OMRON

Solid-state Multi-functional Timer

H3DE-M/-S

- Eight operating modes (H3DE-M) and four operating modes (H3DE-S) cover a wide range of applications.
- Programmable contact enables the building of a self-holding relay circuit (-□2 models).
- A wide time setting range of 0.10 s to 120 h.

Ordering Information

Supply voltage	Control output	Model	
		Multi-function type	Standard type
24 to 230 VAC/DC	Contact output: DPDT (time-limit output SPDT and switchable SPDT (time-limit ←→ instantaneous))	H3DE-M2	H3DE-S2
	Contact output: SPDT (time-limit output SPDT)	H3DE-M1	H3DE-S1

■ Model Number Legend

H3DE -□ □
1 2

1. M: Multi-function type
   S: Standard type
2. 2: DPDT
   1: SPDT

■ 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-M2	H3DE-M1	H3DE-S2	H3DE-S1
Operating mode	A: ON-delay (Signal or Power) B: Flicker OFF start (Signal or Power) B2: Flicker ON start (Signal or Power) C: Signal ON/OFF-delay D: Signal OFF-delay E: Interval (Signal or Power) G: Signal ON/OFF-delay J: One-shot (Signal or Power)		A: ON-delay B2: Flicker ON start E: Interval J: One-shot	
Terminal block	Clamps two 2.5 mm^2 max. bar terminals without sleeves.			
Terminal screw tightening torque	0.98 N • m max. {approx. 10 kgf • cm max.}			
Input type	Voltage input		---	
Output type	Relay: DPDT	Relay: SPDT	Relay: DPDT	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	Time unit display			
	sec	min	hrs	10 h
x 0.1	0.1 to 1.2 s	0.1 to 1.2 min	0.1 to 1.2 h	1 to 12 h
x 1	1 to 12 s	1 to 12 min	1 to 12 h	10 to 120 h

Note: When the main dial is set to “0” for all settings, the output will operate instantaneously.

■ Ratings

Rated supply voltage (see notes 1 and 2)		24 to 230 VAC/DC (50/60 Hz)
Operating voltage range		85% to 110% of rated supply voltage
Power reset		Minimum power-off time: 0.1 s
Reset voltage		2.4 VAC/DC max.
Power consumption (see note 3)	**H3DE-M1**	AC: approx. 4.3 VA (2.2 W) at 230 VAC DC: approx. 0.7 W at 24 VDC
	H3DE-M2	AC: approx. 4.8 VA (2.4 W) at 230 VAC DC: approx. 1.0 W at 24 VDC
	H3DE-S1	AC: approx. 2.7 VA (1.6 W) at 230 VAC DC: approx. 0.7 W at 24 VDC
	H3DE-S2	AC: approx. 3.2 VA (1.9 W) at 230 VAC DC: approx. 1.0 W at 24 VDC
Voltage input		Max. permissible capacitance between input lines (terminals B1 and A2) : 2000 pF Load connectable in parallel with inputs (terminals B1 and A2) H-level: 20.4 to 253 VAC/DC L-level: 0 to 2.4 VAC/DC
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: 1. DC ripple rate: 20% max.

2. Since an inrush current of 0.25 A will occur when using the power supply voltage at 24 VDC, pay careful attention when turning on or off the power supply to the Timer with a solid-state output such as a sensor.

3. The power consumption is for mode A after the Timer counts the time-up time and for the AC input at 50 Hz. The power consumption of the H3DE-M□ includes the input circuit with the B1 and A1 terminals short-circuited.

