

LH2H Hour Meters

Timers/Time Switches/Counters/Hour Meters





Panel mounting type
One-touch installation type



Panel mounting type
Installation frame type



PC board mounting type

Features

1. 8.7 mm Character Height (previously 7 mm .343 inch)

Easy-to-read character height increased from 7 mm to 8.7 mm .276 inch to .343 inch.



2. Plenty of Digits



3. Select by switch between two time ranges in a single meter.

0 to 999999.9h/0 to 3999d23.9h switchable
0 to 999h59m59s/0 to 9999h59.9m switchable

4. Panel Mounting Type Features 2 Installation Methods

Comes with very easy one-touch installation type and also installation frame type that uses the frame on the timer/counter. Choose a method that suits the application.

5. Battery Replacement Easy on Environment

To replace battery simply remove body for the one-touch installation type, and remove battery lid for the installation frame type.

6. Screw Terminals Designed for Safety

Built in finger protection.

7. Panel Covers Replacable (Standard color is ash gray.)

Change the panel design by replacing with a black panel cover.

8. Conforms to IP66 Protective Construction (Only installation frame type.) (Front panel surface)

9. Input Methods

- 1) Non-voltage input method
- 2) Voltage input method
- 3) Free voltage input method

10. Backlight Type Added to Series and Now 2-color Switchable (green/red)

Easy viewing even in dark places and switchable between green and red (Voltage input type).

11. Compliant with UL, c-UL and CE marking.

RoHS Directive compatibility information
<http://www.nais-e.com/>

Product chart

| Type | | Standard type | | | Backlight type |
|------------------------|-----------------------------|------------------------|-------------------------------------|---|-------------------------------------|
| | | Non-voltage input type | Voltage input type (4.5 to 30 V DC) | Free voltage input type (24 to 240 V AC/DC) | Voltage input type (4.5 to 30 V DC) |
| Installation type | One-touch installation type | ○ | ○ | ○ | ○ |
| | Installation frame type | ○ | ○ | ○ | ○ |
| PC board mounting type | | ○ | — | — | — |

Product types

1. Panel mounting type

1) One-touch installation type

① Standard type

| No. digits | Measurement time range | Front reset | Input method | Part No. |
|------------|--|-------------|---|----------------|
| 7 digits | 0 to 999999.9h/0 to 3999d23.9h switchable | Yes | Non-voltage input type | LH2H-FE-DHK |
| | 0 to 999h59m59s/0 to 9999h59.9m switchable | | | LH2H-FE-HMK |
| | 0 to 999999.9h/0 to 3999d23.9h switchable | | Voltage input type (4.5 to 30 V DC) | LH2H-FE-DHK-DL |
| | 0 to 999h59m59s/0 to 9999h59.9m switchable | | | LH2H-FE-HMK-DL |
| | 0 to 999999.9h/0 to 3999d23.9h switchable | | Free voltage input type (24 to 240 V AC/DC) | LH2H-FE-DHK-FV |
| | 0 to 999h59m59s/0 to 9999h59.9m switchable | | | LH2H-FE-HMK-FV |

② Backlight type

| No. digits | Measurement time range | Front reset | Input method | Part No. |
|------------|--|-------------|-------------------------------------|------------------|
| 7 digits | 0 to 999999.9h/0 to 3999d23.9h switchable | Yes | Voltage input type (4.5 to 30 V DC) | LH2H-FE-DHK-DL-B |
| | 0 to 999h59m59s/0 to 9999h59.9m switchable | | | LH2H-FE-HMK-DL-B |

2) Installation frame type

① Standard type

| No. digits | Measurement time range | Front reset | Input method | Part No. |
|------------|--|-------------|---|---------------|
| 7 digits | 0 to 999999.9h/0 to 3999d23.9h switchable | Yes | Non-voltage input type | LH2H-F-DHK |
| | 0 to 999h59m59s/0 to 9999h59.9m switchable | | | LH2H-F-HMK |
| | 0 to 999999.9h/0 to 3999d23.9h switchable | | Voltage input type (4.5 to 30 V DC) | LH2H-F-DHK-DL |
| | 0 to 999h59m59s/0 to 9999h59.9m switchable | | | LH2H-F-HMK-DL |
| | 0 to 999999.9h/0 to 3999d23.9h switchable | | Free voltage input type (24 to 240 V AC/DC) | LH2H-F-DHK-FV |
| | 0 to 999h59m59s/0 to 9999h59.9m switchable | | | LH2H-F-HMK-FV |

② Backlight type

| No. digits | Measurement time range | Front reset | Input method | Part No. |
|------------|--|-------------|-------------------------------------|-----------------|
| 7 digits | 0 to 999999.9h/0 to 3999d23.9h switchable | Yes | Voltage input type (4.5 to 30 V DC) | LH2H-F-DHK-DL-B |
| | 0 to 999h59m59s/0 to 9999h59.9m switchable | | | LH2H-F-HMK-DL-B |

2. PC board mounting type

| No. digits | Measurement time range | Front reset | Input method | Part No. |
|------------|------------------------|-------------|------------------------|-------------|
| 7 digits | 0 to 999999.9h | No | Non-voltage input type | LH2H-C-H-N |
| | 0 to 9999h59.9m | | | LH2H-C-HM-N |

Specifications

1. Panel mounting type

| Item | Type | Standard type | | Backlight type | Standard type |
|---------------------------------|-------------------------|---|--|--|--|
| | | Non-voltage input | Voltage input | | Free voltage type |
| No. digits | | 7 digits | | | |
| External power supply | | Not required (built-in battery) | | | |
| Measurement time range | | 0 to 999999.9h/0 to 3999d23.9h (Switchable by switch) 0 to 999h59m59s/0 to 9999h59.9m (Switchable by switch) Separate product type | | | |
| Start input | Min. input signal width | 200 ms | | | |
| | Input method (signal) | Non-voltage input using contacts or open collector connection | High level: 4.5 to 30 V DC Low level: 0 to 2 V DC | High level: 24 to 240 V AC/DC Low level: 0 to 2.4 V AC/DC | |
| | Input impedance | When shorted: Max. 10 k Ω When open: Max. 750 k Ω | Approx. 4.7 k Ω | — | |
| | Residual voltage | Max. 0.5 V | — | — | |
| Reset input | Min. input signal width | 100 ms | | | |
| | Input method (signal) | Non-voltage input using contacts or open collector connection | High level: 4.5 to 30 V DC Low level: 0 to 2 V DC | Non-voltage input using contacts or open collector connection | |
| | Input impedance | When shorted: Max. 10 k Ω When open: Max. 750 k Ω | Approx. 4.7 k Ω | When shorted: Max. 10 k Ω When open: Max. 750 k Ω | |
| | Residual voltage | Max 0.5 V | — | Max. 0.5 V | |
| Display method | | 7-segment LCD | 7-segment LCD With green/red backlight | 7-segment LCD | |
| Breakdown voltage (initial) | | Between charged and uncharged parts: 1,000 V AC for 1 minute. | | | Between charged and uncharged parts: 2,000 V AC for 1 minute. |
| Insulation resistance (initial) | | Min. 100 M Ω (measured at 500 V DC) Measurement location same as for break down voltage. | | | |
| Backlight power | | — | 24 V DC (\pm 10%) | — | |
| Protective construction (Note) | | IEC Standard IP66 (only panel front: when using rubber gasket) | | | |
| Accessories (Note) | | Rubber gasket, mounting bracket | | | |
| Battery life | | 10 years (at 25°C 77°F) | | | |

Note) Only for installation frame type.

2. PC board mounting type

| Item | | Type | PC board mounting type |
|-----------------------------------|-------------------------|----------------|---|
| Input method | | | Non DC voltage input |
| No. digits | | | 7 digits |
| Rated operation voltage | | | 3 V DC |
| Allowable operation voltage range | | | 2.7 to 3.3 V DC |
| Current consumption | | | Max. 20 μ A (max. 200 μ A during reset input) |
| Measurement time range | | 0 to 999999.9h | 0 to 9999h59.9m |
| Start input | Min. input signal width | | 200 ms |
| | Input method | | Non-voltage input using contacts or open collector connection |
| | Input impedance | | When shorted: Max. 10 k Ω When open: Max. 750 k Ω |
| | Residual voltage | | Max. 0.5 V |
| Reset input | Min. input signal width | | 10 ms |
| | Input method | | Non-voltage input using contacts or open collector connection |
| | Input impedance | | When shorted: Max. 10 k Ω When open: Max. 750 k Ω |
| | Residual power | | Max. 0.5 V |
| Break down voltage (initial) | | | Between charged and uncharged parts: 1,000 V AC for 1 minute. |
| Insulation resistance (initial) | | | Min. 100 M Ω (measured at 500 V DC) Measurement location same as for break down voltage. |

3. Common

| Item | | Type | Panel mounting/PC board mounting types |
|-----------------------|-------------|------|---|
| Time accuracy | | | \pm 100 ppm (25°C 77°F) |
| Vibration resistance | Functional | | 10 to 55 Hz (1 cycle/min.), single amplitude: 0.15 mm (10 min. on 3 axes) |
| | Destructive | | 10 to 55 Hz (1 cycle/min.), single amplitude: 0.375 mm (1 hr. on 3 axes) |
| Shock resistance | Functional | | Min. 98 m/s ² (4 times on 3 axes) |
| | Destructive | | Min. 294 m/s ² (5 times on 3 axes) |
| Operation temperature | | | -10 to +55°C +14 to +131°F (without frost or dew) |
| Storage temperature | | | -25 to +65°C -13 to +149°F (without frost or dew) |
| Ambient humidity | | | 35 to 85% RH (non-condensing) |

Applicable standard

| Safety standard | EN61010-1 | Pollution Degree 2/Overvoltage Category III |
|---|--|--|
| EMC | (EMI)EN61000-6-4 Radiation interference electric field strength | EN55011 Group1 ClassA |
| | Noise terminal voltage | EN55011 Group1 ClassA |
| | (EMS)EN61000-6-2 Static discharge immunity | EN61000-4-2 4 kV contact 8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz) 10 V/m pulse modulation (90 MHz) |
| | EFT/B immunity | EN61000-4-4 2 kV (power supply line) |
| | Conductivity noise immunity | EN61000-4-6 10 V/m AM modulation (0.15 MHz to 80 MHz) |
| Power frequency magnetic field immunity | EN61000-4-8 30 A/m (50 Hz) | |

Part names

1. Front reset button

Reset the elapsed time. It does not work when the lock switch is ON. Be aware that battery life will decrease if this switch is used frequently.

2. Lock switch (Refer to chart on right.)

Disable the front reset button.

Note) Turn ON at the LCD side (reset disabled) and OFF at the terminal block side (reset enabled).

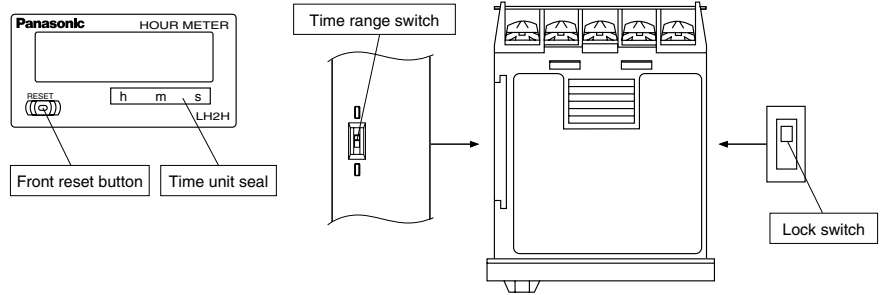
3. Time range switch (See chart on right).

