Solid-state Timer with Valuable Multiple-time Ranges and Multiple-operating Modes

- Handles a wide range of applications through eight operating modes.
- With H3BA-N8H models, the output type can be switched between time-limit DPDT and time-limit SPDT + instantaneous SPDT using a selector.
- Setting rings (order separately) to enable consistent settings and to limit the setting range.
- Panel Covers (order separately) to enable various panel designs.
- CE marking.

UL, CSA and CCC certification, conforms to LR.

■ Broad Line-up of H3B□-N Series

<table>
<thead>
<tr>
<th>H3B□-N</th>
<th>Multi-functional Timer</th>
<th>Twin Timer</th>
<th>Star-delta Timer</th>
<th>Power OFF-delay Timer</th>
</tr>
</thead>
<tbody>
<tr>
<td>H3BA-N</td>
<td>H3BA-N —— 11-pin model</td>
<td>H3BF-N —— 8-pin model</td>
<td>H3BG-N —— 8-pin model</td>
<td>H3BH-N —— 8-pin model</td>
</tr>
<tr>
<td>H3BA-NH —— 8-pin with instantaneous contact output and time-limit output</td>
<td></td>
<td>H3BG-N8 —— 8-pin with instantaneous contact output</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Refer to the H3BF-N/BG-N/BH-N Datasheet (Cat. No. L094-E1-02) for details.
Model Number Structure

Model Number Legend

H3BA-N□

1. Number of Pins/Output
   - None: 11-pin models/Time-limit DPDT
   - 8H: 8-pin models/Time-limit SPDT and switchable SPDT (time-limit ↔ instantaneous)

Ordering Information

List of Models

<table>
<thead>
<tr>
<th>Control output</th>
<th>Supply voltage</th>
<th>11-pin models</th>
<th>8-pin models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contact output: DPDT (time-limit output)</td>
<td>110 VAC (50/60 Hz)</td>
<td>H3BA-N 110 VAC</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>220 VAC (50/60 Hz)</td>
<td>H3BA-N 220 VAC</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>24 VDC</td>
<td>H3BA-N 24 VDC</td>
<td>---</td>
</tr>
<tr>
<td>Contact output: Time-limit SPDT and switchable SPDT (time-limit ↔ instantaneous)</td>
<td>110 VAC (50/60 Hz)</td>
<td>---</td>
<td>H3BA-N8H 110 VAC</td>
</tr>
<tr>
<td></td>
<td>220 VAC (50/60 Hz)</td>
<td>H3BA-N8H 220 VAC</td>
<td>---</td>
</tr>
<tr>
<td></td>
<td>24 VDC</td>
<td>H3BA-N8H 24 VDC</td>
<td>---</td>
</tr>
</tbody>
</table>

Accessories (Order Separately)

<table>
<thead>
<tr>
<th>Name/specifications</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flush Mounting Adapters</td>
<td>Y92F-30</td>
</tr>
<tr>
<td></td>
<td>Y92F-70</td>
</tr>
<tr>
<td></td>
<td>Y92F-71</td>
</tr>
<tr>
<td>Mounting Tracks</td>
<td>PFP-50N</td>
</tr>
<tr>
<td></td>
<td>50 cm (l) × 7.3 mm (t)</td>
</tr>
<tr>
<td></td>
<td>1 m (l) × 7.3 mm (t)</td>
</tr>
<tr>
<td></td>
<td>1 m (l) × 16 mm (t)</td>
</tr>
<tr>
<td>End Plate</td>
<td>PFP-M</td>
</tr>
<tr>
<td>Spacer</td>
<td>PFP-S</td>
</tr>
<tr>
<td>Protective Cover</td>
<td>Y92A-48B</td>
</tr>
<tr>
<td>Track Mounting/ Front Connecting Sockets</td>
<td>P2CF-08</td>
</tr>
<tr>
<td></td>
<td>8-pin</td>
</tr>
<tr>
<td></td>
<td>11-pin</td>
</tr>
<tr>
<td>Back Connecting Sockets</td>
<td>P3G-08</td>
</tr>
<tr>
<td></td>
<td>8-pin</td>
</tr>
<tr>
<td></td>
<td>11-pin</td>
</tr>
<tr>
<td>Time Setting Rings</td>
<td>P3GA-11</td>
</tr>
<tr>
<td></td>
<td>Setting a specific time</td>
</tr>
<tr>
<td></td>
<td>Limiting the setting range</td>
</tr>
<tr>
<td>Panel Covers (See note 1.)</td>
<td>Y92S-27</td>
</tr>
<tr>
<td></td>
<td>Light gray (5Y7/1)</td>
</tr>
<tr>
<td></td>
<td>Black (N1.5)</td>
</tr>
<tr>
<td>Panel Covers (See note 2.)</td>
<td>Y92P-48GL</td>
</tr>
<tr>
<td></td>
<td>Y92P-48GB</td>
</tr>
<tr>
<td>Hold-down Clips (See note 2.)</td>
<td>Y92H-1</td>
</tr>
<tr>
<td></td>
<td>For PL08 Socket</td>
</tr>
<tr>
<td></td>
<td>For PF085A Socket</td>
</tr>
<tr>
<td></td>
<td>Y92H-2</td>
</tr>
</tbody>
</table>

