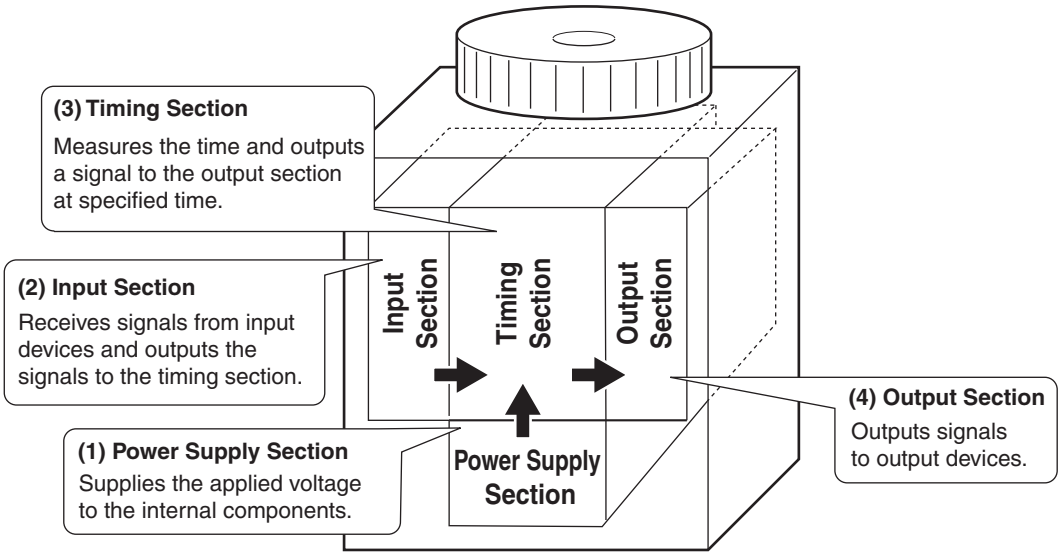
Introduction

What Is a Timer?

A Timer is a control device that outputs a signal at a preset time after an input signal is received.

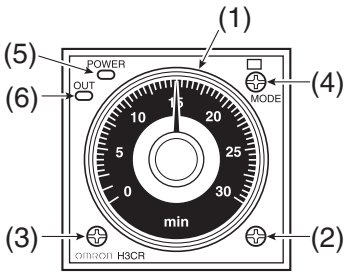
Timer Mechanisms



Settings and Indications of Timers

Example for the H3CR-A

Settings



(1) Time setting knob
(2) Time unit selector
(3) Time range selector
(4) Operating mode selector

Note A variety of time ranges can be set with the H3CR-A using the time unit selector and time range selector.

Indications

The pointers on the Timer do not move along with time like the hands of a clock do. You cannot see the progression of time. Therefore, two operation indicators are provided on the upper left of the Timer to identify the timer status.

(5) Run/Power Indicator (Green)

Run indicator: Indicates whether the time is being measured or the time has reached.

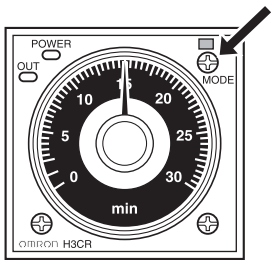
Power indicator: Indicates whether power is being supplied to the Timer.

Fundamentally, the indicators will be lit when the power is being supplied. However, they will flash when the time is being measured.

(6) Output Indicator (Orange)

Used to see the status of the output. Lit when a signal is output.

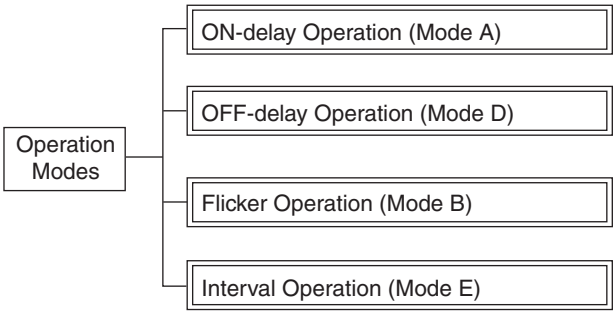
Operating Modes of Timers



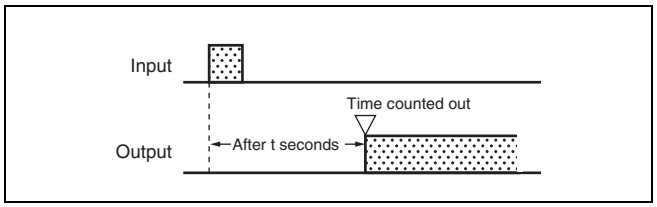
The operating mode selector is in the upper-right corner on the H3CR-A.

The operating mode determines the output method that is used when the set time has reached.

The following four basic operating modes are the most commonly used.