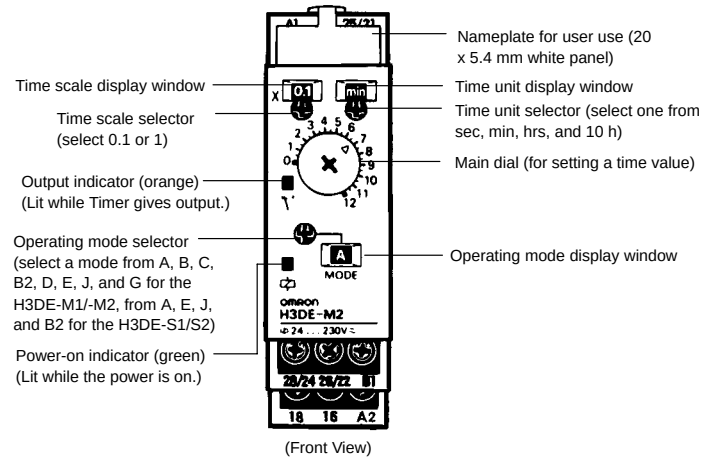
■ Characteristics

Accuracy of operating time	±1% max. of FS (±1% ±10 ms max. at 1.2-s range) (see note 1)
Setting error	±10% ±50 ms max. of FS (see note 1)
Signal input time	50 ms min. (see note 1)
Influence of voltage	±0.5% max. of FS (±0.5% ±10 ms max. at 1.2-s range)
Influence of temperature	±2% max. of FS (±2%±10 ms max. at 1.2-s range)
Insulation resistance	100 MΩ min. at 500 VDC
Dielectric strength	Between current-carrying metal parts and exposed non-current-carrying metal parts: 2,000 VAC for 1 min. Between control output terminals and operating circuit: 2,000 VAC for 1 min. Between contacts of different polarities: 2,000 VAC for 1 min. Between contacts not located next to each other: 1,000 VAC for 1 min.
Vibration resistance	Malfunction: 0.5-mm single amplitude at 10 to 55 Hz Destruction: 0.75-mm single amplitude at 10 to 55 Hz
Shock resistance	Malfunction: 100 m/s^2 (approximately 10G) Destruction: 1,000 m/s^2 (approximately 100G)
Contact material	AGNi+gold plating (Use the G6RN-1 at 12 VDC.)
Impulse withstand voltage	3 kV (between power terminals) 4.5 kV (between current-carrying metal parts and exposed non-current-carrying metal parts)
Noise immunity	Square-wave noise generated by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise) ±1.5 kV
Static immunity	Malfunction: 4 kV Destruction: 8 kV
Life expectancy	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) (see note 2)
EMC	(EMI): EN50081-1 Emission Enclosure: EN55022 class B Emission AC Mains: EN55022 class B Harmonic Current: EN61000-3-2 Voltage Fluctuation and Flickering: EN61000-3-3 (EMS): EN50082-2 Immunity ESD: 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 to 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)
Enclosure rating	IP30 (Terminal block: IP20)
Weight	120 g

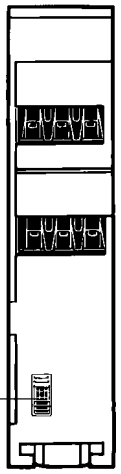
Note: 1. With the H3DE-M□, if the voltage exceeds 26.4 VAC/DC, the following hold at signal OFF for C, D, and G modes:
Accuracy of operating time: ±1% ±50 ms max. at 1.2-s range
Setting error: ±10% +100/–50 ms max.
Signal input time: 100 ms min.

2. 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



(Front View)



(Bottom View)

