Please read and save these instructions. Read carefully before attempting to assemble, install, operate, or maintain the product described. Protect yourself and others by observing all safety information. Failure to comply with instructions could result in personal injury and/or property damage! Retain instructions for future reference.

OMRON **H3CA Solid-State Timer**

Description

OMRON multi-mode/multi-range solid-state timer is digital set with wide 0.1 sec to 9990 hour range in a compact, 1/16 DIN plug-in unit. Easy-to-read LCD time remaining bar graph and output status indicators. Many control modes to match most applications. Thumbwheel switch selects time unit, control mode, and time limit setting. Wide supply range. Timer is UL Recognized and CSA Certified.

Specifications

TIME DELAY

Adjustment ..... 5-digit switches

Range ..... 0.1 sec to 9,990 hours

Repeatability ... +/- 0.3%, +/- 0.05 seconds over specified timing range

Reset Time ..... 0.5 sec max.

POWER

Operating Voltage -
24 to 240 VAC or 24 to 240 VDC

Power Consumption ..... AC 3VA or DC 3W

Frequency ..... 50/60 Hz

OUTPUT

Type ..... Relay S.P.D.T.

Life ..... Mechanical - 10,000,000 operations

Dielectric ..... 2,000 volts RMS at 50/60 Hz between current carrying and non-current carrying parts

ENVIRONMENTAL

Operating Temperature ..... -14 to 131 degrees F

Humidity ..... 35 to 85% RH

MECHANICAL

Termination ..... 11 pin plug

Mounting .....Panel, track, surface

GENERAL SAFETY RECOMMENDATIONS

⚠ WARNING

Disconnect power when connecting or disconnecting the timer or its loads.

⚠ CAUTION

Do not change the time unit or time range while the timer is in operation. Otherwise, the timer may malfunction or be damaged. Be sure to turn off the power supply to the timer before changing any of the selections.

1. This timer should be wired by qualified personnel according to the National Electrical Code (NEC) and local codes.
2. Do not connect input or contact terminals to voltages higher than those indicated on timer.
3. Protect the coil and load circuits with properly rated fuses.
4. Do not install in damp or moist locations.
5. Any application of this timer should be designed to prevent bodily injury, or property damage, in the event of product failure or normal wearout of this product.

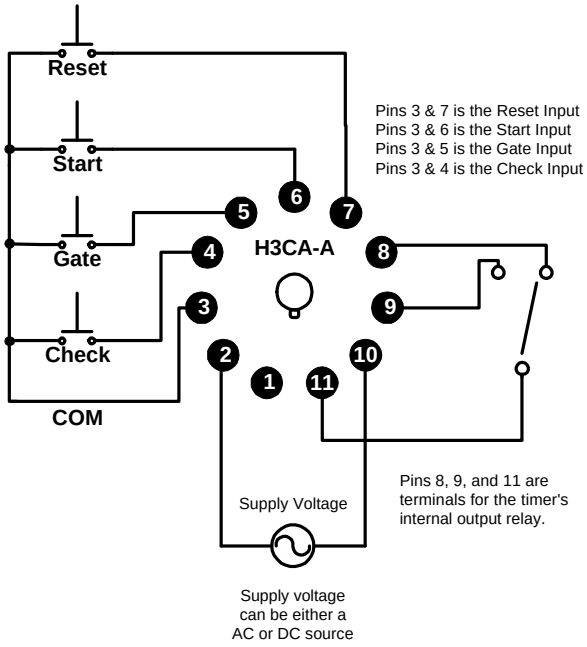
GLOSSARY

No Voltage or Dry Contact
The inputs (Start, Reset, Gate, and Check) on this timer are considered a no voltage or dry contact thus requires no external voltage source to activate. Simply connecting them to the common terminal (Pin 3 or 15) via a switch, relay contact, open collector sensor, and etc., is all that is required to activate each input.

Gate Input (Pause)
When the gate input is closed, timing is temporarily stopped. When the gate opens, timing resumes at the point of interruption.

