                                                                                          |                                                                                                             |
| Output type            | Time-limit: SPST-NO (star operation circuit)<br>SPST-NO (delta operation circuit)                                                        | Time-limit: SPST-NO (star operation circuit)<br>SPST-NO (delta operation circuit)<br>Instantaneous: SPST-NO |
| Mounting method        | DIN track mounting, surface mounting, and flush mounting                                                                                 |                                                                                                             |
| Approved standards     | UL508, CSA C22.2 No.14, NK, Lloyds<br>Conforms to EN61812-1 and IEC60664-1 (VDE0110) 4kV/2.<br>Output category according to EN60947-5-1. |                                                                                                             |

## ■ Time Ranges

| Time unit          |     | Star operation time ranges |
|--------------------|-----|----------------------------|
| Full scale setting | 6   | 0.5 to 6 s                 |
|                    | 12  | 1 to 12 s                  |
|                    | 60  | 5 to 60 s                  |
|                    | 120 | 10 to 120 s                |

|                          |                                                |
|--------------------------|------------------------------------------------|
| Star-delta transfer time | Programmable at 0.05 s, 0.1 s, 0.25 s or 0.5 s |
|--------------------------|------------------------------------------------|

## ■ Ratings

|                                           |                                                                                                     |
|-------------------------------------------|-----------------------------------------------------------------------------------------------------|
| Rated supply voltage (See notes 1 and 2.) | 100 to 120 VAC (50/60 Hz), 200 to 240 VAC (50/60 Hz)                                                |
| Operating voltage range                   | 85% to 110% of rated supply voltage                                                                 |
| Power reset                               | Minimum power-opening time: 0.5 s                                                                   |
| Power consumption                         | 100 to 120 VAC: approx. 6 VA (2.6 W) at 120 VAC<br>200 to 240 VAC: approx. 12 VA (3.0 W) at 240 VAC |
| Control outputs                           | Contact output: 5 A at 250 VAC/30 VDC, resistive load ( $\cos\phi = 1$ )                            |

**Note:** 1. Do not use an inverter output as the power supply. Refer to *Safety Precautions for All Timers* for details.

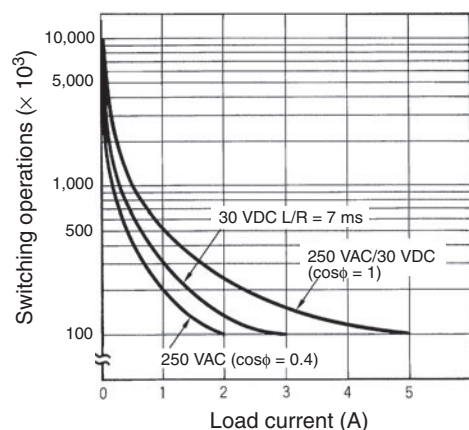
2. Refer to *Safety Precautions for All Timers* when using the Timer together with a 2-wire AC proximity sensor.

## ■ Characteristics

|                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Accuracy of operating time           | ±0.2% FS max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Setting error                        | ±5% FS ±50 ms max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Accuracy of Star-delta transfer time | ±25% FS + 5 ms max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Reset voltage                        | 10% max. of rated voltage                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Influence of voltage                 | ±0.2% FS max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Influence of temperature             | ±1% FS max.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Insulation resistance                | 100 MΩ min. (at 500 VDC)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Dielectric strength                  | 2,000 VAC, 50/60 Hz for 1 min (between current-carrying metal parts and exposed non-current-carrying metal parts)<br>2,000 VAC, 50/60 Hz for 1 min (between control output terminals and operating circuit)<br>2,000 VAC, 50/60 Hz for 1 min (between contacts of different polarities)<br>1,000 VAC, 50/60 Hz for 1 min (between contacts not located next to each other)                                                                                                                                                                                                                                                                                                                                             |
| Impulse withstand voltage            | 3 kV (between power terminals)<br>4.5 kV (between current-carrying terminal and exposed non-current-carrying metal parts)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| Noise immunity                       | ±1.5 kV (between power terminals), square-wave noise by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| Static immunity                      | Malfunction: 8 kV<br>Destruction: 15 kV                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| Vibration resistance                 | Destruction: 10 to 55 Hz with 0.75-mm single amplitude for 2 hrs each in three directions<br>Malfunction: 10 to 55 Hz with 0.5-mm single amplitude for 10 min each in three directions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Shock resistance                     | Destruction: 980 m/s <sup>2</sup> three times each in six directions<br>Malfunction: 294 m/s <sup>2</sup> three times each in six directions                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| Ambient temperature                  | Operating: -10°C to 55°C (with no icing)<br>Storage: -25°C to 65°C (with no icing)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Ambient humidity                     | Operating: 35% to 85%                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Life expectancy                      | Mechanical: 20 million operations min. (under no load at 1,800 operations/h)<br>Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 1,800 operations/h) (See note)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| EMC                                  | (EMI) EN61812-1<br>Emission Enclosure: EN55011 Group 1 class A<br>Emission AC Mains: EN55011 Group 1 class A<br>(EMS) EN61812-1<br>Immunity ESD: IEC61000-4-2: 6 kV contact discharge (level 3)<br>8 kV air discharge (level 3)<br>Immunity RF-interference from AM Radio Waves: IEC61000-4-3: 10 V/m (80 MHz to 1 GHz) (level 3)<br>Immunity RF-interference from Pulse-modulated Radio Waves: IEC61000-4-3: 10 V/m (900±5 MHz) (level 3)<br>Immunity Conducted Disturbance: IEC61000-4-6: 10 V (0.15 to 80 MHz) (level 3)<br>Immunity Burst: IEC61000-4-4: 2 kV power-line (level 3)<br>2 kV I/O signal-line (level 4)<br>Immunity Surge: IEC61000-4-5: 1 kV line to line (level 3)<br>2 kV line to ground (level 3) |
| Case color                           | Light Gray (Munsell 5Y7/1)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Degree of protection                 | IP40 (panel surface)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Weight                               | H3CR-G8L: approx. 110 g; H3CR-G8EL: approx. 130 g                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |

