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# General Catalog

## Timers, Counters, Hour Meters

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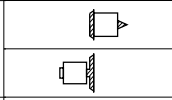
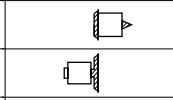
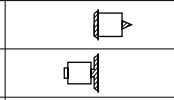
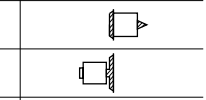
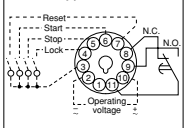
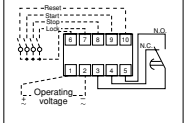
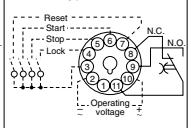
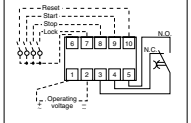
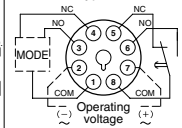
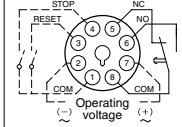
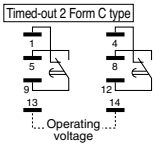
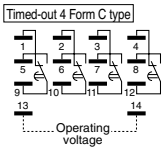
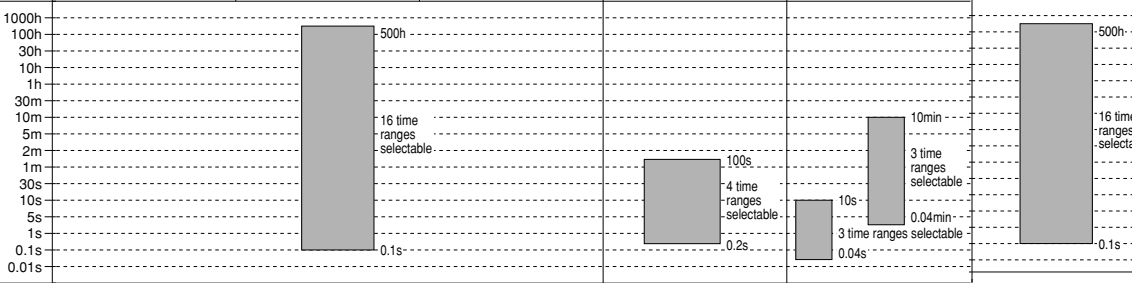
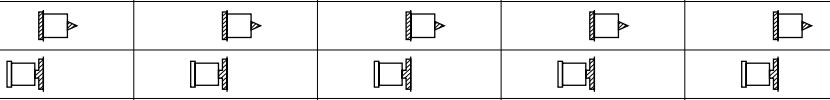
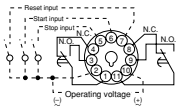
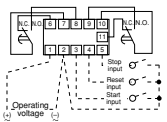
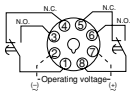
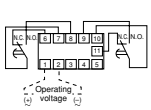
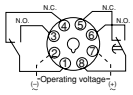
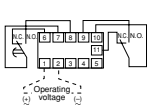
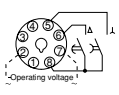
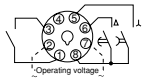
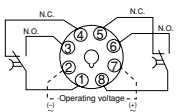
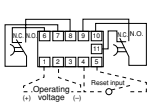
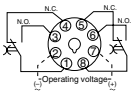
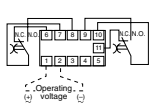
# TIMERS CHART OVERVIEW

| | | Multiple operation | ON-delay | OFF-delay | Twin | Flicker | One-shot | Star delta | Integration |
|---|---|---|---|---|---|---|---|---|---|
| Digital quartz timers | Surface mount/Flush mount |  LT4H LT4H-W |  LT4H  QM4H |  LT4H (Signal) |  LT4H-W |  LT4H |  LT4H | |  LT4H |
| Multi-range analog timer (CR oscillation) | Surface mount/Flush mount |   PM4H-A PM5S-A |    S1DX PM4H-S PM4H-M PM5S-S S1DXM-A/M |   PM4H-A (Signal) PM4H-F PM5S-A (Signal) PM5S-M (Signal) |  PM4H-W |    PM4H-A PM5S-A PM5S-M S1DX S1DXM-M |    PM4H-A PM5S-A PM5S-M S1DX S1DXM-M |  PM4H-SD/SDM | |
| | Relay terminal socket | |  S1DXM-A/M | | |  S1DXM-M |  S1DXM-M | | |
| | PC board mount | |  S1DX | | | | | | |

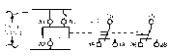
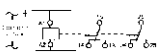
# TIMERS SELECTOR CHART

| | | LT4H Digital timer | LT4H-W Digital timer | QM4H Timer | S1DXM-A/M Timer |
|---|---|---|---|---|---|
| Model/Product Name | |  |  |  |  |
| Operation mode | | Power ON delay (1)<br>Power ON delay (2)<br>Signal ON delay<br>Signal OFF delay<br>Pulse One-shot<br>Pulse ON-delay<br>Signal Flicker<br>Totalizing ON-delay | ON-start flicker<br>OFF-start flicker<br>Delay one-shot | Power ON-delay | Power ON-delay<br>Power flicker<br>Power One-shot |
| | | Quartz oscillation counting timer | | | Output with contact<br>CR oscillation counting timer |
| Major uses | | Suitable for super-high accurate, digital setting | | | For highly accurate time setting |
| Time range<br>Each model has various time ranges. See the product lists before ordering. | | 1000h<br>100h<br>30h<br>10h<br>1h<br>30m<br>10m<br>5m<br>2m<br>1m<br>30s<br>10s<br>5s<br>1s<br>0.1s<br>0.01s<br>999.9h<br>8 time ranges selectable<br>0.05s | 9999h<br>8 time ranges selectable<br>0.08s | 9990h<br>0.01s | 10h<br>30min<br>60min<br>10min<br>3s<br>0.2s<br>0.5s<br>0.05s |
| Features | | Bright and easy-to-read display<br>Simple operation<br>Short body | Bright and easy-to-read display<br>Simple operation<br>Wide time setting range | Possible to set and change the time with front digit switches easily during the power off. Furthermore single unit has a time range of 0.01s to 9990hrs!! | With a large transparent dial. This timer can be attached both on the DIN rails and panel. |
| Control output (resistive) | Current | (Relay output type) 5A<br>(Transistor output type) 100mA | (Relay output type) 5A<br>(Transistor output type) 100mA | 5A | 7A (2 Form C type)<br>5A (4 Form C type) |
| | Voltage | 250 V AC<br>30 V DC | 250 V AC<br>30 V DC | 250 V AC | 250 V AC |
| Mounting method | |  |  |  |  |
| Mounting parts | | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap block, mounting frame, fitting sockets, protective cover |
| Rated operating voltage | | 100 to 240 V AC<br>24 V AC<br>12 to 24 V DC<br>(other models) | 100 to 240 V AC<br>24 V AC<br>12 to 24 V DC<br>(other models) | 100 to 240 V AC/DC<br>12 to 48 V AC/DC<br>(other models) | 100 to 120 V AC<br>200 to 220 V AC<br>12 V DC, 24 V DC<br>(other models) |
| Arrangement | | (Relay output type) Timed-out 1 Form C<br>(Transistor out-put type) Timed-out 1 Form A | (Relay output type) Timed-out 1 Form C<br>(Transistor output type) Timed-out 1 Form A | T.D. mode: Time delay 2C<br>INST. mode: Time delay 1C and instantaneous 1C<br>(Use MODE switch on front) | Timed-out 2 Form C<br>Timed-out 4 Form C |
| Time accuracy | Operation time fluctuation | ±(0.005% + 50 ms) in case of power on start<br>±(0.005% + 20 ms) in case of reset or input signal start | ±(0.005% + 80 ms) in case of power on start<br>±(0.005% + 20 ms) in case of reset or input signal start | ±(0.01% + 0.05 s) in case of power on start<br>±0.005% ±0.03 s (G type only) | ±1% |
| | Temperature error | | | | ±5% |
| | Voltage error | | | | ±1% |
| | Setting error | | | | ±10% |
| Min. power off time | | 500 ms | 500 ms | 100 ms | 100 ms |
| Life (Min. operation) | Mechanical | $2 \times 10^7$ / — | $2 \times 10^7$ / — | $2 \times 10^7$ | $10^7$ |
| | Electrical | $10^5$ / $10^7$ | $10^5$ / $10^7$ | $10^5$ | $2 \times 10^5$ |
| Terminal layouts and Wiring diagrams | | 11-Pin type<br>  <br>Screw terminal type<br>  | 11-Pin type<br>  <br>Screw terminal type<br>  | QM4H-S type<br>  <br>QM4H-G type<br>  | Timed-out 2 Form C type<br>  <br>Timed-out 4 Form C type<br>  |
| Available standards | | UL/c-UL, CE | UL/c-UL, CE | UL/c-UL, CE | UL/c-UL, CE |

# TIMERS SELECTOR CHART

| | | PM4H-A<br>Multi-range analog timer | PM4H-S<br>Multi-range analog timer | PM4H-M<br>Multi-range analog timer | PM4H-SD/SDM<br>Star-Delta timer | PM4H-F8/-F8R/-F11R<br>OFF-delay timer | PM4H-W Analog multi-range<br>cyclic twin timer |
|---|---|---|---|---|---|---|---|
| Model/Product Name | |  |  |  |  |  |  |
| Operation mode | | Pulse ON-delay<br>Pulse Flicker<br>Pulse ON-Flicker<br>Differential ON/OFF-delay (1)(2)<br>Signal OFF-delay<br>Pulse One-shot<br>Pulse One-cycle | Power ON-delay | Power ON-delay<br>Power Flicker<br>Power ON-flicker<br>Power One-shot<br>Power One-cycle<br>(with instantaneous contact) | Star-Delta | Power OFF-delay | Power OFF-start cyclic |
| | | CR oscillation counting timer | | | | | CR oscillation counting timer |
| Major uses | | For time control for short or long time | For time control for short or long time | For self holding circuit | For SD motor start-up | For all uses of power OFF-delay | For repetitive ON/OFF operation |
| Time range<br>Each model has various time ranges. See the product lists before ordering. | |  | | | | | |
| Features | | 16 time ranges are selectable.<br>1s to 500h (Max. range) is controlled.<br>8 operation modes available. | 16 time ranges are selectable.<br>1s to 500h (Max. range) is controlled in one unit. | 16 time ranges are selectable.<br>1s to 500h (Max. range) is controlled in one unit.<br>5 operation modes (with instantaneous contact) available. | 4 time ranges are selectable.<br>2s to 100s (Max. range) is controlled in one unit.<br>5 time ranges selectable for the Y-Δ switching times. | Multiple time ranges are selectable.<br>Power-OFF delay of max. 10 min. is controlled. | 16 time ranges are selectable.<br>1s to 500h (Max. range) is controlled in one unit. |
| Control output (resistive) | Current | 7A<br>5A<br>3A<br>5A | 5A | 5A | 5A | 3A | 5A |
| | Voltage | 250 V AC | 250 V AC | 250 V AC | 250 V AC | 250 V AC | 250 V AC |
| Mounting method | |  | | | | | |
| Mounting parts | | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap, panel cover, rubber gasket, mounting frame |
| Rated operating voltage | | 100 to 240 V AC,<br>48 to 125V DC, 24 V AC/DC,<br>12 V DC<br>(other models) | 100 to 240 V AC,<br>48 to 125V DC, 24 V AC/DC,<br>12 V DC<br>(other models) | 100 to 240 V AC,<br>48 to 125V DC, 24 V AC/DC,<br>12 V DC<br>(other models) | 100 to 240 V AC,<br>24 V AC<br>(other models) | 100 to 120 V AC,<br>200 to 240 V AC,<br>12 V DC, 24 V DC, 24 V AC<br>(other models) | 100 to 240 V AC<br>48 to 125V DC, 24 V AC/DC<br>12 V DC<br>(other models) |
| Arrangement | | Timed-out<br>2 Form C | Timed-out<br>2 Form C | Timed-out 1 Form C<br>Instantaneous 1 Form C | Y side: Timed-out 1 Form A<br>Δ side: Timed-out 1 Form A<br>Instantaneous: 1 Form A | Timed-out 2 Form C<br>Timed-out 1 Form C<br>[F8R type] | Timed-out<br>2 Form C |
| Time accuracy | Operation time fluctuation | ±0.3% | ±0.3% | ±0.3% | ±0.3% | ±0.3% | ±0.3% |
| | Temperature error | ±2% | ±2% | ±2% | ±2% | ±2% | ±2% |
| | Voltage error | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% | ±0.5% |
| | Setting error | ±5% | ±5% | ±5% | ±5% | ±5% | ±5% |
| Min. power off time | | 100 ms | 100 ms | 100 ms | 500 ms | — | 300 ms |
| Life (Min. operation) | Mechanical | $2 \times 10^7$ | $2 \times 10^7$ | $2 \times 10^7$ | $2 \times 10^7$ | $10^7$ | $2 \times 10^7$ |
| | Electrical | $10^5$ | $10^5$ | $10^5$ | $10^5$ | $10^5$ | $10^5$ |
| Terminal layouts and wiring diagrams | | Pin type<br>  <br>Screw terminal type<br>  | Pin type<br>  <br>Screw terminal type<br>  | Pin type<br>  <br>Screw terminal type<br>  | Pin type<br>No instantaneous contact<br>  <br>Pin type<br>With instantaneous contact<br>  | Pin type<br>  <br>Screw terminal type<br>  | Pin type<br>  <br>Screw terminal type<br>  |
| Available standards | | UL/CSA, CE, LLOYD | UL/CSA, CE, LLOYD | UL/CSA, CE, LLOYD | UL/CSA, CE, LLOYD | UL/CSA, CE, LLOYD | UL/CSA, CE, LLOYD |

