

Solid-state Star-delta Timer

H3DE-G

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



Ordering Information

Supply voltage	Model
24 to 230 VAC/VDC	H3DE-G

■ Model Number Legend

H3DE - ☐  
1

1. G: Star-delta timer

■ Accessories (Order Separately)

Mounting Track	50 cm (l) x 7.3 mm (t)	PFP-50N
	1 m (l) x 7.3 mm (t)	PFP-100N
	1 m (l) x 16 mm (t)	PFP-100N2
End Plate	PFP-M	
Spacer	PFP-S	

# Specifications

## ■ General

Item	H3DE-G
Operating mode	Star-delta operation
Operating/Reset method	Time-limit operation/Self-reset
Terminal block	Clamps two 2.5 mm <sup>2</sup> max. bar terminals without sleeves
Terminal screw tightening torque	0.98 N • m max. {approx. 10 kgf • cm max.}
Output type	(Star operation circuit) Relay: SPDT (Delta operation circuit) Relay: SPDT
Mounting method	DIN track mounting
Attachment	Nameplate
Approved standards	UL508, CSA 22.2 No.14 Conforms to EN61812-1 (VDE0435/P2021), IEC60664-1 (VDE0110) 4 kV/2, VDE0106/P100 Conforms to IEC60947-5-1 (AC-13; 250 V 5A/AC-15; 250 V 3 A/DC-13; 30 V 0.1 A) Conforms to EN50081-1 and EN50082-2

## ■ Time Ranges

Time scale display	Star operation time ranges
x 1	1 to 12 s
x 10	10 to 120 s

Star-delta transfer time	Programmable at 0.05 s, 0.1 s, 0.25 s or 0.5 s
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## ■ Ratings

Rated supply voltage (see note)	24 to 230 VAC/VDC (50/60 Hz)
Operating voltage range	85% to 110% of rated supply voltage
Power reset	Minimum power-off time: 0.5 s
Reset voltage	24 VAC/DC max.
Power consumption	AC: Approx. 3 VA (1.8 W) at 230 VAC DC: Approx. 0.8 W at 24 VDC
Control output	Contact output: 5 A at 250 VAC with resistive load ( $\cos\phi = 1$ ) 5 A at 30 VDC with resistive load ( $\cos\phi = 1$ )
Ambient temperature	Operating: -10°C to 55°C (with no icing) Storage: -25°C to 65°C (with no icing)
Ambient humidity	Operating: 35% to 85%

**Note:** DC ripple rate: 20% max.

## ■ Characteristics

<b>Accuracy of operating time</b>	±1% max. of FS
<b>Setting error</b>	±10% ± 0.05 s max. of FS
<b>Total tolerance of transfer time</b>	± (25% FS + 5 ms) max.
<b>Influence of voltage</b>	±0.5% max. of FS
<b>Influence of temperature</b>	±2% max. of FS
<b>Insulation resistance</b>	100 MΩ min. at 500 VDC
<b>Dielectric strength</b>	Between current-carrying metal parts and exposed non-current-carrying metal parts: 2,000 VAC (50/60 Hz) for 1 min. Between control output terminals and operating circuit: 2,000 VAC (50/60 Hz) for 1 min. Between contacts not located next to each other: 1,000 VAC (50/60 Hz) for 1 min.
<b>Impulse withstand voltage</b>	3 kV (between power supply terminals) 4.5 kV (between current-carrying metal parts and exposed non-current-carrying metal parts)
<b>Noise immunity</b>	Square-wave noise generated by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise) ±1.5 kV
<b>Static immunity</b>	Malfunction: 4 kV Destruction: 8 kV
<b>Vibration resistance</b>	Malfunction: 0.5-mm single amplitude at 10 to 55 Hz Destruction: 0.75-mm single amplitude at 10 to 55 Hz
<b>Shock resistance</b>	Malfunction: 100 m/s <sup>2</sup> (approximately 10G) Destruction: 1,000 m/s <sup>2</sup> (approximately 100G)
<b>Life expectancy</b>	Mechanical: 10 million operations min. (under no load at 1,800 operations/h) Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 360 operations/h)
<b>EMC</b>	(EMI): Emission Enclosure: EN50081-1 Emission AC Mains: EN55022 class B Harmonic Current: EN55022 class B Voltage Fluctuation and Flickering: EN61000-3-2 (EMS): EN61000-3-3 Immunity ESD: EN50082-2 EN61000-4-2: 4 kV contact discharge (level 2) 8 kV air discharge (level 3) Immunity RF-interference from AM Radio Waves: ENV50140: 10 V/m (80 MHz and 1 GHz) (level 3) Immunity RF-interference from Pulse-modulated Radio Waves: ENV50204: 10 V/m (900 ±5 MHz) (level 3) Immunity Conducted Disturbance: ENV50141: 10 V (0.15 to 80 MHz) (level 3) Immunity Burst: EN61000-4-4: 2 kV power line (level 3) 2 kV I/O signal line (level 4)
<b>Enclosure rating</b>	IP30 (IP20 for terminal block)
<b>Weight</b>	Approx. 120 g

