

# Mechatronic Analog Timer

# H3AM

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## Large Setting Dial and Moving Pointers Ideal for Easy Operation and Monitoring

- Incorporating an easy-to-see large setting dial with moving pointers.
- Wide time-setting range of 0.2 s to 60 h (available through three time-range model types)
- Wide AC power supply range (100 to 240 VAC)
- IP65 watertight and dust-tight front panel.
- Approved by UL and CSA.
- Conforms to EN61812-1 and IEC60664-1 4 kV for Low Voltage, and EMC Directives.
- Conforms to EMC standards.
- Six-language instruction manual provided.
- Programmable contact enables the building of a self-holding relay circuit as well as built-in instantaneous contact. (-NS)
- Memory retention (-NSR)
- Finger protection terminal block
- Enables easy sequence checks through instantaneous outputs for a zero set value at any time range.



## Model Number Legend

H3AM - NS  -  -   
                   1      2      3

### 1. Resetting System

- None: Self-resetting
- R: Electric resetting

### 2. Time Range

- A: 0.5 s to 30 h
- B: 1 s to 60 h
- C: 0.2 s to 12 h

### 3. Accessory

- None: Without accessory
- 300: Waterproof Packing (Y92S-35) provided

## Ordering Information

### List of Models

| Rated supply voltage | Resetting system (See note.) | Control output  | Time range                                     |  |  |
|----------------------|------------------------------|---|--|--|--|
|                      |                              |   | 0.5 s to 30 h (30 s, 3 min, 30 min, 3 h, 30 h) | 1 s to 60 h (60 s, 6 min, 60 min, 6 h, 60 h) | 0.2 s to 12 h (12 s, 120 s, 12 min, 120 min, 12 h) |
| 100 to 240 VAC       | Self-resetting               | DPDT contact output (Time-limit output SPDT and switchable SPDT (time-limit ↔ instantaneous)) | H3AM-NS-A                                      | H3AM-NS-B                                    | H3AM-NS-C  |
|                      | Electric resetting           | DPDT contact output (Time-limit output SPDT and instantaneous output SPDT)                    | H3AM-NSR-A                                     | H3AM-NSR-B                                   | H3AM-NSR-C   |

**Note:** The operation of the instantaneous contacts differs for the self-resetting and electric resetting systems. Refer to *Timing Charts* on page 5 for details.

## ■ Accessory (Order Separately)

| Item               | Model               |
|--------------------|---------------------|
| Waterproof Packing | Y92S-35 (See note.) |

Note: Supplied with H3AM-NS□-□-300 models.

## Specifications

### ■ General

|                         |   |
|-------------------------|---|
| Operating mode          | ON-delay  |
| Screw tightening torque | 0.98 N·m (10 kgf) max.  |
| Input type              | Voltage input   |
| Output type             | Relay: DPDT   |
| Mounting method         | Flush/Panel mounting, no restriction on mounting angle.   |
| Approved standards      | UL 508, CSA C22.2 No. 14<br>Conforms to EN61812-1, IEC60664-1 4 kV/2, VDE0106/P100<br>Output category according to IEC60947-5-1 |

### ■ Time Ranges

| Model      | Full scale on dial | Set time unit |             |               |               |             |             |
|------------|--------------------|---------------|-------------|---------------|---------------|-------------|-------------|
|            |                    | s             | 10 s        | min           | 10 min        | h (hour)    | 10 h (hour) |
| H3AM-□□□-A | 3                  | ---           | 0.5 to 30 s | 0.05 to 3 min | 0.5 to 30 min | 0.05 to 3 h | 0.5 to 30 h |
| H3AM-□□□-B | 6                  | ---           | 1 to 60 s   | 0.1 to 6 min  | 1 to 60 min   | 0.1 to 6 h  | 1 to 60 h   |
| H3AM-□□□-C | 12                 | 0.2 to 12 s   | 2 to 120 s  | 0.2 to 12 min | 2 to 120 min  | 0.2 to 12 h | ---         |

Note: Instantaneous output is obtained by turning the time setting knob below "0" until the time setting knob stops.

