## OMRON

# Solid-State Timer

## Compact, Multi-function Timers Fit G2R Relay Footprint

- The Push-In Plus Terminal Block Socket-compatible H3RN-□-B Timers in a black design join the Compact, Multi-function H3RN Timers.
- Standard multiple time ranges and multiple operating modes.
- Timers plug into P2RF-PU Sockets with Push-In Plus Terminals reducing wiring time by 60 percent
- UL listed.\*
- Conforms to CSA and CE Marking.

\*When used in combination with a Push-In Plus Terminal Block Socket (P2RF-□-PU).

Refer to Safety Precautions on page 6.

## Model Number Structure

### **Model Number Legend**

H3RN-<u></u> 1 <u>2</u> 1.Output 1: SPDT

2: DPST-NO

### 2.Time Range

None: Short-time range (0.1 s to 10 min)

1: Long-time range (0.1 min to 10 hrs)

## **Ordering Information**

## List of Models

Supply voltage	Time-limit contact	Short-time range model (0.1 s to 10 min)	Long-time range model (0.1 min to 10 h)
24 VAC;	SPDT	H3RN-1-B	H3RN-11-B
12, 24 VDC	DPST-NO	H3RN-2-B	H3RN-21-B

Note: Specify both the model number and supply voltage when ordering. Example: H3RN-1-B 24 VAC

## Accessories (Order Separately)

#### Socket

Timer	Track mounting/Front connecting socket
H3RN-1-B/-11-B	P2RF-05-PU
H3RN-2-B/-21-B	P2RF-08-PU



CEI

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

## H3RN-□-B

## Specifications

## Ratings

Item	H3RN-1-B/H3RN-2-B	H3RN-11-B/H3RN-21-B		
Time ranges	0.1 s to 10 min (1 s, 10 s, 1 min, or 10 min max. selectable)	0.1 min to 10 h (1 min, 10 min, 1 h, or 10 hrs max. selectable)		
Rated supply voltage *2	24 VAC (50/60 Hz); 12, 24 VDC	24 VAC (50/60 Hz); 12, 24 VDC		
Pin type	Plug-in	Plug-in		
Operating mode	ON-delay, interval, flicker OFF-start, or flicker-ON	ON-delay, interval, flicker OFF-start, or flicker-ON start selectable by DIP switch		
Operating voltage range	85% to 110% of rated supply voltage (12 VDC: 90	85% to 110% of rated supply voltage (12 VDC: 90% to 110% of rated supply voltage) *1		
Reset voltage	10% max. of rated supply voltage	10% max. of rated supply voltage		
Power consumption	24 VAC: Relay ON: approx. 0.8 VA 12 VDC: Relay ON: approx. 0.5 W 24 VDC: Relay ON: approx. 0.4 W	12 VDC: Relay ON: approx. 0.5 W		
Control outputs	3 A at 250 VAC, resistive load ( $\cos\phi = 1$ ) (G6B-2 $\Box$ 14P-FD-US used (Contact materials : AgSnIn)) The minimum applicable load is 10 mA at 5 VDC (P reference value).			

\*1. When using the H3RN in any place where the ambient temperature is more than 50°C, supply 90% to 110% of the rated voltages (12 VDC: 95% to 110% of the rated voltage).
\*2. Refer to Safety Precautions for All Times when combining the Timer with an AC 2-wire proximity sensor.