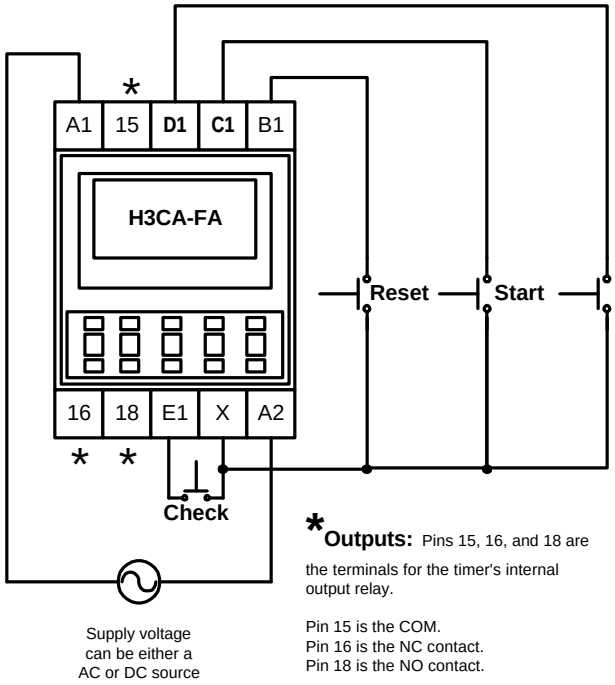
Check Input
When check input is used in ON-delay mode, the elapse time measurement of the set time is not performed - especially useful where ON-delay override is desired. In Repeat Cycle mode, the check input allows the timer to be used like a binary flip-flop or alternating relay.

Terminal / Pin Configuration



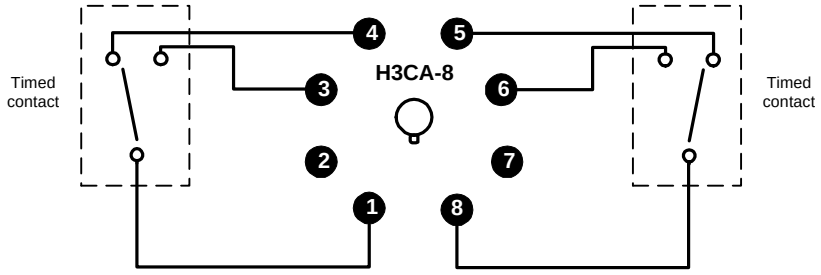
Pins 3 & 7 is the Reset Input
Pins 3 & 6 is the Start Input
Pins 3 & 5 is the Gate Input
Pins 3 & 4 is the Check Input

Pins 8, 9, and 11 are terminals for the timer's internal output relay.



***Outputs:** Pins 15, 16, and 18 are the terminals for the timer's internal output relay.

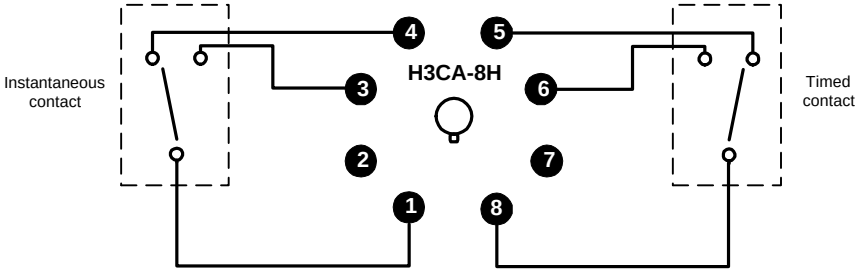
Pin 15 is the COM.
Pin 16 is the NC contact.
Pin 18 is the NO contact.



Outputs: Pins 1,3,4,5,6, and 8 are the terminals for the H3CA-8 internal output relays.

Pin 1 is the COM for relay #1.
Pin 3 is the NO contact for relay #1.
Pin 4 is the NC contact for relay #2.

Pin 8 is the COM for relay #2.
Pin 6 is the NO contact for relay #2.
Pin 5 is the NC contact for relay #2.



Outputs: Pins 1,3,4,5,6, and 8 are the terminals for the H3CA-8H internal output relays.

Relay #1: Is an instantaneous contact. Which means this relay will immediately switch when power is apply to timer.
Pin 1 is the COM for relay #1.
Pin 3 is the NO contact for relay #1.
Pin 4 is the NC contact for relay #2.