Switch the time range.

Note) Always press the front reset button when operating the time range switch.

4. Time unit sticker

Unit seals are included in the package. Affix them in accordance with the time range.



| | 0 to 999999.9h/0 to 3999d23.9h | 0 to 999h59m59s/0 to 9999h59.9m |
|-------------------------------------|--|---|
| Lock switch (Unit display 1) | (Terminal block side) OFF* ↕ (LCD side) ON | (Terminal block side) OFF* ↕ (LCD side) ON |
| Count speed switch (Unit display 2) | (Terminal block side) 0 to 999999.9h* ↕ (LCD side) 0 to 3999d23.9h | (Terminal block side) 0 to 9999h59.9m* ↕ (LCD side) 0 to 999h59m59s |

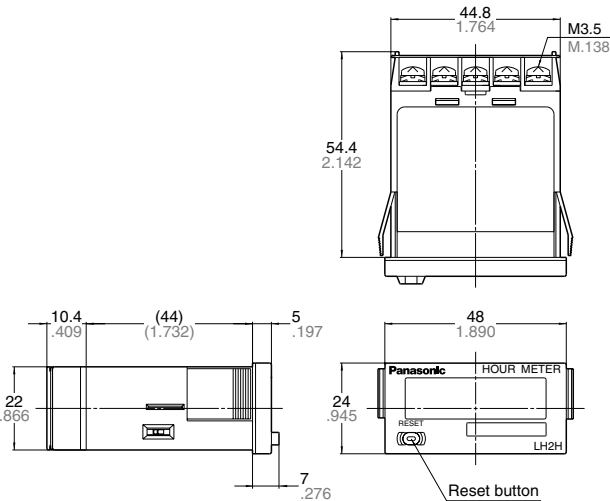
Notes) 1. *Default setting when shipped.
2. Make the switch setting before installing to panel.

Dimensions

1. Panel mounting type

• External dimensions

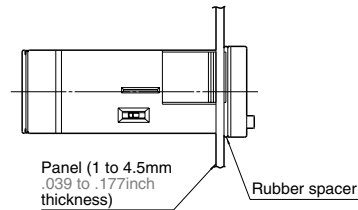
1) One-touch installation type



mm inch

General tolerance: ±1.0 ±.039

• Panel installation diagram

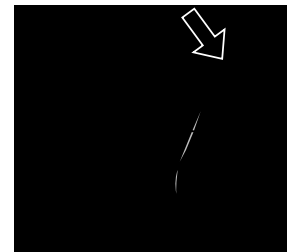


Note) When installing to a 4.5 mm .177 inch thick panel, remove the rubber spacer first.

When installing the one-touch installation type model, make sure that the installation spring does not pinch the rubber gasket.

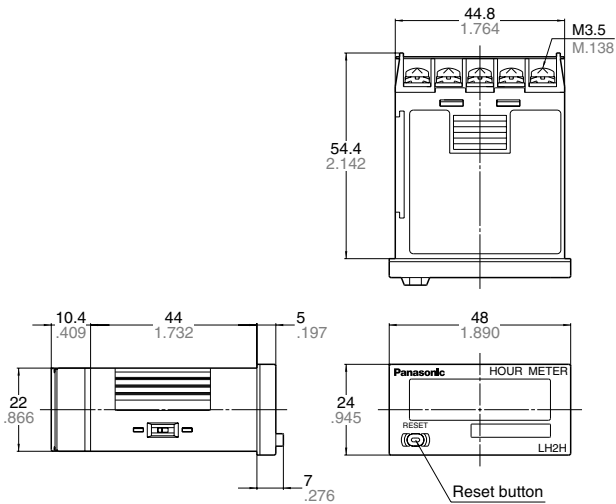
To prevent the installation spring from pinching the rubber gasket:

1. Set the rubber gasket on both ends of the installation spring (left and right).
2. Confirm that the installation spring is not pinching the rubber gasket, and then insert and fix the installation spring in place from the rear of the timer unit.

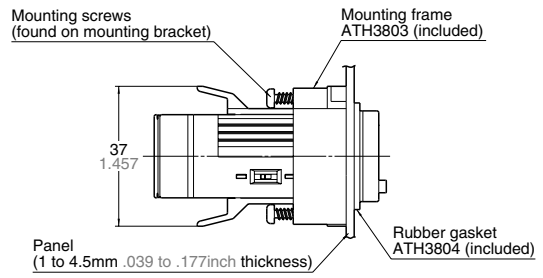


LH2H

2) Installation frame type

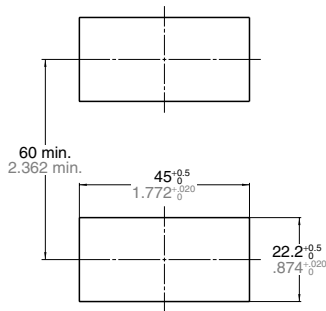


• Panel mounting diagram

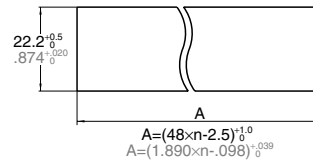


• Panel cut-out dimensions

The standard panel cut-out is shown below.
Use the mounting frame (ATH3803) and the rubber packing (ATH3804).
(Only installation frame type.)



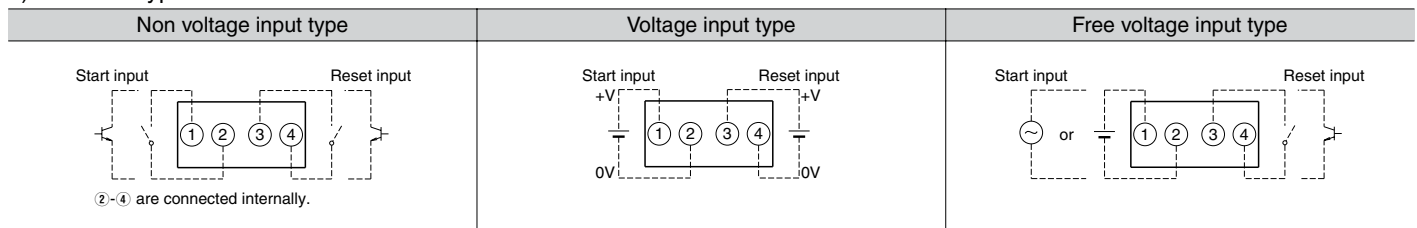
• For connected installation (sealed installation) (Only installation frame type.)



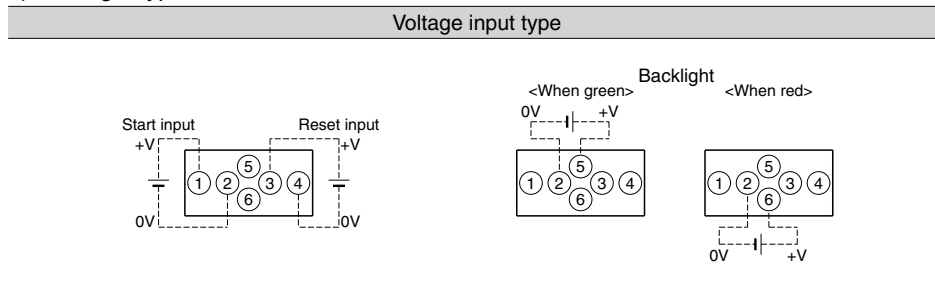
Notes) 1. Suitable installation panel thickness is 1 to 4.5 mm / .039 to .177 inch.
2. Waterproofing will be lost when installing repeatedly (sealed installation).

• Terminal layout and wiring diagrams

1) Standard type



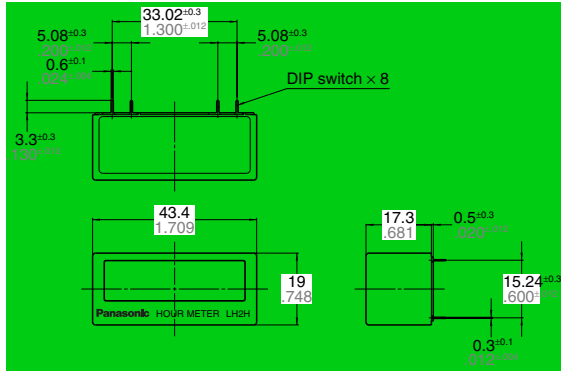
2) Backlight type



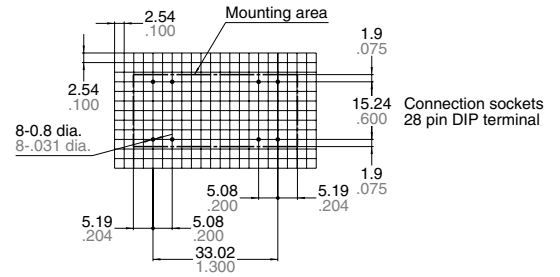
2. PC board mounting type

General tolerance: $\pm 1.0 \pm 0.039$ mm inch

• External dimensions



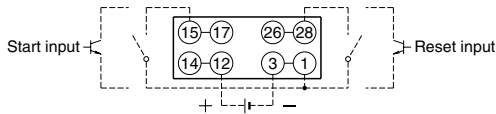
PC board pattern (BOTTOM VIEW)



General tolerance: $\pm 0.1 \pm 0.004$

Note: The AXS212811K is recommended as a compatible connection socket.

• Terminal layout and wiring diagrams



①-③, ⑫-⑭, ⑮-⑰ and ⑳-㉔ are connected internally.
An external power supply is required.

Input method

1. Standard type

| Non-voltage input type | | | |
|--|--|------------------------|------------------------------------|
| Panel mounting type | | PC board mounting type | |
| Contact input | Transistor input NPN transistor | Contact input | Transistor input NPN transistor |
| <p>(② and ④ are connected internally.)</p> | <p>(② and ④ are connected internally.)</p> | <p>3V DC</p> | <p>3V DC</p> |

Notes) 1. When using contact input, since current flow is small from terminals ① and ③ on the panel mounting type and terminals ⑮ to ⑰ and ⑳ to ㉔ on the PC board mounting type, please use relays and switches with high contact reliability.
2. When using transistor input, use the following as a guide for which transistors (Tr) to use for inputting. (Collector withstand voltage ≥ 50 V, leakage current $< 1 \mu\text{A}$)

| Voltage input type | | | Free voltage input type |
|--------------------|------------------|----------------|-------------------------|
| Contact input | Transistor input | | |
| | NPN transistor | PNP transistor | |
| | | | |

Notes) 1. ② and ④. (The input and reset circuits are functionally insulated.)
2. When using transistor (Tr) input, use the right as a guide. (Collector withstand voltage ≥ 50 V, leakage current $< 1 \mu\text{A}$)
3. Be aware that the application of voltage that exceeds the voltage range of the H level to the count input terminal, and the application of voltage to the reset input terminal, can cause damage to the internal elements.

