



- Large 7-digit display
- Leading “0”s in the display are eliminated for easy reading
- Wide counting range

## PRODUCT TYPE

### 1) Non-voltage input type

| Types                            | Part No.          |                      | Rated operating voltage                           | Max. current consumption                    | No. of digits | Counting speed | Input             |
|----------------------------------|-------------------|----------------------|---|---|---------------|----------------|-------------------|
|                                  | With manual reset | Without manual reset |   |   |               |                |                   |
| LC24-F<br>Flush mounting type    | LC24-F            | LC24-F-N             | Built-in battery<br>(Battery life: 10 years)      | —   | 7             | 30 cps         | Non-voltage input |
| LC24-C<br>PC board mounting type | LC24-C            | —                    | 3V DC<br>(Uses manganese dioxide lithium battery) | 20 $\mu$ A<br>(When resetting: 200 $\mu$ A) |               |                |                   |

### 2) Voltage input type

| Types                         | Part No.          |                      | Rated operating voltage                      | No. of digits | Counting speed | Input   |
|-------------------------------|-------------------|----------------------|--|---------------|----------------|---|
|                               | With manual reset | Without manual reset |  |               |                |   |
| LC24-F<br>Flush mounting type | LC24-F-AL         | LC24-F-AL-N          | Built-in battery<br>(Battery life: 6 years)  | 7             | 30 cps         | 100 to 120V AC/DC<br>(Signal reset is controlled by non-voltage type input) |
|                               | LC24-F-AH         | LC24-F-AH-N          |  |               |                | 200 to 240V AC/DC<br>(Signal reset is controlled by non-voltage type input) |
|                               | LC24-F-DL         | LC24-F-DL-N          | Built-in battery<br>(Battery life: 10 years) | 70 cps        | 4.5 to 30V DC  |   |

## SPECIFICATIONS

### Input signals

|                               |                             | Non-voltage input type  |                        | Voltage input type  |                                      |
|-------------------------------|-----------------------------|---|------------------------|---|--------------------------------------|
|                               |                             | Flush mounting type   | PC board mounting type | AC/DC input type  | DC input type                        |
| Operation signal              | Min. operating signal width | 16.7 ms (ON:OFF = 1:1)  |                        |   | 7.15 ms (ON:OFF = 1:1)               |
|                               | Input method                | Non-voltage input: Contact/Open collector   |                        | ON: 100 to 120V AC/DC,<br>200 to 240V AC/DC<br>OFF: 0 to 2V AC/DC | ON: 4.5 to 30V DC<br>OFF: 0 to 2V DC |
|                               | Input impedance             | Max. 1 k $\Omega$ when short-circuited<br>Min. 100 k $\Omega$ when open-circuited |                        |   | 10 k $\Omega$                        |
|                               | Residual voltage            | Max. 0.5 V  |                        |   | —                                    |
| Signal reset                  | Min. signal reset width     | 20ms  | 500ms                  | 20ms  |                                      |
|                               | Input method                | Non-voltage input: Contact/Open collector   |                        |   | ON: 4.5 to 30V DC<br>OFF: 0 to 2V DC |
|                               | Input impedance             | Max. 1 k $\Omega$ when short-circuited<br>Min. 100 k $\Omega$ when open-circuited |                        |   | 7.5 k $\Omega$                       |
|                               | Residual voltage            | Max. 0.5V   |                        |   | —                                    |
| Manual reset min. input width |                             | 20ms  | 500ms                  | 20ms  |                                      |