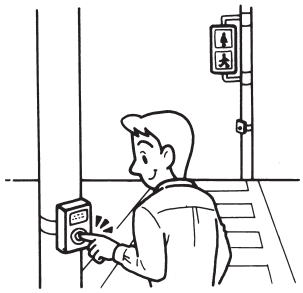


ON-delay Operation



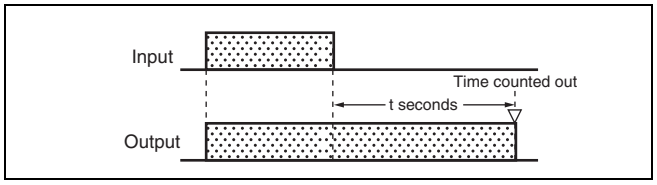
With ON-delay operation, the Timer receives an input and then an output signal is output by switching the Timer contacts after a set time delay.
This name is used because there is a delay between when the input signal is received (i.e., turns ON) and when the output signal is output.
ON-delay operation is the operating mode most often used for automated machines.

Application: Pushbutton Signals



When the pedestrian pushbutton is pressed for a traffic signal, the signal light changes from red to green after a delay.

OFF-delay Operation

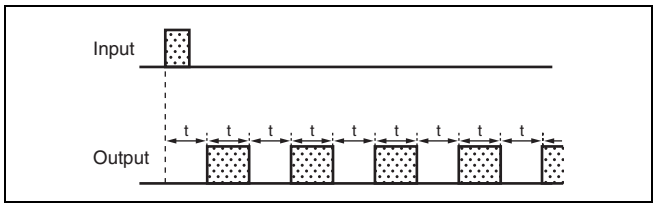


With OFF-delay operation, the output turns ON at the same time as the input and then the output turns OFF when the Timer contacts switch after the set time has expired. The set time is calculated from when the input turns OFF.
This name is used because there is a delay between when the input turns OFF and when the output turns OFF.

Application: Car Ceiling Lights

When you get in your car, the ceiling light turns ON when the door is opened. The light remains lit for several seconds after you get into the car and close the door.

Flicker Operation

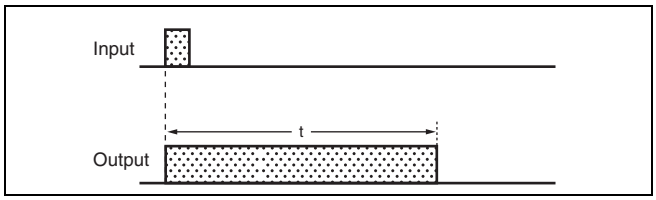


With flicker operation, an output repeatedly turns ON and OFF at the set time after an input is received.

Application: Automatic Control of Fountains

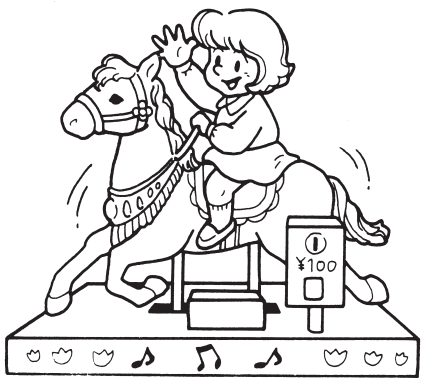
The water is repeatedly released and stopped at intervals of two minutes.

Interval Operation



With interval operation, the output turns ON at the same time as the input and the output turns OFF after a set time.

Application: Amusement Park Rides



The ride operates for five minutes when 100 yen is inserted.

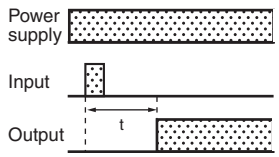
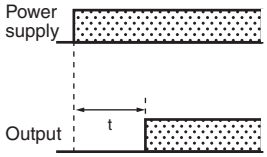
Timer Starting Methods

There are two starting methods for the operating modes.

Example: ON-delay Operation

Signal ON-delay operation: Measuring time starts when the input section receives an input while voltage is being applied to the Timer power supply section.

Power ON-delay operation: Measuring time starts when voltage is applied to the Timer power supply section.

Signal ON-delay	Power ON-delay
	

Differences between Signal ON-delay Operation and Power ON-delay Operation

(1) Accuracy* Operation will not be stable unless a brief period elapses after the power supply is turned ON to the timing section of the Timer.

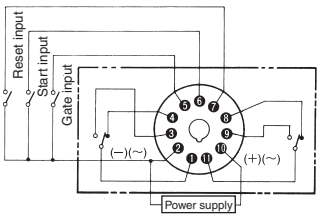
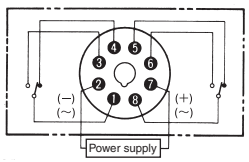
Power supply start: Operation is unstable because measuring time starts at the same time that the power supply turns ON. Therefore, deviation will occur in the operation time immediately after starting the Timer.

Signal start: Stable time accuracy is ensured because a voltage is already applied to the Timer before starting the Timer.

The accuracy of the signal start is generally considered better. For some models, however, such as the H3CR, there is no change in accuracy.

*Accuracy is the correctness of the time.