**Note:** For reference:

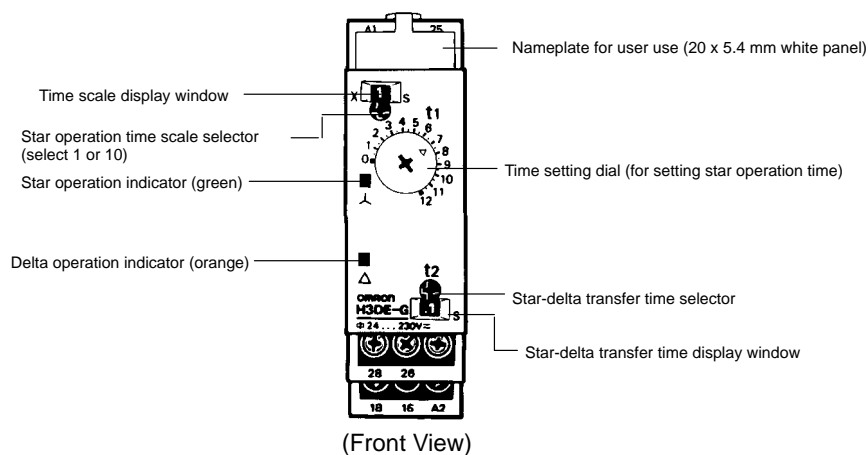
A maximum current of 0.15 A can be switched at 125 VDC (cosφ=1).

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.

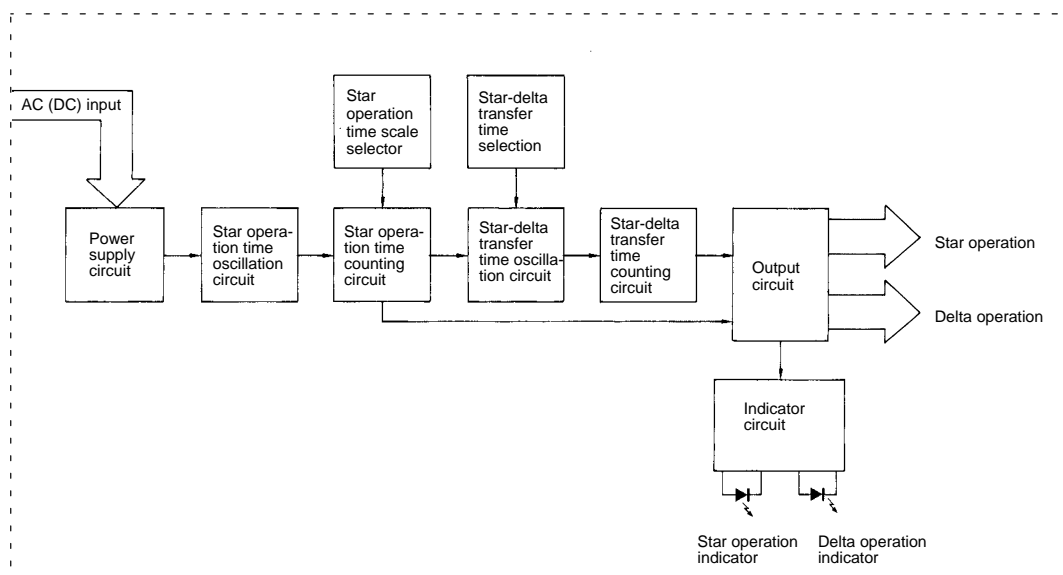
The minimum applicable load is 10 mA at 5 VDC (failure level: P).