2. Backlight type

| Contact input | Voltage input type | | Backlight connection |
|---------------|--------------------|----------------|----------------------|
| | Transistor input | | |
| | NPN transistor | PNP transistor | |
| | | | |

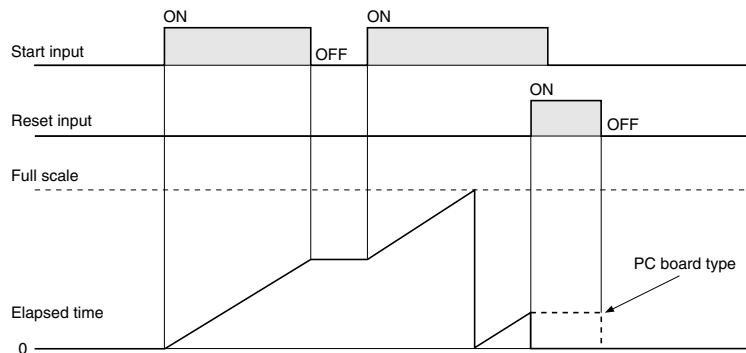
- Notes) 1. Do not reverse the polarities when connecting the DC voltage for the backlight.
 2. ② and ④. (The input and reset circuits are functionally insulated.)
 3. When using transistor (Tr) input, use the right as a guide. (Collector withstand voltage ≥ 50 V, leakage current $< 1 \mu\text{A}$)
 4. Be aware that the application of voltage that exceeds the voltage range of the H level to the count input terminal, and the application of voltage to the reset input terminal, can cause damage to the internal elements.

Explanation of operation

1. Time measuring takes place when the start input is ON.
2. When the elapsed (measured) time reaches full scale it returns to "0", and then measuring starts again from "0".
3. When reset input is ON, the display becomes "0". You cannot measure during reset input.

For PC board mounting type the display disappears while the reset input is ON; however, the display reads "0" when the reset input turns OFF.

4. Press the front reset button if you want to perform a manual reset (for panel installation type)



Cautions for use

1. Non-voltage input type

For both panel mounting and PC board mounting types

1) Never apply voltage to the non-voltage input type. This will damage the internal elements.

2) Since the current flow is very small from the start input and reset input terminals (① and ③ on the panel mounting type and terminals ⑮ to ⑰ and ⑳ to ㉔ on the PC board mounting type) please use relays and switches with high contact reliability. When inputting with an open collector of a transistor, use a transistor for small signals in which ICBO is 1 μA or less and always input with no voltage.

3) When wiring, try to keep all the input lines to the start and reset inputs as short as possible and avoid running them together with high voltage and power transmission lines or in a power conduit. Also, malfunctions might occur if the floating capacitance of these wires exceeds 500 pF (10 m 32.808 ft. for parallel wires of 2 mm²). In particular, when using shielded wiring, be careful of the capacitance between wires.

PC board mounting type

1) For external power supply use manganese dioxide or lithium batteries (CR type: 3V).

2) Always reset after external power is applied and confirm that the display reads "0".

3) Make the wiring from the battery to the hour meter unit as short as absolutely possible. Also, be careful of polarity.

4) Calculate battery life with the following formula.

$$t = A/I$$

t: battery life [h]

I: LH2H current consumption [mA]

A: battery capacity until minimum operation voltage is reached [mAh]

5) Hand solder to the lead terminal. Do not dip solder. With the tip of the soldering iron at 300°C 572°F perform soldering within 3 seconds (for 30 to 60 W soldering iron).

2. Voltage input type

1) Be aware that applying more than 30 V DC to start input terminals ① and ②, and reset input terminals ③ and ④ will cause damage to the internal elements.

2) For external resetting use H level (application of 4.5 to 30 V DC) between reset terminals ③ and ④ of the rear terminals. In this case, connect + to terminal ③ and - to terminal ④. This is the valid polarity; therefore, the hour meter will not work if reversed.

3) When wiring, try to keep all the input lines to the start and reset inputs as short as possible and avoid running them together with high voltage and power transmission lines or in a power conduit. Also, malfunctions might occur if the floating capacitance of these wires exceeds 500 pF (10 m 32.808 ft. for parallel wires of 2 mm²).

3. Free voltage input type

1) Use start input terminals ① and ② for free voltage input and reset terminals ③ and ④ for non-voltage input.

2) Be aware that the application of voltage that exceeds the voltage range of the H level to the start input terminal, and the application of voltage to the reset input terminal, can cause damage to the internal elements.

3) Since the current flow is very small from reset input terminal ③, please use relays and switches with high contact reliability.

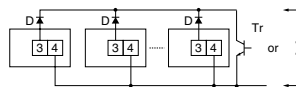
4) When inputting a reset with an open collector of a transistor, use a transistor for small signals in which ICBO is 1 μA or less and always input with no voltage.

5) To reset externally, short reset input terminals ③ and ④ on the rear.

6) Input uses a high impedance circuit; therefore, erroneous operation may occur if the influence of induction voltage is present. If you plan to use wiring for the input signal that is 10 m or longer (wire capacitance 120 pF/m at normal temperature), we recommend the use of a CR filter or the connection of a bleeder resistor.

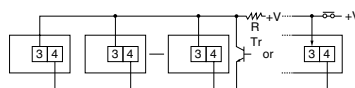
4. How to reset multiple panel mounting type counters all at once (input is the same for count)

Non-voltage input type



- Notes) 1. Use the following as a guide for choosing transistors used for input (Tr).
Leakage current < 1 μA
2. Use as small a diode (D) as possible in the forward voltage so that the voltage between terminals 3 and 4 during reset input meets the standard value (0.5 V).
(At IF = 20 μA, forward voltage 0.1 and higher.)

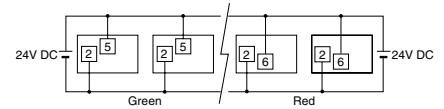
Voltage input type



Note) Make sure that H (reset ON) level is at least 4.5 V.

5. Backlight luminance

To prevent varying luminance among backlights when using multiple Backlight types, please use the same backlight power supply.



6. Acquisition of CE marking

Please abide by the conditions below when using in applications that comply with EN 61010-1/IEC 61010-1

- 1) Ambient conditions
 - Overvoltage category II, pollution level 2
 - Indoor use
 - Acceptable temperature and humidity range: -10 to +55°C, 35 to 85%RH (with no condensation at 20°C)
 - Under 2000 m elevation
- 2) Use the main unit in a location that matches the following conditions.
 - There is minimal dust and no corrosive gas.
 - There is no combustible or explosive gas.
 - There is no mechanical vibration or impacts.
 - There is no exposure to direct sunlight.
 - Located away from large-volume electromagnetic switches and power lines with large electrical currents.
- 3) Connect a breaker that conforms to EN60947-1 or EN60947-3 to the voltage input section.
- 4) Applied voltage should be protected with an overcurrent protection device (example: T 1A, 250 V AC time lag fuse) that conforms to the EN/IEC standards. (Free voltage input type)

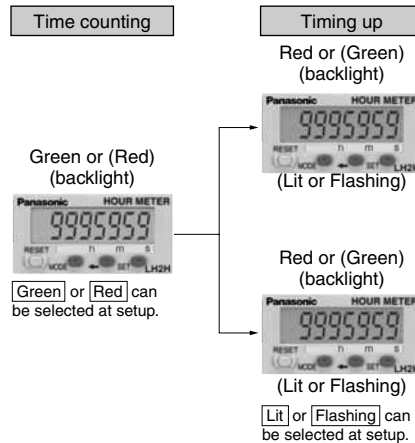
7. Terminal connection

Tighten the terminal screws with a torque of 0.8 N·cm or less.



Features

1. Preset function equipped in half size (24 × 48 mm 0.945 × 1.890 inch).
2. Display has backlight for instant recognition.



3. 8.7 mm 0.343 inch Character Height (previously 7 mm 0.276 inch)
Easy-to read character height increased from 7 mm to 8.7 mm 0.276 inch to 0.343 inch.



4. Plenty of Digits



5. Select by switch between two time ranges in a single meter.

0 to 999999.9h/0 to 3999d23.9h

Selectable

0 to 999h59m59s/0 to 9999h59.9m

Selectable

6. Conforms to IP66 Protective Construction (Front panel surface)

Weatherproofing supported by using optional mounting bracket and rubber gasket

7. Includes reassuring lock mode and lock switch to prevent erroneous operation.

8. Screw terminals are constructed to protect fingers to ensure safety.

9. Compliant with UL, c-UL and CE marking.

RoHS Directive compatibility information
<http://www.nais-e.com/>

Product types

| No. digits | Measurement time range | Operation mode | Output | Operating voltage | Part No. |
|------------|---|--|---|-------------------|-----------------------|
| 7 digits | 0 to 999999.9h/ 0 to 3999d23.9h selectable | G (Totalizing ON delay) B (Signal ON delay) F (Signal flicker) E (Pulse ON delay) | Transistor (1a) | 24 V DC | LH2HP-FEW-DHK-B-DC24V |
| | 0 to 999h59m59s/ 0 to 9999h59.9m selectable | | | | LH2HP-FEW-HMK-B-DC24V |
| Options | | Mounting frame | Use for waterproofing (front panel surface) | ATH3803 | |
| | | Rubber gasket | | ATH3804 | |

Note: Mounting frame and rubber gasket are not included.

Specifications

| Item | | Descriptions | | | | | |
|----------------------------|--|---|---|--------------------------|------------|----------------------|----------------------------|
| Rating | Rated operating voltage | 24 V DC | | | | | |
| | Rated power consumption | Max. 1.5 W | | | | | |
| | Rated control output | 100 mA 30 V DC | | | | | |
| | Time counting direction | Addition or Subtraction (selectable by front switch) | | | | | |
| | Measurement time range | 0 to 999999.9h/0 to 3999d23.9h (selectable by slide switch on side) 0 to 999h59m59s/0 to 9999h59.9m (selectable by slide switch on side) | | | | | |
| | Start input | Min. input signal width: Min. 30 ms | | | | | |
| | Reset input | Min. input signal width: Min. 30 ms | | | | | |
| | Input signal | <ul style="list-style-type: none"> • Non-voltage input using contacts or open-collector connection • Input impedance; when shorted: Max. 1 kΩ, when open: Min. 100 kΩ • Residual voltage: Max. 2 V | | | | | |
| | Operation mode | Totalizing ON delay, Signal ON delay, Signal flicker, Pulse ON delay (selectable by front switch) | | | | | |
| | Display method | 7-segment LCD (Switch between red and green for backlight, and between lit and flashing for time up.) | | | | | |
| | Power failure emory | EEP-ROM (Overwriting times: 10 ⁵ operations or more) | | | | | |
| Time accuracy | Operating time fluctuation | <table border="0"> <tr> <td rowspan="4" style="font-size: 3em; vertical-align: middle;">}</td> <td>Rated operating voltage:</td> </tr> <tr> <td>85 to 110%</td> </tr> <tr> <td>Ambient temperature:</td> </tr> <tr> <td>-10 to +55°C +14 to +131°F</td> </tr> </table> | } | Rated operating voltage: | 85 to 110% | Ambient temperature: | -10 to +55°C +14 to +131°F |
| | } | | | Rated operating voltage: | | | |
| | | | | 85 to 110% | | | |
| | | | | Ambient temperature: | | | |
| -10 to +55°C +14 to +131°F | | | | | | | |
| Voltage error | $\pm 0.01\%$ ± 50 ms in case of power on start | | | | | | |
| Temperature error | $\pm 0.01\%$ ± 30 ms | | | | | | |
| Setting error | in case of input signal start | | | | | | |
| Contact arrangement | 1 Form A (Open collector) | | | | | | |
| Electrical life (contact) | 10 ⁷ operations (at rated control voltage) | | | | | | |
| Electrical | Allowable operating voltage range | 85 to 110% of rated operating voltage | | | | | |
| | Break down voltage (Initial value) | Between input and output: 1,500 V AC, for 1 min. | | | | | |
| | Insulation resistance (Initial value) | Between input and output: 100 M Ω (at 500 V DC) | | | | | |
| Mechanical | Functional vibration resistance | 10 to 55 Hz (1 cycle/min), Single amplitude: 0.15 mm (10 min. on 3 axes) | | | | | |
| | Destructive vibration resistance | 10 to 55 Hz (1 cycle/min), Single amplitude: 0.375 mm (1 hr. on 3 axes) | | | | | |
| | Functional shock resistance | Min. 98 m/s ² (4 times on 3 axes) | | | | | |
| | Destructive shock resistance | Min. 294 m/s ² (5 times on 3 axes) | | | | | |
| Operating conditions | Operation temperature | -10 to 55°C +14 to +131°F (without frost or dew) | | | | | |
| | Storage temperature | -25 to +65°C -13 to +149°F (without frost or dew) | | | | | |
| | Ambient humidity | 35 to 85% RH (non-condensing) | | | | | |
| Protective construction | IP66 (front panel with mounting bracket and rubber gasket) | | | | | | |

* The factory default preset value is set to 0.1.