(2) Terminal Arrangement

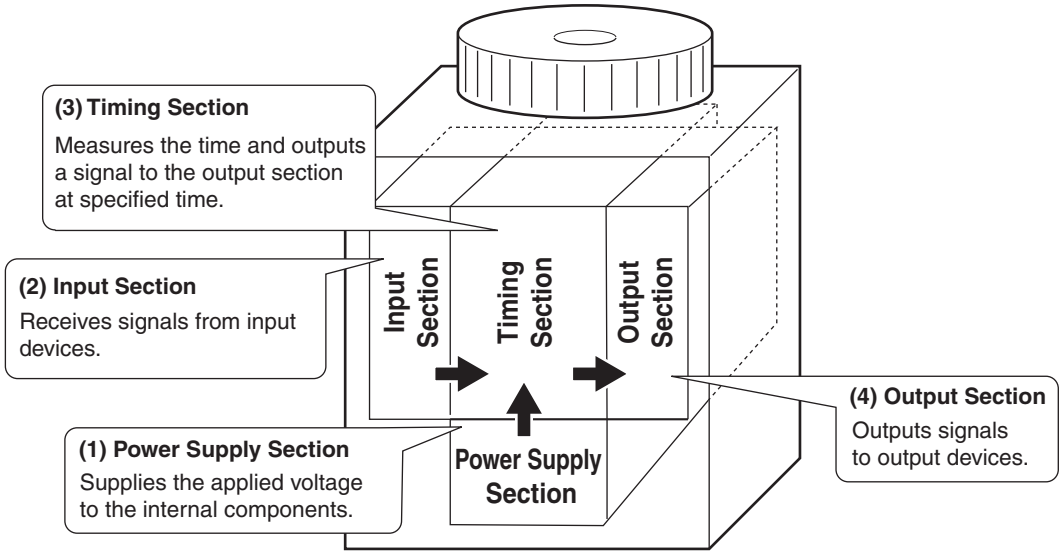
Signal start (H3CR-A)	Power supply start (H3CR-A8)
	

- Models with a signal start require three external inputs, so they have many terminals.
- Models with a power supply start (H3CR-A8) are the H3CR Timers most often used for automated machinery.

What Is a Time Switch?

A Time Switch is a control device that turns a load ON and OFF at the set times.

Time Switch Mechanisms

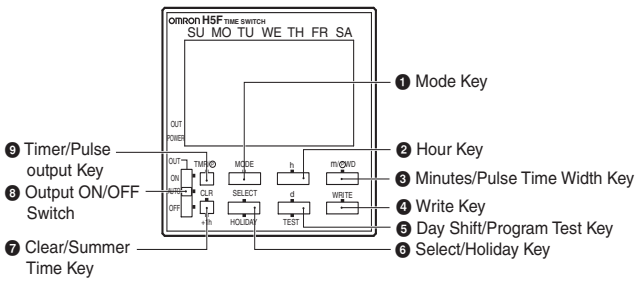


However, most models of Time Switches do not have an input section.
If there is an input section, it is not used to output signals to the timing section, rather, it is used to control some of the functions of the Time Switch, such as adjusting the time.

Settings and Indications of Time Switches

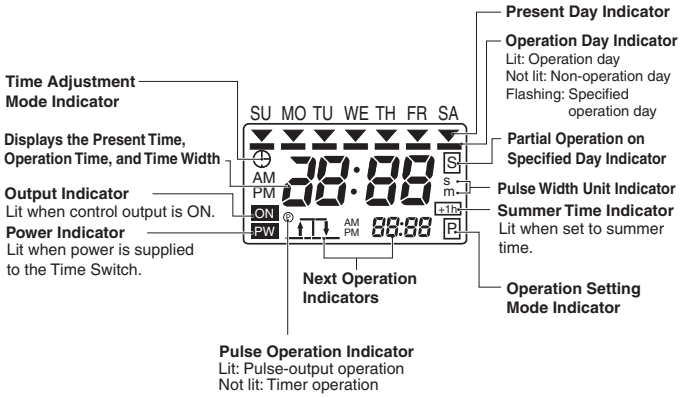
Example for the H5F

Settings



No.	Function
❶	Switches between time adjustment mode, the operation setting modes, and run mode.
❷	Sets hours or switches between 12-hour (am/pm) and 24-hour display.
❸	Sets minutes or a pulse time width.
❹	Writes the set data to memory or confirms settings with the program check function.
❺	Moves the cursor to specify a day or starts the program check function.
❻	Specifies or cancels a specified day or switches to holiday setting mode.
❼	Deletes the set data and initializes the day of operation or sets/clears summer time.
❽	ON: Turns on the output regardless of the setting. AUTO: Turns on/off the output according to the setting. OFF: Turns off the output regardless of the setting. Override and automatic return operation can be executed by using this key in combination with the Write Key.
❾	Selects timer operation or pulse-output operation.