Note: 1. The Time Setting Ring and Panel Cover are sold together.
   2. Hold-down Clips are sold in sets of two.
Specifications

■ General

<table>
<thead>
<tr>
<th>Item</th>
<th>H3BA-N</th>
<th>H3BA-N8H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating mode</td>
<td>A: ON-delay</td>
<td>A: ON-delay</td>
</tr>
<tr>
<td></td>
<td>B: Flicker OFF start</td>
<td>H: ON-delay with instantaneous output contact</td>
</tr>
<tr>
<td></td>
<td>B2: Flicker ON start</td>
<td></td>
</tr>
<tr>
<td></td>
<td>C: Signal ON/OFF-delay</td>
<td></td>
</tr>
<tr>
<td></td>
<td>D: Signal OFF-delay</td>
<td></td>
</tr>
<tr>
<td></td>
<td>E: Interval</td>
<td></td>
</tr>
<tr>
<td></td>
<td>G: Signal ON/OFF-delay</td>
<td></td>
</tr>
<tr>
<td></td>
<td>J: One-shot</td>
<td></td>
</tr>
<tr>
<td>Pin type</td>
<td>11-pin</td>
<td>8-pin</td>
</tr>
<tr>
<td>Input type</td>
<td>No-voltage input</td>
<td>---</td>
</tr>
<tr>
<td>Output type</td>
<td>DPDT (time-limit)</td>
<td>SPDT (time-limit) and switchable SPDT (time-limit &lt;--&gt; instantaneous)</td>
</tr>
<tr>
<td>Mounting method</td>
<td>DIN track mounting, surface mounting, and flush mounting</td>
<td></td>
</tr>
<tr>
<td>Approved standards</td>
<td>UL508, CSA C22.2 No.14, LR, CCC</td>
<td>Conforms to EN61812-1 (Pollution degree 2 / Overvoltage category III)</td>
</tr>
<tr>
<td>EMC</td>
<td>EN61812-1</td>
<td>EN61812-1</td>
</tr>
<tr>
<td></td>
<td>Radiated Emissions: Emission EN 55011 class A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AC Mains: EN 55011 class A</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ESD Immunity: EN 61000-4-2: 6 kV contact discharge, 8 kV air discharge</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Radiated Radio-Frequency EN 61000-4-3: 10 V/m (80 MHz to 1 GHz AM modulation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Electromagnetic Field Immunity: EN 61000-4-3: 3 V/m (1.4 GHz to 2 GHz AM modulation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 V/m (2 GHz to 2.7 GHz AM modulation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>10 V/m (900 MHz Pulse modulation)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Conducted disturbances: Burst EN 61000-4-6: 10 V (0.15 MHz to 80 MHz)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Immunity: EN 61000-4-4: 2 kV power line</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2 kV I/O signal line</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Surge Immunity: EN 61000-4-5: 2 kV common mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 kV differential mode</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Voltage dips: EN 61000-4-11</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Voltage interruptions: EN 61000-4-11</td>
<td></td>
</tr>
</tbody>
</table>

■ Time Ranges

<table>
<thead>
<tr>
<th>Time unit</th>
<th>sec</th>
<th>× 10 s</th>
<th>min</th>
<th>× 10 m</th>
<th>hrs</th>
<th>× 10 h</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full scale setting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.2</td>
<td>0.05 to 1.2</td>
<td>1.2 to 12</td>
<td>0.12 to 1.2</td>
<td>1.2 to 12</td>
<td>0.12 to 1.2</td>
<td>1.2 to 12</td>
</tr>
<tr>
<td>3</td>
<td>0.03 to 3</td>
<td>3 to 30</td>
<td>0.03 to 3</td>
<td>3 to 30</td>
<td>0.03 to 3</td>
<td>3 to 30</td>
</tr>
<tr>
<td>12</td>
<td>0.12 to 12</td>
<td>12 to 120</td>
<td>0.12 to 12</td>
<td>12 to 120</td>
<td>0.12 to 12</td>
<td>12 to 120</td>
</tr>
<tr>
<td>30</td>
<td>0.12 to 12</td>
<td>12 to 120</td>
<td>0.12 to 12</td>
<td>12 to 120</td>
<td>0.12 to 12</td>
<td>12 to 120</td>
</tr>
</tbody>
</table>
## Ratings