Applicable standard

| | | |
|-----|--|--|
| EMC | (EMI)EN61000-6-4 Radiation interference electric field strength | EN55011 Group1 ClassA |
| | Noise terminal voltage | EN55011 Group1 ClassA |
| | (EMS)EN61000-6-2 Static discharge immunity | EN61000-4-2 4 kV contact 8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz) 10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 2 kV (power supply line) 1 kV (signal line) |
| | Conductivity noise immunity | EN61000-4-6 10 V/m AM modulation (0.15 MHz to 80 MHz) |
| | Power frequency magnetic field immunity | EN61000-4-8 30 A/m (50 Hz) |

LH2H

Part names

1. Front reset key

This key resets the elapsed value. It does not work when the lock switch is ON.

2. Mode key

Use to set preset values or to switch between each mode.

3. Setting key

Used to set digits of preset values or set each mode.

4. Set key

Use to set preset values or to switch between modes.

5. Time unit seal

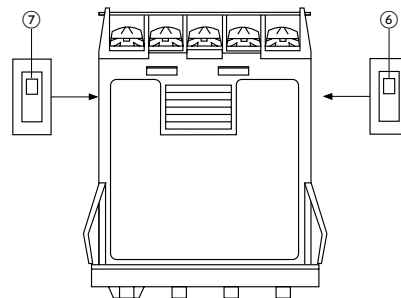
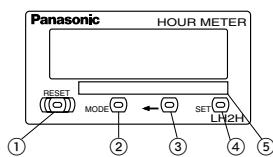
Unit seals are included in the package. Affix them in accordance with the time range.

6. Lock switch

Disable the operation of the front panel reset key and the mode key. With the lock switch on, **000003m7** is displayed for about two seconds when the reset key or mode switch is operated.

7. Time range switch

Switch the time range.



※: Default setting when shipped.

| | LH2HP-FEW-DHK-B-DC24V | LH2HP-FEW-HMK-B-DC24V |
|--------------------------------------|---|--|
| ⑥ Lock switch (unit display 1) | (Terminal block side) ↑ (LCD side) | OFF※ ↑ ON |
| ⑦ Time range switch (unit display 2) | (Terminal block side) ↑ (LCD side) 0 to 999999.9h※ ↓ 0 to 3999d23.9h | (Terminal block side) ↑ (LCD side) 0 to 9999h59.9m※ ↓ 0 to 999h59m59s |

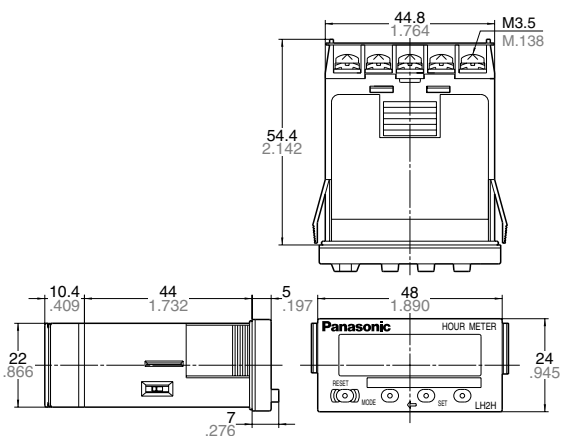
Notes: 1. Make the switch setting before installing to panel.
2. Please turn the power off if you change the setting of the time range switch when the power is on. The setting will become valid when the power is turned back on.

Dimensions

mm inch

General tolerance: $\pm 1.0 \pm .039$

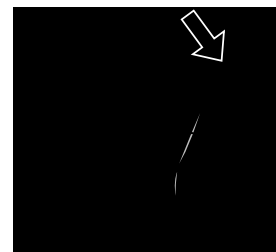
• External dimensions



When installing the one-touch installation type model, make sure that the installation spring does not pinch the rubber gasket.

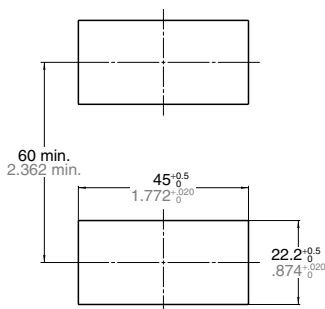
To prevent the installation spring from pinching the rubber gasket:

1. Set the rubber gasket on both ends of the installation spring (left and right).
2. Confirm that the installation spring is not pinching the rubber gasket, and then insert and fix the installation spring in place from the rear of the timer unit.

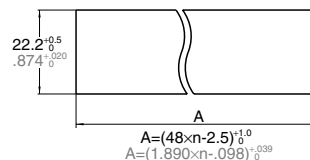


• Panel cut out dimensions

The standard panel cut out is shown below. Use the mounting frame (ATH3803) and the rubber gasket (ATH3804). (Only installation frame type)



• For connected installation (sealed installation) (Only installation frame type)



Notes: 1. Suitable installation panel thickness is 1 to 4.5 mm 0.39 to 0.177 inch.
2. Waterproofing will be lost when installing repeatedly (sealed installation).

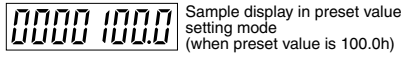
How to set

1. Preset value setting mode

This is the mode for setting preset values.



1) Pressing the MODE key takes you to the preset value setting mode.



- 2) Pressing the setting key moves the flashing digit left by one. Following the highest digit it returns to the lowest digit and each time the digit setting key is pressed it moves one to the left.
- 3) Pressing the set key increases the value by one. (After 9 it returns to 0 and then changes to 1, 2, 3, etc.)
- 4) Pressing the front panel reset key sets the displayed preset value and returns you to the regular operation mode.
- 5) In the preset value setting mode if you do not operate the digit setting key or the set key for ten seconds or more you will be returned to regular operation. In this case the preset value will not change.

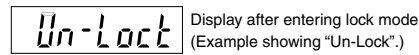
2. Lock mode

This mode prohibits everything except the preset value setting mode.

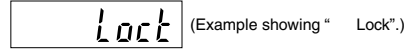


1) Pressing the set key while holding down the mode key takes you to the lock mode.

2) The display reads “Un-Lock” after entering the lock mode (initial setting).



3) Pressing the setting key changes the display between “ Lock” and “Un-lock”.



4) Pressing the front panel reset key sets the content displayed and returns you to regular operation mode.

Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

5) When the lock mode display reads “ Lock”, you will not be able to move to the backlight setting mode, the time counting direction setting mode, or the operation setting mode.

3. Backlight setting mode

This is the mode for setting the backlight during time up.



1) Pressing the SET key two times while holding down the MODE key takes you to the backlight setting mode.

2) The display in the backlight setting mode reads “ LEd”



3) The LED backlight will be red (initial setting).

4) The backlight changes from flashing green to flashing red to lit green and to lit red with each press of the setting key.

5) Pressing the front panel reset key sets the current backlight color and returns you to regular operation mode.

Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

4. Time counting direction setting mode

This is the mode for setting addition or subtraction.

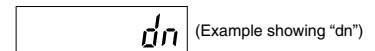


1) Pressing the SET key three times while holding down the MODE key takes you to the time counting direction setting mode.

2) The display after entering the time counting direction setting mode reads “ UP” (initial setting).



3) Pressing the setting key changes the display to “dn” (subtraction) and pressing it again changes it to “UP” (addition). The display alternates between “dn” and “UP”.

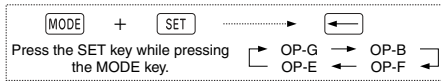


4) Pressing the front panel reset key sets the content displayed and returns you to regular operation mode.

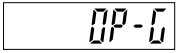
Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

5. Operation mode

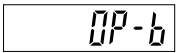
This sets the operation mode.



- 1) Pressing the SET key four times while holding down the MODE key takes you to the operation setting mode.
- 2) The display reads "OP-G" (Totalizing ON delay) after entering the operation setting mode.



- 3) Pressing the setting key causes the display to change as follows:
OP-B (Signal ON delay)



OP-F (Signal flicker)



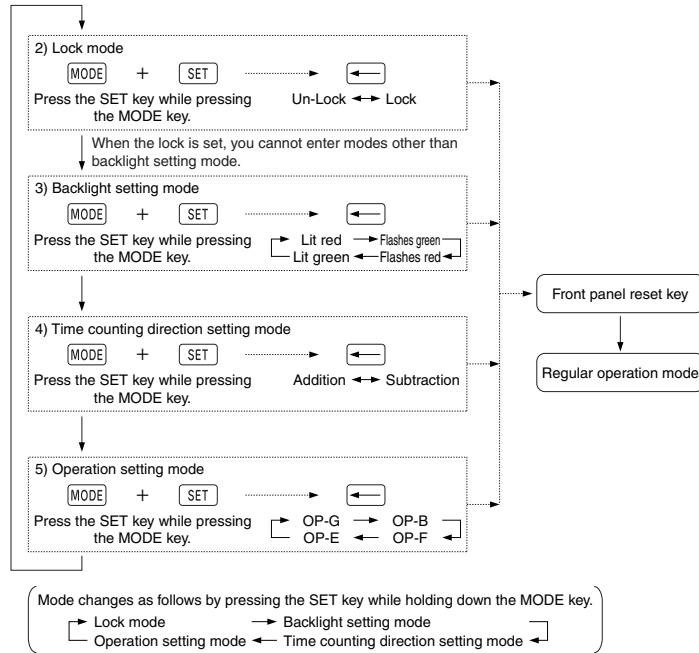
OP-E (Pulse ON delay)



OP-G (Totalizing ON delay)

- 4) Pressing the front panel reset key sets the display content and returns you to regular operation mode.

Note: You will not be returned to regular operation mode if you do not press the front panel reset key.



Please be aware that after doing a front panel reset key and returning to regular operation mode, the preset values, elapsed value and output will be as shown in this table.

| | Preset value | Elapsed value | Output change |
|--------------------------------------|--------------|--|---------------|
| Lock mode | × | × | × |
| Backlight setting mode | × | × | × |
| Time counting direction setting mode | × | Addition: "0" Subtraction: "Preset value" | ON→OFF |
| Operation setting mode | × | Addition: "0" Subtraction: "Preset value" | ON→OFF |

Note: "×" sign: No change

Changing the set time (preset value)

1. It is possible to change the set time even during time delay with the timer. However, be aware of the following points.

1) If the set time is changed to less than the elapsed time (elapsed value) with the time delay set to the addition direction, time delay will continue until the elapsed time reaches full scale, returns to "0 (zero)", and then reaches the new set time.

If the set time is changed to a time above the elapsed time, the time delay will continue until the elapsed time reaches the new set time.