Display



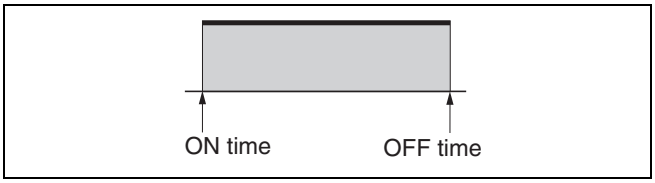
Run mode: Displays the direction (i.e., ON or OFF) and time of the next output operation.
Operation time setting mode: Displays the program number for the setting.
Holiday setting mode: Displays HdAY (hday) when the Time Switch is in holiday setting mode.
Program check: Displays tESt (test) during program check.

Operating Modes of Time Switches

The operating mode determines the ON/OFF output method that is used for the set times.

- Operating Modes
  - Timer Operation (ON/OFF Operation)
  - Pulse-output Operation
  - Forced ON/OFF Operation
  - Override and Automatic Return Operation
  - Partial Operation on Specified Day
  - Holiday Setting

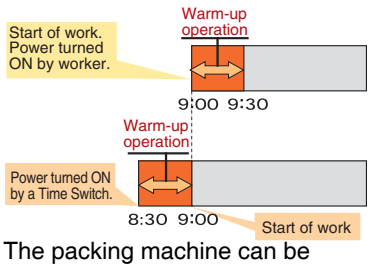
Timer Operation (ON/OFF Operation)



With timer operation, the Time Switch controls the output according to the set ON and OFF times.

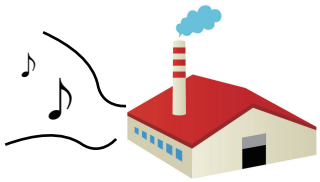
Application 1: Warm-up Operation for Packing Machine

Program Example

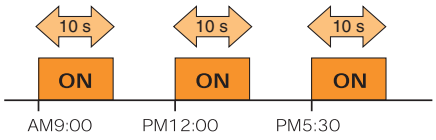


The packing machine can be warmed up before the employees come to work so that work can begin immediately.

Application 2: School Chimes

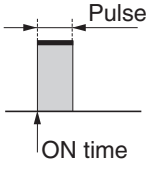


Program Example



The chimes can be sounded at the start of classes, at the lunch break, and at the end of classes.

Pulse-output Operation

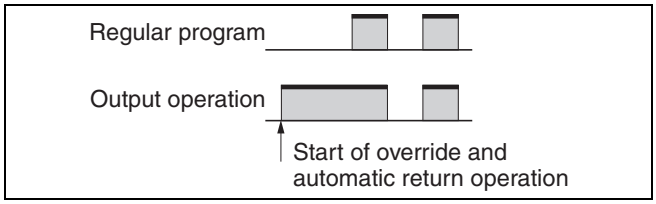


With pulse-output operation, the Time Switch outputs a pulse of a specified time width at the set ON time.

Forced ON/OFF Operation

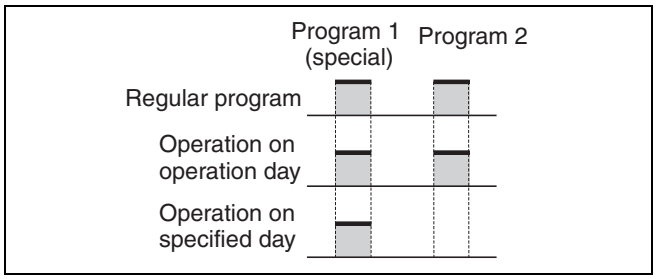
Forced ON/OFF Operation is used to force the output ON or OFF by using the output ON/OFF switch regardless of the control output setting.

Override and Automatic Return Operation



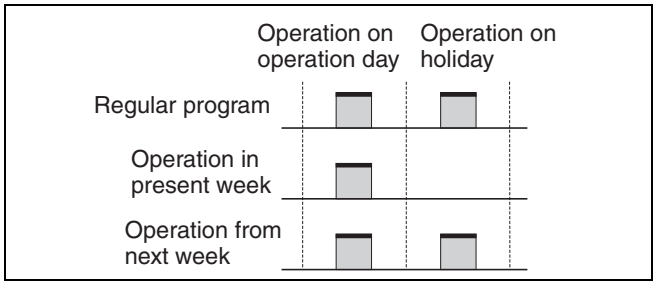
With override and automatic return operation, the output ON/OFF switch and the Write Key are used to hold the control output ON until the next OFF time.

Partial Operation on Specified Day



You can select days on which to execute only part of the set operations.

Holiday Setting



It is possible to set an operation day in the present week as a holiday (i.e., a non-operation day: output will be OFF regardless of the settings). When that day has passed, operation will continue according to the regular program, and operation will be executed as normal on that day from the following week.

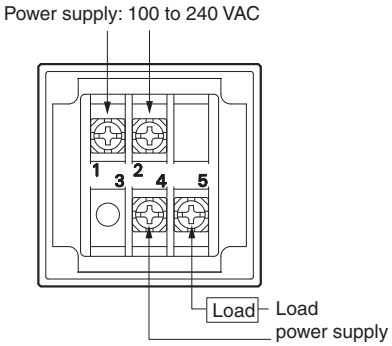
Time Switch Starting Methods

With a Time Switch, the progression of time starts when a voltage is applied to the power supply section.