## **Characteristics**

Item	H3RN-1-B/H3RN-2-B	H3RN-11-B/H3RN-21-B		
Accuracy of operating time	±1% FS max. (1 s range: ±1%±10 ms max.)			
Setting error	±15%±50 ms FS max.			
Reset time	Min. power-opening time: 12, 24 VDC: 0.1 s max. (including halfway reset) 24 VAC: 0.5 s max. (including halfway reset)			
Influence of voltage	±2% FS max.	±2% FS max.		
Influence of temperature	±2% FS max.	±2% FS max.		
Insulation resistance	100 MΩ min. (at 500 VDC)	100 MΩ min. (at 500 VDC)		
Dielectric strength	poles)	2,000 VAC, 50/60 Hz for 1 min (between operating circuit and control output, or contacts of different poles) 1,000 VAC, 50/60 Hz for 1 min (between non-continuous contacts)		
Vibration resistance		Destruction: 10 to 55 Hz, 0.75-mm single amplitude for 1 h each in 3 directions Malfunction: 10 to 55 Hz, 0.5-mm single amplitude for 10 min each in 3 directions		
Shock resistance	Destruction: 980 m/s <sup>2</sup> <b>*</b> 1 Malfunction: 100 m/s <sup>2</sup>			
Ambient temperature	Operating: -10°C to 55°C (with no icing) Storage: -25°C to 65°C (with no icing)			
Ambient humidity	Operating: 35% to 85%	Operating: 35% to 85%		
Life expectancy		Mechanical:10,000,000 operations min. (under no load at 1,800 operations/h)Electrical:100,000 operations min. (3 A at 250 VAC, resistive load at 1,800 operations/h)		
Impulse withstand voltage	Between power terminals: 1 kV	Between power terminals: 1 kV		
Noise immunity	$\pm$ 1.5 kV, square-wave noise by noise simulator (pulse	e width: 100 ns/1 μs, 1-ns rise)		
Static immunity	Destruction: 8 kV Malfunction: 4 kV			
Degree of protection	IP40 (Terminal screw sections are excluded.)	IP40 (Terminal screw sections are excluded.)		
Weight	Approx. 18 g			
ЕМС	(EMI)EN 61812-1Emission Enclosure:EN 55011 GroupEmission AC Mains:EN 55011 Group(EMS)EN 61812-1Immunity ESD:IEC 61000-4-2Immunity RF-interference:IEC 61000-4-3Immunity Surge:IEC 51000-4-4Immunity Surge:IEC 61000-4-5Immunity Conducted Disturbance:IEC 61000-4-6Immunity Voltage Dip/Interruption:IEC 61000-4-11			
Approved standards	cULus (or cURus): UL 508/CSA C22.2 No.14 *2, CSA C22.2 No.14 Conforms to EN 61812-1, IEC 60664-1 4 kV/2.			

**\*1.** The destructive shock resistance test was performed on a standalone Timer. **\*2.** cULus (Listing): Applicable when an OMRON P2RF-□-PU Socket is used.

cURus (Recognition): Applicable when any other socket is used.

## H3RN-D-B

## Connections

## Connection

A1 (5)

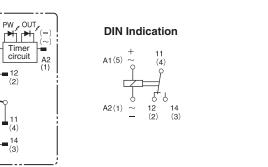
#### H3RN-1-B/H3RN-11-B

12

(2

4 3

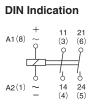
Bottom View



PW,OUT, [▶¶][▶¶] (-) (~) Timer circuit A1 (8) A2 (1)21 (6) 24 (5)

Bottom View

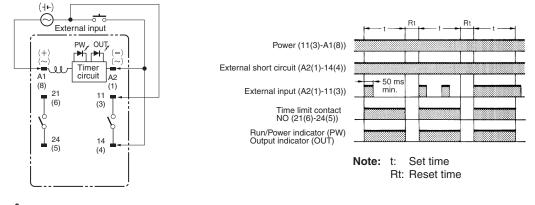
H3RN-2-B/H3RN-21-B



**Pulse Operation** 

A pulse output for a certain period can be obtained with a random external input signal. Use the H3RN in interval mode as shown in the following timing charts.

#### H3RN-2-B/H3RN-21-B

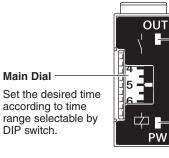


-<u>A</u>Caution

Be careful when connecting wires.