2) If the time delay is set to the subtraction direction, time delay will continue until "0 (zero)" regardless of the new set time.

2. If the set time is changed to "0 (zero)", the hour meter will operate differently depending on the operation mode. In the G (Totalizing ON delay), B (Signal ON delay), and E (Pulse ON delay) modes, the output turns ON when the start input is ON. However, the output will be OFF while reset is being input. In the F (Signal flicker) mode, the flicker operation will not work even if start input is turned ON.

Operation mode

| Operation mode | Explanation | Time chart |
|--------------------------|--|------------|
| Totalizing ON delay Ⓒ | <ul style="list-style-type: none"> Elapsed value does not clear at power ON. (Power outage countermeasure function) The output remains ON even after the power is OFF and restarted. | |
| Signal ON delay Ⓑ | <ul style="list-style-type: none"> Clears elapsed value at power ON. Time delay starts at start ON and output resets at start OFF. Time delay starts at reset OFF and power ON while start is ON. | |
| Signal Flicker Ⓕ | <ul style="list-style-type: none"> Clears elapsed value at power ON. Time delay starts at start ON. After timer completion, control output reverses, elapsed value clears, and time delay starts. Ignores start input during time delay. | |
| Pulse ON delay Ⓔ | <ul style="list-style-type: none"> Clears elapsed value at power ON. Time delay starts at start ON. After timer completion, control output is ON. Ignores start input during time delay. | |

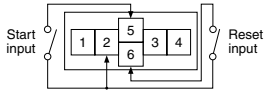
Cautions for use

1. Input and output connection

1) Input connection

(1) Contact input

Use highly reliable metal plated contacts. Since the contact's bounce time leads directly to error in the timer operating time, use contacts with as short a bounce time as possible.



(2) Non-contact input (Transistor input)

Connect with an open collector. Use transistors whose characteristics satisfy the criteria given below.

$$V_{CE0} = \text{Min. } 20 \text{ V}$$

$$I_c = \text{Min. } 20 \text{ mA}$$

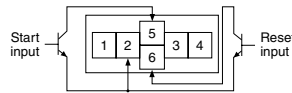
$$I_{CBO} = \text{Max. } 6 \mu\text{A}$$

Also, use transistors with a residual voltage of less than 2 V when the transistor is on.

* The short-circuit impedance should be less than 1 k Ω .

(When the impedance is 0 Ω , the current coming from the start input terminal is approximately 5 mA and from the reset input terminal is approximately 1.5 mA.)

Also, the open-circuit impedance should be more than 100 k Ω .



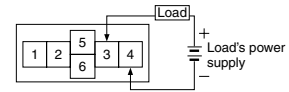
(3) Input wiring

When wiring, use shielded wires or metallic wire tubes, and keep the wire lengths as short as possible.

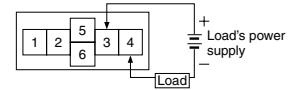
2) Output connection

Since the transistor output of hour meter is insulated from the internal circuitry by a photo-coupler, it can be used as an NPN output or PNP (equal value) output.

As NPN output



As PNP output



2. Self-diagnosis function

If a malfunction occurs, one of the following displays will appear.

| Display | Contents | Output condition | Restoration procedure | Preset values after restoration |
|---------|------------------------|------------------|---|--|
| Err-00 | Malfunctioning CPU | OFF | Enter front reset key or restart hour meter | Preset value at start-up before the CPU malfunction occurred |
| Err-01 | Malfunctioning memory* | | | 0 |

* Includes the possibility that the EEPROM's life has expired.

3. Power failure memory

The EEPROM is overwriting with the following timing.

| Operation mode | Overwrite timing |
|------------------------------|--|
| G (Totalizing ON delay) mode | Change of preset value or when power is OFF after start and reset input turns ON |
| Other modes | When power is OFF after changing preset value |

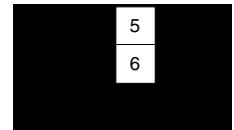
4. Terminal connection

1) When wiring the terminals, refer to the terminal layout and wiring diagrams and be sure to perform the wiring properly without errors.

Tighten the terminal screws with a torque of 0.8 N·cm or less. The screws are M3.5.

An external power supply is required in order to run the main unit.

Power should be applied between terminals (1) and (2). Terminal (1) acts as the positive connection and terminal (2) as the negative.



2) After turning the hour meter off, make sure that any resulting induced voltage or residual voltage is not applied to power supply terminals (1) through (2). (If the power supply wire is wired parallel to the high voltage wire or power wire, an induced voltage may be generated at the power supply terminal.)

3) Have the power supply voltage pass through a switch or relay so that it is applied at one time.

Compliance with the CE marking

• EMC Directive (89/336/EEC)

The LH2H Preset Hour Meter conforms to the EMC Directive as a simple hour meter.

Applicable standards: EN61000-6-4, EN61000-6-2

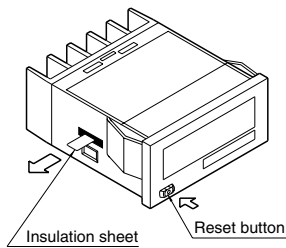
PRECAUTIONS IN USING THE LH2H SERIES

Cautions for use

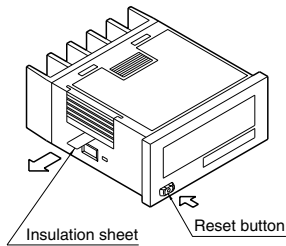
1. Insulation sheet

Before using a panel mounting type, please pull and remove the insulation sheet in the direction of the arrow. In consideration that the product might be stored for long periods without being used, an insulation sheet is inserted before shipping. Remove the insulation sheet and press the front reset button.

• LH2H hour meter (one-touch installation type)



• LH2H hour meter (installation frame type)



2. Waterproof construction

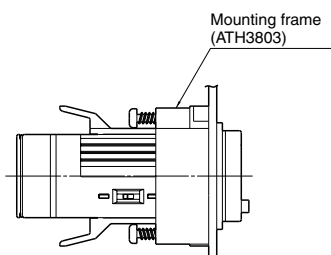
• LH2H hour meter (installation frame type)

The operation part of the panel installation type (installation frame type) is constructed to prevent water from entering the unit and a rubber gasket is provided to prevent water from entering the gap between the unit and the panel cutout.

There must be sufficient pressure applied to the rubber gasket to prevent water from entering.

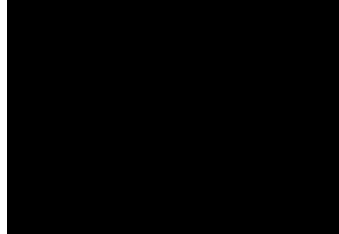
Be sure to use the mounting screws when installing the mounting frame (ATH3803).

Note: The one-touch installation type is not waterproof.



• LH2H preset hour meter

1) When using the waterproof type (IP66: panel front only), install the hour meter to the front plate with mounting frame ATH3803 (sold separately) and rubber gasket ATH3804 (sold separately). Be sure to tighten using mounting screws.



When installing the mounting frame and rubber gasket please remove the pre-attached o-ring.

2) Panel installation order

- (1) Remove o-ring.
- (2) Place rubber gasket.
- (3) Insert hour meter into panel.
- (4) Insert mounting frame from the rear.
- (5) Secure with mounting screws (two locations)

3. Do not use in the following environments

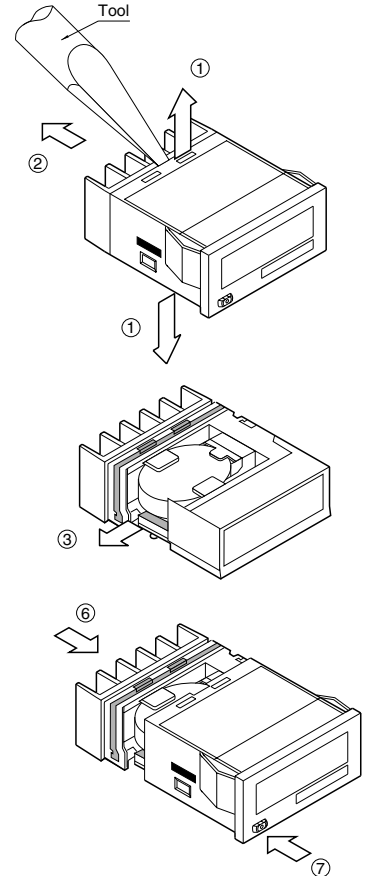
- 1) In places where the temperature changes drastically.
- 2) In places where humidity is high and there is the possibility of dew. (When dew forms the display may vanish and other display errors may occur.)

4. Conditions of use

- 1) Do not use on places where there is flammable or corrosive gas, lots of dust, presence of oil, or where the unit might be subject to strong vibrations or shocks.
- 2) Since the cover is made of polycarbonate resin, do not use in places where the unit might come into contact with or be exposed to environments that contain organic solvents such as methyl alcohol, benzene and thinner, or strong alkali substances such as ammonia and caustic soda.

5. Cautions regarding battery replacement

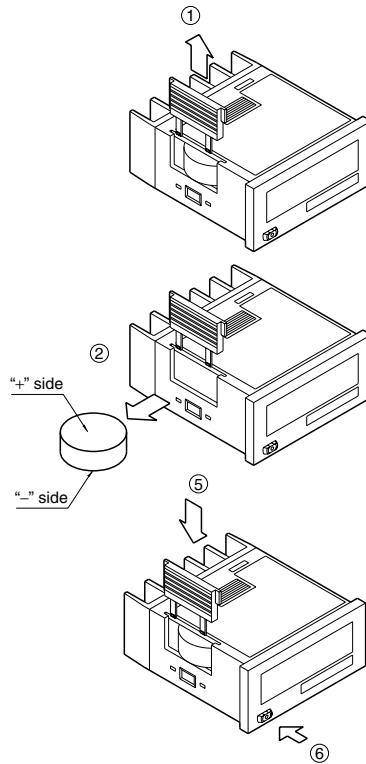
- 1) Remove wiring before replacing the battery. You may be electrocuted if you come into contact to a part where high voltage is applied.
- 2) Make sure you are not carrying a static electric charge when replacing the battery.
- 3) Battery replacement procedure For LH2H hour meter (one-touch installation type)
 - (1) Remove the up/down hook of the case using a tool.
 - (2) Pull the unit away from the case.
 - (3) Remove the battery from the side of the unit. Do not touch the display or other parts.
 - (4) Before inserting wipe clean the surface of the new battery.
 - (5) Insert the new battery with the “+” and “-” sides in the proper position.
 - (6) After replacing the battery, return the unit to the case. Verify that the hook of the case has properly engaged.
 - (7) Before using, press the reset button on the front.



LH2H

For LH2H hour meter
(installation frame type)

- (1) Remove the battery cover from the case.
- (2) Remove the battery from the side of the case. The battery will come loose if you put the battery side face down and lightly shake the unit.
- (3) Before inserting wipe clean the surface of the new battery.
- (4) Insert the new battery with the "+" and "-" sides in the proper position.
- (5) After replacing the battery, return the battery cover to the case. Verify that the hook of the battery cover is properly engaged.
- (6) Before using press the reset button on the front.



Options

1. Accessories (for LH2H hour meter)

Panel cover (black)



Part No.: ATH3801

You can change the design of the front panel by replacing it with this black panel cover. The counter comes with an ash gray panel cover as standard.

Note: No panel cover option (black) is available for the LH2H preset hour meter.

2. Lithium battery (3 V)



Part No.: ATH3802

Packaged with the LH2H (excluding the PC board mounting type).