Relay #2: Is a timed contact. Which means this relay will only switch at the end of the time delay period.
Pin 8 is the COM for relay #2.
Pin 6 is the NO contact for relay #2.
Pin 5 is the NC contact for relay #2.

Because both internal relay outputs are totally different in function. Please make sure not to wire these relays together in an application.

Operation

RANGE SELECTION

There are seven different timing ranges from which to choose. Press the rightmost thumbwheel switch to select the desired time unit. When making your choice the selected time unit will be displayed in the time unit display window.
The seven time units are:

Time units	Timing ranges
0.1 s	0.1 to 99.9 seconds
s	1 to 999 seconds
0.1 m	0.1 to 99.9 minutes
m	1 to 999 minutes
0.1 h	0.1 to 99.9 hours
h	1 to 999 hours
10 h	10 to 9990 hours

Be sure turn off the power supply to the timer before changing any of the selections.

MODE SELECTIONS

There are eight different operating modes from which to choose. Press the leftmost thumbwheel switch to select the desired operation mode. When making your choice the operation mode will be displayed in the operation mode display window.
The eight operation modes are:

Mode	Operation
A	ON-delay
B	Repeat (50% fixed duty cycle)
C	Signal Interval/OFF-delay
D	Signal OFF-delay (I)
E	Interval
F	Cycle One-shot
G	Signal ON-delay/OFF-delay
H	Signal OFF-delay (II)

Note:
The operation mode is fixed to "A" in type H3CA-8 and H3CA-8H timers.

Read thru the operation and application sections of this instruction manual to determine the proper function selection for your application. To insure proper operation, the supply voltage should be disconnected before changing functions.

Mode A ON-delay (Power-ON Start/Power OFF Reset): Connect start terminals (3 & 6). Upon application of power to the timer, time delay period begins. At the end of time delay period, output contacts switches, either connecting or disconnecting load. Output remains switched until power is removed or a reset input is applied.

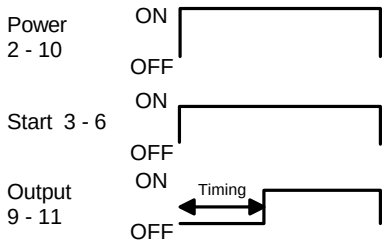


Figure 1

Mode A ON-delay (Signal Start): Power is applied continuously. Time delay period begins at the leading edge of start input. Output contact switches when the accumulated time equals the set time. Subsequent start signals during or after timing will not be accepted. The output relay will remain switched until a reset input is applied or power is interrupted.

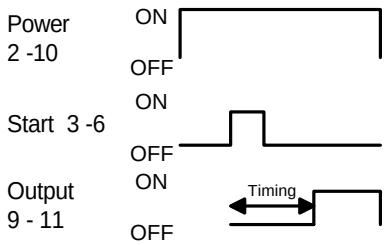


Figure 2

Mode B Repeat Cycle - Signal Start (50% fixed duty cycle): Power is continuously applied. The OFF/ON cycle is initiated at the leading edge of the start input. The output relay will be OFF for the set time and ON for the set time. The ON and OFF cycle will continue to alternate until a reset input is applied or power is disconnected.

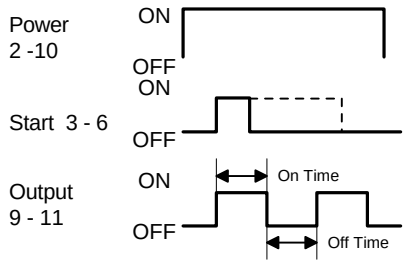


Figure 3

Mode B Repeat Cycle - Power ON Start/Power-OFF Reset (50% fixed duty cycle): Connect start terminals (3 & 6). Upon application of power to the timer, the OFF delay is initated for the set time and then ON for the set time. The ON and OFF cycle will continue to alternate until a reset input is applied or power is disconnected.