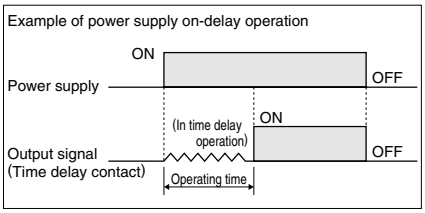
# TIMERS SELECTOR CHART

| | | | | |
|---|---|---|---|---|
| Model/Product Name | | CE  **PM5S-A** **Multi-range analog timer** | CE  **PM5S-S** **Multi-range analog timer** | CE  **PM5S-M** **Multi-range analog timer** |
| Operation mode | | Pulse ON-delay<br>Pulse Flicker<br>Pulse ON-Flicker<br>Signal OFF-delay<br>Pulse One-shot<br>Pulse One-cycle | Power ON-delay | Pulse ON-delay<br>Pulse Flicker<br>Pulse ON-flicker<br>Signal OFF-delay<br>Pulse One-shot<br>Pulse One-cycle<br>(with instantaneous contact) |
| | | CR oscillation counting timer | | CR oscillation counting timer |
| Major uses | | For time control for short or long time | For time control for short or long time | For self holding circuit |
| Time range<br>Each model has various time ranges. See the product lists before ordering. | | 1000h<br>100h<br>30h<br>10h<br>1h<br>30m<br>10m<br>5m<br>2m<br>1m<br>30s<br>10s<br>5s<br>1s<br>0.1s<br>0.01s<br>500h<br>16 time ranges selectable<br>0.1s | | 500h<br>16 time ranges selectable<br>0.1s |
| Features | | 16 time ranges are selectable.<br>1s to 500h (Max. range) is controlled.<br>6 operation modes available. | 16 time ranges are selectable.<br>1s to 500h (Max. range) is controlled in one unit. | 16 time ranges are selectable.<br>1s to 500h (Max. range) is controlled in one unit.<br>6 operation modes (with instantaneous contact) available. |
| Control output (resistive) | Current | 7A<br>5A<br>3A<br>5A | 5A | 5A |
| | Voltage | 250 V AC | 250 V AC | 250 V AC |
| Mounting method | |  |  |  |
| Mounting parts | | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap, panel cover, rubber gasket, mounting frame | Terminal block, cap, panel cover, rubber gasket, mounting frame |
| Rated operating voltage | | 24 to 240V AC/DC | 24 to 240V AC/DC | 24 to 240V AC/DC |
| Arrangement | | Timed-out<br>2 Form C | Timed-out<br>2 Form C | Timed-out 1 Form C<br>Instantaneous 1 Form C |
| Time accuracy | Operation time fluctuation | ±0.3% | ±0.3% | ±0.3% |
| | Temperature error | ±2% | ±2% | ±2% |
| | Voltage error | ±0.5% | ±0.5% | ±0.5% |
| | Setting error | ±10% | ±10% | ±10% |
| Min. power off time | | 100 ms | 100 ms | 100 ms |
| Life (Min. operation) | Mechanical | $2 \times 10^7$ | $2 \times 10^7$ | $2 \times 10^7$ |
| | Electrical (resistive) | $10^5$ | $10^5$ | $10^5$ |
| Wiring diagrams | |  |  |  |
| Available standards | | UL/C-UL | UL/C-UL | UL/C-UL |

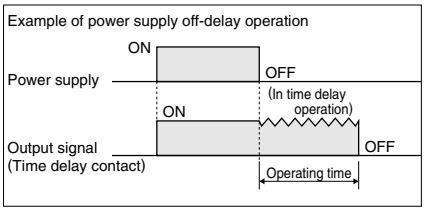
# TIMER-RELATED TERMINOLOGY

**• What is a timer?**
The timer is a relay having such an output (with or without contact) which electrically closes (turns ON) or opens (turns OFF) the circuit after a preset time elapses when electrical or mechanical input is given.

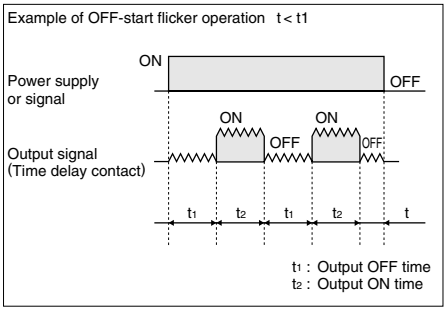
**• On-delay Operation (Time delay operation)**
The on-delay operation is an operation to give output when preset time expires after a predetermined input is given to the power supply circuit or input circuit. On-delay operation includes power supply on-delay operation and signal on-delay operation.



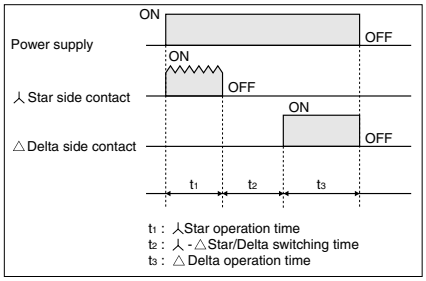

**• Off-delay Operation (Time delay resetting)**
The off-delay operation is an operation to turn OFF output when preset time expires after a predetermined input is given to the power supply circuit or input circuit, and at the same time output signal is given and predetermined input is turned OFF. Off-delay operation includes power supply off-delay operation and signal off-delay operation.




**• Flicker Operation**
The flicker operation is an operation to repeat output ON/OFF action according to preset ON time and OFF time while a predetermined input is given to the power supply circuit or input circuit. Flicker operation includes OFF-start flicker operation and ON-start flicker operation.




**• Star (⅄)/Delta (△) Operation**
This operation controls the time in the star connection used for star-delta starting which is conducted for starting a cage induction motor and the time for switching the star connection over to delta connection.




**• Preset Time**
The preset time is the control time set by setting time-variable timer.

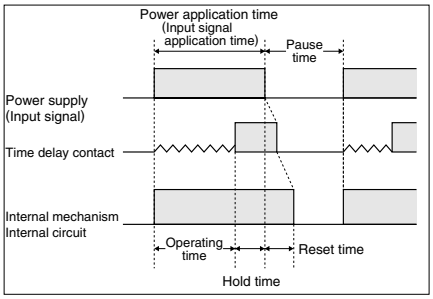
**• Operating Time**
The operating time means the time which elapses between the addition of predetermined input to the power supply circuit and input circuit and the completion of operation for preset time.

**• Hold Time**
It means the time which elapses between the completion of operation for preset time and the start of resetting.

**• Pause Time**
It means the time elapses between the start of operation for preset time and the addition of input required again for the power supply circuit or input circuit. Timer does not perform normal function unless this pause time is set longer than the timer reset time.

**• Resetting**
It means that the operation returns to the state before starting while the timer is in operation for preset time or after it completes the operation for preset time. Resetting during the operation for preset time is referred to as halfway resetting.

**• Reset Time**
It means the time elapses between shut-off of input to the power supply circuit or input of reset signal and the completion of resetting.
Timer resetting function shares the reset of contact, reset of mechanical parts such as pointer etc., reset of parts in internal circuit such as capacitor etc., and the value at which all of these parts complete their resetting operation is regarded as reset time. If timer is used for a pause time shorter than specified reset time, the operation time expires earlier than preset, unexpected instantaneous operation takes place or the operation is failed, thus making it impossible to expect the normal operation. Therefore, be sure to set the timer pause time longer than the specified reset time.




**• Minimum Power Application Time**
It means the minimum time during which power must be supplied in order to operate timer normally, in the case of power supply off-delay timer.

**• Fluctuation of Operating Time**
It means the irregularity in operating time caused when timer is set at specified time and the operation is repeated under the same conditions. It is also referred to as repetitive error.

**• Voltage Error**
It means the difference between the operating time at the rated voltage and that within the allowable voltage range.

**• Temperature Error**
It means the difference between the operating time at the temperature of 20±2°C and that within the allowable temperature range.

**• Set Error**
It means the difference between the set time and the time which actually elapses. It is also referred to as setting error.
The set error of an analog timer is the rate to the full-scale value. If the set error is ±5%, it becomes equivalent to an error of maximum ±5 hours on the assumption that 100 hours is set in the range of 100 hours. The error produced when 10 hours is set is also equivalent to an error of maximum ±5 hours. As far as the set error is concerned, digital timer is by far exact. Select a digital timer for the case when accuracy is required.
When using an analog type multi-range timer for setting of long time, the setting procedure stated as follows minimizes the error. For example, if you want to set 8 hours in the range of 10 hours, first set the pointer to such a graduation where the actual operating time should become as close to 8 seconds as possible in the range of 10 seconds. Then, reset the range to 10 hours, leaving the pointer set at the graduation as it is.

# TIMER-RELATED TERMINOLOGY

**• Pause Time Error**
It means the difference between the operating time to a fixed pause time and the operating time to a pause time that varies.
The pause time characteristics are the main characteristics of CR timer (timer exploiting charge and discharge of capacitor C and resistance R).
If the oscillation count timer (timer which comprises an oscillation circuit composed of CR and quartz and is operated by a counting circuit inside IC or micro-computer which counts the reference signal) is used, the pause time error becomes almost negligible owing to its principles of operation. Accordingly, the description about these characteristics may be omitted for the oscillation count timer.

**• Equation for Each Error and Measurement Conditions**
The operation time shall be measured, in principle, for retention time of 0.5 second and halt time of 1 second.
The measurement shall be repeated five times except for the initial test. The equation for each error and the measurement conditions are shown in the table below:

| Item | Equation | Measurement conditions | | |
|---|---|---|---|---|
| | | Set value Ts (Note 1) | Supply voltage | Ambient temperature |
| (1) Fluctuation in operation time | $\pm\frac{1}{2}\times\frac{Tmax.-Tmin.}{TMs}\times100$ (%) | Full-scale value | Rated voltage | 20±2°C 68±36°F (Note 2) |
| (2) Voltage error | $\frac{TMx_1-TM}{TMs}\times100$ (%) | | Fluctuation range of allowable voltage of power supply (Note 3) | |
| (3) Temperature error | $\frac{TMx_2-TM}{TMs}\times100$ (%) | | Rated voltage | –10 to 50°C +14 to 122°F (Note 4) |
| (4) Set error | $\frac{TM-Ts}{TMs}\times100$ (%) | 1/3 or more of full-scale value | | 20±2°C 68±36°F (Note 2) |
| (5) Pause time error | $\frac{TMx_3-TM}{TMs}\times100$ (%) | Full-scale value | | |

Note 1: For digital timers, the set value Ts shall be optional.
Note 2: If no question arises from evaluation results, 13-35°C is acceptable.
Note 3: The measurement may be performed in other specified voltage ranges.
Note 4: The measurement may be performed in other specified temperature ranges.

TM: Average of measured values for operation time
Ts: Set value
TMs: Full-scale value. For digital timers, any arbitrary scale-value may be used.
Tmax: Maximum of measured values for operation time
Tmin: Minimum of measured values for operation time
$TMx_1$: Average of operation time at such voltage as maximizes deviation from TM in allowable voltage range.
$TMx_2$: Average of operation time at such temperature as maximizes deviation from TM in allowable temperature range.
$TMx_3$: Average of operation time at such pause time (in the range from the specified reset time to 1 hour) as maximizes deviation from TM.

**• Functional Vibration Resistance**
Means such a vibration as occurs in the range where the contact closed with that vibration during the use of the timer remains closed for the specified time (3 or 1 msec.) minimum.

**• Destructive Vibration Resistance**
Means such a vibration as occurs in the range where no part is damage with that vibration during the transportation or use of the timer and the operation characteristics are maintained.

**• Functional Shock Resistance**
Means such a shock as occurs in the range where the contact closed with that shock during the use of the timer remains closed for the specified time (1 ms) minimum.

**• Destructive Shock Resistance**
Means such a shock as occurs in the range where no part is damaged with that shock during the transportation or use of the timer and the operation characteristics are maintained.

**• Mechanical life**
Means the durability that is achieved when the control output is performed in the no-load state.

**• Electrical life**
Means the durability that is achieved when the specified voltage and current loads are individually applied to the control output while being turned ON and OFF. Generally, the life of the timer is represented by the number of times the control output is performed. When a load is connected to the control output, the term of „electrical life“ is used. When no load is connected to the control output, the term of „mechanical life“ is used. The electrical life is shorter than the mechanical life, and becomes longer as the load decreases. The life of the timer is made longer by connecting a relay or a similar part rather than directly switching a large load with the control output.

**• Rated power consumption**
Means the power that is consumed when the rated operation voltage is applied to the power circuit.
(Rated power consumption = rated voltagexcurrent consumption)

**• Rated control capacity**
Means the reference value that is used to determine the performance of the switching part of the load. This value is represented by the combination of voltage and current.

**• Contact resistance**
Means the combined resistance that consists of the contact resistance between contacts, and the conductor resistance of pins and contact springs.

**• Insulation resistance**
Means the resistance between a contact or a conductive pin like the pin to which the operation voltage is applied, and a dead pin or a non-conductive metallic part like the time case, the base, or a retaining screw; or the resistance between contacts.

