

### DIP Model Timer for PC Board Use Provides Contact and Solid-state Output

- Four rated times available:  
models suffixed -A and -SA: 1 s, 10 s, 1 min, 10 min;  
models suffixed -B and -SB: 6 s, 60 s, 6 min, 60 min.
- Timer operation may also be controlled through an external variable resistor.
- Timer can be cleaned while mounted on a PC Board.
- Twenty-four-pin IC socket can be used for mounting the time unit.
- Mountable on a 1-inch pitch rack.
- Pulse output types also available.

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### Ordering Information

Operation/resetting system	Time-limit contact	Time range	Surface mounting (with IC socket or direct mounting on PC Board)
Time-limit operation/power-OFF resetting and external resetting/ Integrating operation/power-OFF resetting and external resetting OFF-delay operation by external signal/ power-OFF resetting	Contact output (SPST-NO + SPST-NC)	1 s to 10 min	H3FA-A
		6 s to 60 min	H3FA-B
	Solid-state output	1 s to 10 min	H3FA-SA
		6 s to 60 min	H3FA-SB
Instantaneous operation/time-limit resetting and external resetting (pulse output)	Contact output (SPST-NO + SPST-NC)	1 s to 10 min	H3FA-AU
		6 s to 60 min	H3FA-BU
	Solid-state output	1 s to 10 min	H3FA-SAU
		6 s to 60 min	H3FA-SBU

- Note:** 1. Specify both the model number and supply voltage when ordering.  
2. The desired operation/resetting system is selected by short-circuiting and opening the specified terminals.

### Specifications

#### ■ Time Ranges

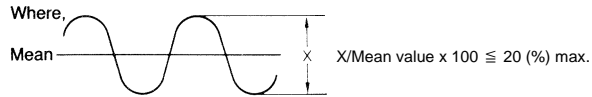
Model	Rated time	Time setting range
H3FA-A	1 s	0.1 to 1 s
H3FA-AU	10 s	1 to 10 s
H3FA-SA	1 min	0.1 to 1 min
H3FA-SAU	10 min	1 to 10 min
H3FA-B	6 s	0.6 to 6 s
H3FA-BU	60 s	6 to 60 s
H3FA-SB	6 min	0.6 to 6 min
H3FA-SBU	60 min	6 to 60 min

- Note:** 1. The above timing range applies to when the internal variable resistor of H3FA is used.  
2. The external variable resistor may also be used by opening the terminals connected to the internal variable resistor.

## ■ Ratings

Item	H3FA-A(U)/H3FA-B(U)	H3FA-SA(U)/H3FA-SB(U)
Rated supply voltage	5, 6, 12, or 24 VDC (see note 1)	5/6 VDC, 12/24 VDC (see notes 1 and 2)
Operating voltage range	5 VDC: 90% to 110% of rated supply voltage 6, 12, 24 VDC: 85% to 110% of rated supply voltage	5/6 VDC: 90% to 110% of rated supply voltage 12/24 VDC: 85% to 110% of rated supply voltage
Power consumption	5, 6 VDC: approx. 230 mW 12 VDC: approx. 270 mW 24 VDC: approx. 330 mW	5/6 VDC: approx. 80 mW 12 VDC: approx. 100 mW 24 VDC: approx. 240 mW
Control outputs	Contact output: SPST-NO + SPST-NC, 3 A at 250 VAC, resistive load	Solid-state output: 150 mA at 24 VDC (voltage drop: 1.0 V max.)