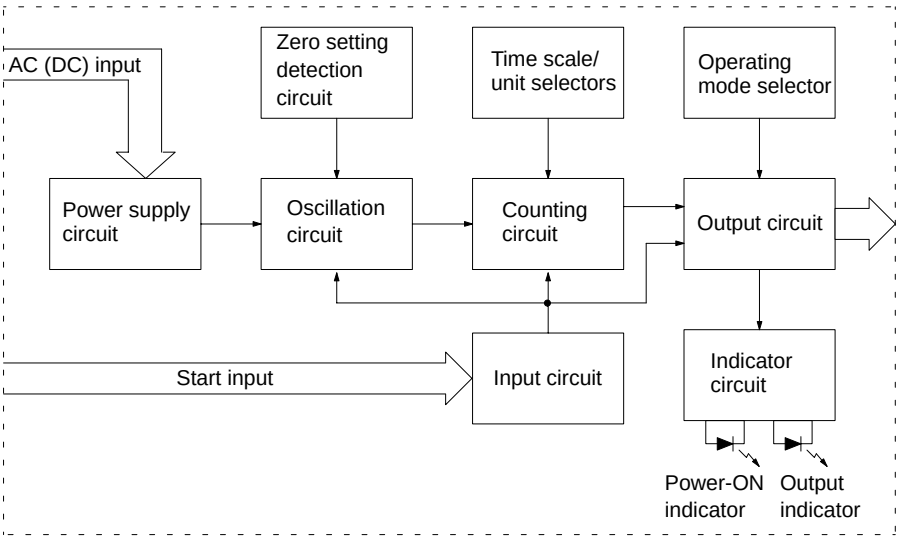
Output Type Selector Switch Settings

Setting	Output type
	Time-limit output (terminal numbers 25, 26 and 28) (default setting)
	Instantaneous output (terminal numbers 21, 22 and 24)

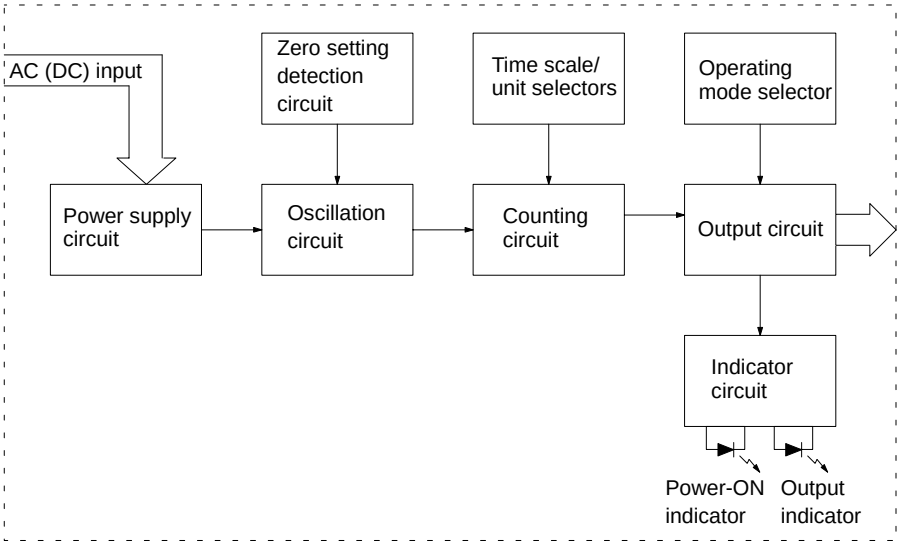
Operation

■ Block Diagram

H3DE-M1/-M2



H3DE-S1/-S2



■ I/O Functions

Item		H3DE-M1/-M2	H3DE-S1/-S2
Input	**Start**	Starts operation.	No input is available.
Output	**Control output**	Outputs are turned ON according to designated output mode when preset value is reached. (See note.)	Outputs are turned ON according to designated output mode when preset value is reached. (see note.)

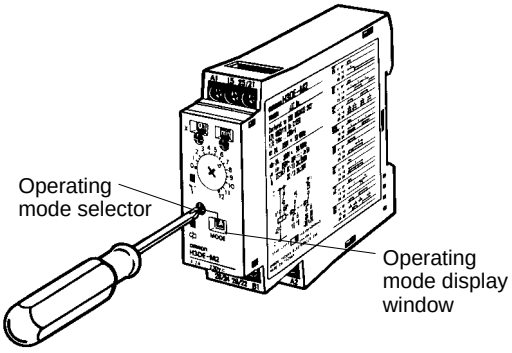
Note: When the output type selector switch on the bottom of the Timer is set to the instantaneous side, the relay R2 (terminal numbers 21/25, 22/26, and 24/28) becomes an instantaneous contact and turns ON/OFF in synchronization with the changes in the power supply.