### ■ Ratings

|                            |  |
|----------------------------|--|
| Rated supply voltage       | 100 to 240 VAC (50/60 Hz)  |
| Operating voltage range    | 85% to 110% of rated supply voltage  |
| Power reset (-NS)          | Minimum power-opening time: 0.5 s  |
| Reset input time (-NSR)    | Minimum input time: 0.5 s  |
| Reset voltage range (-NSR) | H level: 85 to 264 VAC<br>L level: 0 to 10 VAC   |
| Power consumption          | Approx. 9 VA (Approx. 5 W)   |
| Control output             | Contact output: 5 A at 250 VAC, resistive load ( $\cos\phi = 1$ )  |
| Ambient temperature        | Operating: $-10^{\circ}\text{C}$ to $55^{\circ}\text{C}$ (with no icing)<br>Storage: $-25^{\circ}\text{C}$ to $65^{\circ}\text{C}$ (with no icing) |
| Ambient humidity           | Operating: 35% to 85%  |

Note: The minimum applicable load:

H3AM-NS: 10 mA at 5 VDC (failure level: P, reference value)

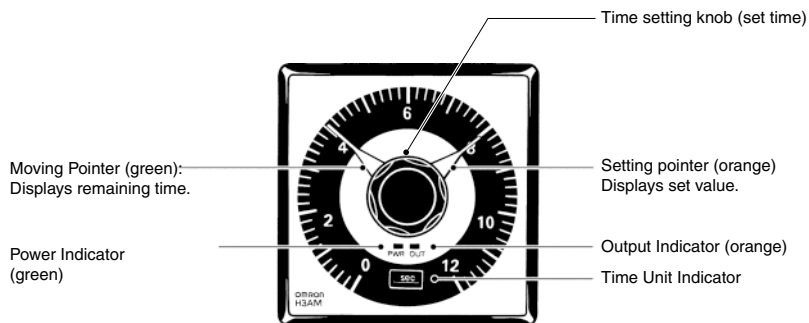
H3AM-NSR: 100 mA at 5 VDC (failure level: P, reference value)