**Note:** 1. Permissible ripple: 20% max. (3% max. at 5, 6 VDC-operated models)



2. Supply voltage can be selected by short-circuiting (12 VDC) or opening (24 VDC) the specified terminals.

## ■ Characteristics

Accuracy of operating time	±0.5% max. (see note 1)
Setting error	0 to 30% FS (at 20°C, at rated voltage)
Reset time	10 ms max.
Influence of voltage	±1% max. (see note 1) ±2% max.: (5, 6, 5/6 VDC-operated models)
Influence of temperature	±5% max. (see note 1)
Insulation resistance	100 MΩ min. (at 500 VDC)
Dielectric strength	1,500 VAC, 50/60 Hz for 1 min (between current-carrying and non-current-carrying metal parts and between contact and control circuit) (see note 2) 1,000 VAC, 50/60 Hz for 1 min (between non-continuous contacts) (see note 2)
Vibration resistance	Destruction: 10 to 55 Hz with 0.75-mm double amplitude Malfunction: 10 to 55 Hz with 0.5-mm double amplitude
Shock resistance	Destruction: 1,000 m/s <sup>2</sup> (approx. 100G) Malfunction: 100 m/s <sup>2</sup> (approx. 10G)
Ambient temperature	Operating: -10°C to 55°C
Ambient humidity	Operating: 35% to 85%
Life expectancy (see note 1)	Mechanical: 10,000,000 operations min. (under no load at 18,000 operations/h) Electrical: 100,000 operations min. (3 A at 250 VAC, resistive load at 1,800 operations/h)
Approved standards	UL (File No. E41515), CSA (File No. LR22310)
Weight	Contact output: approx. 15 g Solid-state output: approx. 10 g

**Note:** 1. Add or subtract 10 ms to the ratings when using a timer with a rated time of 1 s.

2. Applicable to H3FA-A(U) and -B(U)

## ■ Rated Time and Terminal Connection

Model	Terminal connection			
H3FA-A(U)/-SA(U)	1 s	10 s	1 min	10 min
H3FA-B(U)/-SB(U)	6 s	60 s	6 min	60 min

**Note:** 1. Short-circuit terminals 21 and 22 when using the internal variable resistor of H3FA.

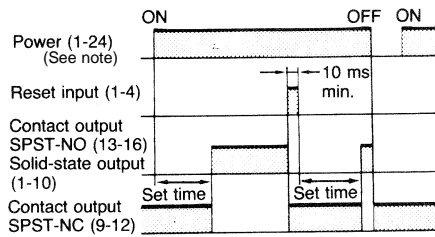
2. An external resistor can also be used by opening terminals 21 and 22. When using an external resistor (1 MΩ for H3FA-A(U) and -SA(U), 3 MΩ for H3FA-B(U) and -SB(U)), connect it between terminals 21 and 23.

# Operation

## ■ Timing Chart

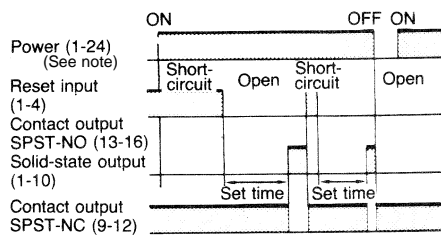
### H3FA-A/H3FA-B/H3FA-SA/H3FA-SB

#### Standard Operation (ON-delay Operation)



**Note:** When using the 12/24 VDC operated timer with a 12 VDC power supply, short-circuit terminals 13 and 15.

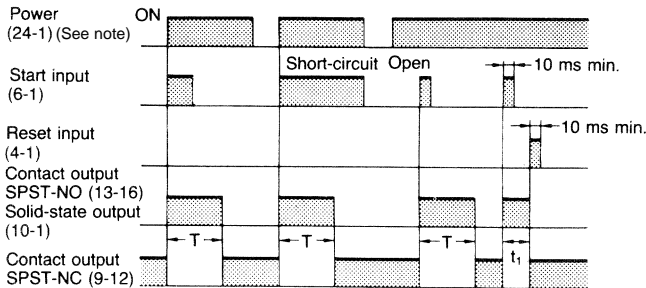
#### OFF-delay Operation by External Signal