* When the power supply section is OFF, time progresses and the settings are retained, but no operations are performed to turn the output ON or OFF.

Terminal Arrangement

Example for the H5F-A/B



Explanation of Terms

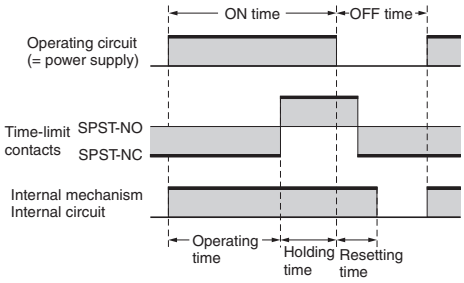
ON Time
The period of time during which the specified voltage is applied to the operating circuit.

OFF Time
The period of time between the moment that resetting begins and the moment that the operating voltage is applied to the operating circuit again. The OFF time is longer than the resetting time.

Operating Time
The period of time from the application of the specified voltage to the operation circuit until the completion of the time-limit contact operation.

Holding Time
The period of time from the completion of the time-limit operation to the start of the reset operation.

Resetting Time
The period of time from the interruption of the voltage supplied to the operating circuit during or after the time-limit operation until the return of the Timer to its initial state.



The resetting time of the Timer is the period of time during which all the internal components including the contacts, pointer, and the circuit components, such as the capacitor, of the Timer are reset.
If the Timer is operated with an insufficient OFF time (i.e., the OFF time is less than the rated resetting time), the normal operation of the Timer cannot be expected. In such cases, the Timer may operate with an insufficient operating time, operate instantaneously, or not operate at all. Be sure that the OFF time of the Timer is the same as or more than the rated resetting time.

Self-reset
To Automatically reset the Timer by interrupting the voltage that is supplied to the operating circuit.

Electrical Reset
To reset the Timer by applying the required voltage to the reset circuit.

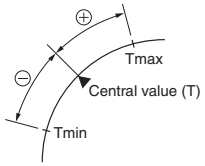
Accuracy of Operating Time
The difference in operating times measured when the Timer repeats operation under the same conditions with a specified set time.

Formula for calculation (with operating time measured more than 5 times):

$$\text{Accuracy of operating time} = \pm \frac{1}{2} \times \frac{\text{Tmax} - \text{Tmin}}{\text{TMs}} \times 100\ (\%)$$

where,
T max.: Maximum value of operating times measured at the same set time
T min.: Minimum value of operating times measured at the same set time
TMs: Maximum scale time (TMs is a set value in the case of a Digital Timer.)

The difference in the operating times appears as a shift from the central value of operation, so the maximum or minimum values divided by 2 and expressed as plus (+) and minus (-) indication.



If the settings of an Analog Timer is changed while it is performing time-limit operation, the following operation will result.

$$T = T_1 + T_2 \times \frac{T_3 - T_1}{T_3}$$

T: Final time-up time
T_1: Time elapsed
T_2: New setting
T_3: Previous setting

Setting Error
The difference between the actual operating time and scale time.
Formula for calculation (measurement position can be any scale position as long as it is set to 1/3 min. of the maximum scale time):

$$\text{Setting error} = \frac{\text{TM} - \text{Ts}}{\text{TMs}} \times 100\ (\%)$$

TM: Average value of five or more measured operating times
Ts: Set time
TMs: Maximum scale time (TMs is a set value in the case of a Digital Timer.)

For a Time Switch, the setting error is applied for the pulse-output operating time.

Total Error (Time Switch)
A single time rating that combines the setting error, accuracy of operating time, influence of temperature, and influence of voltage.
This rating applies to all measurement results for measurements made under the setting error, influence of temperature, and influence of voltage conditions.

Cyclic Error (Error per Month) (Time Switches)
The error time in the internal clock per month at an ambient temperature of 25°C.

Influence of Voltage

The change in the operating time when the voltage of the control power source changes within the allowable voltage range.

Formula for calculation:

Variation due to voltage change

$$=\pm\frac{TMx_1-TM_1}{TMs}\times 100\ (\%)$$

where,

TM_1: Average value of operating times measured at rated power supply voltage

TMx_1: Average value of operating times measured at the voltage that causes the largest deviation from TM_1 within the allowable voltage range.

TMs: Maximum scale time (TMs is a set value in the case of a Digital Timer.)

Influence of Temperature

The change in the operating time when the ambient temperature changes within the ambient operating temperature range.

Formula for calculation:

Variation due to temperature change

$$=\pm\frac{TMx_2-TM_2}{TMs}\times 100\ (\%)$$

where,

TM_2: Average value of operating times measured at 20°C.

TMx_2: Average value of operating times measured at the temperature that causes the largest deviation from TM_2 within the ambient operating temperature range.

TMs: Maximum scale time (TMs is a set value in the case of a Digital Timer.)

OFF Time Characteristics

The change between the operating time for a given OFF time and the operating time when the OFF time is changed.