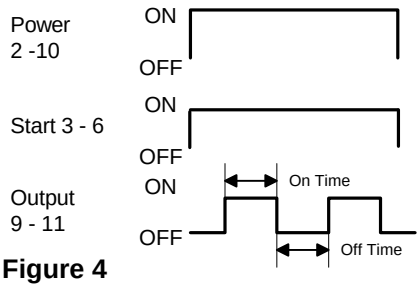


Figure 4

Mode C Signal Interval/OFF-delay: Power is continously applied. Time delay period begins on both the leading and trailing edges of the start input. Output contact switches during time delay period, either connecting or disconnecting load. Once the timer has timed out from the trailing edge, it resets and is ready for subsequent start inputs. **Refer to Figure 5.**

Operation (Continued)

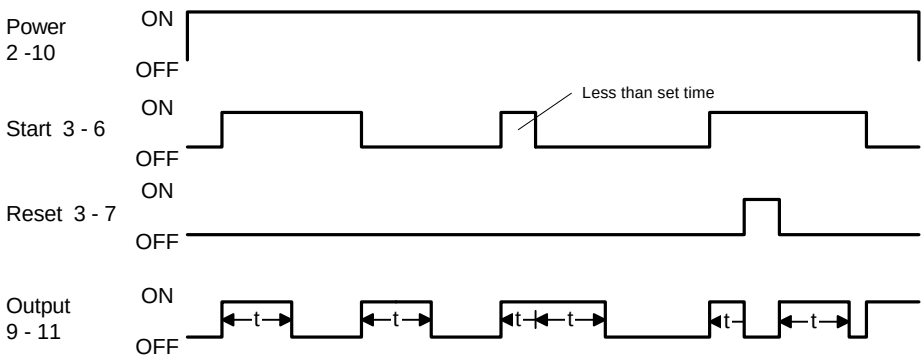


Figure 5

Mode D
Signal OFF-delay (I):
Power is continuously applied. The output relay switches at the leading edge of the start input, either connecting or disconnecting load. Time delay period begins at the trailing edge of the start input. Output relay switches again when accumalated time equals the set time.

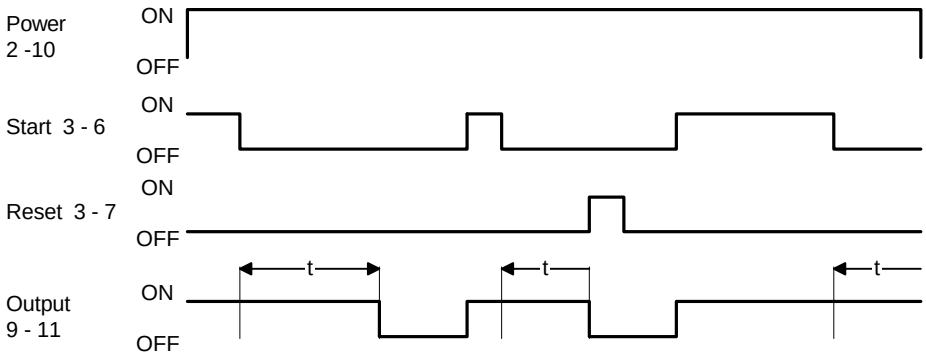


Figure 6

Mode E - Interval
Signal Start: Power is applied continously. Timing begins at the leading edge of the start input. The output relay is switched, either connecting or disconnecting load, only during timing. The timer is reset when power is disconnected or a reset input is applied.
Refer to Figure 7

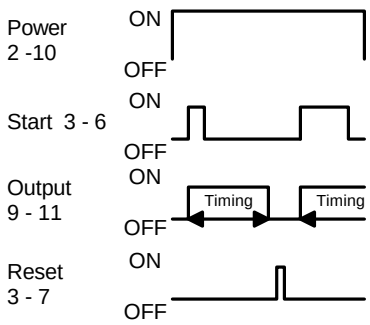


Figure 7

Mode E - Interval
Power-ON Start/Power-OFF reset: Connect start terminals (3 & 6). Upon application of power to the timer, timing starts. The output relay is switched during timing, either connecting or disconnecting load. Output remains switched until power is removed or a reset input is applied.

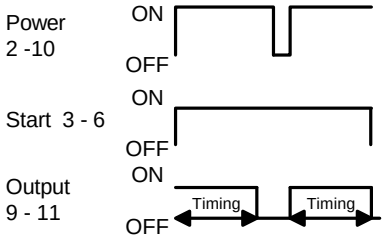


Figure 8

Mode F Cycle One-shot
Power-On Short/Power-OFF Reset: Connect start terminals (3 & 6). Upon application of power to the timer, timing starts. The output relay is OFF for the set time and then ON for the set time for one cycle only. The timer is reset when power is removed or a reset input is applied.