**Note:** When using the 12/24 VDC operated timer with a 12 VDC power supply, short-circuit terminals 13 and 15.

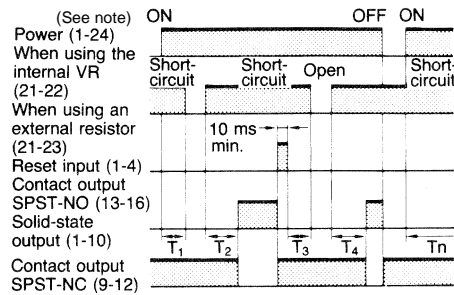
### H3FA-AU/H3FA-BU/H3FA-SAU/H3FA-SBU

#### One-shot Output Operation



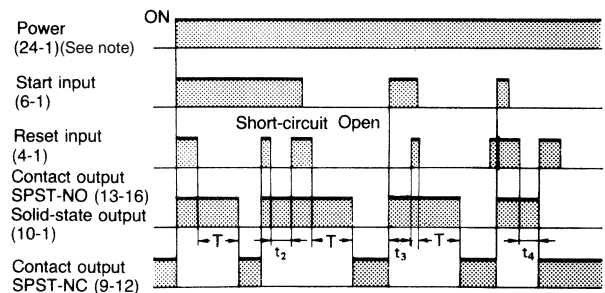
**Note:** 1. When using the 12 VDC operated timer suffixed -Sj U, short-circuit terminals 13 and 15.  
2. T denotes set time.  
 $t_1, t_2, t_3, t_4, < T$

#### Integration Operation



**Note:** 1. Control output is provided when the set time ( $T_1 + T_2$  or  $T_3 + T_4$ ) is up.  
2. When using the 12/24 VDC operated timer with a 12 VDC power supply, short-circuit terminals 13 and 15.

#### OFF-delay Operation by External Signal



**Note:** 1. When using the 12 VDC operated timer suffixed -Sj U, short-circuit terminals 13 and 15.  
2. T denotes set time.  
 $t_1, t_2, t_3, t_4, < T$

■ External Resistor and Operate Time

When using an external resistor, refer to the characteristic diagrams shown below.

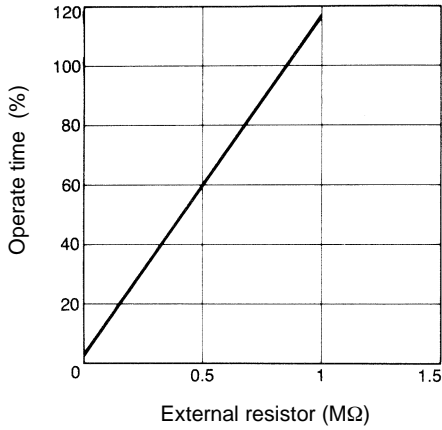
Use an external resistor rated at about 0.1 W/1 MΩ for H3FA(U) and -SA(U), and 0.1W/3 MΩ for H3FA-B(U) and -SB(U).

Pay attention to external noise and keep the lead length to less than 2 m. Since the characteristic diagrams represent standard data, the operate time factory-setting may not always be uniform from one product to another.

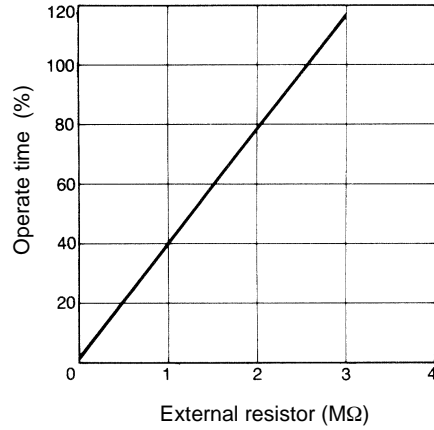
Should higher timer precision be required, use of a variable resistor is recommended for time adjustment.

Note that the operate time becomes slightly longer than the set time as the length of the leads increase.

H3FA-A(U)/-SA(U)



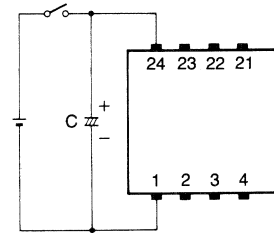
H3FA-B(U)/-SB(U)



When Prolonging Reset Time

The time unit has a shorter reset time than conventional timers so that it can be used in combination with solid-state circuit. To prolong the reset time of the time unit while it is in operation to about 100 ms, connect a capacitor having the listed constant to the time unit as shown below. Since the reset time after the set time is up varies depending on the load relay connected, select an appropriate capacitor having the desired constant taking into consideration the load relay connected. For the pulse output types (H3FA-j U), since the reset time before the set time is up varies depending on the load relay connected, select an appropriate capacitor having the desired constant taking into consideration the load relay connected.