<table>
<thead>
<tr>
<th>Item</th>
<th>H3BA-N</th>
<th>H3BA-N8H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated supply voltage</td>
<td>110 VAC (50/60 Hz), 220 VAC (50/60 Hz), 24 VDC</td>
<td>110 VAC (50/60 Hz), 220 VAC (50/60 Hz), 24 VDC</td>
</tr>
<tr>
<td>Operating voltage range</td>
<td>85% to 110% of rated supply voltage</td>
<td>85% to 110% of rated supply voltage</td>
</tr>
<tr>
<td>Power reset</td>
<td>Minimum power-opening time: 0.1 s</td>
<td>Minimum power-opening time: 0.1 s</td>
</tr>
<tr>
<td>No-voltage input</td>
<td>ON impedance: 1 kΩ max.</td>
<td>ON impedance: 1 kΩ max.</td>
</tr>
<tr>
<td></td>
<td>ON residual voltage: 1 V max.</td>
<td>ON residual voltage: 1 V max.</td>
</tr>
<tr>
<td></td>
<td>OFF impedance: 200 kΩ min.</td>
<td>OFF impedance: 200 kΩ min.</td>
</tr>
<tr>
<td>Power consumption</td>
<td>110 VAC: Approx. 4.6 VA (1.5 W)</td>
<td>110 VAC: Approx. 3.6 VA (1.6 W)</td>
</tr>
<tr>
<td></td>
<td>220 VAC: Approx. 7.6 VA (1.3 W)</td>
<td>220 VAC: Approx. 7.8 VA (1.9 W)</td>
</tr>
<tr>
<td></td>
<td>24 VDC: Approx. 0.6 W</td>
<td>24 VDC: Approx. 0.9 W</td>
</tr>
<tr>
<td>Control outputs</td>
<td>Contact: 5 A at 250 VAC, resistance load (cosφ = 1)</td>
<td>Contact: 5 A at 250 VAC, resistance load (cosφ = 1)</td>
</tr>
</tbody>
</table>

**Note:**
1. DC ripple rate: 20% max.
2. Models other than 24-VDC H3BA-N models cause an inrush current. Pay careful attention when attempting to turn on power to such models with non-contact output from a device such as a sensor.
3. 90% or higher if the Timer is used continuously at a high ambient temperature.

## Characteristics

<table>
<thead>
<tr>
<th>Item</th>
<th>H3BA-N</th>
<th>H3BA-N8H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accuracy of operating time</td>
<td>±0.3% FS max. (±0.3%±10 ms in a range of 1.2 s)</td>
<td>±0.3% FS max. (±0.3%±10 ms in a range of 1.2 s)</td>
</tr>
<tr>
<td>Setting error</td>
<td>±5% FS ±0.05 s max.</td>
<td>±5% FS ±0.05 s max.</td>
</tr>
<tr>
<td>Reset time</td>
<td>Min. power-opening time: 0.1 s max.</td>
<td>Min. power-opening time: 0.1 s max.</td>
</tr>
<tr>
<td></td>
<td>Min. pulse-input time: 50 ms</td>
<td>Min. pulse-input time: 50 ms</td>
</tr>
<tr>
<td>Influence of voltage</td>
<td>±0.5% FS max. (±0.5%±10 ms in a range of 1.2 s)</td>
<td>±0.5% FS max. (±0.5%±10 ms in a range of 1.2 s)</td>
</tr>
<tr>
<td>Influence of temperature</td>
<td>±2% FS max. (±2%±10 ms in a range of 1.2 s)</td>
<td>±2% FS max. (±2%±10 ms in a range of 1.2 s)</td>
</tr>
<tr>
<td>Insulation resistance</td>
<td>100 MΩ min. (at 500 VDC)</td>
<td>100 MΩ min. (at 500 VDC)</td>
</tr>
<tr>
<td>Dielectric strength</td>
<td>2,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and exposed non-current-carrying metal parts</td>
<td>2,000 VAC, 50/60 Hz for 1 min between control output terminals and operating circuit</td>
</tr>
<tr>
<td></td>
<td>2,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and exposed non-current-carrying metal parts</td>
<td>1,000 VAC, 50/60 Hz for 1 min between contacts not located next to each other (750 VAC for H3BA-N8H)</td>
</tr>
<tr>
<td>Impulse withstand voltage</td>
<td>1 kV (between power terminals)</td>
<td>2 kV (between power terminals)</td>
</tr>
<tr>
<td></td>
<td>2 kV (between current-carrying terminal and exposed non-current-carrying metal parts, 1.5 kV for 24-VDC models)</td>
<td>2 kV (between current-carrying terminal and exposed non-current-carrying metal parts, 1.5 kV for 24-VDC models)</td>
</tr>
<tr>
<td>Noise immunity</td>
<td>AC models: ±1.5 kV (between power terminals), and ±600 V (between input terminals), square-wave noise by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise)</td>
<td>DC models: ±480 V (between power terminals), and ±600 V (between input terminals), square-wave noise by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise)</td>
</tr>
<tr>
<td>Static immunity</td>
<td>Malfunction: 4 kV</td>
<td>Destruction: 8 kV</td>
</tr>
<tr>
<td>Vibration resistance</td>
<td>Malfunction: 10 to 55 Hz with 0.75-mm single amplitude each in three directions</td>
<td>Malfunction: 10 to 55 Hz with 0.75-mm single amplitude each in three directions</td>
</tr>
<tr>
<td>Shock resistance</td>
<td>Malfunction: 1,000 m/s² (approx. 100G) each in three directions</td>
<td>Malfunction: 1,000 m/s² (approx. 100G) each in three directions</td>
</tr>
<tr>
<td>Ambient temperature</td>
<td>Operating: –10°C to 55°C (with no icing)</td>
<td>Operating: –10°C to 55°C (with no icing)</td>
</tr>
<tr>
<td></td>
<td>Storage: –25°C to 65°C (with no icing)</td>
<td>Storage: –25°C to 65°C (with no icing)</td>
</tr>
<tr>
<td>Life expectancy</td>
<td>Mechanical: 10 million operations min. (under no load at 1,800 operations/h)</td>
<td>Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 1,800 operations/h)</td>
</tr>
<tr>
<td></td>
<td>Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 1,800 operations/h)</td>
<td>Electrical: 100,000 operations min. (5 A at 250 VAC, resistive load at 360 operations/h)</td>
</tr>
<tr>
<td>Case color</td>
<td>Light gray (Munsell 5Y7/1)</td>
<td>Light gray (Munsell 5Y7/1)</td>
</tr>
<tr>
<td>Enclosure ratings</td>
<td>IEC: IP40 (panel surface)</td>
<td>IEC: IP40 (panel surface)</td>
</tr>
<tr>
<td>Weight</td>
<td>Approx. 95 g</td>
<td>Approx. 95 g</td>
</tr>
</tbody>
</table>