**• Withstand voltage**
Means the limit value that does not cause breakdown when high voltage is applied for one minute to the same location as measured for insulation resistance. The detectable leak current is normally 10 mA. In special cases, however, it may be 1mA or 3 mA.

**• Withstand surge voltage**
Means the limit value that shows the durability against momentary abnormal voltage resulting from lightning or switching a conductive load. The surge waveform is represented by the standard impulsive voltage waveform at ±(1.2x50) µs or ±(1x40) µs.

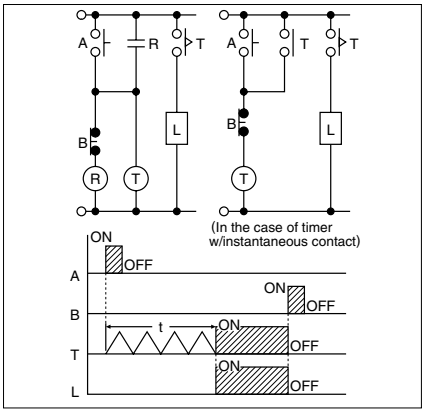
# ON-DELAY TIMER BASIC CIRCUIT

(Symbols)

| | |
|---|---|
| Self-resetting switch | Relay NO contact |
| Holding switch | Relay NC contact |
| Ⓡ Relay | Timer delay NO contact |
| Ⓣ Timer | Timer delay NC contact |
| Ⓛ Load | Timer instantaneous NO contact |
| Timer in work | Timer instantaneous NC contact |

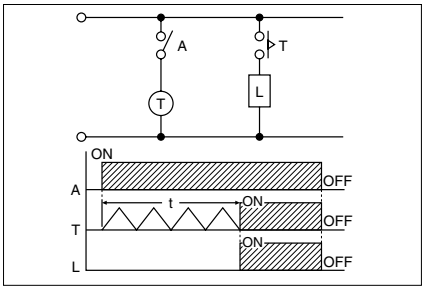
**1. Delay Operation (Instantaneous input)**

When control switch A is pressed, timer T starts immediately and after t-time elapses, load L is turned ON. When B is pressed, timer T is reset and load L is turned OFF.



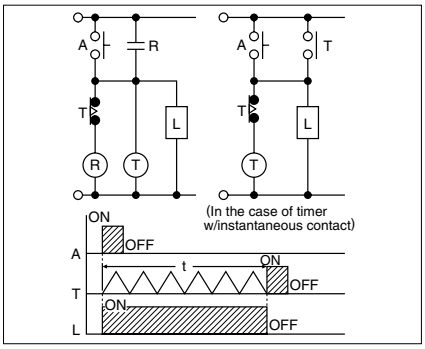

**2. Delay Operation (Continuous input)**

When switch A is pressed, after t-time elapsed, the timer contact closes and load L is turned ON. When switch A is opened, the timer is reset and the load is turned OFF.



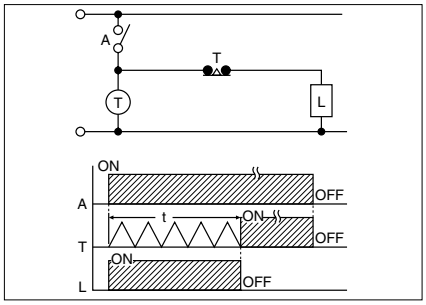

**3. Fixed Time Operation (Instantaneous input)**

When control switch A is pressed, load L is immediately turned ON, and after t-time elapses, load L is turned OFF.




**4. Fixed Time Operation (Continuous input)**

When switch A is closed, load L is turned ON and after t-time elapses, the load is turned OFF. When switch A is opened, timer T is reset and load L is turned OFF.

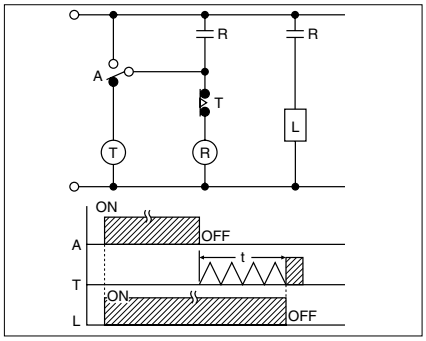



**5. Delay Reset Operation**

When contact A is reversed, load L is immediately turned ON. When contact A is returned to normal state, load L is turned OFF after t-time elapses.

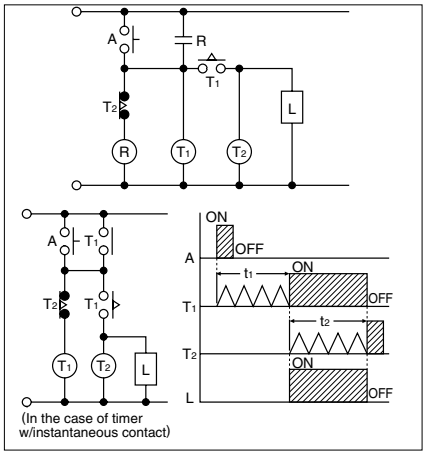
This circuit is used when the power supply is kept ON at all times or used for off-delay-like application.

However, it can not be used as off-delay timer at the time of power failure.



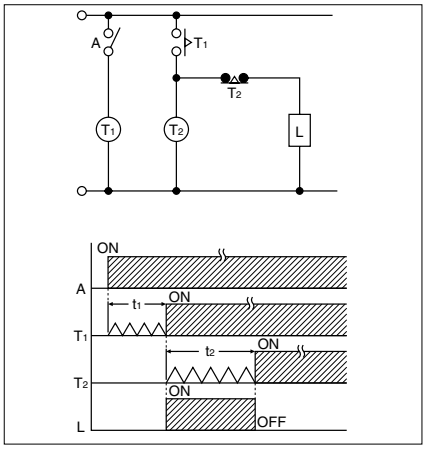

**6. Fixed Time Operation after Delay Time is Set (Instantaneous input)**

When control switch A is pressed, load L is turned ON after t1-time elapses, and load L is turned OFF after t2-time elapses. This circuit is used for the case of instantaneous input (one pulse).



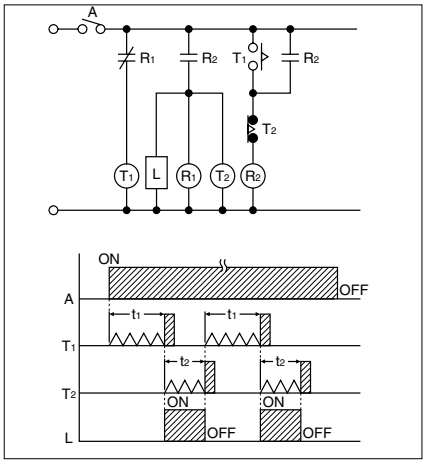

**7. Fixed Time Operation after Delay Time is Set (Continuous input)**

When switch A is pressed, load L is turned ON after t1-time elapses and load L is turned OFF after t2-time elapses.




**8. Repetitive Operation**

When switch A is pressed, load L is turned ON after t1-time elapses and load L is turned OFF after t2-time elapses, and thereafter the t1 and t2 operations are repeated. This repetitive operation stops when switch A is turned OFF.

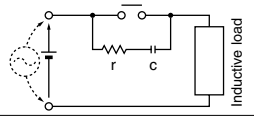
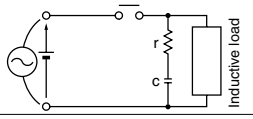
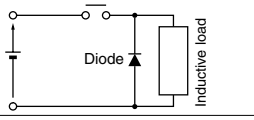
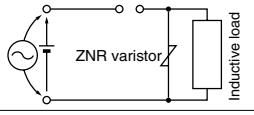


# GENERAL APPLICATION GUIDELINES

## Cautions for circuits

### 1. Protective circuit for timer contact

In the circuit that switches an inductive load, a contact failure may occur at a contact point due to surge or inrush current resulting from that switching. Therefore, it is recommended that the following protective circuit be used to protect the contact point.

| | | CR circuit (r: resistor c: capacitor) | | Diode circuit | Varistor circuit |
|---|---|---|---|---|---|
| Circuit | | Timer contact<br>  | Timer contact<br>  | Timer contact<br>  | Timer contact<br>  |
| Application | AC | (see note.) | Available | Not available | Available |
| | DC | Available | Available | Available | Available |
| Features/Notes | | If the load is a relay or solenoid, the release time lengthens. Effective when connected to both contacts if the power supply voltage is 24 or 48 V and the voltage across the load is 100 to 200 V. | | The diode connected in parallel causes the energy stored in the coil to flow to the coil in the form of current and dissipates it as joule heat at the resistance component of the inductive load. This circuit further delays the release time compared to the CR circuit. (2 to 5 times the release time listed in the catalog) | Using the rated voltage characteristics of the varistor, this circuit prevents excessively high voltages from being applied across the contacts. This circuit also slightly delays the release time. |
| | | If the load is a timer, leakage current flows through the CR circuit causing faulty operation. Note: If used with AC voltage, be sure the impedance of the load is sufficiently smaller than that of the c and r. | — | | |
| Device Selection | | As a guide in selecting r and c,<br>c: 0.5 to 1 μF per 1 A contact current<br>r: 0.5 to 1 Ω per 1 V contact voltage<br>Values vary depending on the properties of the load and variations in timer characteristics. Capacitor c acts to suppress the discharge the moment the contacts open. Resistor r acts to limit the current when the power is turned on the next time. Test to confirm. Use a capacitor with a breakdown voltage of 200 to 300 V. Use AC type capacitors (non-polarized) for AC circuits. | | Use a diode with a reverse breakdown voltage at least 10 times the circuit voltage and a forward current at least as large as the load current. In electronic circuits where the circuit voltages reverse breakdown voltage of about 2 to 3 times the power supply voltage. | — |

### 2. Type of Load and Inrush Current

The type of load and its inrush current characteristics, together with the switching frequency are important factors which cause contact welding. Particularly for loads with inrush currents, measure the steady state current and inrush current and use a relay or magnet switch which provides an ample margin of safety.
The table below shows the relationship between typical loads and their inrush currents.

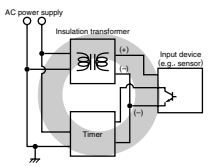
| Type of load | Inrush current |
|---|---|
| Resistive load | Steady state current |
| Solenoid load | 10 to 20 times the steady state current |
| Motor load | 5 to 10 times the steady state current |
| Incandescent lamp load | 10 to 15 times the steady state current |
| Mercury lamp load | 1 to 3 times the steady state current |
| Sodium vapor lamp load | 1 to 3 times the steady state current |
| Capacitive load | 20 to 40 times the steady state current |
| Transformer load | 5 to 15 times the steady state current |

When you want large load and long life of the timer, do not control the load direct with a timer. When the timer is designed to use a relay or a magnet switch, you can acquire the longer life of the timer.

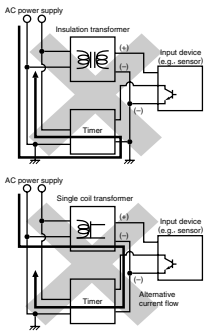
### 3. Connection of input

The PM4H and LT4H series use power supply without a transformer (power and input terminals are not insulated). In connecting various kinds of input signals, therefore, use a power transformer in which the primary side is separated from the ungrounded secondary side as shown in Fig. A, for the power supply for a sensor and other input devices so that short-circuiting can be prevented.

(Fig. A) Good example




(Fig. B) Bad example

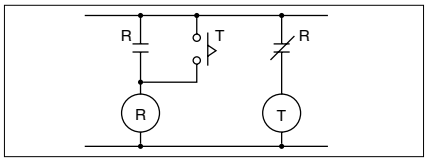



Do not use a single coil transformer (e.g., Sly-Duck). Otherwise, the internal circuit of the timer will be short-circuited as shown in Fig. B resulting in breakdown.

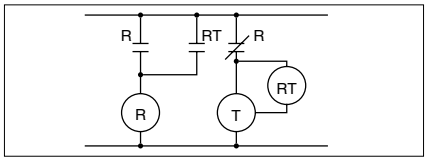
### 4. Long Continuous Current Flow

Long continuous current flow through the timer (approx. one month or longer) cause generation of heat internally, which degrade the electronic parts. Use the timer in combination with a relay and avoid long continuous current flow through the timer.

(1) When using contact output

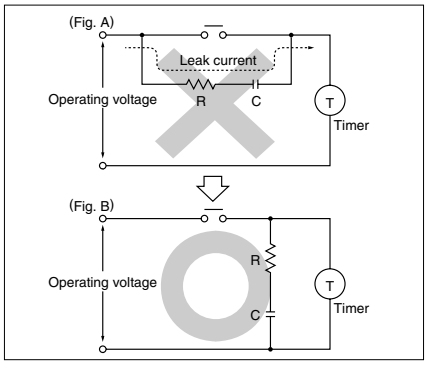



(2) When using non-contact output




### 5. Leakage current

1) For connecting and disconnecting operating voltage to the timer, a circuit should be used, which will prevent the flow of leakage current. For example, a circuit for contact protection as shown in Fig A. will permit leakage current flow through R and C, causing erroneous operation of the timer. Instead, the circuit shown in Fig. B should be used.



# GENERAL APPLICATION GUIDELINES

2) If the timer is directly switched with a non-contact element, leak current may flow into the timer and cause it to malfunction.