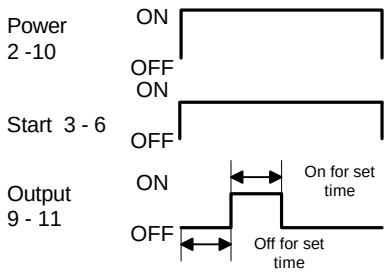


Figure 9

Mode F Cycle One-shot
Signal Start: Power is continously applied. The OFF/ON cycle is initated at the leading edge of the start input. The output relay will be OFF for the set time and then ON for the set time for one cycle only. The timer is reset when power is removed or a reset input is applied. **Refer to Figure 10.**

Operation (Continued)

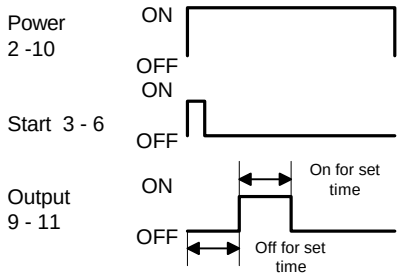


Figure 10

Mode G
Signal ON-delay/OFF-delay:
Power is continuously applied. Timing begins on both the leading and trailing edges of the start input. The output relay switches when the accumulated time from the leading edge equals the set time, either connecting or disconnecting load. It also switches for the set amount of time from the trailing edge of the start input.

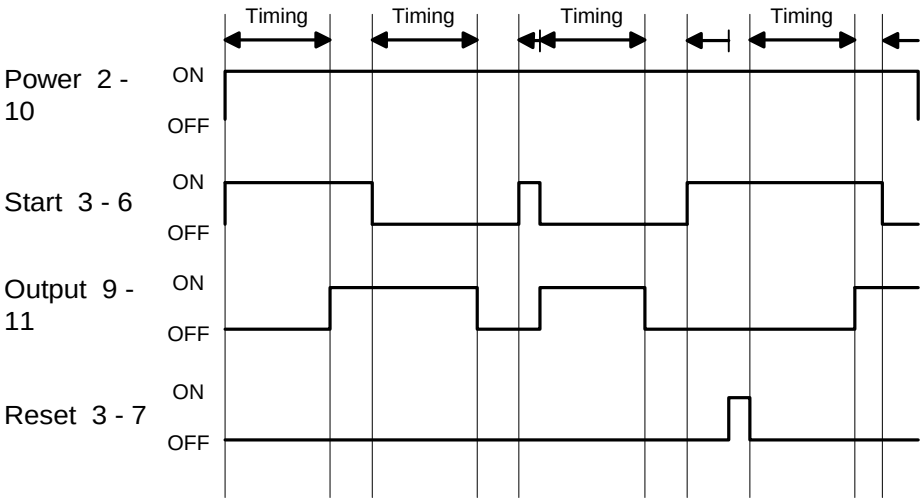


Figure 11

Mode H
Signal OFF-delay:
Power is continuously applied. Timing begins at the trailing edge of the start input. The output relay is switched only during timing.

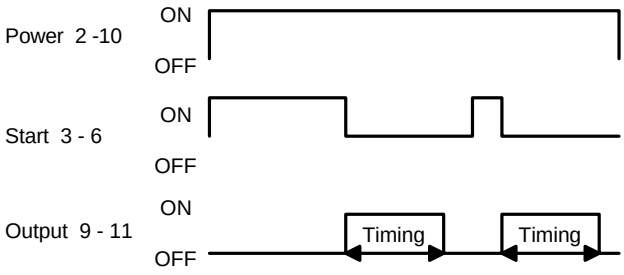


Figure 12

Application

ON-DELAY Power-ON Start/ Power-OFF Reset

Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper start input, pins 3 and 6 together.
3. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
4. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
5. Time period begins upon application of power, once the time delay period ends, output relay energizes and contacts transfer, activating load.
6. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

ON-DELAY Signal Start
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
3. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
4. Once start input is closed (pins 3 and 6), output relay energizes and contacts transfer, activating load.
5. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