**Note:** For setting the time-limit of the Timer to a cycle of less than 3 seconds or applying the forced reset, use the H3BA-N in mode D (signal OFF-delay).
Nomenclature

H3BA-N

- Power Indicator (Green): Lit when Timer operates.
- Operating Mode Display Window
- Operating Mode Selector: Select a mode from A, B, B2, C, D, E, G, and J.
- Scale Range Display Windows
- Time Unit Selector: Select a unit from sec, 10 s, min, 10 m, hrs, and 10 h.
- Time setting knob (set time)
- Output Indicator (Orange): Lit when Timer outputs.
- Time Range Selector: Select one from 1.2, 3, 12, and 30.

H3BA-N8H

- Power Indicator (Green): Lit when Timer operates.
- Output Type Display Window
- Output Type Selector: Select a type from A and H
  - A: Time-limit DPDT (default setting)
  - H: Time-limit SPDT and instantaneous SPDT
- Scale Range Display Windows
- Time Unit Selector: Select a unit from sec, 10 s, min, 10 m, hrs, and 10 h.
- Time setting knob (set time)
- Time Range Selector: Select one from 1.2, 3, 12, and 30.
### Operation

#### Block Diagrams

**H3BA-N**

- AC (DC) input
- Power supply circuit
- Oscillation circuit
- Time range/unit selectors
- Operating mode selector
- Counting circuit
- Output circuit
- Indicator circuit
- Input circuit
- Reset input, start input, and gate input
- Power-ON indicator
- Output-ON indicator

**H3BA-N8H**

- AC (DC) input
- Power supply circuit
- Oscillation circuit
- Time range/unit selectors
- Operating mode selector
- Counting circuit
- Output circuit
- Indicator circuit
- Output type selector
- Power-ON indicator
- Output-ON indicator
- Instantaneous output circuit

#### I/O Functions

<table>
<thead>
<tr>
<th>Inputs</th>
<th>Start</th>
<th>Starts time-measurement.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset</td>
<td></td>
<td>Interrupts time-measurement and resets time-measurement value. No time-measurement is made and control output is OFF while the reset input is ON.</td>
</tr>
<tr>
<td>Gate</td>
<td></td>
<td>Prohibits time-measurement.</td>
</tr>
</tbody>
</table>

| Outputs | Control output | Outputs are turned ON according to designated output mode when preset value is reached. |
### Basic Setting

#### Setting of Selector

The selectors can be turned clockwise and counterclockwise to select the desired time unit, time range, output type (only for H3BA-N8H) or operating mode. Each selector has a snap mechanism that secures the selector at a given position. Set the selector at a position at which it is secured. Do not set it midway between two securing positions or a malfunction could result from improper setting.