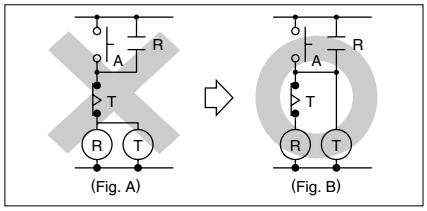
**6. Power off time**

If the operation voltage for the timer is turned ON after the limit time operation is completed or before the limit time is reached, the Power off time longer than the timer restoration time must be secured.

**7. Suicide circuit**

If the timer is restored immediately after the specified time is reached, the circuit must be configured so that the restoration time of the timer can be secured sufficiently.

If the power circuit for the timer is turned OFF with the timer contact, a suicide circuit may be configured (Fig. A). In order to settle the problem with this potential suicide circuit, the circuit must be designed so that the timer is turned OFF after the self-retention circuit is completely released (Fig. B).




**8. Electrical life**

The electrical life varies depending on the load type, the switching phase, and the ambient atmosphere. In particular, the following cases require careful attention:

(1) If an AC load is switched in synchronized phases:

Locking or welding is liable to occur due to contact transposition. Check this with the actual system.

(2)If a load is switched very frequently:

If a load which generates arcs when a contact is switched is turned ON and OFF very frequently, nitrogen and oxygen in air are combined due to arc energy and then $HNO_3$ is produced. This may corrode metallic materials.

The effective countermeasures include:

1. Using an arc-extinguishing circuit;
2. Decreasing the switching frequency; and
3. Decreasing the humidity in the ambient atmosphere.

## Cautions for use (common for all models)

**1. Pin connections**

Correctly connect the pins while seeing the terminal layout/wiring diagram. In particular, the DC type, which has polarities, does not operate with the polarities connected reverse. Any incorrect connection can cause abnormal heating or ignition.

**2. Connection to operation power supply**

1) Supply voltage must be applied at a time through a switch, a relay, and other parts. If the voltage is applied gradually, the specified time may be reached regardless of its value or the power supply may not be reset.

2) The operation voltage for the DC type must be at the specified ripple percentage or less. The average voltage must fall within the allowable operation voltage range.

| Rectification type | Ripple percentage |
|---|---|
| Single-phase, full-wave | Approx. 48% |
| Three-phase, full-wave | Approx. 4% |
| Three-phase, half-wave | Approx. 17% |

Note: Refer to the ripple percentage of each timer.

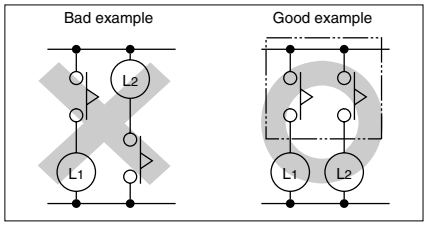
3) Make sure that no induced voltage and residual voltage are applied between the power pins on the timer after the power switch is turned OFF.

(If the power line is wired in parallel with the high-voltage and motor lines, induced voltage may be produced between the power pins.)

**3. Control output**

1) The load for the control output must be used within the load capacity specified in the rated control capacity. If it is used exceeding the rated value, the life is greatly shortened.

2) The following connection might result in short circuit between the heteropolar contacts in the timer.




**4. Installing the timer**

1) To install the timer, use the dedicated pin bracket or socket (cap). Avoid connecting the pins on the timer by directly soldering them.

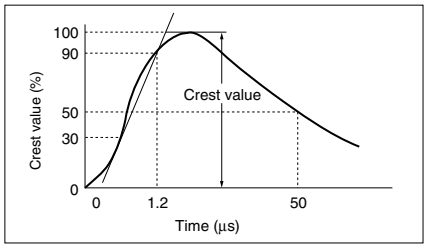
2) In order to maintain the characteristics, do not remove the timer cover (case).

**5. Superimposed surge of power supply**

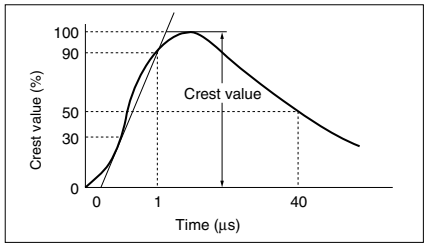
For the superimposed surge of power supply, the standard waveform (±1.2x50µs or ±1x40µs) is taken as the standard value for surge-proof voltage. (The positive and negative voltages are applied each three or five times between the power pins.)

For the standard values for the PM4H, LT4H and S1DX type timers, see the respective items in „Cautions for use."

**• Single-pole, full-wave voltage for surge waveform [±(1.2x50) µs]**




**• Single-pole, full-wave voltage for surge waveform [±(1x40) µs]**




**• PMH [±(1x40) µs]**

| Voltage type | Surge voltage |
|---|---|
| AC type (Except for 24V AC) | 4,000V |
| 12V DC, 24V DC, 24V AC | 500V |
| 48V DC | 1,000V |
| 100 to 110V DC | 2,000V |

If external surge occurs exceeding the specified value, the internal circuit may break down. In this case, use a surge absorption element. The typical surge absorption elements include a varistor, a capacitor, and a diode. If a surge absorption element is used, use an oscilloscope to see whether or not the foreign surge exceeding the specified value appears.

**6. Changing the set time**

Do not change the set time when the limit time operation is in progress. However, this is possible only with the motor-driven type timer if the set time is shorter than the remaining time. For changing the set time on the digital timer (LT4H series), see the relevant item in „Cautions for use."

# GENERAL APPLICATION GUIDELINES

**7. Operating environment**

1) Use the timer within the ambient temperature range from –10°C to +50°C +14°F to +122°F (+55°C +131°F for the LT4H series) and at ambient humidity of 85% RH maximum.

2) Avoid using the timer in a location where inflammable or corrosive gas is generated, the timer is exposed to much dust and other foreign matter water or oil is splashed on the timer or vibrations or shocks are given to the timer.

3) The timer cover (case), the knobs, and the dials are made of polycarbonated resin. Therefore, prevent the timer from being exposed to organic solvents such as methyl alcohol, benzine, and thinner, strong acid substances such as caustic soda, and ammonia and avoid using the timer in atmosphere containing any of those substances.

4) If the timer is used where noises are emitted frequently, separate the input signal elements (such as a sensor), the wiring for the input signal line, and the timer as far as possible from the noise source and the high power line containing noises.

**8. Checking the actual load**

In order to increase the reliability in the actual use, check the quality of the timer in the actual usage.

**9. Others**

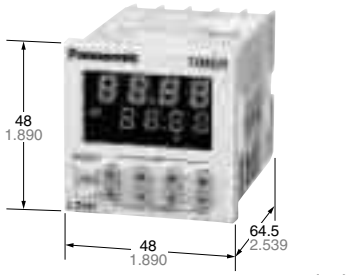
1) If the timer is used exceeding the ratings (operation voltage and control capacity), the contact life, or any other specified limit, abnormal heat, smoke, or ignition may occur.

2) If any malfunction of the timer is likely to affect human life and properties, give allowance to the rated values and performance values. In addition, take appropriate safety measures such as a duplex circuit from the viewpoint of product liabilities.

Panasonic
ideas for life

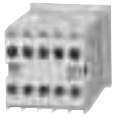
# DIN 48 SIZE DIGITAL TIMER

# LT4H




mm inch

Pin type



Screw terminal type

**UL File No.: E122222**
**C-UL File No.: E122222**

## Features

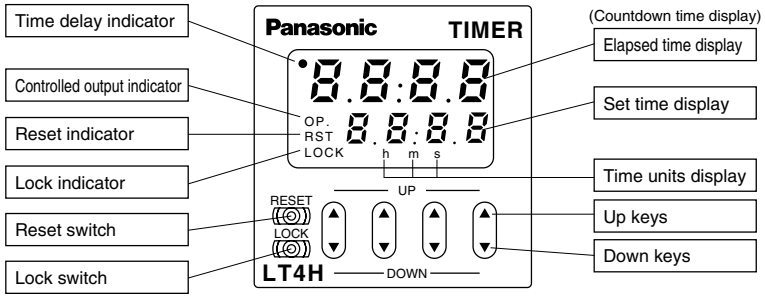
- **Bright and Easy-to-Read Display**
  A brand new bright 2-color back light LCD display. The easy-to-read screen in any location makes checking and setting procedures a cinch.
- **Simple Operation**
  Seesaw buttons make operating the unit even easier than before.
- **Short Body of only 64.5 mm 2.539 inch (screw terminal type) or 70.1 mm 2.760 inch (pin type)**
  With a short body, it is easy to install in even narrow control panels.
- **Conforms to IP66's Weather Resistant Standards**
  The water-proof panel keeps out water and dirt for reliable operation even in poor environments.
- **Screw terminal (M3.5) and Pin Types are Both Standard Options**
  The two terminal types are standard options to support either front panel installation or embedded installation.
- **Changeable Panel Cover**
  Also offers a black panel cover to meet your design considerations.
- **Compliant with UL, c-UL and CE.**

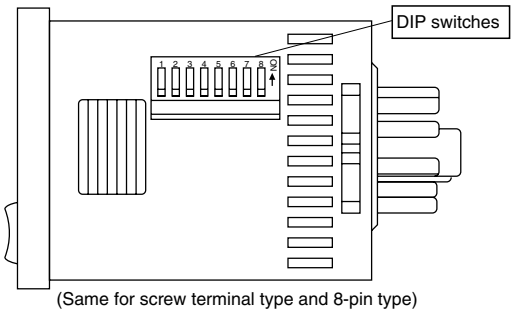
## Product types

| Time range | Operating mode | Output | Operating voltage | Power down insurance | Terminal type | Part number |
|---|---|---|---|---|---|---|
| 9.999 s (0.001 s~)<br>99.99 s (0.01 s~)<br>999.9 s (0.1 s~)<br>9999 s (1 s~)<br>99 min 59 s (1 s~)<br>999.9 min (0.1 min~)<br>99 h 59 min (1 min~)<br>999.9 h (0.1 h~) | Power ON delay (1)<br>Power ON delay (2)<br>Signal ON delay<br>Signal OFF delay<br>Pulse One-shot<br>Pulse ON-delay<br>Signal Flicker<br>Totalizing ON-delay<br>(8 modes) | Relay<br>(1 c) | 100 to 240 V AC | Available | 8 pins | LT4H8-AC240V |
| | | | | | 11 pins | LT4H-AC240V |
| | | | | | Screw terminal | LT4H-AC240VS |
| | | | 24 V AC | | 8 pins | LT4H8-AC24V |
| | | | | | 11 pins | LT4H-AC24V |
| | | | | | Screw terminal | LT4H-AC24VS |
| | | | 12 to 24 V DC | | 8 pins | LT4H8-DC24V |
| | | | | | 11 pins | LT4H-DC24V |
| | | | | | Screw terminal | LT4H-DC24VS |
| | | Transistor<br>(1 a) | 100 to 240 V AC | | 8 pins | LT4HT8-AC240V |
| | | | | | 11 pins | LT4HT-AC240V |
| | | | | | Screw terminal | LT4HT-AC240VS |
| | | | 24 V AC | | 8 pins | LT4HT8-AC24V |
| | | | | | 11 pins | LT4HT-AC24V |
| | | | | | Screw terminal | LT4HT-AC24VS |
| | | | 12 to 24 V DC | | 8 pins | LT4HT8-DC24V |
| | | | | | 11 pins | LT4HT-DC24V |
| | | | | | Screw terminal | LT4HT-DC24VS |

* A rubber gasket (ATC18002) and a mounting frame **(AT8-DA4)** are included.

## Part names




(Same for screw terminal type and 8-pin type)