Formula for calculation:

OFF time characteristic

$$=\pm\frac{TMx_3-TM_3}{TMs}\times 100\ (\%)$$

TM_3: Average value of operating times measured with a 1-second OFF time.

TMx_3: Average value of operating times measured with an OFF time that causes the maximum deviation from TM_3 within the specified OFF-time range of one hour from the specified resetting time.

TMs: Maximum scale time (TMs is a set value in the case of a Digital Timer.)

The OFF time characteristics are determined by the charging and discharging of a capacitor and resistor used in combination as an Electronic Timer. The characteristics vary from ±1.5% to ±5%.

The accuracy of operating time, setting error, influence of voltage, influence of temperature, and OFF time characteristic are used to express the precision of the Timer. Any of these items may be ignored depending on the particular specifications of the model.

The Motor Timer and Electric Timer indicate these items by percentage values. The Count Timer indicates these items by differential time values because the differential range of the Timer's operating time is essentially constant due to operating principles of the Timer. Furthermore, the total error can be indicated to express all these items in the case of the Count Timer.

Vibration Resistance (Malfunction)

The range of vibration during operation in which contacts that are closed will not open by vibration for at least the specified time (1 ms).

Vibration Resistance (Destruction)

The range of vibration in which there is no damage to parts during transport or use, and the operating characteristics are still satisfied.

Shock Resistance (Malfunction)

The range of shock during operation in which contacts that are closed will not open by shock for at least the specified time (1 ms).

Shock Resistance (Destruction)

The range of shock in which there is no damage to parts during transport or use, and the operating characteristics are still satisfied.

Insulation Resistance

The resistance provided by an electrically insulating material between charged metal parts and uncharged metal parts, between control outputs and operating circuits, etc.

Dielectric Strength

The voltage level that will not cause insulation breakdown when applied for 1 minute to the same location as in the insulation resistance measurement.

Impulse Withstand Voltage (AC)

A voltage imposed between the operating power supply terminals or between a charged terminal and non-charged metal part to test the resistance to surge voltages. The impulse withstand voltage imposed between the operating power supply terminals is 3 kV and that imposed between a charged terminal and non-charged metal part is 4.5 kV with both using a $\pm 1.2 \times 50$-μs standard waveform.

Noise Immunity

The malfunction and destruction resistance of the Timer against external noise.

The noise immunity of the Timer is checked with a noise simulator, an inductive load, an oscillating relay, and static electric noise.

Mechanical Life Expectancy

The life expectancy of a Timer when the control output of the Timer is operated under a no-load condition.

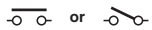
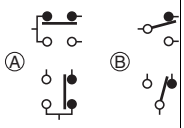
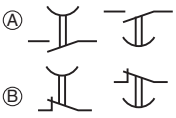
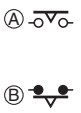
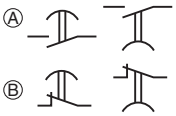
Electrical Life Expectancy

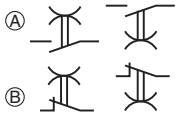
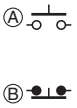
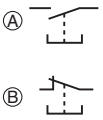
The life expectancy of a Timer when the control output of the Timer is operated to switch the specified voltage/current load connected to the control output.

The electrical or mechanical life of the Timer is generally indicated by the operating times of the control output. The electrical life is indicated by the operating times of the control output connected to a load and the mechanical life is indicated by the operating times of the control output with no load. The electrical life is shorter than the mechanical life. The lighter the load is, the longer the electrical life will be. Therefore, to prolong the electrical life of the Timer, use the Timer to switch heavy loads via relays instead of directly switching them with the control output.

Further Information

Symbols Used in Internal Connection Diagram

Name	Symbol		Description
	Symbol used in catalogs	Symbol defined by JIS	
NO contacts			Normally open contacts (A pair of contacts which are normally open when no relay input is applied.)
NC contacts			Normally closed contacts (A pair of contacts which are normally closed when no relay input is applied.)
Transfer contacts			Transfer contacts (NO and NC contacts that have a common contact terminal are collectively called "transfer contacts".) The contacts shown in A and B are all transfer contacts. The NC contact is either on the right side or on the upper side.
Time-limit operating contacts			A: NO contacts B: NC contacts
Time-limit resetting contacts			A: NO contacts B: NC contacts

Name	Symbol		Description
	Symbol used in catalogs	Symbol defined by JIS	
Time-limit operation , time-limit resetting contacts			A: NO contacts B: NC contacts
Manually operated, automatic resetting contact			Contacts that reset when the operator releases their hand. These contacts are used, for example, to operate a pushbutton switch. (Same for pushbutton, pull, and rotating switches.) A: NO contacts B: NC contacts
Synchron ous motor			A miniature motor which operates in synchronization with the power supply frequency.
Relay			An electromagnetic relay
LED			Used to indicate the operating status of the Timer.

Inrush Currents for Timers and Time Switches

"---" indicates a constant current and therefore the corresponding values are omitted from the table. All the values are approximate values and should therefore only be used as a guide.