#### Selection of Operating Mode with H3BA-N

Turn the operating mode selector with a screwdriver until the desired operating mode (A, B, B2, C, D, E, G, or J) appears in the display window located above the selector.

#### Selection of Output Type with H3BA-N8H

Turn the output type selector with a screwdriver until the desired output type (A or H) appears in the display window located above the selector.

#### Selection of Time Unit and Time Range

The desired time unit (sec, 10 s, min, 10 m, hrs, or 10 h) is displayed in the window below the time setting knob by turning the time unit selector located at the lower right corner of the front panel. A time range (1.2, 3, 12, or 30) is selected with the time range selector at the lower left corner of the front panel, and the selected time range appears (in the window at the lower right part) within the plastic frame of the time setting knob.

### Using the Setting Ring

#### Setting a Specific Time

Mount the Panel Cover on the Timer, set the desired time with the time setting knob, and place Time Setting Ring A onto the time setting knob so that the time setting notch of Time Setting Ring A is in the center of the reset lock position of the Panel Cover.

#### Limiting the Setting Range

Example: To set a range of 10 and 20 s.

Mount the Panel Cover on the Timer, set the time setting knob to 10 s (the lower limit of the setting range), and place Time Setting Ring C onto the time setting knob so that the stopper of Time Setting Ring C is on the right edge of the reset lock position of the Panel cover. Next, set the time setting knob to 20 s (the upper limit of the setting range), place Time Setting Ring B onto the time setting knob so that the stopper of Time Setting Ring B is on the left edge of the reset lock position of the Panel Cover.
### Timing Chart

**Note:**
1. The minimum power-opening time ("Rt") is 0.1 s and the minimum pulse width is 0.05 s.
2. The letter "t" in the timing charts stands for the set time and "t–a" means that the period is less than the time set.

**H3BA-N**

<table>
<thead>
<tr>
<th>Operating mode</th>
<th>Timing chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: ON-delay</td>
<td><img src="image" alt="Timing Chart A" /></td>
</tr>
<tr>
<td>B: Flicker OFF start</td>
<td><img src="image" alt="Timing Chart B" /></td>
</tr>
<tr>
<td>B2: Flicker ON start</td>
<td><img src="image" alt="Timing Chart B2" /></td>
</tr>
<tr>
<td>C: Signal ON/OFF-delay</td>
<td><img src="image" alt="Timing Chart C" /></td>
</tr>
</tbody>
</table>
**Operating mode**

### D: Signal OFF-delay

<table>
<thead>
<tr>
<th>Power 2 and 10</th>
<th>Start 2 and 6</th>
<th>Reset 2 and 7</th>
<th>Output relay 1 and 4 (11 and 8) (NC)</th>
<th>Output relay (NO) (Output indicator) 1 and 3 (11 and 9)</th>
<th>Power indicator</th>
</tr>
</thead>
</table>

- **Basic operation**
  - Power
  - Start
  - Output

### E: Interval

<table>
<thead>
<tr>
<th>Power 2 and 10</th>
<th>Start 2 and 6</th>
<th>Reset 2 and 7</th>
<th>Output relay 1 and 4 (11 and 8) (NC)</th>
<th>Output relay (NO) (Output indicator) 1 and 3 (11 and 9)</th>
<th>Power indicator</th>
</tr>
</thead>
</table>

- **Basic operation**
  - Power
  - Start
  - Output

### G: Signal ON/OFF-delay

<table>
<thead>
<tr>
<th>Power 2 and 10</th>
<th>Start 2 and 6</th>
<th>Reset 2 and 7</th>
<th>Output relay 1 and 4 (11 and 8) (NC)</th>
<th>Output relay (NO) (Output indicator) 1 and 3 (11 and 9)</th>
<th>Power indicator</th>
</tr>
</thead>
</table>

- **Basic operation**
  - Power
  - Start (See note)
  - Output

**Note:** Start input is valid and retriggerable while the Timer is in operation.

### J: One-shot output

<table>
<thead>
<tr>
<th>Power 2 and 10</th>
<th>Start 2 and 6</th>
<th>Reset 2 and 7</th>
<th>Output relay 1 and 4 (11 and 8) (NC)</th>
<th>Output relay (NO) (Output indicator) 1 and 3 (11 and 9)</th>
<th>Power indicator</th>
</tr>
</thead>
</table>

- **Basic operation**
  - Power
  - Start (See note)
  - Output

**Note:** Start input is valid and retriggerable while the Timer is in operation. (Previous start input will be cancelled.)
**Gate Signal Input in Operating Mode A (ON-delay Operation)**

![Operating Mode A Diagram](image)

*Note:* The set time is the sum of \( t_1 \) and \( t_2 \).