## Specifications

| Item \ Type | | | Relay output type | | Transistor output type | |
|---|---|---|---|---|---|---|
| | | | AC type AC/DC type | DC type | AC type AC/DC type | DC type |
| Rating | Rated operating voltage | | 100 to 240 V AC, 24 V AC, 24 V AC/DC | 12 to 24 V DC | 100 to 240 V AC, 24 V AC, 24 V AC/DC | 12 to 24 V DC |
| | Rated frequency | | 50/60 Hz common | — | 50/60 Hz common | — |
| | Rated power consumption | | Max. 10 V A | Max. 3 W | Max. 10 V A | Max. 3 W |
| | Rated control capacity | | 5 A, 250 V AC (resistive load) | | 100 mA, 30 V DC | |
| | Time range | | 9.999 s, 99.99 s, 999.9 s, 9999 s, 99 min 59 s, 999.9 min, 99 h 59 min, 999.9 h (selected by DIP switch) | | | |
| | Time counting direction | | Addition (UP)/Subtraction (DOWN) (2 directions selectable by DIP switch) | | | |
| | Operation mode | | A (Power ON delay 1), A2 (Power ON delay 2), B (Signal ON delay), C (Signal OFF delay), D (Pulse one-shot), E (Pulse ON delay), F (Signal Flicker), G (Totalizing ON delay) (selectable by DIP switch) | | | |
| | Start/Reset/Stop input | | Min. input signal width: 1 ms, 20 ms (2 directions by selected by DIP switch) (The 8-pin type does not have a stop input.) | | | |
| | Lock input | | Min. input signal width: 20 ms (The 8-pin type does not have a lock input.) | | | |
| | Input signal | | Open collector input Input impedance: Max. 1 kΩ; Residual voltage: Max. 2 V Open impedance: 100kΩ or less, Max. energized voltage: 40V DC | | | |
| | Indication | | 7-segment LCD (LT4H, LT4H-L common), Elapsed value (backlight red LED), Setting value (backlight yellow LED) | | | |
| | Power failure memory method | | EEP-ROM (Min. $10^5$ overwriting) | | | |
| Time accuracy (max.) | Operating time fluctuation<br>Temperature error<br>Voltage error<br>Setting error | | ± (0.005 % + 50 ms) in case of power on start<br>± (0.005 % + 20 ms) in case of input signal start | | [Operating voltage: 85 to 110%<br>Temperature: –10 to +55°C +14 to +131°F<br>Min. input signal width: 1ms] | |
| Contact | Contact arrangement | | Timed-out 1 Form C | | Timed-out 1 Form A (Open collector) | |
| | Contact resistance (Initial value) | | 100 mΩ (at 1 A 6 V DC) | | — | |
| | Contact material | | Ag alloy/Au flash | | — | |
| Life | Mechanical (contact) | | Min. $2 \times 10^7$ ope. (Except for switch operation parts) | | — | |
| | Electrical (contact) | | $1.0 \times 10^5$ ope. (At rated control voltage) | | Min. $10^7$ ope. (At rated control voltage) | |
| Electrical | Allowable operating voltage range | | 85 to 110 % of rated operating voltage | | | |
| | Breakdown voltage (Initial value) | | 2,000 Vrms for 1 min: Between live and dead metal parts (11-pin)<br>2,000 Vrms for 1 min: Between input and output<br>1,000 Vrms for 1 min: Between contacts | | 2,000 Vrms for 1 min: Between live and dead metal parts (Pin type)<br>2,000 Vrms for 1 min: Between input and output | |
| | Insulation resistance (Initial value) | | Min. 100 MΩ: Between live and dead metal parts, Between input and output (At 500V DC), Between contacts | | Min. 100 MΩ: Between live and dead metal parts, Between input and output (At 500V DC) | |
| | Operating voltage reset time | | Max. 0.5 s | | | |
| | Temperature rise | | Max. 65° C (under the flow of nominal operating current at nominal voltage) | | — | |
| Mechanical | Vibration resistance | Functional | 10 to 55 Hz: 1 cycle/min single amplitude of 0.35 mm .014 inch (10 min on 3 axes) | | | |
| | | Destructive | 10 to 55 Hz: 1 cycle/min single amplitude of 0.75 mm .030 inch (1 h on 3 axes) | | | |
| | Shock resistance | Functional | Min. 98 m 321.522 ft./$s^2$ (4 times on 3 axes) | | | |
| | | Destructive | Min. 294 m 964.567 ft./$s^2$ (5 times on 3 axes) | | | |
| Operating conditions | Ambient temperature | | –10° C to 55° C +14° F to +131° F | | | |
| | Ambient humidity | | Max. 85 % RH (non-condensing) | | | |
| | Air pressure | | 860 to 1,060 h Pa | | | |
| | Ripple rate | | — | 20 % or less | — | 20 % or less |
| Connection | | | 8-pin/11-pin/screw terminal | | | |
| Protective construction | | | IP66 (front panel with rubber gasket) | | | |

## Applicable standard

| Safety standard | EN61812-1 | Pollution Degree 2/Overvoltage Category II |
|---|---|---|
| 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<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 2 kV (power supply line)<br>1 kV (signal line) |
| | Surge immunity | EN61000-4-5 1 kV (power 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) |
| | Voltage dip/Instantaneous stop/Voltage fluctuation immunity | EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

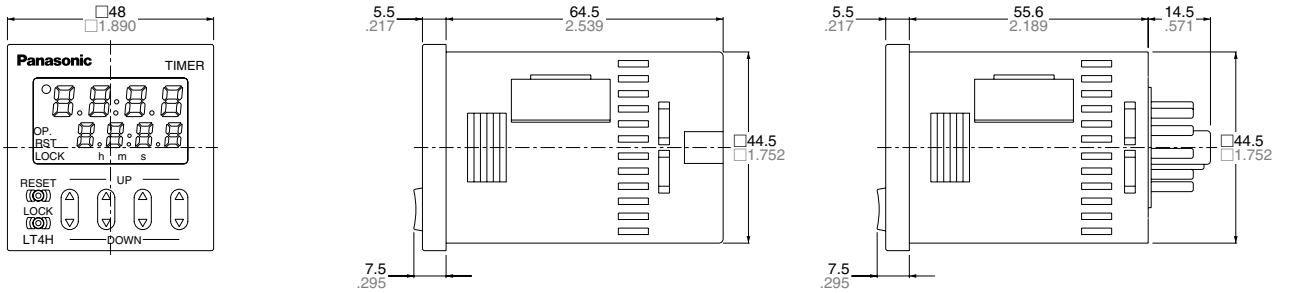
## Dimensions

(units: mm inch)
Tolerance: ±1.0 ±.039

**• LT4H digital timer**

Screw terminal type
(Flush mount)

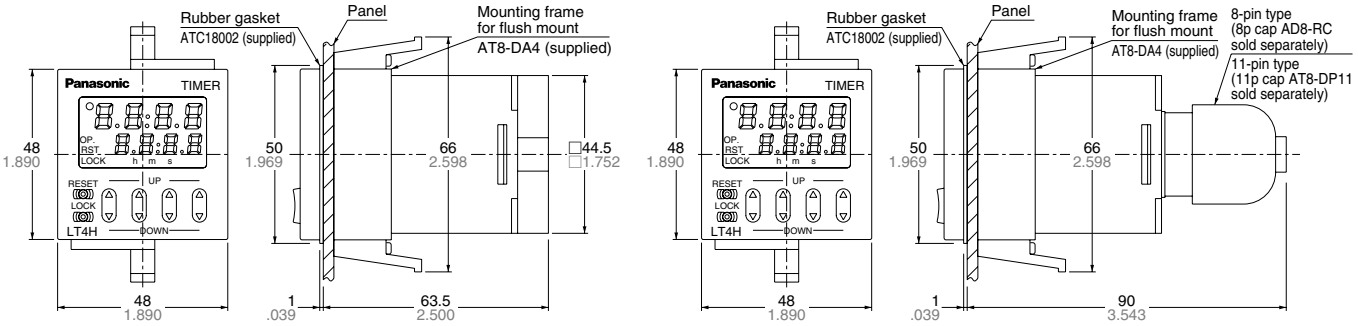
Pin type
(Flush mount/Surface mount)



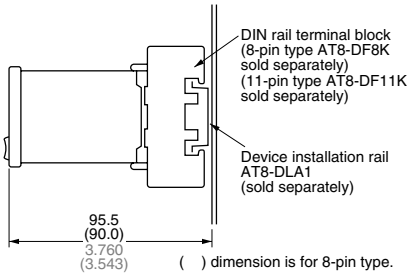

**• Dimensions for embedded installation (with adapter installed)**

Screw terminal type

Pin type

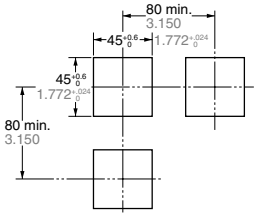



**• Dimensions for front panel installations**

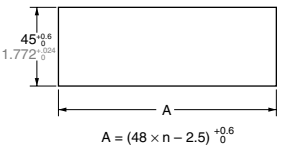



**• Installation panel cut-out dimensions**

The standard panel cut-out dimensions are shown below. Use the mounting frame (AT8-DA4) and rubber gasket (ATC18002).




**• For connected installations**

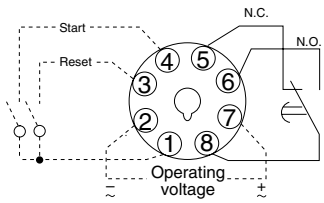



Note) 1: The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.
2: For connected installations, the waterproofing ability between the unit and installation panel is lost.

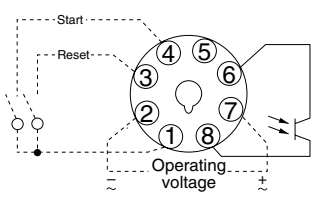
## Terminal layouts and wiring diagrams

**• 8-pin type**

Relay output type

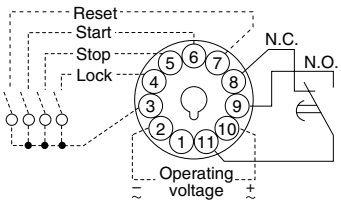



Transistor output type

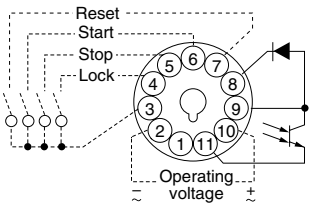



**• 11-pin type**

Relay output type

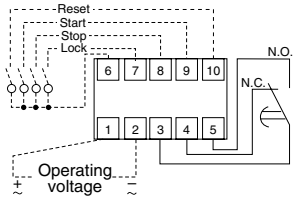



Transistor output type

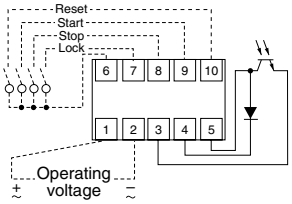



**• Screw terminal type**

Relay output type




Transistor output type




Note) For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 26.

## Setting the operation mode, time range and time

**Setting procedure 1) Setting the operation mode and time range**

Set the operation mode and time range with the DIP switches on the side of the LT4H timer.

**DIP switches**

| | Item | DIP switch | |
|---|---|---|---|
| | | OFF | ON |
| 1 | Operation mode | Refer to table 1 | |
| 2 | | | |
| 3 | | | |
| *4 | Minimum input reset, start, and stop signal width | 20 ms | 1 ms |
| 5 | Time delay direction | Addition | Subtraction |
| 6 | Time range | Refer to table 2 | |
| 7 | | | |
| 8 | | | |

* The 8-pin type does not have the stop input, so that the dip switch can be changed over between reset and start inputs. The signal range of the lock input is fixed (minimum 20 ms).

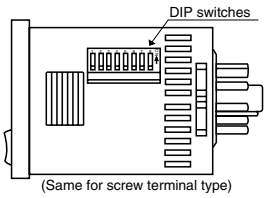



Table 1: Setting the operation mode

| DIP switch No. | | | Operation mode |
|---|---|---|---|
| 1 | 2 | 3 | |
| ON | ON | ON | A: Power on delay 1 |
| OFF | OFF | OFF | A2: Power on delay 2 |
| ON | OFF | OFF | B: Signal on delay |
| OFF | ON | OFF | C: Signal off delay |
| ON | ON | OFF | D: Pulse One shot |
| OFF | OFF | ON | E: Pulse On delay |
| ON | OFF | ON | F: Signal Flicker |
| OFF | ON | ON | G: Totalizing On delay |

Table 2: Setting the time range

| DIP switch No. | | | Time range |
|---|---|---|---|
| 6 | 7 | 8 | |
| ON | ON | ON | 0.001 s to 9.999 s |
| OFF | OFF | OFF | 0.01 s to 99.99 s |
| ON | OFF | OFF | 0.1 s to 999.9 s |
| OFF | ON | OFF | 1 s to 9999 s |
| ON | ON | OFF | 0 min 01 s to 99 min 59 s |
| OFF | OFF | ON | 0.1 min to 999.9 min |
| ON | OFF | ON | 0 h 01 min to 99 h 59 min |
| OFF | ON | ON | 0.1 h to 999.9 h |

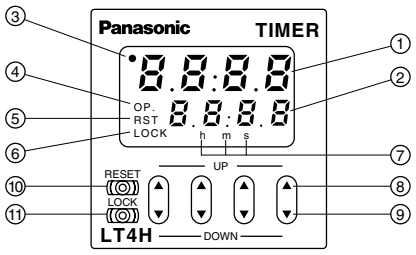
Notes: 1) Set the DIP switches before installing the timer.
2) When the DIP SW setting is changed, turn off the power once.
3) The DIP switches are set as ON before shipping.

**Setting procedure 2) Setting the time**

Set the set time with the keys (UP and DOWN keys) on the front of the LT4H timer.

**Front display section**

① Elapsed time display
② Set time display
③ Time delay indicator
④ Controlled output indicator
⑤ Reset indicator
⑥ Lock indicator
⑦ Time units display




⑧ UP keys
Changes the corresponding digit of the set time in the addition direction (upwards)
⑨ DOWN keys
Changes the corresponding digit of the set time in the subtraction direction (downwards)
⑩ RESET switch
Resets the elapsed time and the output
⑪ LOCK switch
Locks the operation of all keys on the unit

**• Changing the set time**

**1. It is possible to change the set time with the up and down keys 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 with the time delay set to the addition direction, time delay will continue until the elapsed time reaches full scale, returns to 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" regardless of the new set time.

**2. If the set time is changed to "0," the unit will operate differently depending on the operation mode.**

1) If the operation mode is set to A (power on delay 1) or A2 (power on delay 2), the output will turn on when the power supply is turned on. However, the output will be off while reset is being input.

2) In the other modes, the output turns on when the start is input. When the operation mode is C (signal off delay), D (Pulse one shot), or F (Signal flicker), only when the start input is on does the output turn on. Also, when the reset is being input, the output is off.