■ Basic Operation

Setting of Selector

The selectors can be turned clockwise and counterclockwise to select the desired time unit, time scale, or operating mode.

Each selector has a snap mechanism that secures the selector at a given position. Set the selector at a position at which it is secured. Do not set it midway between two securing positions or a malfunction could result from improper setting.

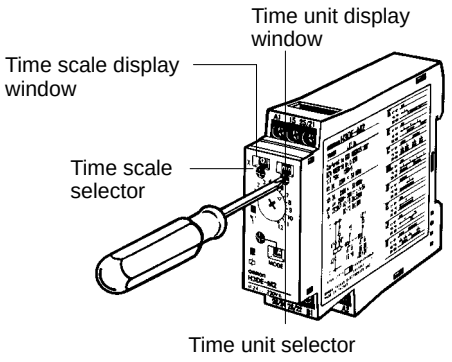


Selection of Operating Mode

The H3DE-M/-S can be set to any one of the operating modes A to J. Turn the operating mode selector with a screwdriver until the desired operating mode (A, B, C, B2, D, E, J, or G for the H3DE-M and A, E, J, or B2 for the H3DE-S) appears in the operating mode display window located below the selector.

Selection of Time Unit and Time Scale

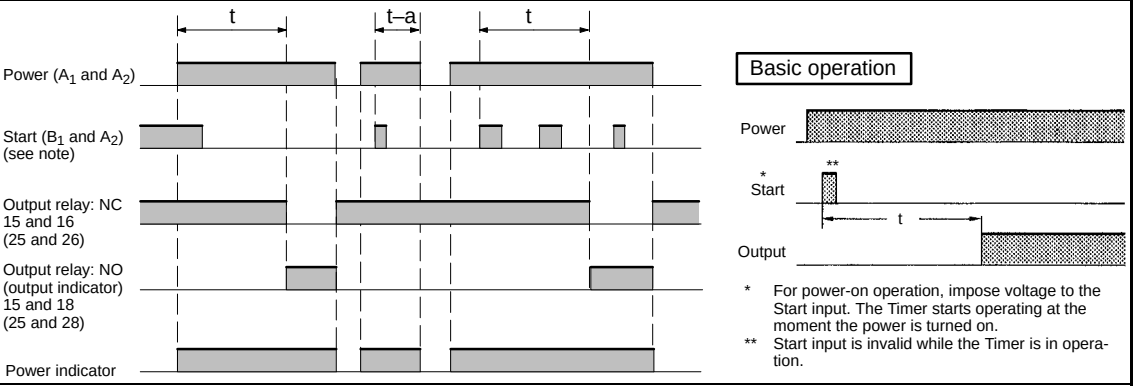
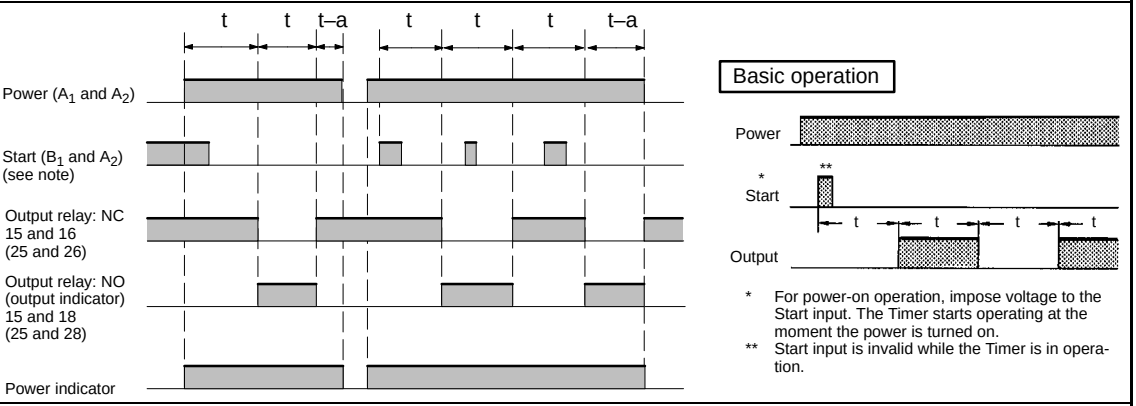
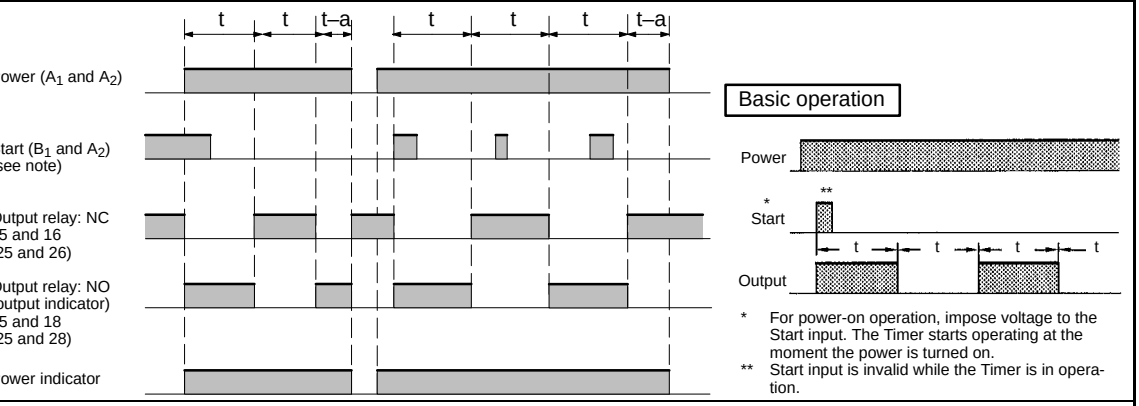
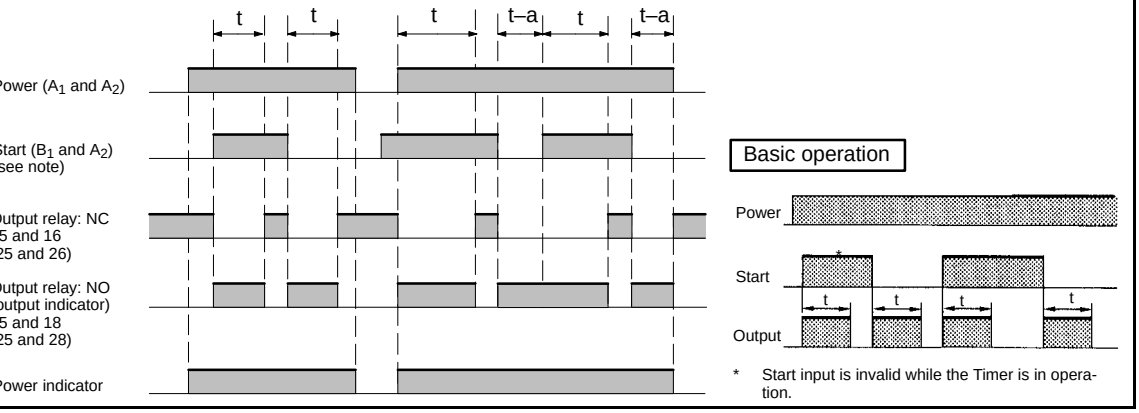
The desired time unit (s, m, h, or 10h) can be displayed in the time unit display window above the time setting dial by turning the time unit selector located at the upper right corner of the front panel. Time scale (0.1 or 1) is selected with the time scale selector at the upper left corner of the front panel, it appears in the time scale display window above the selector.