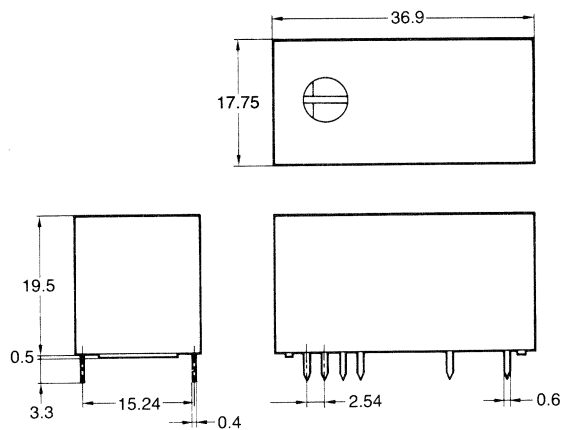
Rated voltage	Capacity of capacitor
12 VDC	10 μF, 25 V
24 VDC	4.7 μF, 50 V
5, 6 VDC	22 μF, 16 V



# Dimensions

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

## H3FA-A, H3FA-B, H3FA-SA, H3FA-SB

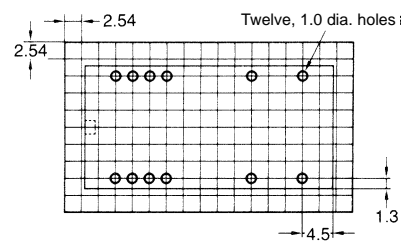


### Applicable Connecting Socket

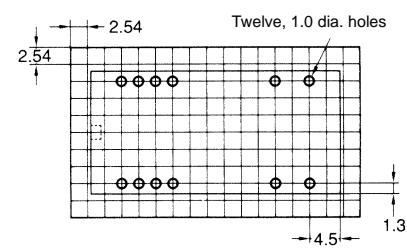
Standard 24-pin IC socket can be used for mounting the time unit.

### Mounting Holes (Top View)

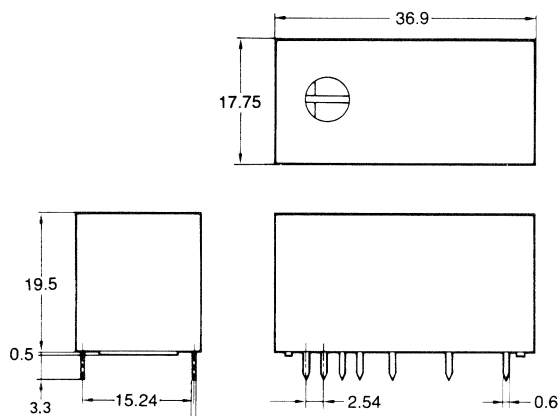
#### H3FA-A/-B



#### H3FA-SA/-SB



## H3FA-AU, H3FA-BU, H3FA-SAU, H3FA-SBU

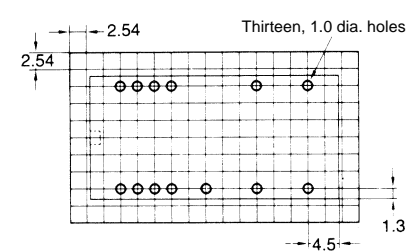


### Applicable Connecting Socket

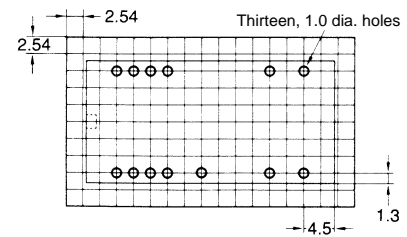
Standard 24-pin IC socket can be used for mounting the time unit.

### Mounting Holes (Top View)

#### H3FA-AU/-BU



#### H3FA-SAU/-SBU



# Installation

## ■ Connection

**Note:** Do not apply voltage to any terminal other than the power supply terminals. Otherwise, the internal circuitry may be damaged.