**• Power failure memory**

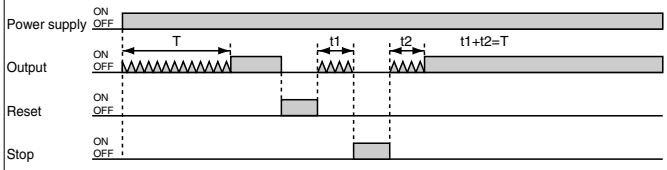
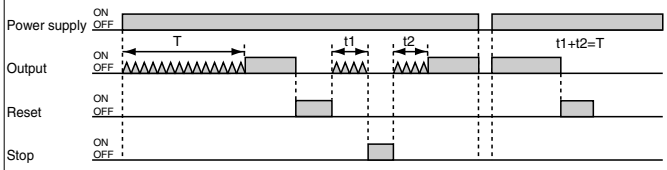
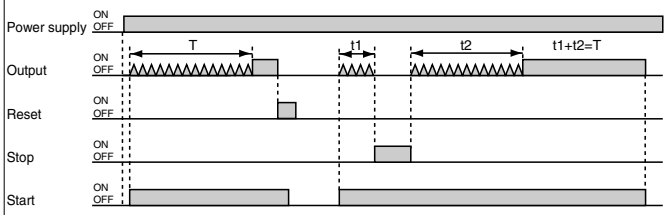
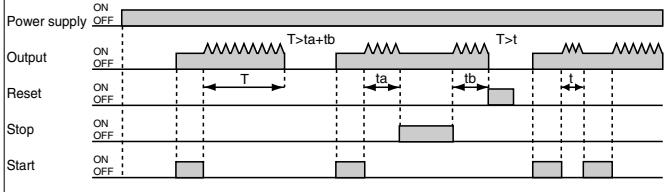
**The EEPROM is used for power failure memory. It has a life of Min. $10^5$ over-writings.**
**The EEPROM is overwriting with the following timing.**

| Output mode | Overwrite timing |
|---|---|
| Power ON delay (2) A2 | When power is OFF |
| Addition G | Change of preset value or start, reset input<br>When power is OFF after being ON |
| Other modes | When power is OFF after changing preset value |

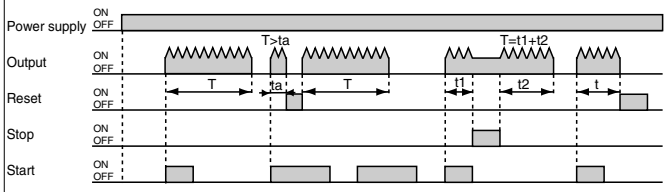
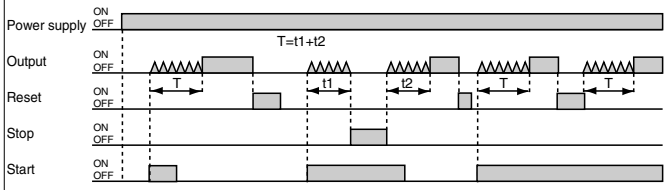
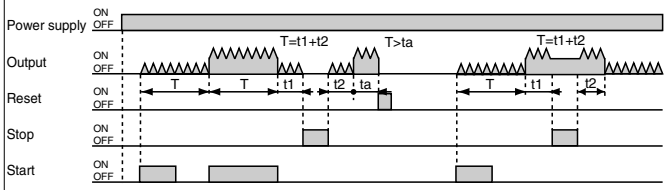
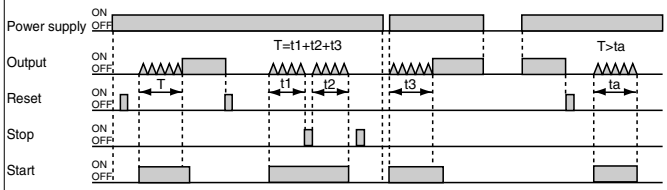
* Be aware that the contents of EEPROM for all modes will be overwritten when power is turned OFF during input to external lock terminals ④ to ③ and 7 to 6. Such an action does not exist by doing lock operation from the front.

## Operation mode

**T: Set time t1, t2, t3, ta<T**

| Operation type | Explanation | Time chart |
|---|---|---|
| Power on delay (1) Ⓐ | • Set the operation mode section of the DIP switches (no.'s 1, 2, and 3) on the side of the timer as shown.<br>1 2 3<br>ON ON ON<br>• Clears elapsed time value and starts time delay at power ON.<br>• After timer completion, stops at the display of the set value (addition), or stops at "0" (subtraction).<br>• Ignores start input.<br>• Stops delay time operation at stop ON. Restarts delay time operation at stop OFF. |  |
| Power on delay (2) Ⓐ2 | • Set the operation mode section of the DIP switches (no.'s 1, 2, and 3) on the side of the timer as shown.<br>1 2 3<br>OFF OFF OFF<br>• Elapsed time value does not clear at power ON. (power outage countermeasure function)<br>• The output remains ON even after the power is cut and restarted.<br>• After timer completion, stops at the display of the set value (addition), or stops at "0" (subtraction).<br>• Ignores start input.<br>• Stops delay time operation at stop ON. Restarts delay time operation at stop OFF. |  |
| Signal on delay Ⓑ | • Set the operation mode section of the DIP switches (no.'s 1, 2, and 3) on the side of the timer as shown.<br>1 2 3<br>ON OFF OFF<br>• Clears elapsed time value at power ON.<br>• Time delay starts at start ON and elapsed time value or output resets at start OFF.<br>• Instantaneous time delay start at reset OFF and power ON while start is ON.<br>• Stops delay time operation at stop ON. Restarts delay time operation at stop OFF.<br>• In order to have the time delay start at power ON or reset at power OFF, short out the start input beforehand. |  |
| Signal off delay Ⓒ | • Set the operation mode section of the DIP switches (no.'s 1, 2, and 3) on the side of the timer as shown.<br>1 2 3<br>OFF ON OFF<br>• Clears elapsed time value at power ON.<br>• Output control ON at start ON and time delay start at start OFF.<br>• Elapsed time value clears when start goes ON again during time delay.<br>• Stops delay time operation at stop ON. Restarts delay time operation at stop OFF. |  |

Notes: 1) Each signal input (start, reset, stop, and lock) is applied by shorting their input terminal to the common terminal (terminal ① for the 8-pin type, terminal ③ for the 11-pin type, and terminal for the screw terminal type).
2) The 8-pin type does not have a stop input or lock input.

| Operation type | Explanation | Time chart |
|---|---|---|
| Pulse One-shot Ⓓ | • Set the operation mode section of the DIP switches (no.'s 1, 2, and 3) on the side of the timer as shown.<br>1: ON, 2: ON, 3: OFF<br>• Clears elapsed time value at power ON.<br>• Time delay starts and output control ON at start ON.<br>• Turns output control OFF and clears elapsed time value at time-up.<br>• Ignores start input during time delay.<br>• Stops delay time operation at stop ON. Restarts delay time operation at stop OFF.<br>• In order to have the time delay start at power ON or reset at power OFF, short out the start input beforehand. |  |
| Pulse On delay Ⓔ | • Set the operation mode section of the DIP switches (no.'s 1, 2, and 3) on the side of the timer as shown.<br>1: OFF, 2: OFF, 3: ON<br>• Clears elapsed time value at power ON.<br>• Time delay starts at start ON.<br>• Ignores start input during time delay.<br>• Stops delay time operation at stop ON. Restarts delay time operation at stop OFF.<br>• In order to have the time delay start at power ON or reset at power OFF, short out the start input beforehand. |  |
| Signal Flicker Ⓕ | • Set the operation mode section of the DIP switches (no.'s 1, 2, and 3) on the side of the timer as shown.<br>1: ON, 2: OFF, 3: ON<br>• Clears elapsed time value at power ON.<br>• Time delay starts at start ON.<br>• Ignores start input during time delay.<br>• Output control reverses, elapsed time value clears, and timer delay starts at timer completion.<br>• Stops delay time operation at stop ON. Restarts delay time operation at stop OFF.<br>• In order to have the time delay start at power ON or reset at power OFF, short out the start input beforehand. |  |
| Totalizing On delay Ⓖ | • Set the operation mode section of the DIP switches (no.'s 1, 2, and 3) on the side of the timer as shown.<br>1: OFF, 2: ON, 3: ON<br>• Elapsed time value does not clear at power ON. (power outage countermeasure function)<br>• The output remains ON even after the power is off and restarted.<br>• Stops delay time operation at stop ON. Restarts delay time operation at stop OFF. |  |

Notes: 1) Each signal input (start, reset, stop, and lock) is applied by shorting their input terminal to the common terminal (terminal ① for the 8-pin type, terminal ③ for the 11-pin type, and ter-6minal 6 for the screw terminal type).
2) The 8-pin type does not have a stop input or lock input.

Panasonic
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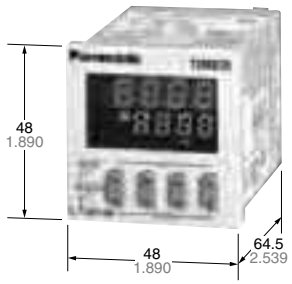
# DIN 48 SIZE DIGITAL TIMER

# LT4H-W

**UL File No.: E122222**
**C-UL File No.: E122222**




mm inch

8-pin type | 11-pin type | Screw terminal type

## Features

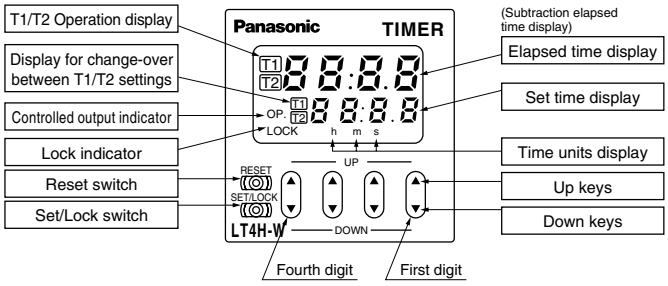
- **Wide time range**
  The operation time range covers from 0.01 sec. to 9999 hours.
  The individual setting can be performed on each of 1 and 2 timers.
  99.99s 99min59s 99h59min
  999.9s 999.9min 999.9h
  9999s 9999h
- **Bright and Easy-to-Read Display**
  A brand new bright 2-color back light LCD display. The easy-to-read screen in any location makes checking and setting procedures a cinch.
- **Simple Operation**
  Seesaw buttons make operating the unit even easier than before.
- **Short Body of only 64.5 mm 2.539 inch (screw terminal type) or 70.1 mm 2.760 inch (pin type)**
  With a short body, it is easy to install in even narrow control panels.
- **Conforms to IP66's Weather Resistant Standards**
  The water-proof panel keeps out water and dirt for reliable operation even in poor environments.
- **Screw terminal (M3.5) and Pin Types are Both Standard Options**
  The two terminal types are standard options to support either front panel installation or embedded installation.
- **Changeable Panel Cover**
  Also offers a black panel cover to meet your design considerations.
- **Compliant with UL, c-UL and CE.**

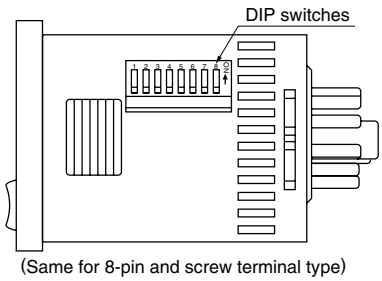
## Product types

| Time range | Operating mode | Output | Operating voltage | Power down insurance | Terminal type | Part number |
|---|---|---|---|---|---|---|
| 99.99s<br>999.9s<br>9999s<br>99min59s<br>999.9min<br>99h59min<br>999.9h<br>9999h | Pulse input:<br>• Delayed one shot<br>• OFF-start flicker<br>• ON-start flicker<br><br>Integrating input:<br>• Delayed one shot<br>• OFF-start flicker<br>• ON-start flicker | Relay (1 c) | 100 to 240 V AC | Available | 8 pins | LT4HW8-AC240V |
| | | | | | 11 pins | LT4HW-AC240V |
| | | | | | Screw terminal | LT4HW-AC240VS |
| | | | 24 V AC | | 8 pins | LT4HW8-AC24V |
| | | | | | 11 pins | LT4HW-AC24V |
| | | | | | Screw terminal | LT4HW-AC24VS |
| | | | 12 to 24 V DC | | 8 pins | LT4HW8-DC24V |
| | | | | | 11 pins | LT4HW-DC24V |
| | | | | | Screw terminal | LT4HW-DC24VS |
| | | Transistor (1 a) | 100 to 240 V AC | | 8 pins | LT4HWT8-AC240V |
| | | | | | 11 pins | LT4HWT-AC240V |
| | | | | | Screw terminal | LT4HWT-AC240VS |
| | | | 24 V AC | | 8 pins | LT4HWT8-AC24V |
| | | | | | 11 pins | LT4HWT-AC24V |
| | | | | | Screw terminal | LT4HWT-AC24VS |
| | | | 12 to 24 V DC | | 8 pins | LT4HWT8-DC24V |
| | | | | | 11 pins | LT4HWT-DC24V |
| | | | | | Screw terminal | LT4HWT-DC24VS |

* A rubber gasket (ATC18002) and a mounting frame (AT8-DA4) are included.