Mode	Terminals
Pulse operation	Power supply between 11(3) and A1(8) Short-circuit between 14(4) and A2(1) Input signal between 11(3) and A2(1)
Operating mode; interval and all other modes	Power supply between A2(1) and A1(8)

## H3RN-⊡-B Nomenclature



- Output Indicator (Orange) (Lit: Output ON)

Run/Power Indicator (Green) (Lit: Power ON)

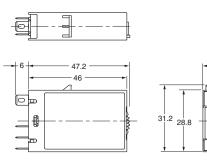
12.8

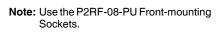
## Dimensions

## Timers

H3RN-1-B/H3RN-11-B Front Mounting



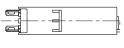


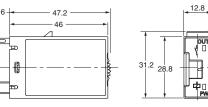


(Unit: mm)

#### H3RN-2-B/H3RN-21-B Front Mounting

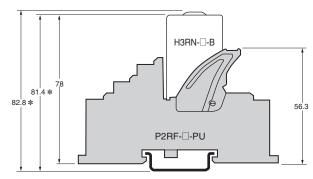






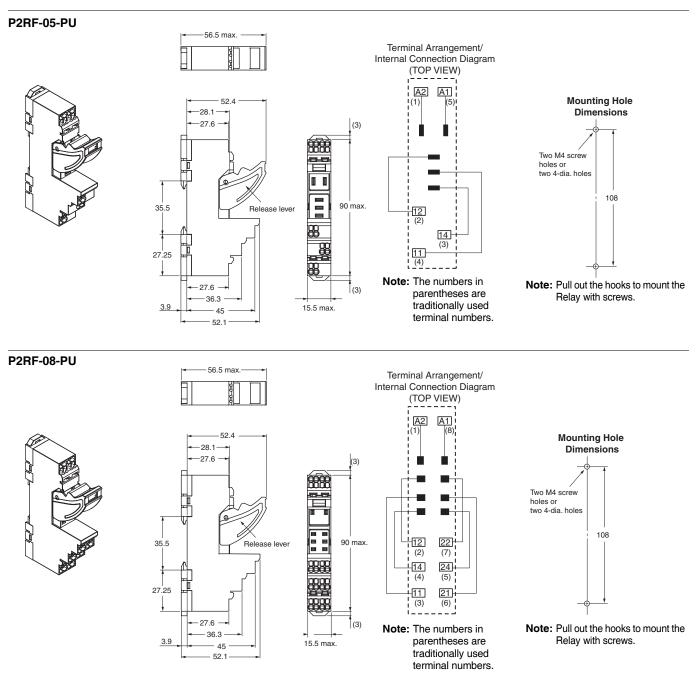
Note: Use the P2RF-08-PU Front-mounting Sockets.

#### P2RF-□-E



Note: There are no restrictions to the mounting direction. ★ These values apply when the PFP-□N is used. Add 9 mm if you use the PFP-□N2.

## **Connecting Sockets**

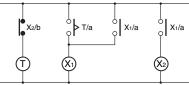


## H3RN-□-B

## **Safety Precautions**

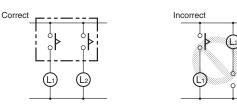
#### Precautions for Correct Use

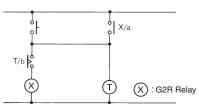
- When using the H3RN --B in any place where the ambient temperature is more than 50°C, supply 90% to 110% of the rated voltages (at 12 VDC: 95% to 110%).
- Do not leave the H3RN-□-B in time-up condition (i.e., with the internal relay in an ON state) for a long period of time (for example, more than one month in any place where the ambient temperature is high), otherwise the internal parts may become damaged. Therefore, the use of the H3RN-□-B with a relay as shown in the following circuit diagram is recommended.



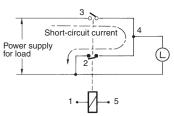
(X) : Auxiliary relay such as G2R Relay

- The H3RN must be disconnected from the socket when setting the DIP switch, otherwise the user may touch a terminal imposed with a high voltage and get an electric shock.
- Do not connect the H3RNB as shown in the following circuit diagram on the right hand side, otherwise the H3RNB's internal contacts different from each other in polarity may become shortcircuited.





- In the case of the above circuit, the H3RN -B will be in pulse
   operation. Therefore, if the circuit shown on page 3 is used, no
   auxiliary relay will be required.
- Do not use the SPDT contact in a circuit which may cause shortcircuiting at three points (otherwise, short-circuiting of the power supply may occur) because the SPDT contact of H3RN-1-B/-11-B is composed of an SPST-NC contact.