### H3FA-A, H3FA-B, H3FA-SA, H3FA-SB

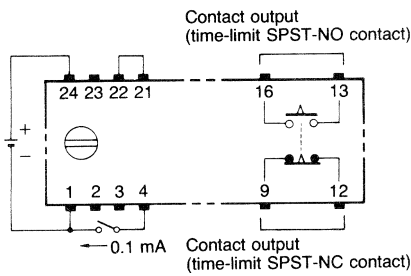
#### Standard Operation (ON-delay Operation)

When the set time has elapsed subsequent to the power application (connect power to terminals A and X, and short-circuit terminals M and O when a 12/24 VDC-operated model is used with a 12 VDC power supply), output is produced.

When connecting an external resistor to the time unit, connect it between terminals U and W, and open terminals U and V. Refer to "External Resistor and Operate Time" on page 4.

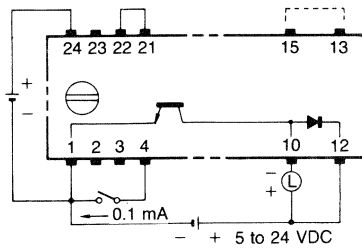
When operating an external reset input contact short-circuit terminals A and D. In this case, the current that flows from terminal D to terminal A is approx. 0.1 mA. Therefore, use of a high-reliability contact is recommended for the reset input.

#### Contact Output (Top View)



#### Solid-state Output (Top View)

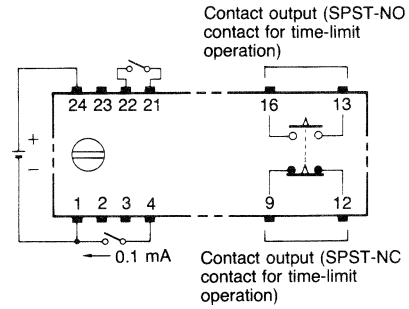
When using the 12/24 VDC operated timer with a 24 VDC power supply, open terminals 13 and 15.



#### Integration Operation

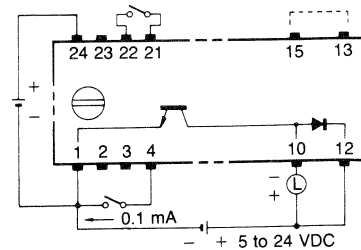
By opening the terminals connected to the internal variable resistor (U and V), or external resistor (U and W), timer operation can be interrupted to permit the time unit to perform time integration operations. Reconnecting the terminals enables timer operation to be continued.

#### Contact Output (Top View)



#### Solid-state Output (Top View)

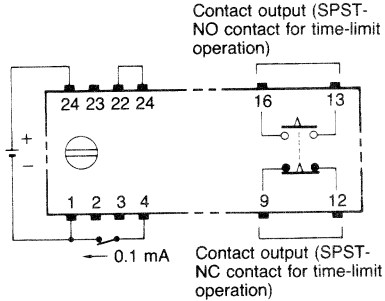
When using the 12/24 VDC operated timer with a 24 VDC power supply, open terminals 13 and 15.



### OFF-delay Operation by External Signal

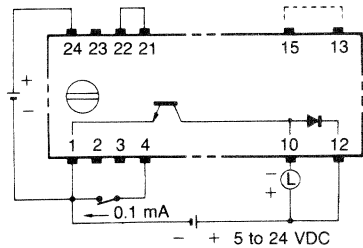
The time unit can be reset through the application of an external reset signal. This permits the time unit to perform OFF-delay operation. With terminals A and D short-circuited, the time unit initiates the time-limit operation upon opening these terminals and when the set time has elapsed, output is produced. Since the current that flows from terminal D to terminal A is about 0.1 mA, use of a high-reliability contact is recommended for the reset input.

#### Contact Output (Top View)



#### Solid-state Output (Top View)

When using the 12/24 VDC operated timer with a 24 VDC power supply, open terminals 13 and 15.



### H3FA-AU, H3FA-BU, H3FA-SAU, H3FA-SBU

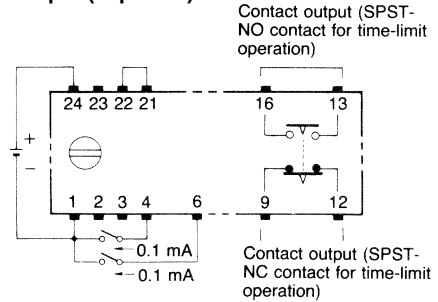
#### One-shot Output Operation

Upon power application (connect power to terminals A and X short-circuit terminals M and O when using the 12/24 VDC operated timer with 12 VDC power supply) and start input application (short-circuit terminals F and A), output is produced immediately and is reset when the set time has elapsed.