## Part names




(Same for 8-pin and screw terminal type)

## Specifications

| Item | | | Type: Relay output type, AC type | Relay output type, DC type | Transistor output type, AC type | Transistor output type, DC type |
|---|---|---|---|---|---|---|
| Rating | Rated operating voltage | | 100 to 240 V AC, 24 V AC | 12 to 24 V DC | 100 to 240V AC, 24V AC | 12 to 24 V DC |
| | Rated frequency | | 50/60 Hz common | — | 50/60 Hz common | — |
| | Rated power consumption | | Max. 10 V A | Max. 3 W | Max. 10 V A | Max. 3 W |
| | Rated control capacity | | 5 A, 250 V AC | | 100 mA, 30 V DC | |
| | Time range | | 99.99s, 999.9s, 9999s, 99min59s, 999.9min, 99h59min, 999.9h, 9999h (selected by DIP switch) | | | |
| | Time counting direction | | Addition (UP)/Subtraction (DOWN)<br>(2 directions selectable by DIP switch) | | | |
| | Operation mode | | Pulse input: Delayed one shot, OFF-start flicker or ON-start flicker<br>Integrating input: Delayed one shot, OFF-start flicker or ON-start flicker | | | |
| | Start/Reset/Stop input | | Min. input signal width: 1 ms, 20 ms (2 directions by selected by DIP switch) (The 8 pin type does not have a stop input.) | | | |
| | Lock input | | Min. input signal width: 20 ms (The 8-pin type does not have a lock input.) | | | |
| | Input signal | | Open collector input Input impedance: Max. 1 kΩ; Residual voltage: Max. 2V<br>Open impedance: 100 kΩ or less, Max. energized voltage: 40 V DC | | | |
| | Indication | | 7-segment LCD, Elapsed value (backlight red LED), Setting value (backlight yellow LED) | | | |
| | Power failure memory method | | EEP-ROM (Min. $10^5$ overwriting) | | | |
| Time accuracy (max.) | Operating time fluctuation | | ± (0.005% + 50 ms) in case of power on start<br>± (0.005% + 20 ms) in case of input signal start | | [Operating voltage: 85% to 110%<br>Temperature: –10°C to +55°C +14°F to +131°F<br>Min. input signal width: 1ms] | |
| | Temperature error | | | | | |
| | Voltage error | | | | | |
| | Setting error | | | | | |
| Contact | Contact arrangement | | Timed-out 1 Form C | | Timed-out 1 Form A (Open collector) | |
| | Contact resistance (Initial value) | | 100 mΩ (at 1 A 6 V DC) | | — | |
| | Contact material | | Ag alloy/Au flash | | — | |
| Life | Mechanical (contact) | | Min. $2 \times 10^7$ ope. (Except for switch operation parts) | | — | |
| | Electrical (contact) | | Min. $10^5$ ope. (At rated control voltage) | | Min. $10^7$ ope. (At rated control voltage) | |
| Electrical | Allowable operating voltage range | | 85 to 110 % of rated operating voltage | | | |
| | Breakdown voltage (Initial value) | | 2,000 Vrms for 1 min: Between live and dead metal parts (11-pin type only)<br>2,000 Vrms for 1 min: Between input and output<br>1,000 Vrms for 1 min: Between contacts | | 2,000 Vrms for 1 min: Between live and dead metal parts (Pin type only)<br>2,000 Vrms for 1 min: Between input and output | |
| | Insulation resistance (Initial value) | | Min. 100 MΩ: Between live and dead metal parts<br>Between input and output (At 500V DC)<br>Between contacts | | Min. 100 MΩ: Between live and dead metal parts<br>Between input and output (At 500V DC) | |
| | Operating voltage reset time | | Max. 0.5 s | | | |
| | Temperature rise | | Max 65° C<br>(under the flow of nominal operating current at nominal voltage) | | — | |
| Mechanical | Vibration resistance | Functional | 10 to 55 Hz: 1 cycle/ min single amplitude of 0.35 mm .014 inch (10 min on 3 axes) | | | |
| | | Destructive | 10 to 55 Hz: 1 cycle/ min single amplitude of 0.75 mm .030 inch (1 h on 3 axes) | | | |
| | Shock resistance | Functional | Min. 98 m 321.522 ft./$s^2$ (4 times on 3 axes) | | | |
| | | Destructive | Min. 294 m 964.567 ft./$s^2$ (5 times on 3 axes) | | | |
| Operating conditions | Ambient temperature | | –10° C to 55° C +14° F to +131° F | | | |
| | Ambient humidity | | Max. 85 % RH (non-condensing) | | | |
| | Air pressure | | 860 to 1,060 h Pa | | | |
| | Ripple rate | | — | 20 % or less | — | 20 % or less |
| Connection | | | 8-pin/11-pin/screw terminal | | | |
| Protective construction | | | IP66 (front panel with rubber gasket) | | | |

## Applicable standard

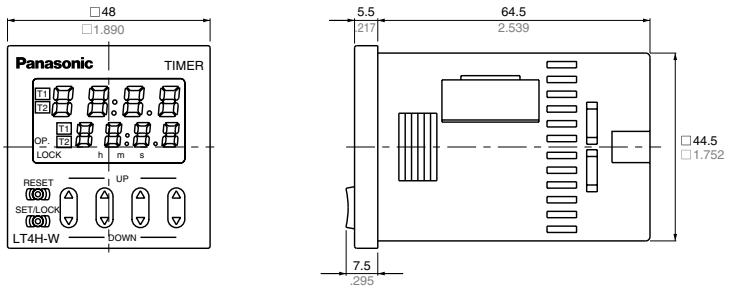
| Safety standard | EN61812-1 | Pollution Degree 2/Overvoltage Category II |
|---|---|---|
| EMC | (EMI)EN61000-6-4 | |
| | Radiation interference electric field strength | EN55011 Group1 ClassA |
| | Noise terminal voltage | EN55011 Group1 ClassA |
| | (EMS)EN61000-6-2 | |
| | Static discharge immunity | EN61000-4-2 4 kV contact<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 2 kV (power supply line)<br>1 kV (signal line) |
| | Surge immunity | EN61000-4-5 1 kV (power 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) |
| | Voltage dip/Instantaneous stop/Voltage fluctuation immunity | EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

## Dimensions

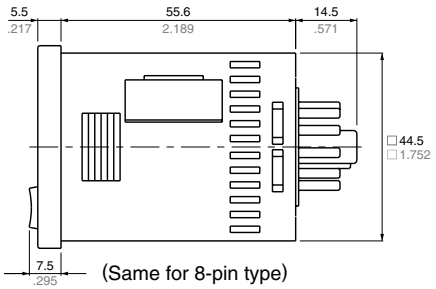
(units: mm inch)
Tolerance: ±1.0 ±.039

**• LT4H-W digital timer**

Screw terminal type
(Flush mount)



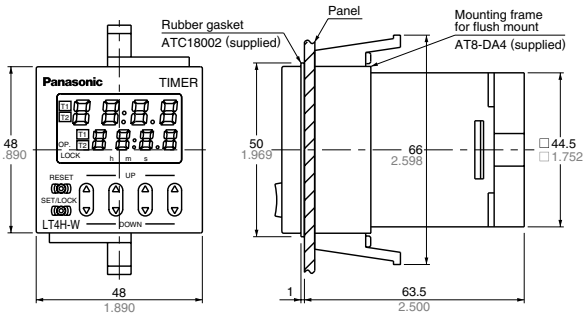

Pin type
(Flush mount/Surface mount)



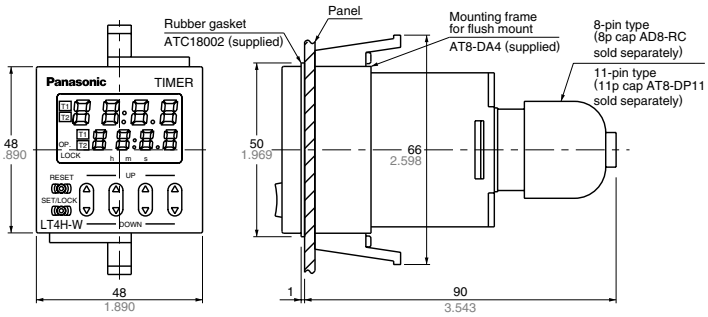

(Same for 8-pin type)

**• Dimensions for flush mount (with adapter installed)**

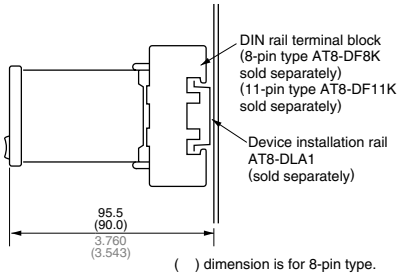
Screw terminal type




Pin type



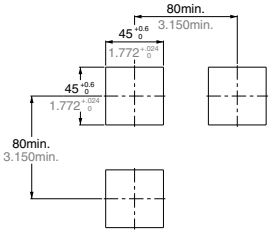

**• Dimensions for front panel installations**



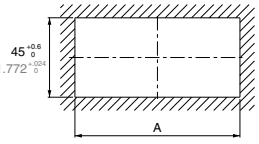

( ) dimension is for 8-pin type.

**• Installation panel cut-out dimensions**

The standard panel cut-out dimensions are shown below. Use the mounting frame (AT8-DA4) and rubber gasket (ATC18002).




**• For connected installations**




When n timers are continuously installed, the dimension (A) is calculated according to the following formula (n: the number of the timers to be installed):

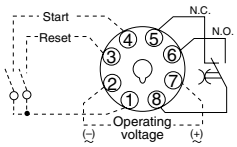
$A=(48 \times n - 2.5)^{+0.6}_{0}$ $A=(1.890 \times n - .098)^{+.024}_{0}$

Note) 1: The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.
2: For connected installations, the waterproofing ability between the unit and installation panel is lost.

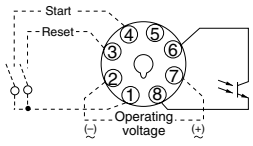
## Terminal layouts and wiring diagrams

**• 8-Pin type**

Relay output type

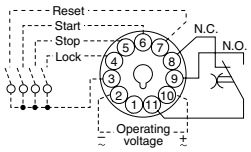



Transistor output type

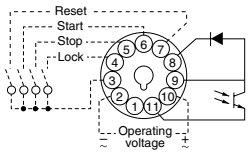



**• 11-Pin type**

Relay output type

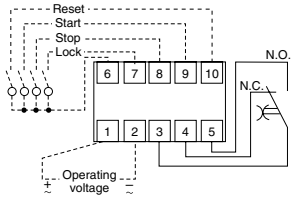



Transistor output type

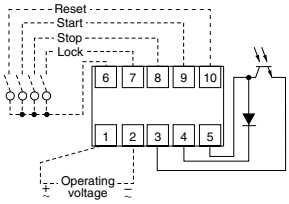



**• Screw terminal type**

Relay output type




Transistor output type




Note) For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 26.

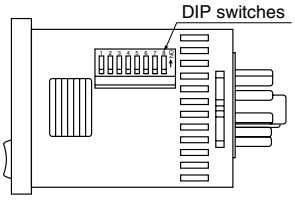
## Setting the operation mode and time range

**Setting procedure 1) Setting the time range (Timer $T_1$/Timer $T_2$)**

Set the time range with the DIP switches on the side of the LT4H-W timer.

| | Item | DIP switch | |
|---|---|---|---|
| | | OFF | ON |
| 1 | Time range (Timer $T_1$) | Refer to table 1 | |
| 2 | | | |
| 3 | | | |
| *4 | Minimum input reset, start, and stop signal width | 20 ms | 1 ms |
| 5 | Time delay direction | Addition | Subtraction |
| 6 | Time range (Timer $T_2$) | Refer to table 2 | |
| 7 | | | |
| 8 | | | |

* The 8-pin type does not have the stop input, so that the dip switch can be changed over between reset and start inputs. The signal range of the lock input is fixed (minimum 20 ms).




(same for screw terminal type and 8-pin type.)

Table 1: Setting the time range (Timer $T_1$)

| DIP switch No. | | | Time range |
|---|---|---|---|
| 1 | 2 | 3 | |
| ON | ON | ON | 0.01 s to 99.99 s |
| OFF | OFF | OFF | 0.1 s to 999.9 s |
| ON | OFF | OFF | 1 s to 9999 s |
| OFF | ON | OFF | 0 min 01 s to 99 min 59 s |
| ON | ON | OFF | 0.1 min to 999.9 min |
| OFF | OFF | ON | 0 h 01 min to 99 h 59 min |
| ON | OFF | ON | 0.1 h to 999.9 h |
| OFF | ON | ON | 1 h to 9999 h |

Table 2: Setting the time range (Timer $T_2$)

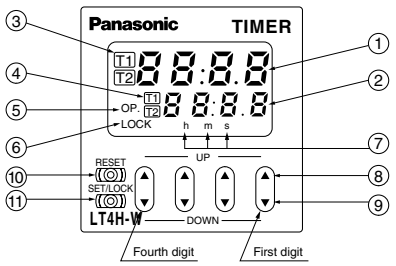
| DIP switch No. | | | Time range |
|---|---|---|---|
| 6 | 7 | 8 | |
| ON | ON | ON | 0.01 s to 99.99 s |
| OFF | OFF | OFF | 0.1 s to 999.9 s |
| ON | OFF | OFF | 1 s to 9999 s |
| OFF | ON | OFF | 0 min 01 s to 99 min 59 s |
| ON | ON | OFF | 0.1 min to 999.9 min |
| OFF | OFF | ON | 0 h 01 min to 99 h 59 min |
| ON | OFF | ON | 0.1 h to 999.9 h |
| OFF | ON | ON | 1 h to 9999 h |

Notes: 1) Set the DIP switches before installing the timer.
2) When the DIP SW setting is changed, turn off the power once.
3) The DIP switches are set as ON before shipping.

**Setting procedure 2) Setting the operation mode**

Set the operation mode with the keys on the front of the LT4H-W timer.