Timers (Major Models)

Model or series		Voltage	Applied voltage	Inrush current (peak value)	Time (see note) ✱
H3AM-NS/-NSR		100 to 240 VAC	264 VAC	2.74 A	1.7 ms
H3CA-A series		24 to 240 VAC or 12 to 240 VDC	264 VAC	1.6 A	0.6 ms
H3CA-8/-8-306		200/220/240 VAC	264 VAC	1.5 A	0.6 ms
		100/110/120 VAC	132 VAC	780 mA	5 ms
		24 VDC	---	---	---
H3CA-8H/-8H-306		200/220/240 VAC	264 VAC	1.6 A	1.6 ms
		100/110/120 VAC	132 VAC	1.5 A	5 ms
		24 VDC	26.4 VDC	1.2 A	2 ms
H3CR-A/-A8/-AP		100 to 240 VAC or 100 to 125 VDC	264 VAC	780 mA	1.8 ms
			137.5 VDC	310 mA	3.2 ms
		24 to 48 VAC or 12 to 48 VDC	26.4 VAC	830 mA	2.4 ms
			26.4 VDC	570 mA	6.3 ms
H3CR-A8E		100 to 240 VAC or 100 to 125 VDC	264 VAC	1.76 A	0.1 ms
			137.5 VDC	550 mA	0.2 ms
		24 to 48 VAC/DC	26.4 VAC	270 mA	35 ms
			26.4 VDC	270 mA	31 ms
H3CR-AS/-A8S		24 to 48 VAC or 12 to 48 VDC	26.4 VAC	370 mA	2.2 ms
			26.4 VDC	250 mA	3.2 ms
H3CR-F		100 to 240 VAC or 100 to 125 VDC	264 VAC	750 mA	1 ms
			137.5 VDC	0.5 A	9.1 ms
		24 to 48 VAC or 12 to 48 VDC	26.4 VAC	0.83 A	10 ms
			26.4 VDC	0.57 A	9.4 ms
H3CR-H	S series	100/110/120 VAC	132 VAC	1.05 A	111 ms
		200/220/240 VAC	264 VAC	1.07 A	119 ms
		24 VAC/DC	26.4 VAC	1.26 A	133 ms
			26.4 VDC	0.85 A	137 ms
		48 VDC	52.8 VDC	0.73 A	112 ms
		100 to 125 VDC	137.5 VDC	0.62 A	109 ms
	M series	100/110/120 VAC	132 VAC	1.02 A	364 ms
		200/220/240 VAC	264 VAC	1.03 A	323 ms
		24 VAC/DC	26.4 VAC	1.21 A	478 ms
			26.4 VDC	0.87 A	560 ms
		48 VDC	52.8 VDC	0.71 A	384 ms
		100 to 125 VDC	137.5 VDC	0.62 A	380 ms
H3DE-MS/F/G		24 to 230 VAC/DC	253 VAC	4.4 A	0.03 ms
			253 VDC	2.68 A	0.03 ms
			26.4 VDC	203 mA	11 ms
H3DE-H		200 to 230 VAC	200 VAC	Approx. 0.8 A	130 ms
		100 to 120 VAC	100 VAC	Approx. 0.93 A	130 ms
		48 VAC/DC	48 VAC	Approx. 0.95 A	130 ms
			48 VDC	Approx. 0.68 A	70 ms
		24 VAC/DC	24 VAC	Approx. 1.25 A	140 ms
			24 VDC	Approx. 0.89 A	40 ms

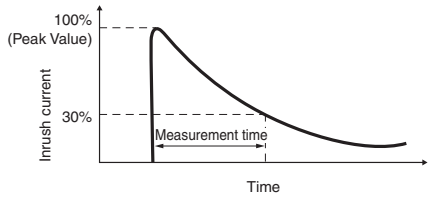
Model or series	Voltage	Applied voltage	Inrush current (peak value)	Time (see note) ✱
H3DK-M/S/F/G	24 to 240 VAC/DC	264 VAC	Approx. 4.69 A	46.27 ms
		24 VDC	Approx. 0.168 A	134 ms
		264 VDC	Approx. 3.64 A	46 ms
	12 VDC	13.2 VDC	Approx. 2.62 A	418.67 ms
H3DK-H	100 to 120 VAC	132A	Approx. 2.06 A	1320 µs
	200 to 240 VAC	264 VAC	Approx. 2.38 A	677.33 µs
	24 to 48 VAC/DC	52.8 VAC	Approx. 1.81 A	1810 µs
		24 VAC	Approx. 1.68 A	19.8 ms
		24 VDC	Approx. 1.16 A	35.2 ms
		52.8 VDC	Approx. 2.44 A	8.84 ms
H3DS	24 to 230 VAC or 24 to 48 VDC	253 VAC	3 A	1 ms
		26.4 VDC	0.5 A	4 ms
H3DT-N/L/A/F/G	24 to 240 VAC/DC	264 VAC	7.04 A	500 µs
		24 VDC	336 mA	5.36 ms
		264 VDC	4.92 A	704 µs
H3DT-H	100 to 120 VAC	132 VAC	2.08 A	21.6 µs
	200 to 240 VAC	264 VAC	4.08 A	23.2 µs
	24 to 48 VAC/DC	52.8 VAC	1.09 A	19.2 µs
		24 VDC	668 mA	63.2 ms
		52.8 VDC	1.96 A	15.2 ms
H3FA-A	24 VDC	26.4 VDC	1.8 A	0.01 ms
	12 VDC	13.2 VDC	1.5 A	0.01 ms
	6 VDC	6.6 VDC	1.1 A	0.05 ms
	5 VDC	5.5 VDC	1.1 A	0.05 ms
H3FA-SA	24 VDC	26.2 VDC	1.8 A	0.01 ms
	12 VDC	13.2 VDC	1.5 A	0.01 ms
	6 VDC	6.6 VDC	1.1 A	0.05 ms
	5 VDC	5.5 VDC	1.1 A	0.05 ms
H3M series	200/220/240 VAC	264 VAC	1.2 A	0.5 ms
	100/110/120 VAC	132 VAC	620 mA	0.4 ms
	110 VDC	---	---	---
	100 VDC	---	---	---
	48 VDC	52.8 VDC	5 A	1 ms
	24 VDC	26.4 VDC	2.6 A	1 ms
	12 VDC	13.2 VDC	1.3 A	1 ms
H3RN series	All specifications except for 24 VAC	---	---	---
	24 VAC	26.4 VAC	200 mA	3 ms
H3Y series	All specifications except for 12 VDC	---	---	---
	12 VDC	13.2 VDC	350 mA	0.4 ms
H3YN series	All specifications except for 12 VDC	---	---	---
	12 VDC	13.2 VDC	600 mA	1 ms