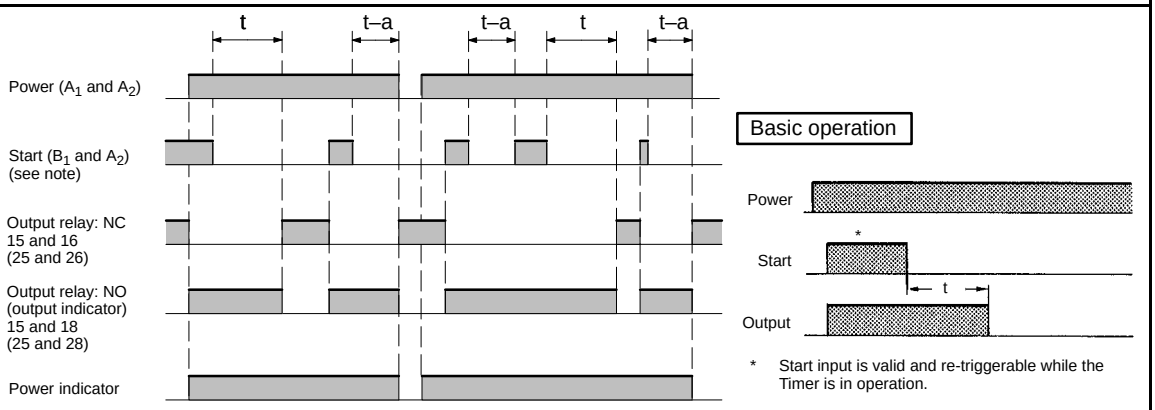
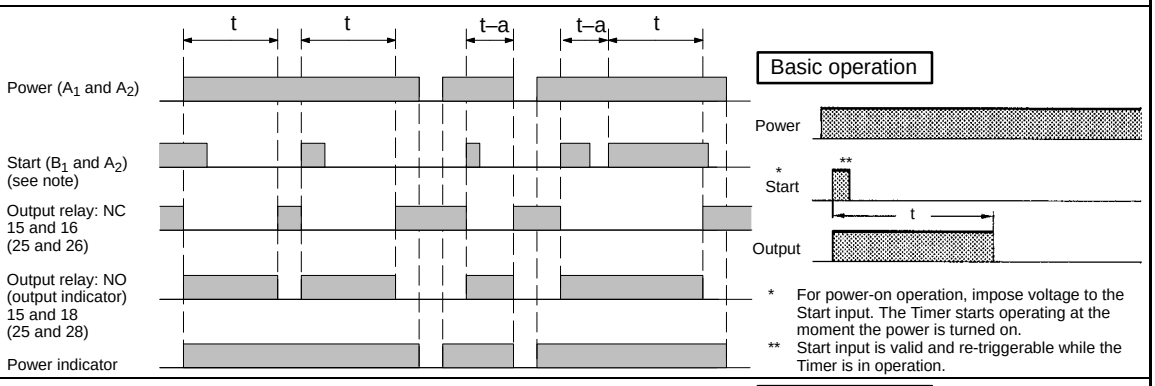
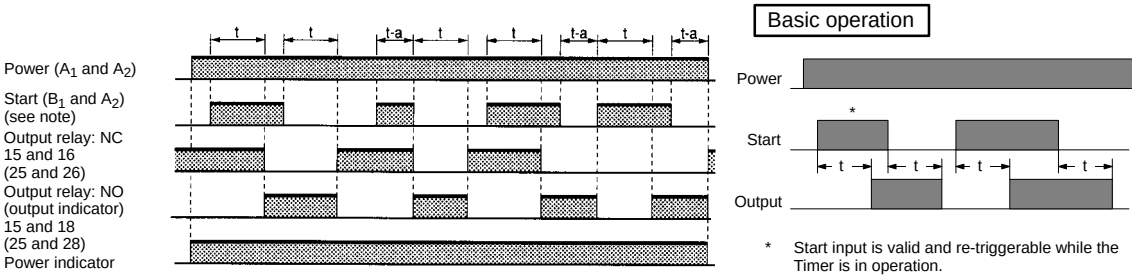
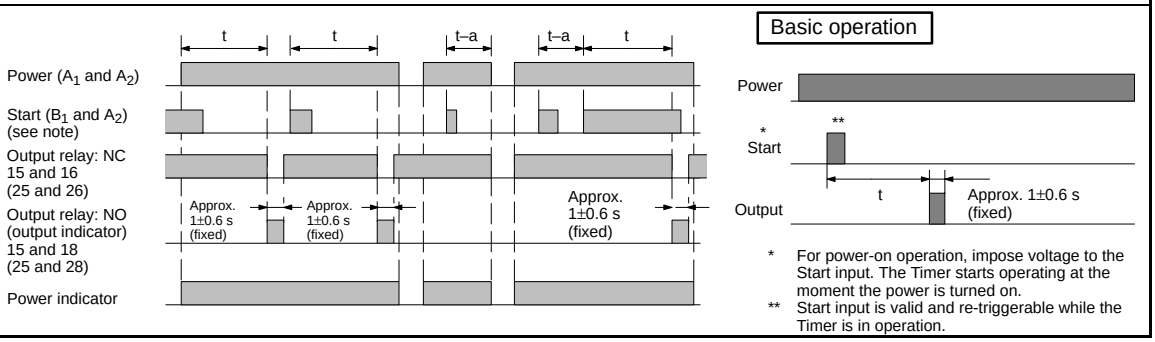
■ Timing Chart