## ■ Characteristics

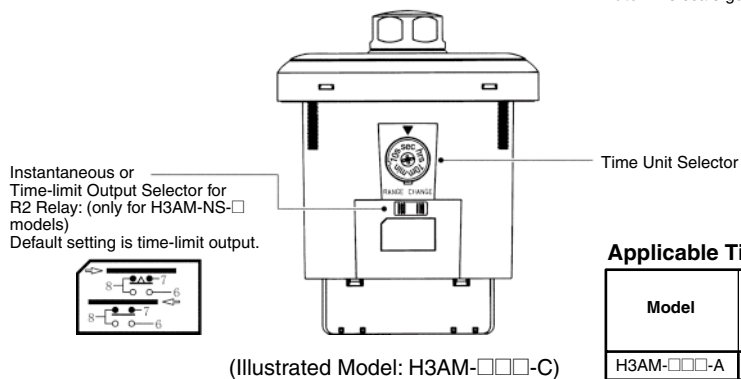
|                                   |   |
|-----------------------------------|---|
| <b>Accuracy of operating time</b> | ±0.7% FS max.   |
| <b>Setting error</b>              | ±2% FS max.   |
| <b>Reset time</b>                 | Power reset: 0.5 s max.<br>Reset input time: 0.5 s max.   |
| <b>Influence of voltage</b>       | ±1% FS max.   |
| <b>Influence of temperature</b>   | ±2% FS max.   |
| <b>Insulation resistance</b>      | 100 MΩ max. (at 500 VDC)  |
| <b>Dielectric strength</b>        | 2,000 VAC (50/60 Hz) for 1 min between exposed non-current-carrying metal parts and current-carrying metal parts<br>2,000 VAC (50/60 Hz) for 1 min between the operating circuit and control output terminals<br>1,000 VAC (50/60 Hz) for 1 min between the operating power supply circuit and reset input circuit (H3AM-NSR only)<br>1,000 VAC (50/60 Hz) for 1 min between contacts not located next to each other<br>2,000 VAC (50/60 Hz) for 1 min between contacts of opposite poles   |
| <b>Impulse withstand voltage</b>  | 3 kV between power terminals<br>4.5 kV between exposed non-current-carrying metal parts and current-carrying metal parts  |
| <b>Noise immunity</b>             | ±1.5 kV (between power terminals) square-wave noise by a noise simulator<br>(pulse width: 100 ns/1 μs, 1-ns rise)   |
| <b>Static immunity</b>            | Malfunction: 8 kV<br>Destruction: 15 kV   |
| <b>Vibration resistance</b>       | Destruction: 10 to 55 Hz, 0.75-mm single amplitude for 2 cycles each in 3 directions (8 min per cycle)<br>Malfunction: 10 to 55 Hz, 0.5-mm single amplitude for 2 cycles each in 3 directions (8 min per cycle)   |
| <b>Shock resistance</b>           | Destruction: 300 m/s <sup>2</sup> 3 times each in 6 directions<br>Malfunction: 150 m/s <sup>2</sup> (100 m/s <sup>2</sup> in the front/back direction) 3 times each in 6 directions   |
| <b>Life expectancy</b>            | Mechanical: 5,000,000 times min. (under no load at 1,800 times/h)<br>Electrical: 100,000 times min. (5-A at 250 VAC, resistive load at 1,800 times/h)   |
| <b>Motor life expectancy</b>      | 20,000 h  |
| <b>EMC</b>                        | (EMI): EN61812-1<br>Emission Enclosure: EN55011 class A<br>Emission AC Mains: EN55011 class A<br>(EMS): EN61812-1<br>Immunity ESD: IEC61000-4-2: 6 kV contact discharge<br>8 kV air discharge<br>Immunity RF-interference: IEC61000-4-3: 10 V/m (Amplitude-modulated, 80 MHz to 1 GHz)<br>10 V/m (Pulse-modulated, 900 MHz±5 MHz)<br>Immunity Power Frequency Magnetic Fields: IEC61000-4-8: 30 A/m (50 Hz)<br>Immunity Conducted Disturbance: IEC61000-4-6: 10 V (0.15 to 80 MHz)<br>Immunity Burst: IEC61000-4-4: 2 kV power-line<br>2 kV I/O signal-line<br>Immunity Surge: IEC61000-4-5: 1 kV line to line<br>2 kV line to ground |
| <b>Enclosure rating</b>           | IP65 (front panel only) (See note.) IP20 (terminal section)   |
| <b>Weight</b>                     | Approx. 350 g   |

**Note:** A separately sold waterproof packing (Y92S-35) is necessary to ensure IP65 waterproofing between the Timer and installation panel.  
The H3AM-NS□-□-300 model with waterproof packing is available.

# Nomenclature



**Note:** The scale goes up to "3" with the H3AM-□-A and up to "6" with the H3AM-□-B.



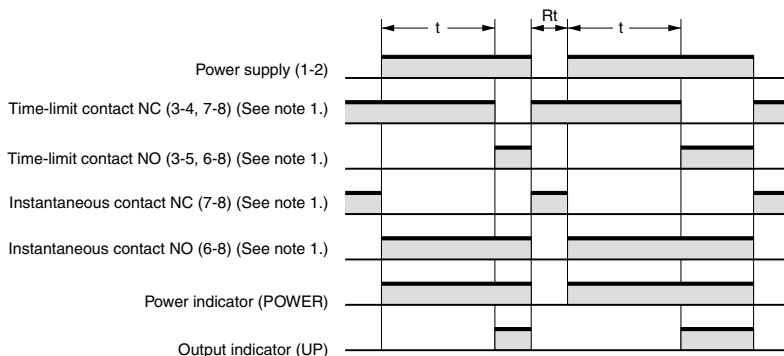
### Applicable Time Unit

| Model      | Full scale on dial | Applicable time unit |      |     |        |     |      |
|------------|--------------------|----------------------|------|-----|--------|-----|------|
|            |                    | s                    | 10 s | min | 10 min | h   | 10 h |
| H3AM-□□□-A | 3                  | No                   | Yes  | Yes | Yes    | Yes | Yes  |
| H3AM-□□□-B | 6                  | No                   | Yes  | Yes | Yes    | Yes | Yes  |
| H3AM-□□□-C | 12                 | Yes                  | Yes  | Yes | Yes    | Yes | No   |