While operating the timer unit, if a reset input is applied a start input (terminals F and A are open), the time unit stops operating and the output is reset.

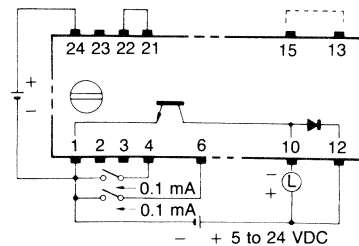
When operating an external start or reset input contact, the current that flows from terminal F to terminal A (start input) or from terminal D to terminal A (reset input) is approx. 0.1 mA. Therefore, use of a high-reliability contact is recommended for start and reset inputs. When connecting an external resistor to the time unit, connect it between terminals U and W open terminals U and V. Refer to "External Resistor and Operate Time".

#### Contact Output (Top View)



#### Solid-state Output (Top View)

When using the 12/24 VDC operated timer with a 24 VDC power supply, open terminals 13 and 15.



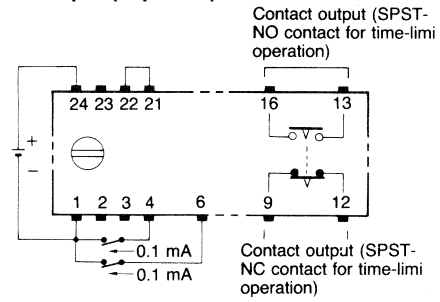
### OFF-delay Operation by External Signal

Upon power application (connect power to terminals A and X short-circuit terminals M and O when using the 12/24 VDC operated timer with 12 VDC power supply) and start input application (short-circuit terminals F and A), output is produced immediately, and if the start input is continuously applied, the time-limit operation can be suspended by applying a reset input before the set time has elapsed. (Although the reset input has been continuously applied before applying a start input, output will be produced upon applying a start input.)

With terminals A and D short-circuited, the time unit initiates the time-limit operation upon opening these terminals and when the set time has elapsed, output is reset.

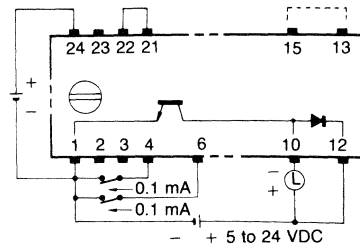
When operating an external start or reset input contact, the current that flows from terminal F to terminal A (start input) or from terminal D to terminal A (reset input) is approx. 0.1 mA. Therefore, use of a high-reliability contact is recommended for start and reset inputs.

### Contact Output (Top View)



### Solid-state Output (Top View)

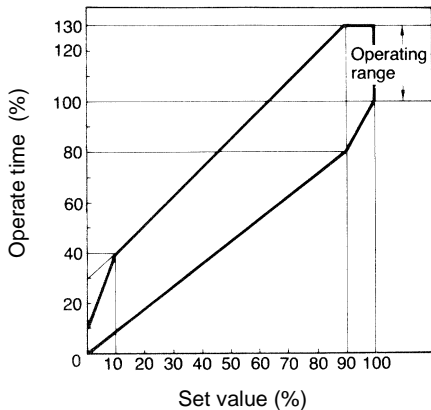
When using the 12/24 VDC operated timer with a 24 VDC power supply, open terminals 13 and 15.



## Precautions

### Operating

Refer to the diagram below for variations in the operate time with respect to the set value.



### Others

When cleaning the timer, confirm that the sealing tape is securely in place. Do not clean without this sealing tape affixed.

Use alcohol type (IPA, ethanol) solvent which are less chemically reactive. Note that use of other solvents may damage the materials used for the timer. Clean the Timer in less than 2 minutes. The cleaning solution must be 50\_C or less.

The tails of the connecting leads are solder-plated with consideration given to temperature at the time of soldering. When soldering the leads, keep the temperature at 260°C±5°C and complete soldering within 10 s.

**ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.**  
 To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.