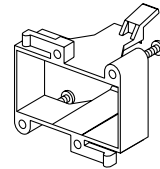
Warning

- Make sure the "+" and "-" polarities are positioned correctly.
- Do not throw the old battery into a fire, short circuit it, take it apart, or allow it to come into contact with heat.
- The battery is not rechargeable.

3. Installation parts

Mounting frame

Suitable for installation frame type LH2H hour meter and LH2H preset hour meter

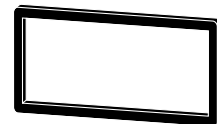


Part No.: ATH3803

Packaged with the mounting bracket type LH2H hour meter

Rubber gasket






Suitable for installation frame type LH2H hour meter and LH2H preset hour meter







Part No.: ATH3804




Packaged with the mounting bracket type LH2H hour meter

HOUR METERS SELECTOR CHART

| Types | | DIN 48 48 size Hour Meters | | | | |
|---|-----------|--|--|--|--|--|
| Name of product | | TH14 Hour Meters | TH24 Hour Meters | TH40 Hour Meters | TH50 Hour Meters | TH70 Hour Meters |
| Appearance | |  |  |  |  |  |
| | | TH14 series | TH24 series | TH40 series | TH50 series | TH70 series |
| Counting range | | 0 to 99999.9 hours | 0 to 9999.9 hours | Reset side 0 to 9999.9 hours Without reset side 0 to 99999.9 hours | 0 to 9999.9 min | 0 to 99999.9 hours |
| Features | | For controlling total integrated hours | With zero reset function For controlling measured integrated hours | Composite function for total accumulated hours monitoring and measuring each zero reset | Zero reset for minute unit time monitoring | For monitoring accumulated hours on DC line |
| Driving method | | AC motor | AC motor | AC motor | AC motor | DC quartz motor |
| Counting direction | | Addition (UP) | Addition (UP) | Addition (UP) | Addition (UP) | Addition (UP) |
| Power | Voltage | 12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC | 12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC | 12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC | 12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC | 12 V DC, 24 V DC |
| | Frequency | 50/60Hz (common) | 50/60Hz (common) | 50/60Hz (common) | 50/60Hz (common) | — |
| Counting integral/ Counting max. speed | | Synchronizing with power supply frequency | Synchronizing with power supply frequency | Synchronizing with power supply frequency | Synchronizing with power supply frequency | According to quartz oscillation frequency |
| Min. counting unit | | 0.1 h | 0.1 h | 0.1 h | 0.1 min | 0.1 h |
| Reset input | | — | Manual reset | Manual reset | Manual reset | — |
| Max. power consumption | | Approx. 1.5 W | Approx. 1.5 W | Approx. 1.5 W | Approx. 1.5 W | Approx. 1.5 W |
| Weight | | 145 g 5.115 oz | 150 g 5.291 oz | 160 g 5.644 oz | 150 g 5.291 oz | 170 g 5.997 oz |
| Remarks | | — | The TH50 series displays time in minute. | — | — | The unit with a reset function is also available. (Manufacturing after receiving an order) |
| | | The TH14, 24, 40, 50, 63, and 64 series have numbers at the end of the part number that indicate the voltage required as follows: 1:100 V, 2:200 V, 3:12 V, 4:24 V, 5:48 V, 6:110 V, 7:115 to 120 V, 8:220 V, 9:240 V, Ex.) The part number of the TH24 series with 220 V is TH248. When "S" is specified at the end of the part number, a silver panel is equipped at the front. | | | | |
| Page | | P. 168 | P. 168 | P. 170 | P. 172 | P. 176 |

| Types | | DIN 24 48 size Hour Meters | | DIN 24 48 size Hour Meters | |
|---|------------------------------|--|--|---|---|
| Name of product | | TH63 Hour Meters | TH64 Hour Meters | LH2H Hour Meters | LH2H Preset Hour Meters |
| Appearance | |  |  |  |  |
| | Front section of part number | TH63 series | TH64 series | Panel mounting type PC board mounting type | ATH3 |
| Counting range | | 0 to 99999.9 hours | 0 to 9999.9 hours | Flush mounting type: 0 to 99999.9 hours/0 to 3999 days 23.9 hours (selectable) 0 to 999 hours 59 min 59 sec/0 to 9999 hours 59.9 min (selectable) PC board mounting type: 0 to 99999.9 hours/9999 hours 59.9 min (different type) | 0 to 99999.9 hours/ 0 to 3999 days 23.9 hours (selectable) 0 to 999 hours 59 min 59 sec/ 0 to 9999 hours 59.9 min (selectable) |
| Features | | For controlling total integrated hours | With zero reset function For controlling measured integrated hours | Big 7-digit display, 8.7 mm tall display Bright, 2-color back light (voltage input type) Plenty of input methods • Non-voltage input, Voltage input, free voltage input | Preset function equipped in half size |
| Driving method | | AC motor | AC motor | Quartz oscillation type | Quartz oscillation type |
| Counting direction | | Addition (UP) | Addition (UP) | Addition (UP) | Addition or subtraction |
| Power | Voltage | 12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC | 12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC | Flush mounting type: Unnecessary (Built-in battery) PC board mounting type: 3 V DC (Battery is externally installed.) | 24 V DC |
| | Frequency | 50/60Hz (common) | 50/60Hz (common) | — | — |
| Counting integral/ Counting max. speed | | Synchronizing with power supply frequency | Synchronizing with power supply frequency | ±100 ppm (25°C) | ±0.01% ±50 ms in case of power on start ±0.01% ±30 ms in case of input signal start |
| Min. counting unit | | 0.1 h | 0.1 h | 0.1 h, 0.1 min, 1 s | 0.1 h, 0.1 min, 1 s |
| Reset input | | — | Manual reset | Push button and external reset input terminal | Push button and external reset input terminal |
| Max. power consumption | | Approx. 1.5 W | Approx. 1.5 W | — | Max. 1.5 W |
| Weight | | 80 g 2.822 oz | 90 g 3.174 oz | Flush mounting type: 55 g 1.940 oz PC board mounting type: 15 g .529 oz | 50 g 1.764 oz |
| Remarks | | The numbers at the end of the part number indicate voltage. (See the remarks above.) | | — | — |
| Page | | P. 174 | P. 174 | P. 148 | P. 156 |

HOUR METERS SELECTOR CHART

| Types | DIN 52 52 size Hour Meters | | TH Hour Meter: Round type |
|---|---|---|---|
| Name of product | TH13 Hour Meter | TH23 Hour Meter | DC Hour Meter |
| Appearance |  TH13 series |  TH23 series |  TH8 series |
| Counting range | 0 to 99999.9 hours | 0 to 9999.9 hours | 0 to 9999.9 hours |
| Features | For controlling total integrated hours | With zero reset function For controlling measured integrated hours | Driven on DC power |
| Driving method | AC motor | AC motor | Ceramic oscillation + AC motor |
| Counting direction | Addition (UP) | Addition (UP) | Addition (UP) |
| Power | Voltage | 100 V AC, 200 V AC, 110 V AC, 115 to 120 V AC, 220 V AC, 240 V AC | 100 V AC, 200 V AC, 110 V AC, 115 to 120 V AC, 220 V AC, 240 V AC |
| | Frequency | 50 Hz or 60 Hz | 50 Hz or 60 Hz |
| Counting integral/ Counting max. speed | Synchronizing with power supply frequency | Synchronizing with power supply frequency | ±0.2% (25°C) |
| Min. counting unit | 0.1 h | 0.1 h | 0.1 h |
| Reset input | — | Manual reset | — |
| Max. power consumption | Approx. 1.5 W | Approx. 1.5 W | Approx. 1.5 W |
| Weight | 130 g 4.586 oz | 135 g 4.762 oz | 170 g 5.997 oz |
| Remarks | Both the TH13 and 23 series have numbers at the end of the part number that indicate the voltage and frequency required. The third number from the front of the part number indicates the required voltage as follows: 4:100 V, 5:200 V, 6:110 V, 7:115 V (for 50 Hz only) or 115 V to 120 V (for 60 Hz only), 8:220 V, 9:240 V The fourth number from the front of the part number indicates the required frequency as follows: 5:50 Hz, 6:60 Hz Ex.) The part number for the TH13 series of 220 V & 50 Hz specification is TH1385. | | — |
| Page | P. 166 | P. 166 | P. 178 |

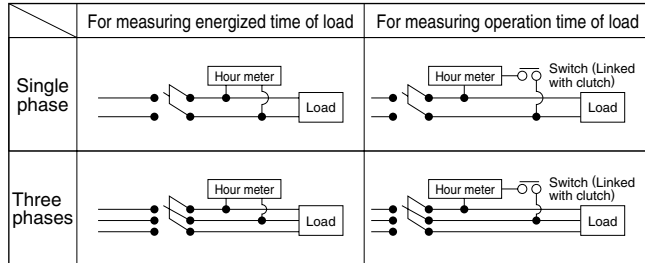
PRECAUTIONS IN USING THE HOUR METERS

1. Frequency setting

Frequency is specified for AC motor-driven hour meters. Before installing, be sure to check your local power frequency.

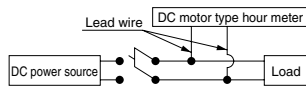
2. Connections

- TH13,23,14,24,40,50,63,64



Note) Make the connection with the accompanying flat connector first and then with the hour meter's terminal (#187). In such case, be sure to cover the connection with the accompanying insulating sleeve.

- TH70, TH8



Note) Solder the lead wires in position.

3. Safety precautions

Do not use the hour meters in the following places.

- Where ambient temperature is below -10° or above $+50^{\circ}\text{C}$
- In wet, dusty or gaseous environments
- Where exposed to vibrations and shocks
- Outdoors, or where exposed to rain or direct sunlight

4. Compliant with CE.

- LH2H

Ambient conditions:

Overvoltage category III, contamination factor 2, indoor use.
Ambient temperature and humidity -10 and $+55^{\circ}\text{C}$ and 35% to 85%RH respectively.

- TH13, 23, 14, 24, 40, 50, 63, 64

Ambient conditions:

Overvoltage category II, contamination factor 2, indoor use.
Ambient temperature and humidity -10 and $+50^{\circ}\text{C}$ and below 85%RH respectively.

5. Reset-type hour meter

- Precautions for use

If the number indications are off before use, press the reset button and confirm that all zeroes ("0") are displayed.

- Resetting caution

Exercise due caution as an insufficient amount of pressure on the reset button may result in abnormal readings.

6. Acquisition of CE marking

Please abide by the conditions below when using in applications that comply with EN 61010-1/IEC 61010-1

1) Ambient conditions

- Overvoltage category II, pollution level 2
- Indoor use
- Acceptable temperature and humidity range: -10 to $+55^{\circ}\text{C}$, 35 to 85%RH (with no condensation at 20°C)
- Under 2000 m elevation

2) Use the main unit in a location that matches the following conditions.

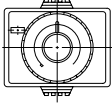



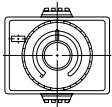























- There is minimal dust and no corrosive gas.
- There is no combustible or explosive gas.
- There is no mechanical vibration or impacts.
- There is no exposure to direct sunlight.
- Located away from large-volume electromagnetic switches and power lines with large electrical currents.

3) Connect a breaker that conforms to EN60947-1 or EN60947-3 to the voltage input section.