# Operations

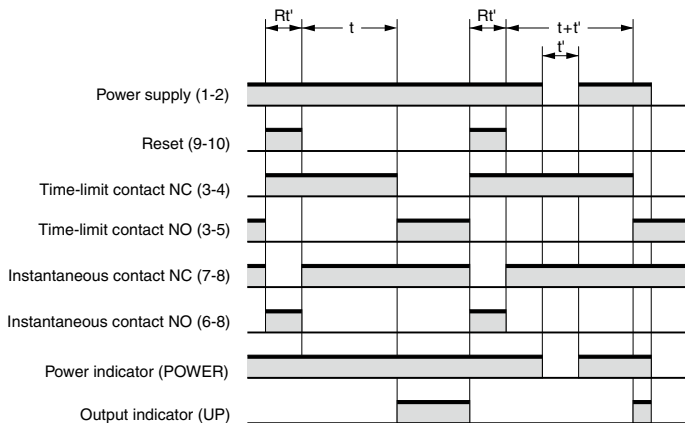
## ■ Timing Charts

### H3AM-NS



- Note: 1.** The R2 contacts (7-8 and 6-8) are programmable and can be set to either instantaneous or time-limit contacts using the switch located on the bottom of the Timer.
- 2.**  $Rt$  is the reset time and  $t$  is the set time.

### H3AM-NSR

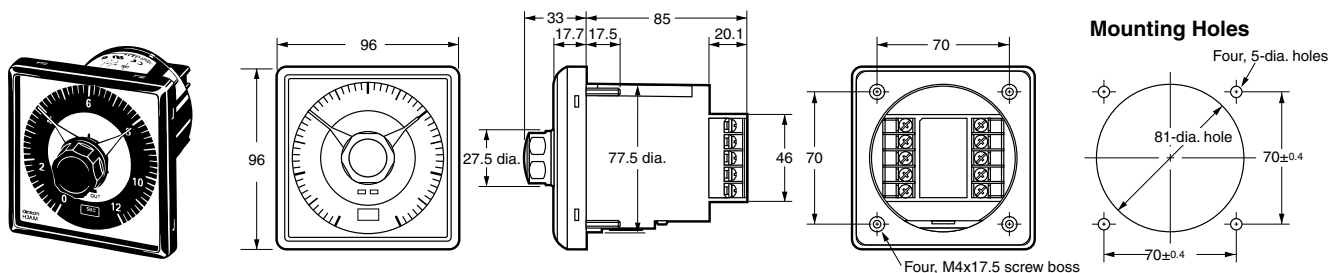


**Note:**  $t$  is the set time,  $Rt'$  is the reset application time, and  $t'$  is the power interruption time.

# Dimensions

Note: All units are in millimeters unless otherwise indicated.

## H3AM (Flush Mounting)



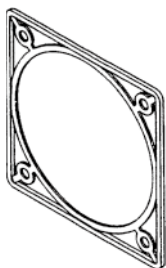
Note: Tightening torque for panel mounting is as follows:  
300 m N·m ±50 m N·m

## ■ Accessories (Order Separately)

### Waterproof Packing

(Provided with H3AM-NS□-□-300 models.)

Y92S-35

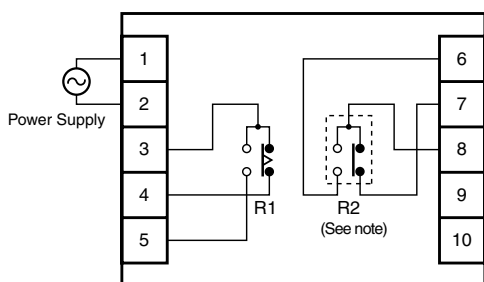


Note: Use Waterproof Packing to provide a level of water protection that complies with IP65 standards. Depending on the operating environment, the Waterproof Packing may deteriorate, contract, or harden and so regular replacement is recommended.