Note: 1. The minimum power reset time is 0.1 s and the minimum signal input time is 0.05 s.

2. The letter "t" in the timing charts stands for the set time and "t–a" means that the period is less than the time set.

Operating mode	Timing chart
A: ON-delay	
B: Flicker OFF start	
B2: Flicker ON start	
C: Signal ON/OFF-delay	

Note: The start input of the H3DE-M1 or H3DE-M2 model is activated by applying a voltage to B1 and A2 terminals. The voltage can be applied by turning on the contact between B1 and A1 (Refer to *Terminal Arrangement*).

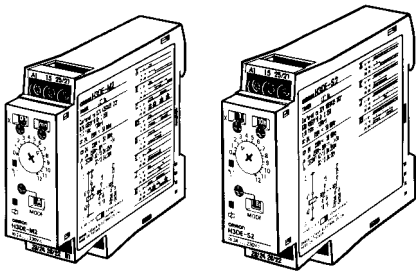
Operating mode	Timing chart
D: Signal OFF-delay	
E: Interval	
G: Signal ON/OFF-delay	
J: One-shot output (ON delay)	

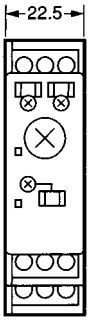
Note: The start input of the H3DE-M1 or H3DE-M2 model is activated by applying a voltage to B1 and A2 terminals. The voltage can be applied by turning on the contact between B1 and A1 (Refer to *Terminal Arrangement*).

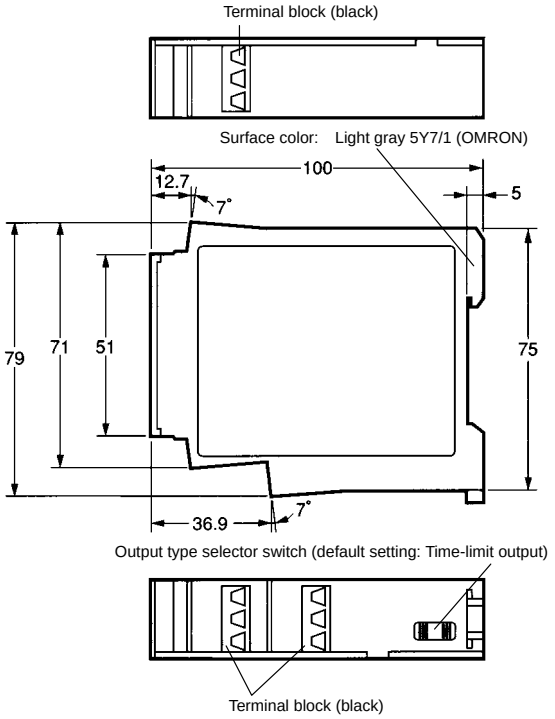
Dimensions

Note: All units are in millimeters unless otherwise indicated.