4) Applied voltage should be protected with an overcurrent protection device (example: T 1A, 250 V AC time lag fuse) that conforms to the EN/IEC standards. (Free voltage input type)

DISCONTINUED MODELS AND RECOMMENDED SUBSTITUTES

















Timers















| Discontinued models | Recommended substitutes | Attachment | Discontinued models | Recommended substitutes | Attachment |
|---|--|--|--|--|---|
| MHP-NS (Exposed type Square plug-in/ horizontal type)  | MHP-N (Exposed type Round plug-in/ vertical type)  | Terminal base AT8-RFD should be used. | CHP-NF (Exposed type Round plug-in/ vertical type)  | PM4H-F  | Attachment frame AT7821 should be used. * External dimensions, however, differ. In addition, the reset method changes from voltage input to non-voltage input. |
| MHP-NS- | MHP-N- | | CHP-NF | PM4HF- | |
| MHP-M (Exposed type Round plug-in/ horizontal type)  | MHP-NM (Exposed type Round plug-in/ vertical type)  | Terminal base AT8-RFD should be used. | CHP-SD  | PM4H-SD  | With exposed attachment, terminal base ATC180041 should be used. * External dimensions and contact capacity, however, differ. In addition, with the PM4H-SD: 1) (1) to (8) have no internal connection, and 2) the input (star) changes to 1a. |
| MHP-M- | MHP-NM- | | CHP-SD- | PM4HSD- | |
| MHP-YC (Embedded type With attachment frame)  | MHP-N (Exposed type Without attachment frame)  | Attachment frame AT7821 should be used. | PM48A  | PM4H-A  | With exposed attachment, terminal base ATC180041 should be used. |
| MHP-YC- | MHP-N- | | PM48A- | PM4HA- | |
| MHP-YM (Embedded type With attachment frame)  | MHP-NM (Exposed type Without attachment frame)  | Attachment frame AT7831 should be used. | PM48  | PM4H-S  | With exposed attachment, terminal base ATC180031 should be used. |
| MHP-YM- | MHP-NM- | | PM48 | PM4HS- | |
| CHP-N (Exposed type with attachment frame type)  | PM4H-S PMH  | The external dimension and contact capacity are different. | PM48M  | PM4H-M  | With exposed attachment, terminal base ATC180031 for F8 type and F8R type ATC180041 for F11R type. |
| CHP-N- | PM4HS- PMH- | | PM48M- | PM4HM- | |
| CHP-N (Exposed type without attachment frame type)  | PM4H-S PMH  | The external dimension and contact capacity are different. | PM48F  | PM4H-F  | With exposed attachment, terminal base ATC180031 for F8 type and F8R type ATC180041 for F11R type. |
| CHP-N- | PM4HS- PMH- | | PM48F- | PM4HF- | |
| CHP-NF (Exposed type without attachment frame type)  | PM4H-F  | * External dimensions, however, differ. In addition, the reset method changes from voltage input to non-voltage input. | PM48SD  | PM4H-SD  | With exposed attachment, terminal base ATC180031 should be used. |
| CHP-NF- | PM4HF- | | PM48SD | PM4HSD | |

Timers

| Discontinued models | Recommended substitutes | Attachment | Discontinued models | Recommended substitutes | Attachment |
|---|---|--|--|--|------------|
| PM48W  | PM4H-W  | With exposed attachment, terminal base ATC180031 should be used. | LT48 (8-pin)  | LT4H (8-pin)  | |
| PM48W | PM4HW- | | LT48 | LT4H LT4H-L | |
| PMH-M  | PM4H-M/PM4S  | The external dimension and contact capacity are different. | LT48W (8-pin)  | LT4H-W (8-pin)  | |
| PMH-M- | PM4HM-/PM4S- | | LT48W | LT4HW | |
| CDX Time relay  | S1DXM-A Timer/ S1DX Timer  | | DIN rail socket (8-pin)  | DIN rail socket (8-pin)  | |
| CDX | S1DXM-/S1DX- | | ATC18003 | ATC180031 | |
| PDX Timer  | S1DXM-A Timer/ S1DX Timer  | | DIN rail socket (11-pin)  | DIN rail socket (11-pin)  | |
| PDX | S1DXM-/S1DX- | | ATC18004 | ATC180041 | |
| VHP digital high-power timer  | QM4H digital timer  | The size is different. Compact size ↓ DIN48 | | | |
| VHP | QM4H | | | | |
| QM48S (8-pin)  | QM4H (8-pin)  | | | | |
| QM48S | QM4H | | | | |
| QM72S (Screw terminal)  | QM4H (8-pin)  | The size is different. □72 ↓ □48 | | | |
| QM72S | QM4H | | | | |

In some cases, the specifications of the recommended substitutes are not exactly the same as those of the discontinued model. Please confirm the specifications before using the recommended substitutes.

| Counters | | |
|---|--|---|
| Discontinued models | Recommended substitutes | Attachment |
| MC electromagnetic counters  MC6 | LC4H  LC4H LC4H-L | The size and attachment method are different. The input method is different. (Voltage input → non-voltage input) |
| LC48 (Relay type: 8-pin Tr type: 11-pin)  LC48 | LC4H (Relay type: 8-pin Tr type: 11-pin)  LC4H LC4H-L | |
| LC48W (11-pin)  LC48W | LC4H-W (11-pin)  LC4H-W | |
| EM48S (8-pin)  EM48S | LC4H (8-pin)  LC4H LC4H-L | |
| EM72S (Screw terminal)  EM72S | LC4H (Screw terminal)  LC4H LC4H-L | The size is different. <input type="checkbox"/> 72  <input type="checkbox"/> 48 |
| LC24 Panel-mounting type  <ul style="list-style-type: none"> One-touch installation type LC24 | LC2H Panel-mounting type   <ul style="list-style-type: none"> One-touch installation type Installation frame type LC2H | The both one-touch installation type and installation frame type are available. |
| LC24 PC board mounting type  LC24 | LC2H PC board mounting type  LC2H | |

| Hour meters | | |
|--|--|---|
| Discontinued models | Recommended substitutes | Attachment |
|  TH11* TH12* |  TH141S TH142S | Body Round type (attachment hole ϕ 45)  Square type (attachment hole \square 45) |
|  TH21* TH22* |  TH241S TH242S | Body Square type (attachment hole \square 47)  Square type (attachment hole \square 45) |
| TH30  TH30 | LT4H (~999.9 h)  LT4H LT4H-W (~9999 h)  LT4HW | The size and attachment method are different. The input method is different. (Voltage input → non-voltage input) |
| LH24 Panel-mounting type  <ul style="list-style-type: none"> One-touch installation type LH24 | LH2H Panel-mounting type   <ul style="list-style-type: none"> One-touch installation type Installation frame type LH2H | The both one-touch installation type and installation frame type are available. |
| LH24 PC board mounting type  LH24 | LH2H PC board mounting type  LH2H | |

In some cases, the specifications of the recommended substitutes are not exactly the same as those of the discontinued model. Please confirm the specifications before using the recommended substitutes.

FOREIGN SPECIFICATIONS OVERVIEW

1. International Standards

IEC standard

International Electrotechnical Commission

By promoting international cooperation toward all problems and related issues regarding standardization in the electrical and electronic technology fields, the IEC, a non-governmental organization, was started in October, 1908, for the purpose of realizing mutual understanding on an international level. To this end, the IEC standard was enacted for the purpose of promoting international standardization.

2. North America

UL (Underwriters Laboratories Inc.)

This is a non-profit testing organization formed in 1894 by a coalition of U.S. fire insurance firms, which tests and approves industrial products (finished products). When electrical products are marketed in the U.S., UL approval is mandated in many states, by state law and city ordinances. In order to obtain UL approval, the principal parts contained in industrial products must also be UL-approved parts.

UL approval is divided into two general types. One is called "listing" (Fig. 1), and applies to industrial products (finished products). Under this type of approval, products must be approved unconditionally. The other type is called "recognition" (Fig. 2), and is a conditional approval which applies to parts and materials.

LISTING MARK



Fig. 1

RECOGNITION MARK



Fig. 2

Certification



Fig. 3

Component Acceptance



Fig. 4



Fig. 5



Fig. 6

CSA (Canadian Standards Association)

This was established in 1919 as a non-profit, non-governmental organization aimed at promoting standards. It sets standards for industrial products, parts, and materials, and has the authority to judge electrical products to determine whether they conform to those standards. The CSA is the ultimate authority in the eyes of both the government and the people in terms of credibility and respect. Almost all states and provinces in Canada require CSA approval by law, in order to sell electrical products. As a result, electrical products exported from Japan to Canada are not approved under Canadian laws unless they have received CSA approval and display the CSA mark. Approval is called "certification", and products and parts which have been approved are called "certified equipment", and display the mark shown in Fig. 3. The mark shown in Fig. 4 is called the "Component Acceptance" mark, and indicates conditional approval which is applicable to parts. The C-UL mark shown in Fig. 5 (finished products) and Fig. 6 (parts) indicates that the product has been tested and approved in UL laboratories, based on UL and CSA standards, through mutual approval activities.

3. Europe

EN standard

European Standards/Norme Europeenne (France)/Europaishe Norm (Germany)

Abbreviation for European Standards. A unified standard enacted by CEN/CENELEC (European Standards Committee/European Electrical Standards Committee). EU and EFTA member nations employ the content of the EN standards into their own national standards and are obligated to abolish those national standards that do not agree with the EN standards.

(1) Germany



VDE (Verband Deutscher Elektrotechniker)

The VDE laboratory was established mainly by the German Electric Technology Alliance, which was formed in 1893. It carries out safety experiments and passes approval for electrical devices and parts. Although VDE certification is not enforced under German law, punishment is severe should electrical shock or fire occur; therefore, it is, in fact, like an enforcement.



TÜV (Technischer Überwachungs-Verein)

TÜV is a civilian, non-profit, independent organization that has its roots in the German Boiler Surveillance Association, which was started in 1875 for the purpose of preventing boiler accidents. A major characteristic of TÜV is that it exists as a combination of 14 independent organizations (TÜV Rheinland, TÜV Bayern, etc.) throughout Germany. TÜV carries out inspection on a wide variety of industrial devices and equipment, and has been entrusted to handle electrical products, as well, by the government. TÜV inspection and certification is based mainly on the VDE standard. TÜV certification can be obtained from any of the 14 TÜVs throughout Germany and has the same effectiveness as obtaining VDE certification.

4. Shipping Standards

(1) Lloyd's Register of Shipping



Standards from the Lloyd's Register shipping association based in England. These standards are safety standards for environmental testing of the temperature and vibration tolerances of electrical components used for UMS (unmanned machine rooms in marine vessels) applications. These standards have become international standards for control equipment in all marine vessel applications. No particular action is taken to display the conformation to these standards on the products.

5. Pilot Duty

One of the specifications in the “UL508 Industrial Control Equipment” regulations at UL (Underwriters Laboratories Inc.), has to do with the grade of contact control capacity by NEMA (National Electrical Manufacturers Association) standards. By obtaining both UL and CSA approval for this grade, the product becomes authorized publicly.