**Note:** Refer to the *Life-test Curve*.

## Life-test Curve

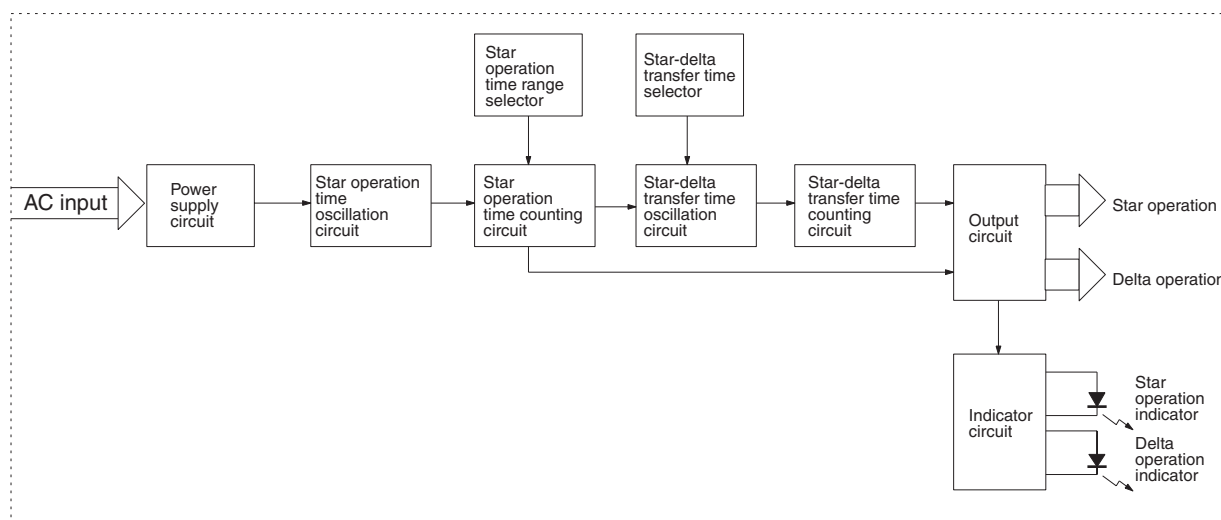


Reference: A maximum current of 0.15 A can be switched at 125 VDC ( $\cos\phi = 1$ ) and a maximum current of 0.1 A can be switched if L/R is 7 ms. In both cases, a life of 100,000 operations can be expected. The minimum applicable load is 10 mA at 5 VDC (failure level: P).