H3DE-M/-S



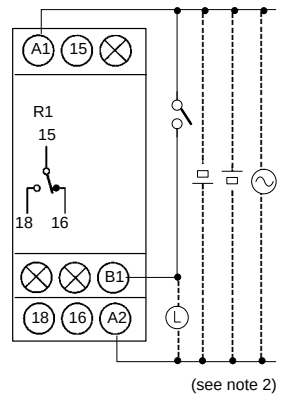




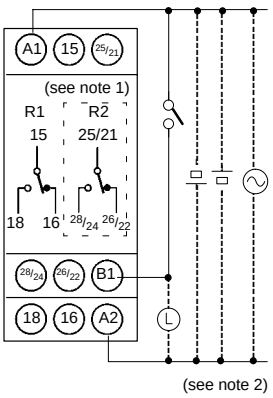
Installation

■ Terminal Arrangement

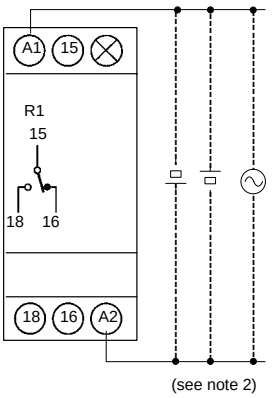
H3DE-M1



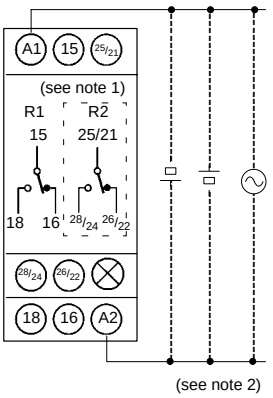
H3DE-M2



H3DE-S1



H3DE-S2



Note: 1. The relay R2 can be set to either instantaneous or time-limit contact using the switch located on the bottom of the Timer.

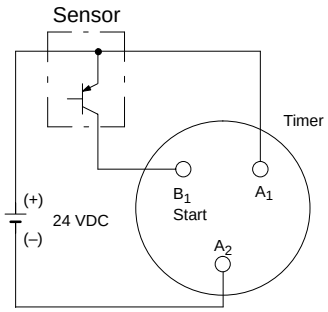
2. DC supply voltage does not require the designation of polarity.

3. The contact symbol for the H3DE is indicated with  because it offers multiple operating modes and is different from the delayed contact for conventional timers.

■ Input Connections

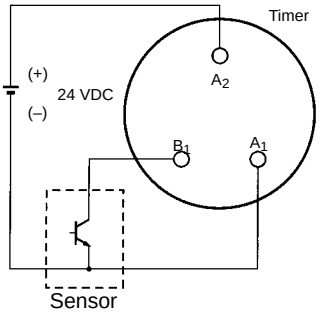
The inputs of the H3DE-M1/-M2 are voltage (voltage imposition or open) inputs.

No-contact Input
(Connection to PNP output sensor.)



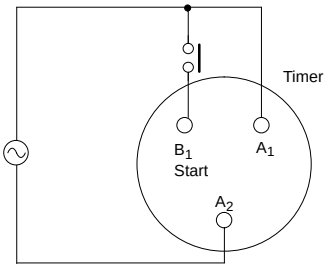
Operates with PNP transistor ON

No-contact Input
(Connection to NPN output sensor.)



Operates with NPN transistor ON

Contact Input



Operates with relay ON

Voltage Input Signal Levels

No-contact input	1. Transistor ON Residual voltage: 1 V max. (Voltage between terminals B_1 and A_2 must be more than the rated “H-level” voltage (20.4 VDC min.).)
	2. Transistor OFF Leakage current: 0.01 mA max. (Voltage between terminals B_1 and A_2 must be less than the rated “L-level” voltage (2.4 VDC max.).)
Contact input	Use contacts that can adequately switch 0.1 mA at each voltage to be imposed. (When the contacts are ON or OFF, voltage between terminals B_1 and A_2 must be within the following ranges: When contacts are ON: 20.4 to 253 VAC/DC When contacts are OFF: 0 to 2.4 VAC/DC