**H3BA-N8H, Output Type: A Type**

<table>
<thead>
<tr>
<th>Operating mode</th>
<th>Timing chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: ON-delay</td>
<td><img src="image" alt="Timing Chart A" /></td>
</tr>
</tbody>
</table>

- **Basic operation**
  - Power 2 and 7
  - Output relay (NC) 8 and 5 (1 and 4)
  - Output relay (NO) 8 and 6 (1 and 3) and output indicator
  - Power indicator

**H3BA-N8H, Output Type: H Type**

<table>
<thead>
<tr>
<th>Operating mode</th>
<th>Timing chart</th>
</tr>
</thead>
<tbody>
<tr>
<td>H: ON-delay with instantaneous output contact</td>
<td><img src="image" alt="Timing Chart H" /></td>
</tr>
</tbody>
</table>

- **Basic operation**
  - Power 2 and 7
  - Output relay 8 and 5 (NC)
  - Output relay 8 and 6 (NO) (output indicator)
  - Instantaneous 1 and 4 output relay (NC)
  - Instantaneous 1 and 3 output relay (NO)
  - Power indicator
### Dimensions

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

**H3BA-N**

**H3BA-N8H**

**Dimensions with Set Ring**

**Dimensions with Y92F-30 Flush Mounting Adapter**

**Panel Cutout**

**Note:** The mounting panel thickness should be 1 to 5 mm.
Dimensions with Y92F-70 Flush Mounting Adapter

Dimensions with Y92F-71 Flush Mounting Adapter

Track Mounting

Flush Mounting

Note: These dimensions vary with the kind of DIN track (reference value).

Note: The mounting panel thickness should be 1 to 3.2 mm.

Note: These dimensions vary with the kind of DIN track (reference value).
■ Accessories (Order Separately)

Track Mounting/Front Connecting Socket

**P2CF-08**

![Diagram of P2CF-08](image)

**P2CF-11**

![Diagram of P2CF-11](image)

Back Connecting Socket

**P3G-08**

![Diagram of P3G-08](image)

**P3GA-11**

![Diagram of P3GA-11](image)

Mounting Track

**PFP-100N, PFP-50N**

![Diagram of PFP-100N](image)

**PFP-100N2**

![Diagram of PFP-100N2](image)

**Terminal Arrangement/Internal Connections**

- **Top View**
  - Eight, M3.5 x 7.5 sems
  - Two, 4.5 dia. holes

- **Bottom View**
  - Eleven, M3.5 x 7.5 sems
  - Two, 4.5 dia. holes

**Surface Mounting Holes**

- Two, 4.5 dia. or two, M4

**Terminal Arrangement/Internal Connections**

- **Top View**
  - Eight, M3.5 x 7.5 sems
  - Two, 4.5 dia. holes

- **Bottom View**
  - Eleven, M3.5 x 7.5 sems
  - Two, 4.5 dia. holes

**Mounting Track**

- **PFP-100N**
  - L: 7.3±0.15
  - Width: 27±0.15

- **PFP-50N**
  - L: 7.3±0.15
  - Width: 27±0.15

- **PFP-100N2**
  - L: 16
  - Width: 29.2

**L: Length**

- 1 m: PFP-100N
- 50 cm: PFP-50N
- 1 m: PFP-100N2
End Plate

PFP-M

Spacer

PFP-S

Protective Cover

Y92A-48B

The protective cover protects the front panel, particularly the time setting section, against dust, dirt, and water. It also prevents the set value from being altered due to accidental contact with the time setting knob.

Note: 1. The Y92A-48B Protective Cover is made of a hard plastic and therefore it must be removed to change the timer set value.

2. The Protective Cover cannot be mounted if the Panel Cover (sold separately) is used on the Timer.

Y92A-48B

Time Setting Ring/Panel Cover

There are two types of Panel Covers (Y92P-48GL, Y92P-48GB), all of which are available in two colors. Use the most suitable type of Panel Cover with the design of the scaling plate according to the application.

When setting a given time for the Timer, use of the Y92S-27 or Y92S-28 Time Setting Ring facilitates the time setting operation and minimizes possible setting errors by operators.

The Time Setting Ring and Panel Cover should be used as a pair.