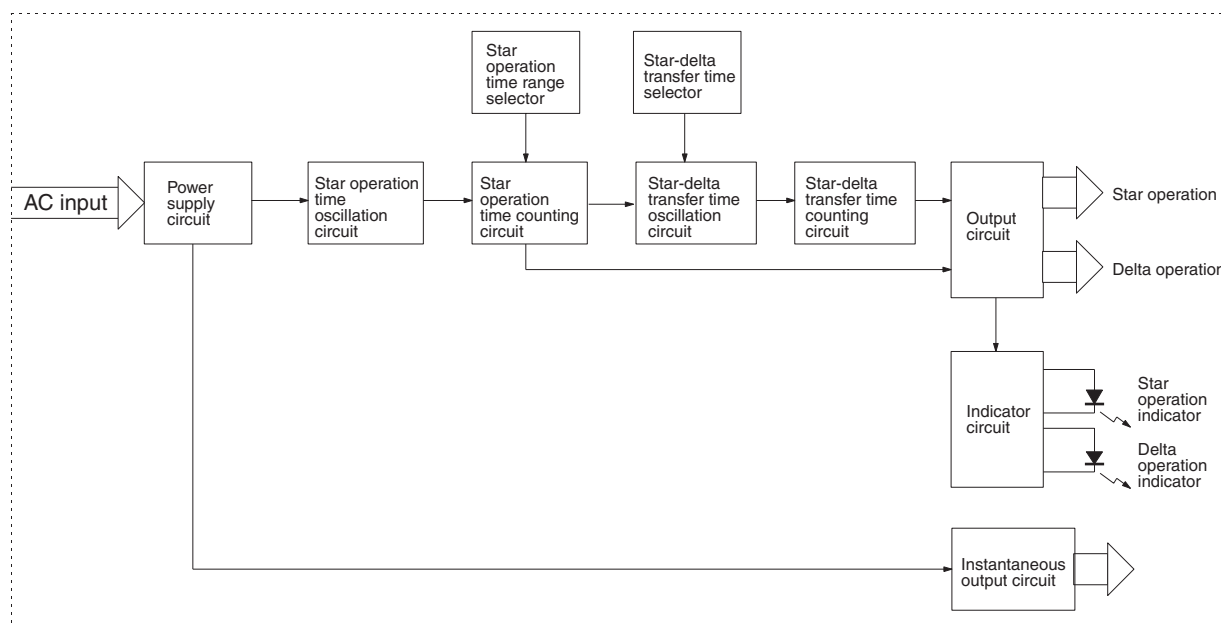
## Connections

### Block Diagrams

H3CR-G8L



H3CR-G8EL

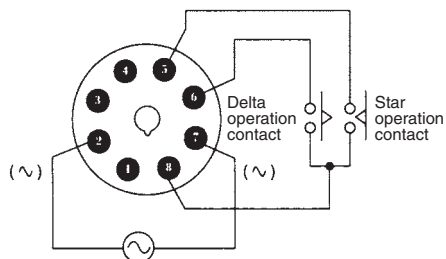


## I/O Functions

|         |                |                                                                                                                                                                                                         |
|---------|----------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Inputs  | ---            |                                                                                                                                                                                                         |
| Outputs | Control output | If the time reaches the value set with the time setting knob, the star operation output will be turned OFF and there will be delta operation output after the set star-delta transfer time has elapsed. |