## Nomenclature



## Operation

### ■ Block Diagram



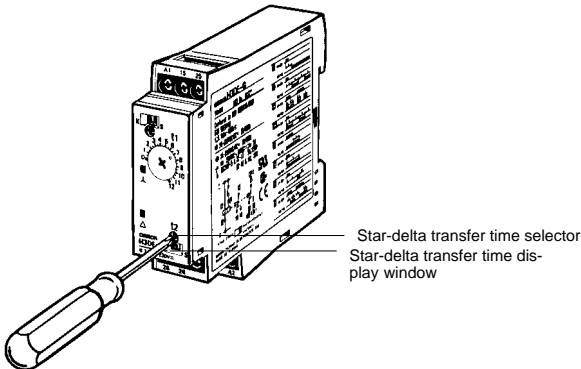
### ■ I/O Functions

Inputs		---
Outputs	Control output	Star output is turned OFF when the dial set value is reached and delta output is ON after the preset transfer time elapses

## Basic Operation

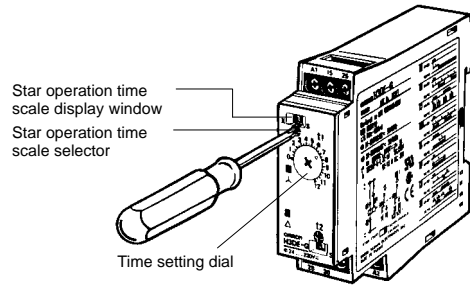
### Time Unit Setting

The star-delta transfer time is set to 0.05, 0.1, 0.25 or 0.5 with the star-delta transfer time selector on the lower-right side of the front panel and the set value appears in the star-delta transfer time display window below the selector.



### Time Scale Selection

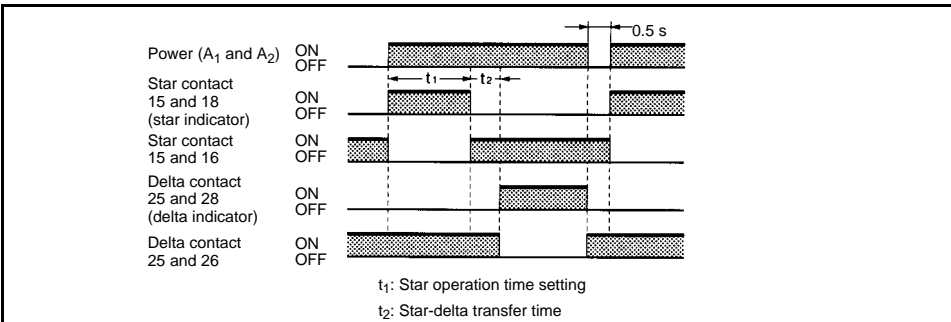
The star operation time scale selector on the upper-left side of the front panel can be set to 1 or 10 as a magnification.



### Time Setting

The operation time of the Timer is set with the time setting dial.

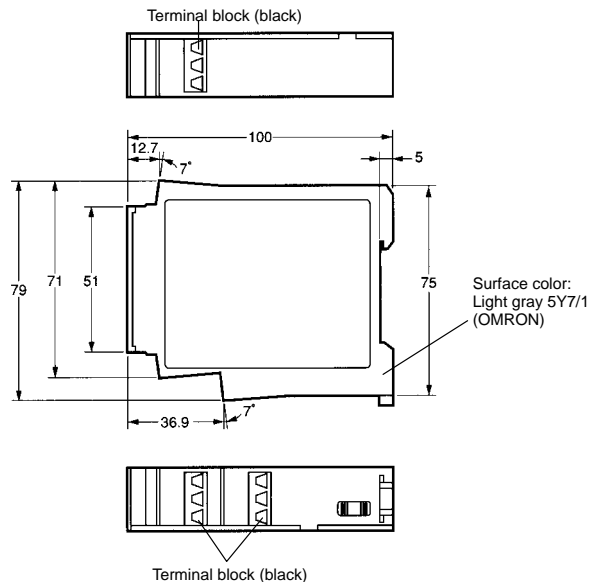
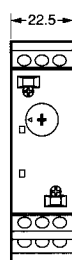
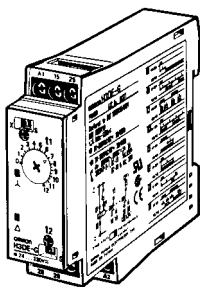
## Timing Charts



**Note:** The reset time requires a maximum of 0.5 s.

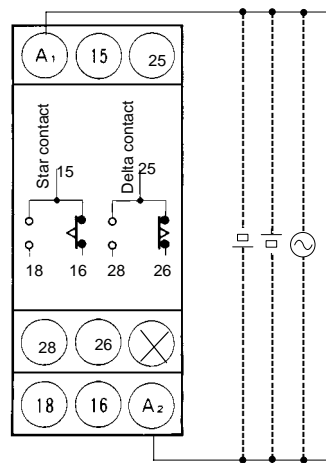
## Dimensions

### H3DE-G



## Installation

### ■ Terminal Arrangement



**Note:** DC supply voltage does not require the designation of polarity.