Pilot Duty A300

| AC applied voltage [V] | Electrification current [A] | Input power [A] | Breaker power [A] | [VA] | |
|------------------------|-----------------------------|-----------------|-------------------|--------------|----------------|
| | | | | During input | During breaker |
| 120 | 10 | 60 | 6 | 7,200 | 720 |
| 240 | | 30 | 3 | 7,200 | 720 |

Pilot Duty B300

| AC applied voltage [V] | Electrification current [A] | Input power [A] | Breaker power [A] | [VA] | |
|------------------------|-----------------------------|-----------------|-------------------|--------------|----------------|
| | | | | During input | During breaker |
| 120 | 5 | 30 | 3 | 3,600 | 360 |
| 240 | | 15 | 1.5 | 3,600 | 360 |

Pilot Duty C300

| AC applied voltage [V] | Electrification current [A] | Input power [A] | Breaker power [A] | [VA] | |
|------------------------|-----------------------------|-----------------|-------------------|--------------|----------------|
| | | | | During input | During breaker |
| 120 | 2.5 | 15 | 1.5 | 1,800 | 180 |
| 240 | | 7.5 | 0.7 | 1,800 | 180 |

FOREIGN SPECIFICATIONS

TIMER

| Products Name | Recognized by UL Standards | | Certified by CSA Standards | | Lloyd's Register Standards | | Remarks | |
|---|----------------------------|--|---|--|---|--|---|--|
| | File No. | Recognized rating | File No. | Certified rating | File No. | Certified rating | | |
| PM4S | E43149 | 5A250VAC PILOT DUTY C300 | E43149 (C-UL) | 5A250VAC PILOT DUTY C300 | — | — | | |
| PM4H-A PM4H-S PM4H-M PM4H-SD PM4H-W | E122222 | 5A250VAC PILOT DUTY C300 | LR39291 | 5A250VAC PILOT DUTY C300 | 98/10004 | 5A 250V AC (resistive) | | |
| PM4H-F | E122222 | 3A250VAC PILOT DUTY C300 | LR39291 | 3A250VAC PILOT DUTY C300 | 98/10004 | 3A 250V AC (resistive) | | |
| LT4H LT4H-L LT4H-W | E122222 | 5A250VAC PILOT DUTY C300 100mA30VDC | E122222 (C-UL) | 5A250VAC PILOT DUTY C300 100mA30VDC | — | — | | |
| QM4H | E43149 | 5A250VAC PILOT DUTY C300 | E43149 (C-UL) | 5A250VAC PILOT DUTY C300 | — | — | | |
| PMH | E59504 | 7A1/6HP125VAC 7A1/6HP250VAC 3A30VDC PILOT DUTY C300 | LR39291 | 7A1/6HP125VAC 7A1/6HP250VAC 3A30VDC PILOT DUTY C300 | 88/10123 | 125V3.5A (COS $\phi \approx 0.4$) 250V2A (COS $\phi \approx 0.4$) 250V7A (COS $\phi \approx 1.0$) | "The standard models conform to the UL/CSA standard. (To place an order, you do not need to specify the tailing character [9] of each item number.)" The standard models conform to the LLOYD standard. | |
| MHP MHP-M | E59504 | 5A250VAC | LR39291 | 5A250VAC | 88/10123 | 250V5A (COS $\phi \approx 1.0$) | "The standard models conform to the UL/CSA standard. (To place an order, you do not need to specify the tailing character [9] of each item number.)" | |
| S1DXM-A/M (Relay output) | 2C | E122222 | 7A125VAC 6A250VAC 1/6HP125, 250VAC PILOT DUTY C300 | LR39291 | 7A125VAC 6A250VAC 1/6HP125, 250VAC PILOT DUTY C300 | 98/10004 | 7A 250V AC (resistive) | |
| | 4C | E122222 | 5A250VAC 1/10HP125, 250VAC PILOT DUTY C300 | LR39291 | 5A250VAC 1/10HP125, 250VAC PILOT DUTY C300 | 98/10004 | 5A 250V AC (resistive) | |
| S1DX (Relay output) | 2C | E122222 | 7A125VAC 6A250VAC 1/6HP125, 250VAC PILOT DUTY C300 | LR39291 | 7A125VAC 6A250VAC 1/6HP125, 250VAC PILOT DUTY C300 | 98/10004 | 7A 250V AC (resistive) | |
| | 4C | E122222 | 5A250VAC 1/10HP125, 250VAC PILOT DUTY C300 | LR39291 | 5A250VAC 1/10HP125, 250VAC PILOT DUTY C300 | 98/10004 | 5A 250V AC (resistive) | |
| PM5S-A PM5S-S PM5S-M | E59504 (C-UL) | 5A250VAC PILOT DUTY C300 | E59504 (C-UL) | 5A250VAC PILOT DUTY C300 | — | — | | |

Accessories

| Products Name | Recognized by UL Standards | | Certified by CSA Standards | | Lloyd's Register Standards | | Remarks |
|-----------------------------------|----------------------------|--|----------------------------|--|----------------------------|------------------|---------|
| | File No. | Recognized rating | File No. | Certified rating | File No. | Certified rating | |
| Common mounting tracks for timers | E59504 | 10A250VAC AT8-RFD (AT78039) 7A250VAC AT8-DF8L (ATA48211) 8P cap was an approved as an option. AD8-RC (AD8013) | LR39291 | 10A250VAC AT8-RFD (AT78039) 7A250VAC AT8-DF8L (ATA48211) 8P cap was an approved as an option. AD8-RC (AD8013) | — | — | |
| | E148103 | AT8-DF8K (ATC180031) AT8-DF11K (ATC180041) AT8-R8K (AT78041) AT8-R11K (AT78051) | E148103 (C-UL) | AT8-DF8K (ATC180031) AT8-DF11K (ATC180041) AT8-R8K (AT78041) AT8-R11K (AT78051) | — | — | |

FOREIGN SPECIFICATIONS

Counters

| Product name | UL recognized | | CSA certified | | Remarks |
|--------------------------|---------------|--|-------------------|--|---------|
| | File No. | Approved ratings | File No. | Approved ratings | |
| LC4H LC4H-L LC4H-S | E122222 | 5A250V AC PILOT DUTY C300 100mA 30V DC | E122222 (C-UL) | 5A250V AC PILOT DUTY C300 100mA 30V DC | |
| LC4H-W | E122222 | 3A250V AC PILOT DUTY C300 100mA 30V DC | E122222 (C-UL) | 3A250V AC PILOT DUTY C300 100mA 30V DC | |
| LC2H | E122222 | 24-240 V AC/DC 4.5-30 V DC 3 V DC | E122222 (C-UL) | 24-240 V AC/DC 4.5-30 V DC 3 V DC | |
| LC2H preset | E122222 | 24-240 V AC/DC 4.5-30 V DC 3 V DC | E122222 (C-UL) | 24-240 V AC/DC 4.5-30 V DC 3 V DC | |

Hour Meters

| Product name | UL recognized | | CSA certified | | Remarks |
|--------------------|---------------|--|-------------------|--|---|
| | File No. | Approved ratings | File No. | Approved ratings | |
| TH13 · TH23 series | E42876 | 115-120, 220, 240V AC | LR39291 | 115-120, 220, 240V AC | • For UL-recognized and CSA-certified products, specify "U" at the end of the part No. |
| TH14 · TH24 series | E42876 | 12, 24, 48, 100, 110, 115-120, 200, 220, 240V AC | LR39291 | 12, 24, 48, 100, 110, 115-120, 200, 220, 240V AC | • Only black panel-mounting type UL-recognized and CSA-certified. • For UL-recognized and CSA-certified products, specify "U" at the end of the product code. • Panel-mounting silver type not UL-recognized nor CSA-certified. |
| TH63 · 64 series | E42876 | 12, 24, 48, 100, 110, 115-120, 200, 220, 240V AC | LR39291 | 12, 24, 48, 100, 110, 115-120, 200, 220, 240V AC | • Standard products are UL-recognized and CSA-certified. |
| LH2H | E122222 | 24-240 V AC/DC 4.5-30 V DC 3 V DC | E122222 (C-UL) | 24-240 V AC/DC 4.5-30 V DC 3 V DC | • Standard products are UL-recognized and CSA-certified. |
| LH2H preset | E122222 | 24-240 V AC/DC 4.5-30 V DC 3 V DC | E122222 (C-UL) | 24-240 V AC/DC 4.5-30 V DC 3 V DC | • Standard products are UL-recognized and CSA-certified. |
| TH8 series | E42876 | 12 V DC 24 V DC | E42876 (C-UL) | 12 V DC 24 V DC | • Standard products are UL-recognized and CSA-certified. |

Accessories

| Product name | UL-recognized | | CSA certified | | Remarks |
|-------------------------|---------------|---|-------------------|--|---------|
| | File No. | Rating | File No. | Rating | |
| Common counter fixtures | E59504 | 10A250V AC AT8-RFD (AT78039) 7A250V AC AT8-DF8L (ATA48211) 8P cap CSA-certified as option. AD8-RC (AD8013) | LR26550 | 10A250V AC AT8-RFD (AT78039) 7A250V AC AT8-DF8L (ATA48211) 8P cap UL-listed as option. AD8-RC(AD8013) | |
| | E148103 | AT8-DF8K (ATC180031) AT8-DF11K (ATC180041) AT8-R8K (AT78041) AT8- R11K (AT78051) | E148103 (C-UL) | AT8-DF8K (ATC180031) AT8-DF11K (ATC180041) AT8-R8K (AT78041) AT8- R11K (AT78051) | |

CE MARKINGS OVERVIEW

Counter, Hour Meter conforming to EN/IEC standards

The Timer, Counter, Hour Meter shown below conform to both EN and IEC standards, and may display the CE markings.

| Product classification | Product name | EMC directives | Low-voltage directives |
|------------------------|--------------|---------------------------|------------------------|
| Timers | LT4H | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | LT4H-L | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | LT4H-W | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | PM4H | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | S1DX | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | S1DXM-A/M | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | PM4S | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | PM5S | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | QM4H | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| Time Switch | A-TB72 | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | A-TB72Q | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| Counters | LC4H | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | LC4H-L | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | LC4H-S | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | LC4H-W | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | LC2H | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | LC2H preset | EN 61000-6-4/EN 61000-6-2 | — |
| Hour Meters | TH13 | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | TH23 | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | TH14 | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | TH24 | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | TH40 | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | TH50 | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | TH63 | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | TH64 | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | LH2H | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| | LH2H preset | EN 61000-6-4/EN 61000-6-2 | — |
| | TH8 | EN 61000-6-4/EN 61000-6-2 | — |

What are EN standards?

An abbreviation of Norme Europeenne (in French), and called European Standards in English. Approval is by vote among the CEN/CENELEC member countries, and is a unified standards limited to EU member countries, but the contents conform to the international ISO/IEC standards.

If the relevant EN standard does not exist, it is necessary to obtain approval based on the relevant IEC standard or, if the relevant IEC standard does not exist, the relevant standard from each country, such as VDE, BS, SEMKO, and so forth.

CE markings and EC directives

The world's largest single market, the European Community (EC) was born on 1 January 1993 (changing its name to EU in November 1993. It is now always expressed as EU, apart from EC directives.) EU member country products have always had their quality and safety guaranteed according to the individual standards of each member country. However, the standards of each country being different prevented the free flow of goods within the EU. For this reason, in order to eliminate non-tariff barriers due to these standards, and to maximize the merits of EU unification, the EC directives were issued concomitant to the birth of the EU.

The EN standards were established as universal EU standards in order to facilitate EU directives. These standards were merged with the international IEC standards and henceforth reflect the standards in all countries. Also, the CE markings show that products conform to EC directives, and guarantee the free flow of products within the EC.

Appropriate EC directives for control equipment products

The main EC directives that are to do with machinery and electrical equipment are the machinery directive, the EMC directive, the low voltage directive, and the telecom directive. Although these directives have already been issued, the date of their enactment is different for each one. The machinery directive was 1 January 1995. The EMC directive was 1 January 1996, and the low voltage directive was enacted from 1 January 1997. The telecom directive was established by the separate CTR (Common Technology References.)