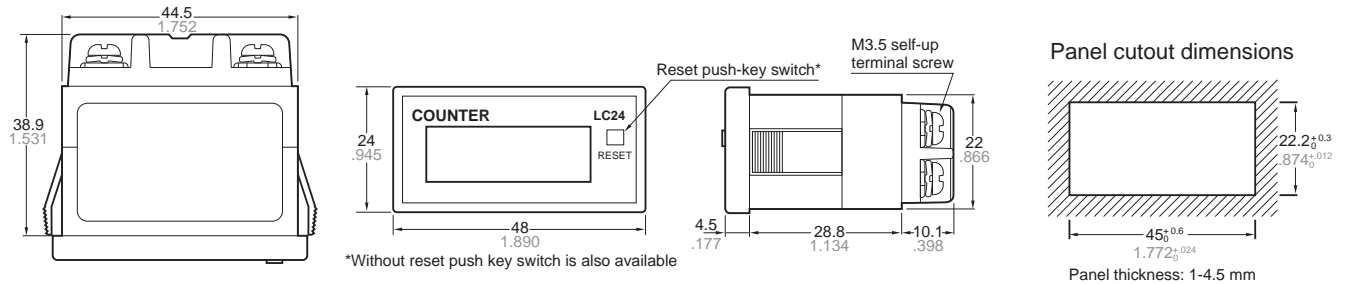
## Characteristics

|                         | Non-voltage input type        |  | Voltage input type |               |
|-------------------------|-------------------------------|--|--------------------|---------------|
|                         | LC24-F<br>Flush-mounting type | LC24-C<br>PC board mounting type                                       | AC/DC input type   | DC input type |
| Rated operating voltage | Built-in battery              | 3V DC<br>(manganese dioxide lithium battery)                           | Built-in battery   |               |
| Battery life            | 10 years                      | —  | 6 years            | 10 years      |
| Shock resistance        | Functional                    | 10G (4 times on 3 axes)  |                    |               |
|                         | Destructive                   | 30G (5 times on 3 axes)  |                    |               |
| Vibration resistance    | Functional                    | 10 to 55 Hz: 1 cycle/min double amplitude of 0.3 mm (10 min on 3 axes) |                    |               |
|                         | Destructive                   | 10 to 55 Hz: 1 cycle/min double amplitude of 0.75 mm (1 h on 3 axes)   |                    |               |
| Ambient temperature     | -10 to +55°C +14 to 131°F     |  |                    |               |
| Storage temperature     | -25 to +65°C +13 to 149°F     |  |                    |               |
| Ambient humidity        | 35 to 85% RH                  |  |                    |               |
| Counting direction      | Addition (UP)                 |  |                    |               |

## DIMENSIONS

LC24-F, flush mounting type (Common for non-voltage input type and voltage input type)

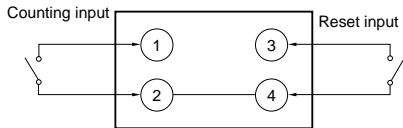
mm (inch)



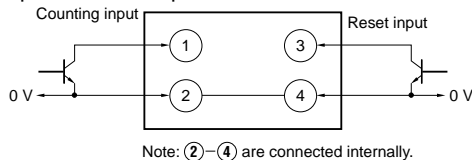
## WIRING DIAGRAM

1) Non-voltage input type

Contact input



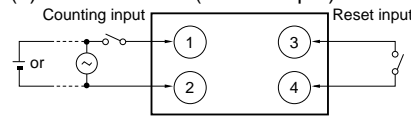
Open collector input



2) Voltage input type

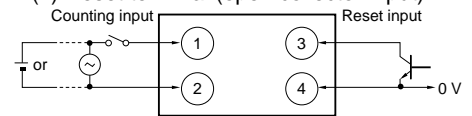
• AC/DC voltage input

(1) Reset terminal (contact input)



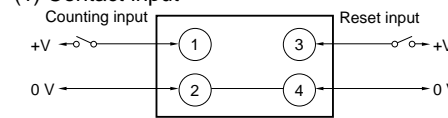
• Timing input terminals (1), (2) and reset input terminals (3), (4) are insulated internally.

(2) Reset terminal (open collector input)

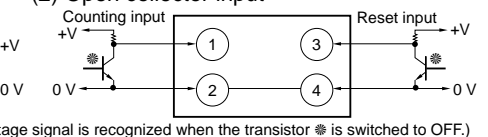


• DC voltage input

(1) Contact input

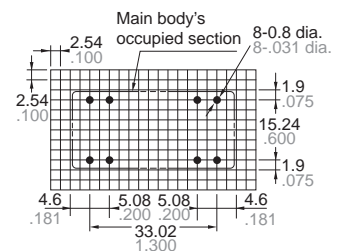
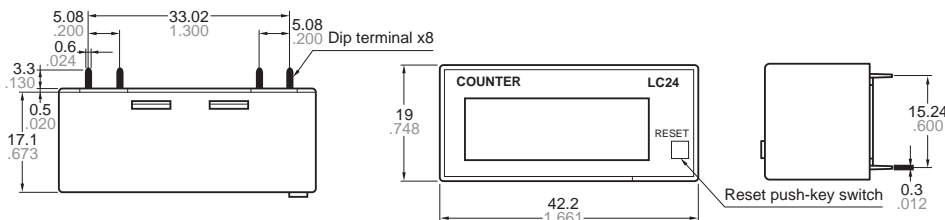