<table>
<thead>
<tr>
<th>Setting a specific time</th>
<th>Limiting the setting range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time Setting Ring A (Y92S-27) and Panel Cover (Y92P-48GL, -48GB)</td>
<td>Time Setting Ring B or C (Y92S-28), and Panel Cover (Y92P-48GL, -48GB)</td>
</tr>
</tbody>
</table>

Y92S-27
Time Setting A
Y92S-28
Time Setting B
Y92S-28
Time Setting C

Y92P-48GL
Light Gray
Y92P-48GB
Black

Hold-down Clip

Y92H-1
For PL08 Socket
Y92H-2
For PF085A Socket
Installation

■ Terminal Arrangement

H3BA-N (Contact Output)

Note: The output contact can be set to either instantaneous or time-limit contact using the output type selector located at the upper right corner of the front panel.

H3BA-N8H (Contact Output)

Note: The delayed contacts of conventional timers are shown as follows:

The contact symbol of the H3BA-N is expressed as follows because of its multiple operating modes:

The instantaneous contacts of conventional timers are shown as follows:
**Input Connections**

The inputs of the H3BA-N are no-voltage (short circuit or open) inputs.

**No-voltage Inputs**

**No-contact Input**  
(Connection to NPN open collector output sensor.)

- 12 to 24 VDC  
  (sensor power supply)

**Contact Input**

- Operates with relay ON

**No-contact Input Signal Levels**

<table>
<thead>
<tr>
<th>No-contact Input</th>
<th>Contact Input</th>
</tr>
</thead>
</table>
| 1. Short-circuit level  
  Transistor ON  
  Residual voltage: 1 V max.  
  Impedance when ON: 1 kΩ max. | Use contacts which can adequately switch 0.1 mA at 5 V |
| 2. Open level  
  Transistor OFF  
  Impedance when OFF: 200 kΩ min. |   |
Safety Precautions

Warning Indications

<table>
<thead>
<tr>
<th>CAUTION</th>
<th>Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.</th>
</tr>
</thead>
</table>

Precautions for Safe Use

Supplementary comments on what to do or avoid doing, to use the product safely.

Precautions for Correct Use

Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

Environmental Precautions

Please observe the following precautions for safe use of this product.

Store the Timer within specified ratings. If the Timer has been stored at -10°C or lower, let it stand for 3 hours or longer at room temperature before turning ON the power supply.

Use the Timer within the specified ratings for operating temperature and humidity.

Do not operate the Timer in locations subject to sudden or extreme changes in temperature, or locations where high humidity may result in condensation.

Do not use the Timer in locations subject to excessive dust, corrosive gas, or direct sunlight.

Do not use the Timer in locations subject to vibration or shock.

Extended use in such locations may result in damage due to stress.

Install the Timer well away from any sources of static electricity, such as pipes transporting molding materials, powders, or liquids.

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.

Pay careful attention to polarity to prevent wrong connections when wiring terminals.

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.

The Timer uses a transformerless power supply. Do not touch the input terminals while the supply voltage is being applied, otherwise an electric shock may occur.

Precautions for Correct Use

Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.

Meaning of Product Safety Symbols

- Used to warn of the risk of electric shock under specific conditions.
- Used to warn of the risk of minor injury caused by high temperatures.
- Used for general mandatory action precautions for which there is no specified symbol.
- Use to indicate prohibition when there is a risk of minor injury from electrical shock or other source if the product is disassembled.

CAUTION

Minor electric shock may occasionally occur. Do not disassemble the product or touch the interior of the Timer.

Minor burns may occasionally occur. Do not touch the product while power is being supplied or immediately after power is turned OFF.

Minor fires may occasionally occur. Tighten terminal screws to a torque of 1.08 N·m so that they do not become loose.

Minor electric shock may occasionally occur during operation. Install the terminal cover.

Minor electric shock, fire, or malfunction may occasionally occur. Do not allow metal fragments, lead wire scraps, or chips from processing during installation to fall inside the Timer.
Precautions for Correct Use

Changing the Setting
Do not change the time unit, time range, or operation mode while the Timer is in operation, otherwise the Timer may malfunction.

Connecting the Operating Power Supply
The H3BA-N contains a capacitor-drop power circuit. Use a sinusoidal power supply with a commercial frequency. Do not use power supplies with a high frequency component (such as inverter power supplies) for Timers with 110 or 220-VAC specifications. Using these power supplies can damage internal circuits.

If voltages other than the rated voltage is applied, the internal components may be damaged. The internal element (varistor) will be damaged if a voltage of higher than 100 VAC is applied to the 24-VDC line.

Connect the power supply voltage through a relay or switch in such a way that the voltage reaches a fixed value immediately or the Timer may not be reset or a timer error could result.

A DC power supply can be connected if its ripple factor is 20% or less and the mean voltage is within the rated operating voltage range of the Timer.

If the wiring to the terminal 2 (common terminal for both the power supply and input signals) is broken, the internal circuit will be destroyed.