REPEAT CYCLE - Signal Start
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
3. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
4. Once start input is closed (pins 3 and 6), output relay begins cycling, thus activating and deactivating the load.
5. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

REPEAT CYCLE - Power ON Start/Power-OFF Reset
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper start input, pins 3 and 6 together.
3. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
4. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
5. Upon application of power, output relay begins cycling, thus activating and deactivating the load.
6. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

SIGNAL INTERVAL/OFF-DELAY
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper start input, pins 3 and 6 together.
3. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
4. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
5. Time period begin each time start input is closed and opened. Load is activated only during time period.
6. Reset is established once timer has timed out after start input was opened or power is removed from pins 2 or 10.

SIGNAL OFF-DELAY (I)
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper start input, pins 3 and 6 together.
3. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
4. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
5. Once start input is closed, load is activated and stays activate as long as start input is closed or time period expires.
6. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

INTERVAL Signal Start
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper start input, pins 3 and 6 together.
3. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
4. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
5. Once start input is closed (pins 3 and 6), output relay activates load during time period and deactivates load once time period ends.
6. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

Application (Continued)

INTERVAL Power-ON Start/ Power-OFF reset
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper start input, pins 3 and 6 together.
3. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
4. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
5. Time period begins upon application of power, the time period begins, output relay energizes and contacts transfer, activating load. The load is activate only during timing period
6. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

CYCLE One-Shot
Power-ON Short/Power-OFF Reset
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper start input, pins 3 and 6 together.
3. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
4. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
5. Once start input is closed (pins 3 and 6), output relay energizes and contacts transfer, activating load.
6. Time period begins upon application of power, output relay cycles OFF for the set time and then ON for only one cycle.
6. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

CYCLE One-Shot
Signal Start
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
3. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
4. Once start input is closed, output relay cycles OFF for the set time and then ON for only one cycle.
5. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

SIGNAL ON-DELAY/OFF-DELAY
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
4. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
5. Time period begin each time start input is closed and opened. Load is activated when the accumulated time from the last start input closure equals the set time. The load is also activate for the set time period immediately after the start input is opened.
6. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

SIGNAL OFF-DELAY (II)
Refer to Figures A, B, and C

1. Power is applied to pins 2 and 10.
2. Jumper one side of power (either pin 2 or 10) to COM of output relay (pin 11).
3. Load is activated through pin 9 (normally open contact) and the other side of power not connected to COM (pin 11).
4. Load is activated for the duration of the set time period only after the start input has been closed then opened.
5. Reset timer by applying a switch closure to reset input (pins 3 and 7) or by removing power from pins 2 or 10.