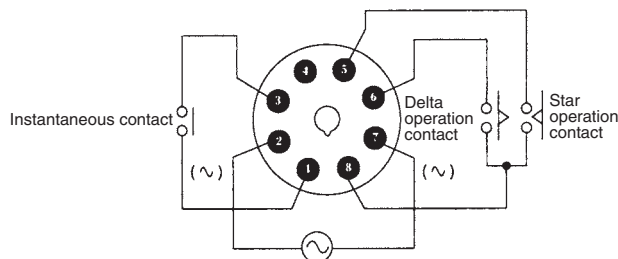
## Terminal Arrangement

H3CR-G8L



**Note:** Leave terminals 1, 3, and 4 open.  
Do not use them as relay terminals.

H3CR-G8EL

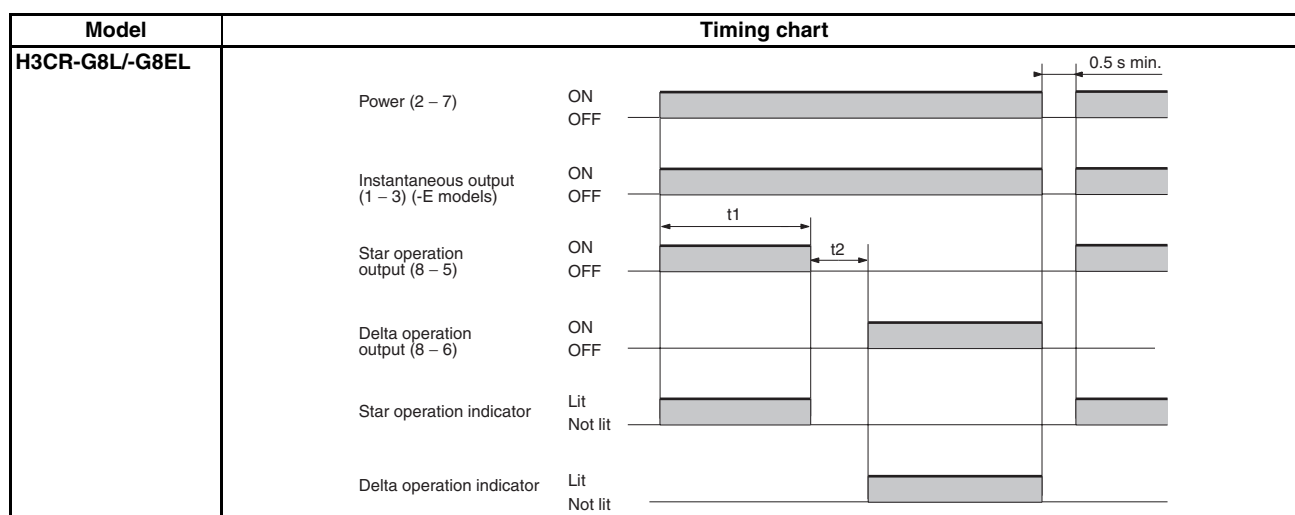


**Note:** Leave terminal 4 open. Do not use them as relay terminals.

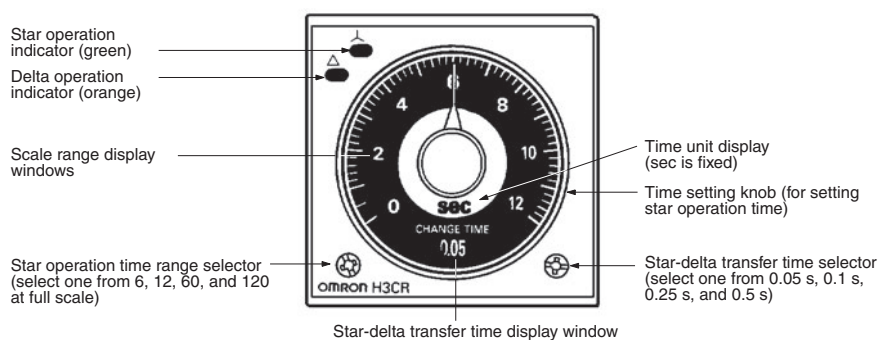
## Operation

### Timing Chart

t1: Star operation time setting  
t2: Star-delta transfer time

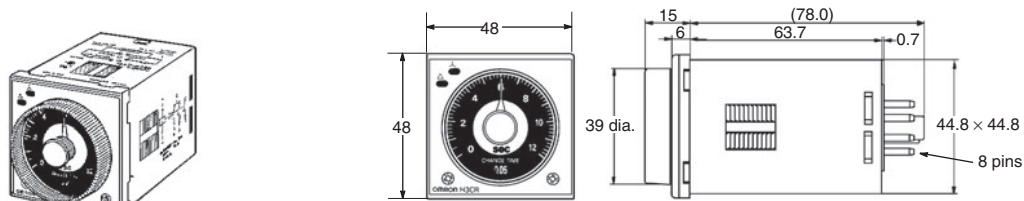


## Nomenclature

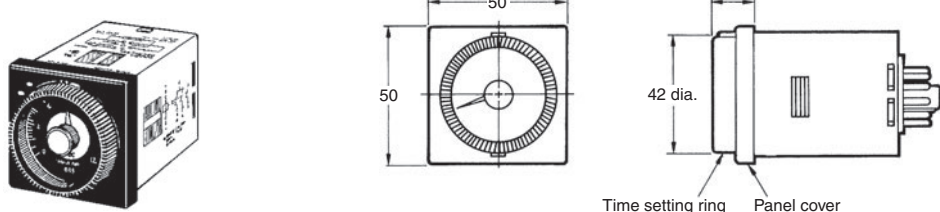


# Dimensions

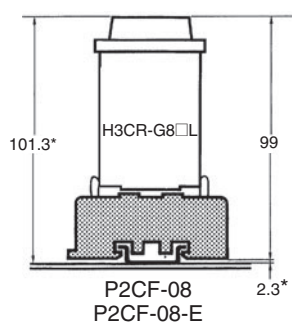
**Note:** All units are in millimeters unless otherwise indicated.



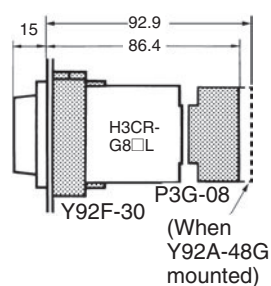
**Dimensions with Set Ring**



**Dimensions with Front Connecting Socket**  
P2CF-08-□



**Dimensions with Back Connecting Socket**  
P3G-08



\*These dimensions vary with the kind of DIN track (reference value).

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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