![Diagram of H3BA-N Timer](Image)

Input/Output
An appropriate input will be applied to the input signal terminals of the Timer when one of the input terminals (terminals 5, 6, and 7) and the common terminal (terminal 2) for the input signals are short-circuited. Do not attempt to connect any input terminal to any terminal other than the specified input and common terminals or to apply voltage across other than the specified input and common terminals or the internal circuits of the Timer may be damaged.

![Diagram of Input/Output Connections](Image)

Note: 1. Power supply terminal 2 is a common terminal for the input signals (G, S, R) to the Timer. Never use terminal 10 as the common terminal for this purpose, otherwise the internal circuit of the Timer may be damaged.

2. Do not connect a relay or any other load between these two points, otherwise the internal circuit of the Timer may be damaged due to the high-tension voltage applied to the input terminals.

Operating Time Setting
When setting the operating time, do not turn the setting knob beyond its scale range. For precise time setting, conduct operation tests by adjusting the setting knob.

The accuracy of the operating time of the Analog Timer is indicated by the percentage value on the basis of the full-scale time. The absolute fluctuation value will not be improved by changing the time setting. Therefore, when selecting the model, be sure that the application will be able to use a time setting as close as the full-scale time setting of the Timer.

Others
When conducting a dielectric test, impulse voltage test, or insulation resistance test between the electric circuit and non-current-carrying metal parts of the Timer mounted to a control panel, be sure to take the following steps. These steps will prevent the internal circuitry of the Timer from damage that may be caused if a machine on the control panel has an improper dielectric strength or insulation resistance.

1. Separate the Timer from the circuitry of the control panel by disconnecting the socket from the Timer or wires.

2. Short-circuit all terminals of the Timer.

If any device with no-contact output, such as a proximity sensor, photoelectric sensor, or SSR, is directly connected to the Timer, current leakage from the device may cause Timer malfunction. Be sure to test the device with the Timer before using the device for actual applications.

Before using the Timer to switch inductive loads, be sure to connect a surge absorbing element to the Timer in order to prevent the Timer from malfunction and damage. A diode is an example of a surge absorbing element for DC circuits and a surge absorber is an example of a surge absorbing element for AC circuits.

Do not leave the Timer in time-up condition for a month or longer in places with high temperatures, otherwise the internal parts, such as an electrolytic capacitor, of the Timer may be damaged. Use the Timer with an appropriate relay so that the Timer will not be left in time-up condition for a long time.

If the Timer is mounted in contact with a mounting surface, the service life of internal parts may be shortened. Provide at least 10 mm between the Timer and the mounting surface to prolong the service life of the Timer.

When the Timer is reset right after the Timer goes into time-up condition, be sure to provide the Timer with an appropriate circuit configuration considering the resetting time of the Timer so that a sequential error will not result.

![Diagram of Operating Time Setting](Image)

The Timer uses the constant value read method. Be careful when changing the set value because the output of the Timer will be ON when the set value coincides with the count value.

Be sure that the casing of the Timer is free from organic solvents, such as paint thinner and benzene, strong acid, and alkali solvents, which will damage the casing.

Note: It is impossible to connect more than two Timers in parallel.
### Mounting

#### Surface Mounting
There is no particular restriction on surface mounting directions, but be sure that the Timer is securely mounted horizontally.

#### P2CF Socket
When mounting the Timer vertically with the P2CF Socket, consider the movable hooks and be sure that there is a 20-mm space on each of the upper and lower parts of the Socket.

#### PL Socket
1. Secure the Socket to the panel surface with screws and insert the F-shaped hook into the sockets.
2. Connect the Timer to the Socket and press the tip of each hook by hand.

#### Panel Mounting
When the Y92F-30 Flush Mounting Adapter is used, insert the Timer into the square hole from the front side of the panel and put on the Flush Mounting Adapter from the rear side of the Timer. Press the Flush Mounting Adapter so that the space between the Flush Mounting Adapter and the panel is reduced as much as possible, and secure the Flush Mounting Adapter with screws.

When using the US08, be sure to use 10.5-dia. max. multi-conductor cable or 3-dia. max. insulated stranded wire for wiring.

When the Y92F-30, Y92F-70 or Y92F-71 Flush Mounting Adapter is used, just insert the Timer into the square panel hole. If the panel coating is too thick and the hooks do not click, spread open the hooks appropriately to the left and right after inserting the Timer to the hole.

#### Dismounting

#### Surface Mounting with P2CF
Loosen the screws of the Flush Mounting Adapter, spread open the hooks, and remove the Mounting Adapter.

#### Panel Mounting
Loosen the screws of the Flush Mounting Adapter, spread open the hooks, and remove the Mounting Adapter.

When the Y92F-30, Y92F-70, Y92F-71 Mounting Adapter is used, press the hook inwards with the thumb and index finger of both hands, and press the Timer towards the front side.
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