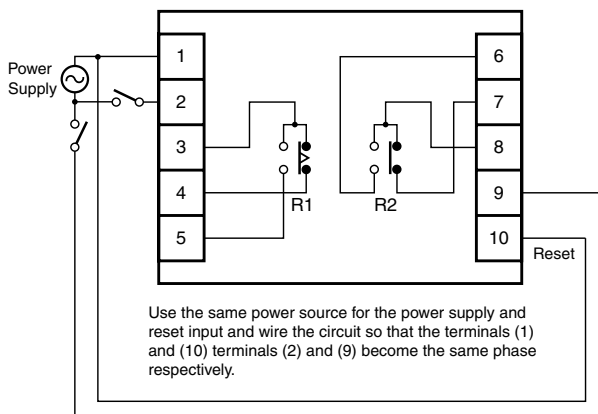
# Installation

## ■ Internal Connections and Terminal Arrangement

H3AM-NS



H3AM-NSR



Note: The R2 relay can be switched between instantaneous and time-limit contacts and thus the contact symbol is shown as follows:

# Safety Precautions

## ■ Precautions for Safe Use

Observe the following items to ensure the safe use of this product.

### Environmental Precautions

- Store the H3AM within the specified ratings. If the H3AM has been stored at temperatures  $-10^{\circ}\text{C}$  or lower, let it stand for 3 hours or longer at room temperature before turning ON the power supply.
- Use the H3AM within the specified ratings for operating temperature and humidity.
- Do not operate the H3AM in locations subject to sudden or extreme changes in temperature, or locations where high humidity may result in condensation.
- Do not use the H3AM in locations subject to vibrations or shock. Extended use in such locations may result in damage due to stress.
- Do not use the H3AM in locations subject to excessive dust, corrosive gas, or direct sunlight.
- Install the H3AM well away from any sources of static electricity, such as pipes transporting molding materials, powders, or liquids.
- Do not use organic solvents (such as paint thinner or benzene), strong alkaline, or strong acids because they will damage the external finish.

### Usage Precautions

- Install a switch or circuit breaker that allows the operator to immediately turn OFF the power, and label it to clearly indicate its function.
- Be sure to wire the terminals correctly.
- Do not install input lines in the same duct or conduit as power supply or other high-voltage lines. Doing so may result in malfunction due to noise. Separate the input lines from high-voltage lines.
- Internal elements may be destroyed if a voltage outside the rated voltage is applied.
- Maintain voltage fluctuations in the power supply within the specified range.
- Use a switch, relay, or other contact so that the rated power supply voltage will be reached within 0.1 s. If the power supply voltage is not reached quickly enough, the H3AM may malfunction or outputs may be unstable.

## ■ Precautions for Correct Use

### Changing Switch Settings

Be sure to adjust the time unit selector and instantaneous or time-limit output selector for R2 relay only before the Timer is turned ON, otherwise the Timer may be damaged or malfunction.

Be sure to set the time only when Timer has stopped, otherwise the Timer may malfunction.

### Setting the Operating Time

Do not turn the time setting knob beyond the permissible range. If a precise time setting is required, check the operation of the Timer in trial operation before the Timer is put in actual operation.

Before using the H3AM-NSR, apply voltage between terminals 9 and 10 to reset the operation.

When changing the setting time of the H3AM-NSR to a longer time value, be sure to apply voltage between terminals 9 and 10 during the change.

### Others

When mounting the Timer on a panel, evenly tighten the Timer to a specified torque. If the Timer using waterproof packing is tightened to a torque other than the specified value, required waterproof properties will not be achieved.

If the Timer is mounted on a control panel, dismount the Timer from the control panel or short-circuit the circuitry before carrying out a voltage withstand test between the electric circuitry and non current-carrying metal part of the machine, in order to prevent the internal circuitry of the Timer from damage.

The internal elements may be damaged if a voltage other than the rated supply voltage is applied.

## ■ Precautions for EN61812-1 Conformance

The H3AM as a built-in timer conforms to EN61812-1 provided that the following conditions are satisfied:

The output section of the H3AM is provided only with basic isolation.

The H3AM itself is designed according to the following:

- Overvoltage category III
- Pollution degree 2

On the above basis:

Operation parts on the front and bottom: Reinforced isolation

With clearance of 5.5 mm and creepage distance of 5.5 mm at 240 VAC

Output: Basic isolation

With clearance of 3.0 mm and creepage distance of 3.0 mm at 240 VAC

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

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

In the interest of product improvement, specifications are subject to change without notice.

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