Model or series	Voltage	Applied voltage	Inrush current (peak value)	Time (see note) ✻
H5AN series	100 to 240 VAC	264 VAC	23 A	1 ms
	100 VDC	110 VDC	8 A	2 ms
	12 to 24 V DC	26.4 VDC	15 A	6.5 ms
H5CN series	100 to 240 VAC	264 VAC	800 mA	1 ms
	12 to 48 VDC	52.8 VDC	400 mA	1 ms
H5CX-A□-N series	100 to 240 VAC	264 VAC	4.8 A	0.5 ms
H5CX-A□D-N series	24 VAC or 12 to 24 VDC	26.4 VAC	9.5 A	1 ms
		26.4 VDC	6.6 A	1 ms
H5CX-L□-N series	100 to 240 VAC	264 VAC	5.3 A	0.4 ms
	24 VAC or 12 to 25 VDC	26.4 VAC	6.4 A	1.4 ms
		26.4 VDC	4.4 A	1.7 ms
H5CX-B□-N series	12 to 24 VDC	26.4 VDC	4.4 A	1.7 ms
H5CX-A/-L series (previous models)	100 to 240 VAC	264 VAC	5.3 A	0.4 ms
	24 VAC or 12 to 24 VDC	26.4 VAC	6.4 A	1.4 ms
		26.4 VDC	4.4 A	1.7 ms
H5CX-B series (previous models)	12 to 24 V DC	26.4 VDC	6 A	1.2 ms
H5CZ series	100 to 240 VAC	264 VAC	4.6 A	0.4 ms
	24 VAC or 12 to 24 VDC	26.4 VAC	9.5 A	1 ms
		26.4 VDC	6.6 A	1 ms

Time Switches (Major Models)

Model or series	Voltage	Applied voltage	Inrush current (peak value)	Time (see note) ✻
H4KV-DSA-R	100 to 200 VAC	240 VAC	4.8 A	1.1 ms
H4KV-DSA (previous models)	100 to 200 VAC	240 VAC	0.7 A	0.5 ms
H5L-A	All specifications	---	---	---
H5S-W series	100 to 240 VAC	264 VAC	3.1 A	0.2 ms
	24 VDC	26.4 VDC	1.3 A	2.7 ms
H5S-Y series	100 to 240 VAC	264 VAC	3.1 A	0.2 ms
	24 VDC	26.4 VDC	1.4 A	2.7 ms
H5S series (previous models)	100 to 240 VAC	264 VAC	2.5 A	0.3 ms
	24 VDC	26.4 VDC	1.1 A	3 ms
H5F series	100 to 240 VAC	264 VAC	2 A	0.3 ms

✻ The time of the inrush current is measured in the range shown in the following waveform.



Troubleshooting

	Problem	Probable cause	Solution
Timers	A sensor was used to turn the power supply to the Timer ON and OFF, but the sensor output was damaged.	The inrush current when the power supply voltage was applied may have damaged the sensor output.	Use an MY or other relay to turn the power supply to the Timer ON/OFF. (Use a suitable contact capacity.)
	The top part of the display on a Timer with a memory backup is missing.	If the power supply is not connected and power is interrupted for 10 minutes or longer, the measured value or display will not be dependable and unnecessary outputs may appear.	Always connect a battery when you use a Timer with a memory backup. If the battery voltage is 3 V, you can use various type of batteries. The memory backup time will depend on the capacity of the battery.