Wiring Diagrams

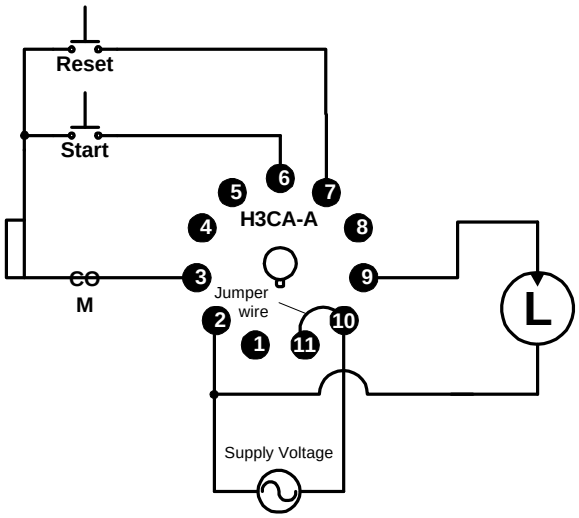


Figure A

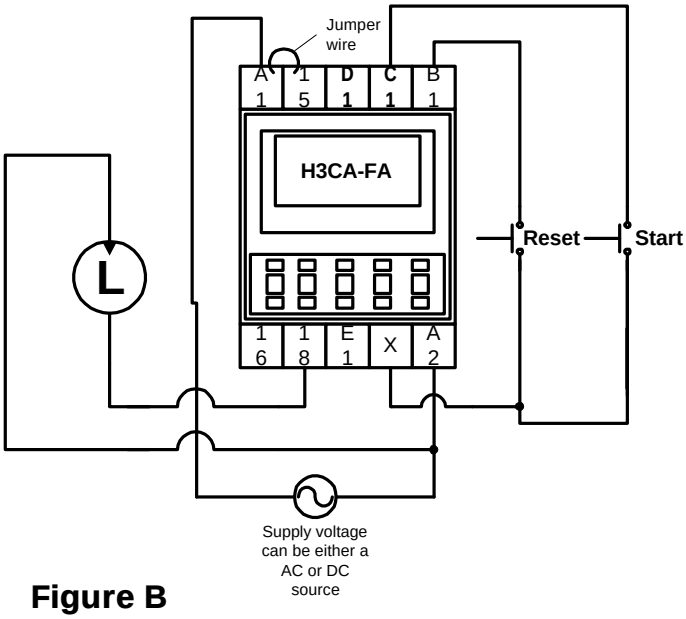


Figure B

Figures A, B, and C illustrate how to wire the load to utilize the very same supply voltage going to the timer.

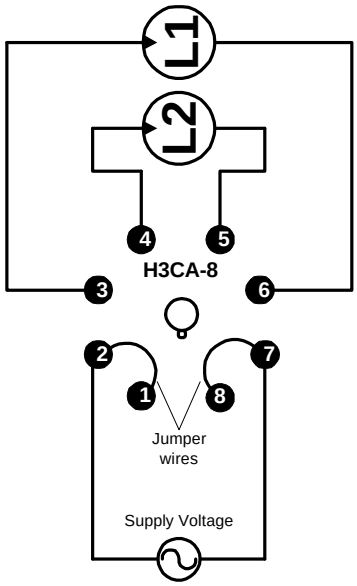


Figure C

Figure D illustrates how to wire the load to utilize a separate power source then the one used by the timer.

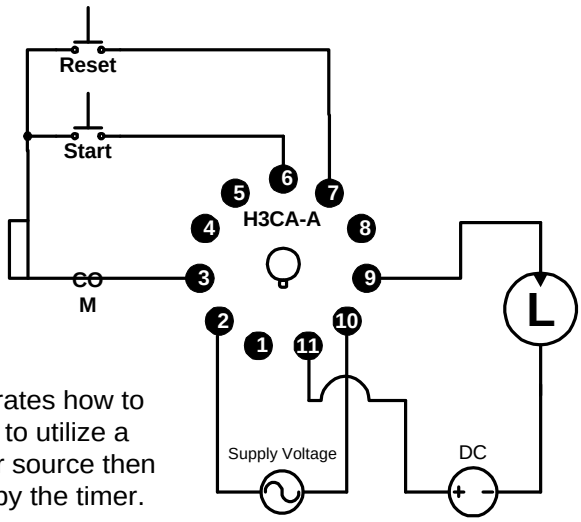


Figure D

PRODUCT WARRANTY

NOTE: Specifications to change without notice.

Omron certifies all of its products either meet or exceed stipulated specifications. Omron is not liable for stenographic and/or clerical errors.

Omron's obligation under this warranty is limited solely to repair or replacement at Omron's discretion. Omron will not be liable for any design furnished by Buyer and incorporated into equipment.

This warranty is voided if the product is altered in any way or suffers consequential damage due to negligence or misuse.

Omron is not to suffer risk due to suitability or unsuitability or the results of the use of its products used in combination with any electrical or electronic components, circuits, systems assemblies, or any other materials or substances or environments.

The foregoing warning is the only warranty which Omron Electronics, Inc. provides with respect to the products listed herein. No other warranties, expressed, implied, or statutory shall apply, whether as to merchantability, fitness for a particular purpose, description, or otherwise.

This warranty is extended to three years for temperature and process controllers.

Limitation of Liability: Notwithstanding any other statement herein, Omron Electronics, Inc., its contractors and suppliers, shall not be liable for any special, indirect, incidental, or consequential damages.
The remedies of the purchaser set forth herein are exclusive where so stated and the total cumulative liability of Omron Electronics, Inc., its contractors and suppliers, with respect to this contract or anything done in connection therewith, shall not exceed replacement price reimbursement as to the product on which such liability is based.