- Do not set to the minimum setting in the flicker modes, otherwise the contact may be damaged.
- Do not use the H3RN--B in places where there is excessive dust, corrosive gas, or direct sunlight.
- Make sure that there is a space of 3 mm or more between any H3RN-□-B Models next to each other. (When using the P2RF-08-PU Socket, a space of 3 mm or more will be secured.) If a space of 3 mm or more is not secured, the ambient temperature must be less than 50°C.
- The internal parts may become damaged if a supply voltage other than the rated ones is imposed on the H3RN-□-B.

## Precautions for EN 61812-1 Conformance

The H3RN- $\Box$ -B as a built-in timer conforms to EN 61812-1 provided that the following conditions are satisfied.

#### Handling

#### Wiring

- Basic insulation is ensured between the H3RN-□-B's operating circuit and control output.
  - Basic insulation: Overvoltage category III,
    - pollution degree 2

(with a clearance of 3.0 mm and a creepage distance of 3.0 mm at 240 VAC)

 When using the P2RF-□-PU Socket, basic insulation is ensured in the mounted condition for a voltage of 250 VAC max.

## Recommended Replacement Periods and Periodic Replacement as Preventive Maintenance

The recommended replacement period for preventive maintenance is greatly influenced by the application environment of the product. As a guideline for models that do not have a Maintenance Forecast Monitor, the recommended replacement period is 7 to 10 years.\* To

prevent failures that can be caused by using a product beyond its service life, we recommend that you replace the product as early as possible within the recommended replacement period. However, realize that the recommended replacement period is for reference only and does not guarantee the life of the product.

Many electronic components are used in the product and the product depends on the correct operation of these components to achieve product functions and performance. However, the influence of the ambient temperature on aluminum electrolytic capacitors is large, and the service life is reduced by half for each 10°C rise in temperature (Arrhenius law). When the capacity reduction life of the electrolytic capacitor is reached, the product may fail. We therefore recommend that you replace the product periodically to minimize product failures in advance.

- \* The following conditions apply: rated input voltage, load rate of 50% max., ambient temperature of 35°C max., and the standalone mounting method.
  - This product model is designed with a service life of 10 years minimum under the above conditions.

## Operation

## **DIP Switch Settings**

The 1-s range and ON-delay mode for H3RN-1-B/-2-B, 1-min range and ON-delay mode for H3RN-11-B/-21-B are factory-set before shipping.

#### **Time Ranges**

Model	Time range	Time setting range	Setting	Factory-set
	1 s	0.1 to 1 s		Yes
H3RN-1-B,	10 s	1 to 10 s		No
H3RN-2-B	1 min	0.1 to 1 min		No
	10 min	1 to 10 min		No
	1 min	0.1 to 1 min		Yes
H3RN-11-B,	10 min	1 to 10 min		No
H3RN-21-B	1 h	0.1 to 1 h		No
	10 h	1 to 10 h		No

Note: The left two DIP switch pins are used to select the time ranges.

### **Operating Modes**

Operating mode	Setting	Factory-set
ON-delay		Yes
Interval		No
Flicker OFF-start		No
Flicker ON-start		No

Note: The right two DIP switch pins are used to select the operating modes.

## H3RN-□-B

Timing Chart			
Operating mode	Timing chart		
	H3RN-1-B/H3RN-11-B	H3RN-2-B/H3RN-21-B	
ON-delay Power	Power (A2(1)-A1(5))         Rt         t           Time limit contact NC (11(4)-12(2))         Time limit contact NO (11(4)-14(3))         Time limit contact NO (11(4)-14(3))           Run/Power indicator (PW)         Time limit contact Output indicator (OUT)         Time limit contact Time limit contact NO (11(4)-14(3))	Power (A2(1)-A1(8)) Time limit contact NO (14(4)-11(3),24(5)-21(6)) Run/Power indicator (PW) Output indicator (OUT)	
Interval Power	Power (A2(1)-A1(5))	Power (A2(1)-A1(8))	
Flicker OFF-start	Power (A2(1)-A1(5))	Power (A2(1)-A1(8))	
Flicker ON-start Power Output Output Note: t: Set time	Power (A2(1)-A1(5)) Time limit contact NC (11(4)-12(2)) Time limit contact NO (11(4)-14(3)) Run/Power indicator (PW) Output indicator (OUT)	Power (A2(1)-A1(8))	

Rt: Reset time

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