(2) Open collector input



LH24-C, PC board mounting type

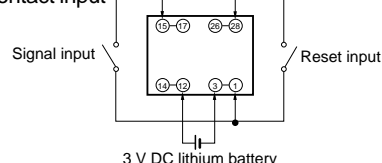
PC board pattern (Bottom view)



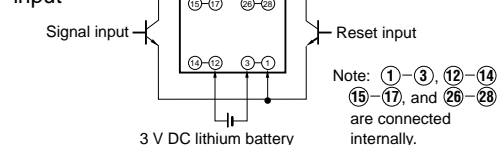
Compatible 28-pin dip terminal

## WIRING DIAGRAM

Contact input



Open collector input



# OPERATION EXPLANATION

|   |   |                    |
|---|---|--------------------|
| Addition<br><div style="border: 1px solid black; padding: 2px; display: inline-block;">UP</div> | <b>LC24-F type</b> <ul style="list-style-type: none"> <li>Counts when the operation signal is ON.</li> <li>While the reset input is ON, the signal time is not counted and the display is "0".</li> </ul> | <b>Example</b><br> |
|   | <b>LC24-C type</b> <ul style="list-style-type: none"> <li>Counts when the operation signal is ON.</li> <li>While the reset input is ON, the signal does not change.</li> </ul>                            | <b>Example</b><br> |

## CAUTIONS

### <Non-voltage input type>

- Since the current from the operation signal and reset input terminals [①-③ (flush mounting type), ⑮-⑱ (PC board mounting type)] is small, use relays and switches which have high-reliability contact performance.
- When input signals are triggered through the transistor's open collector, use a small signal transistor with an  $I_{CBO}$  less than  $1 \mu A$ , being sure to trigger them with no voltage across the collector.
- When connecting the signal input and reset input wires, do not run them parallel to high-voltage or power cables and avoid using the same conduit. Use shielded wires or metallic conduits which are as short as possible. If the floating capacitance of the wires exceeds  $500 \text{ pF}$  (approx.  $10 \text{ m}$  for parallel wires of  $2 \text{ mm}^2$ ), it will cause malfunctions.
- Lithium batteries are built in the flush mounting types. Never throw them into a fire. Do not dispose of them in trash intended to be incinerated.

### •PC board mounting type—

- After connecting the external power, be sure to reset it to make sure that "0" appears on the display.
- Battery life is calculated as follows:

$$t = \frac{A}{I}$$

- t: Battery life (h)
- I: Consumption current (mA)
- A: Battery capacity when the operating voltage becomes minimum.

### 3. Hand soldering:

|                      |   |
|----------------------|---|
| Soldering iron       | 30 W to 60 W  |
| Iron tip temperature | Approx. $300^\circ\text{C}$ ( $572^\circ\text{F}$ ) |
| Soldering time       | Less than approx. 3 seconds                         |

### <Voltage input type>

#### • AC/DC Voltage input type

- Apply voltage to the signal input terminal. Do not apply voltage to the reset input terminal. When voltage exceeding the range of the rated input voltage is applied to the signal input terminal, or if voltage is applied to the reset terminal, it may cause break-down of internal elements.
- Since the current from the reset input terminal is small, use relays and switches which have high-reliability contact performance.
- When reset is triggered through the transistor's open collector, use a small signal transistor with an  $I_{CBO}$  less than  $1 \mu A$ , being sure to trigger it with no voltage across the collector.
- For external reset, make a temporary short-circuit between the rear reset terminals [③-④].

#### • DC voltage input type

- When more than  $30 \text{ V DC}$  is applied to the signal or reset input terminals, it may cause breakdown of internal elements.
- For external reset, voltage is applied between the rear reset terminals [③-④] to the H level ( $4.5$  to  $30 \text{ V DC}$ ). In this case, connect (-) to terminal ④ and (+) to terminal ③. Since they are polarized, they will not operate with reverse polarity.

#### • Common

- When connecting the operation signal wires [①-②] and reset input wires [③-④], do not run them in parallel with high-voltage or power cables. Avoid running signal or reset wires in a power conduit. Use shielded wires or metal conduits which are as short as possible. If the floating capacitance of these wires exceeds  $500 \text{ pF}$  (approximately  $10 \text{ m}$  for parallel wires of  $2 \text{ mm}^2$ ), it will cause malfunctions.
- Lithium batteries are built in. Never throw them into a fire. Do not dispose of them in trash intended to be incinerated.