① Elapsed time display
② Set time display
③ $T_1$/$T_2$ operation indicator
④ $T_1$/$T_2$ setting value selectable indicator
⑤ Controlled output indicator
⑥ Lock indicator
⑦ Time units display

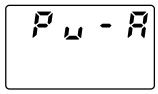


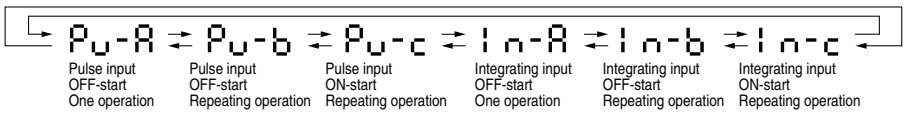

⑧ UP keys
Changes the corresponding digit of the set time in the addition direction (upwards)
⑨ DOWN keys
Changes the corresponding digit of the set time in the subtraction direction (downwards)
⑩ RESET switch
Resets the elapsed time and the output
⑪ SET/LOCK switch
Changes over the display between $T_1$/$T_2$ settings, sets the operation mode, checks the operation mode and locks the operation of each key (such as up, down or reset key).

**1) Setting or changing the operation mode**

(1) When the UP or DOWN key at the first digit is pressed with the SET/LOCK switch pressed, the mode is changed over to the setting mode.
(2) Now release the SET/LOCK switch.
(3) The operation mode in the setting mode is changed over sequentially in the left or right direction by pressing the UP or DOWN key at the first digit, respectively.

Ex: Setting operation mode display (PULSE-A example)




(4) The operational mode displayed at present is set by pressing the RESET switch, and the display returns to the normal condition.

**2) Setting (changing) the time**

(1) Pressing the SET/LOCK key switches the set value display between T1 and T2. Display the timer (T1 or T2) which is to be set (or changed).
(2) After displaying the timer (T1 or T2) which is to be set, press the UP or DOWN key to change the time.

**• Checking the operation mode**

When the UP or DOWN key at the second digit is pressed with the SET/LOCK switch pressed, the operational mode can be checked.
The display returns to the normal condition after indicating the operational mode for about two seconds. (While the display indicates the operational mode for about two seconds, the other indicators continue to operate normally.)

**• Setting the lock**

When the UP or DOWN key at the fourth digit is pressed with the SET/LOCK switch pressed, all keys on the unit are locked.
The timer does not accept any of UP, DOWN and RESET keys.
To release the lock setting, press the UP or DOWN key at the fourth digit again with the set/lock switch pressed.
* Operational mode, adding and subtracting and minimum input signal range cannot be set at $T_1$ and $T_2$, respectively.

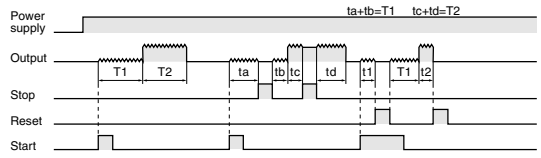
**• Changing over the $T_1$/$T_2$ setting display**

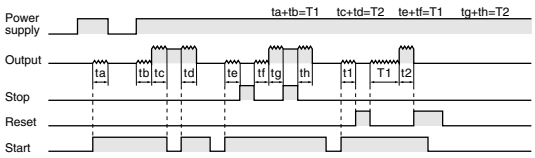
The T1/T2 setting display is changed over by pressing the SET/LOCK switch. (This operation gives no effect on the other operations. The set time and elapsed time (residual time) at $T_1$ are linked with those at $T_2$.)

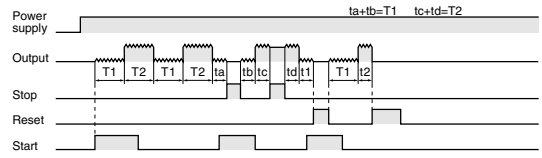
**• Changing the set time**

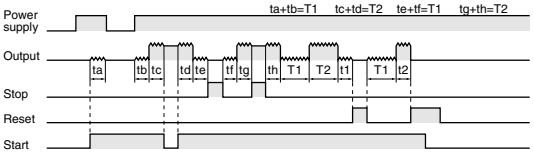
1) It is possible to change the set time with the UP and DOWN keys even during time delay with the timer. However, be aware of the following points.
(1) If the set time is changed to less than the elapsed time with the time delay set to the addition direction, time delay will continue until the elapsed time reaches full scale, returns to 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" regardless of the new set time.
2) When the set times at $T_1$ and $T_2$ are set to 0, the output becomes ON only while the start input is carried out. However, while the reset input is carried out, the output becomes OFF.

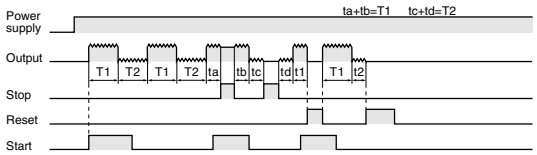
## Operation Mode

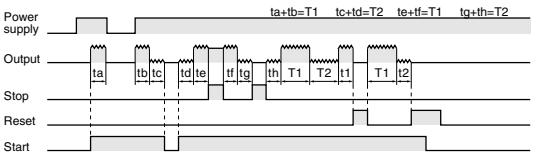
<table>
<tr><th></th><th>PULSE : Pulse input</th><th>INTEGRATION : Integrating input</th></tr>
<tr><td>PULSE<br>Delayed one shot<br>A</td><td>PULSE A OFF-start/1 operation $t_1<T_1$, $t_2<T_2$<br> 

• Elapsed value cleared when power is turned on.<br>• Time limit start initiated when start input goes on; start input ignored if time limit interval is in progress.<br>• Elapsed value cleared when one operation has been completed.</td><td>INTEGRATION A OFF-start/1 operation $t_1<T_1$, $t_2<T_2$<br> 

• Elapsed value not cleared when power is turned on (power failure backup function).<br>• When power is turned back on, same status is maintained for output as that previous to power going off.<br>• Elapsed value cleared when one operation has been completed.</td></tr>
<tr><td>OFF-start flicker<br>B</td><td>PULSE B OFF-start/repeating operation $t_1<T_1$, $t_2<T_2$<br> 

• Elapsed value cleared when power is turned on.<br>• Time limit start initiated when start input goes on; start input ignored if time limit interval is in progress.</td><td>INTEGRATION B OFF-start/repeating operation $t_1<T_1$, $t_2<T_2$<br> 

• Elapsed value not cleared when power is turned on (power failure backup function).<br>• When power is turned back on, same status is maintained for output as that previous to power going off.</td></tr>
<tr><td>ON-start flicker<br>C</td><td>ON-start/repeating operation $t_1<T_1$, $t_2<T_2$<br> 

• Elapsed value cleared when power is turned on.<br>• Time limit start initiated when start input goes on; start input ignored if time limit interval is in progress.</td><td>ON-start/repeating operation $t_1<T_1$, $t_2<T_2$<br> 

• Elapsed value not cleared when power is turned on (power failure backup function).<br>• When power is turned back on, same status is maintained for output as that previous to power going off.</td></tr>
<tr><td>Remarks and notes</td><td>• The pulse input mode starts the operation by starting the start input.<br>• When using the unit by starting it with the power on, short-circuit the start terminal (8-pin: ① to ④, 11-pin: ③ to ⑥ and screw terminal: 6 to 9).</td><td>• The integrating input mode is operated by the integrated time of the start input. In other word, the timer operates only when the start input is performed.<br>• When the elapsed value is cleared by the reset input, the output is reset.<br>• When using the unit by starting it with the power on, short-circuit the start terminal (8-pin: ① to ④, 11-pin: ③ to ⑥ and screw terminal: 6 to 9).</td></tr>
<tr><td></td><td colspan="2">• Each signal input such as start, reset, stop and lock inputs is applied by short-circuiting its input terminal and common terminal (8-pin type: terminal ①, 11-pin type: terminal ③ and screw terminal: terminal 6) respectively.<br>• The 8-pin type does not have a stop input or lock input.</td></tr>
</table>

**1. Terminal wiring**

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

2) When using the instrument with an flush mounting, the screw-down terminal type is recommended. For the pin type, use either the rear terminal block (AT78041) or the 8P cap (AD8-RC) for the 8-pin type, and the rear terminal block (AT78051) or the 11P cap (AT8-DP11) for the 11-pin type. Avoid soldering directly to the round pins on the unit. When using the instrument with a front panel installation, use the DIN rail terminal block (AT8-DF8K) for the 8-pin type and the DIN rail terminal block (AT8-DF11K) for the 11-pin type.

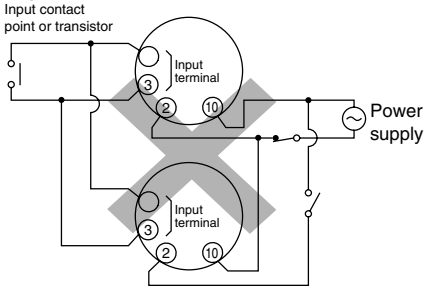
3) After turning the unit off, make sure that any resulting induced voltage or residual voltage is not applied to power supply terminals ② through ⑦ (8-pin type) ② through ⑩ (11-pin type) or 1 and 2 (screw terminal type). (If the power supply wire is wired parallel to the high voltage wire or power wire, an induced voltage may be generated between the power supply terminals.)

4) Have the power supply voltage pass through a switch or relay so that it is applied at one time. If the power supply is applied gradually, the counting may malfunction regardless of the settings, the power supply reset may not function, or other such unpredictable occurrence may result.

**2. Input connections**

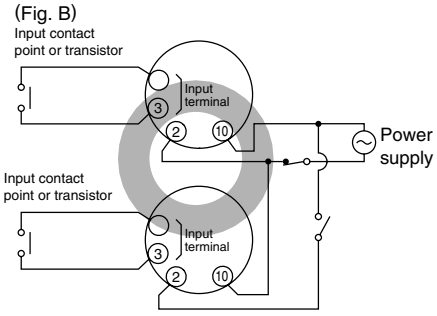
The power circuit has no transformer (power and input terminals are not insulated). When an input signal is fed to two or more timers at once, do not arrange the power circuit in an independent way. If the timer is powered on and off independently as shown in Fig. A, the timer's internal circuitry may get damaged.Be careful never to allow such circuitry. (Figs. A, B and C show the circuitry for the 11-pin type.)

(Fig. A)



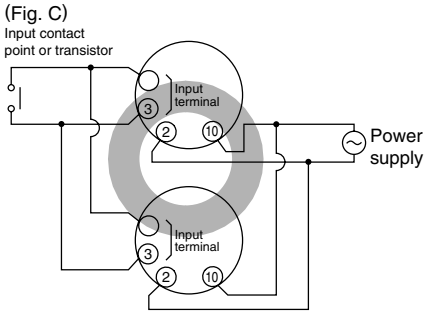

If independent power circuitry must be used, keep the input contacts or transistors separate from each other, as shown in Fig. B.

(Fig. B)




When power circuitry is not independent, one input signal can be fed to two or more counters at once, as shown in Fig. C.

(Fig. C)

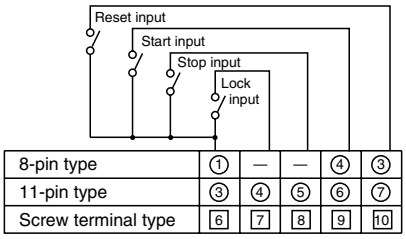



**3. Input and output**

1) Signal input type

(1) Contact point input

Use highly reliable metal plated contacts. Since the contact point's bounce time leads directly to error in the timer operations, use contacts with as short a bounce time as possible. Also, select a minimum input signal width of 20 ms.




| | | | | | |
|---|---|---|---|---|---|
| 8-pin type | ① | — | — | ④ | ③ |
| 11-pin type | ③ | ④ | ⑤ | ⑥ | ⑦ |
| Screw terminal type | 6 | 7 | 8 | 9 | 10 |

(2) Non-contact point input

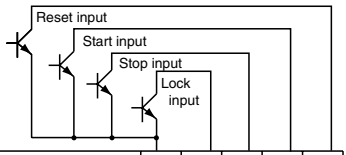
Connect with an open collector. Use transistors whose characteristics satisfy the criteria given below.

$V_{CEO}$ = 20 V min.

$I_C$ = 20 mA min.

$I_{CBO}$ = 6μA max.

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



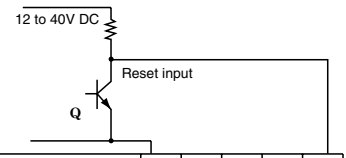

| | | | | | |
|---|---|---|---|---|---|
| 8-pin type | ① | — | — | ④ | ③ |
| 11-pin type | ③ | ④ | ⑤ | ⑥ | ⑦ |
| Screw terminal type | 6 | 7 | 8 | 9 | 10 |

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

[When the impedance is 0 Ω, the current coming from the start input and stop input terminals is approximately 12 mA, and from the reset input and lock input terminals is approximately 1.5 mA.]

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

* As shown in the diagram below, from a non-contact point circuit (proximity switches, photoelectric switches, etc.) with a power supply voltage of between 12 and 40 V, the signal can be input without using an open collector transistor. In the case of the diagram below, when the non-contact point transistor Q switches from off to on (when the signal voltage goes from high to low), the signal is input.




| | | | | | |
|---|---|---|---|---|---|
| 8-pin type | ① | — | — | ④ | ③ |
| 11-pin type | ③ | ④ | ⑤ | ⑥ | ⑦ |
| Screw terminal type | 6 | 7 | 8 | 9 | 10 |

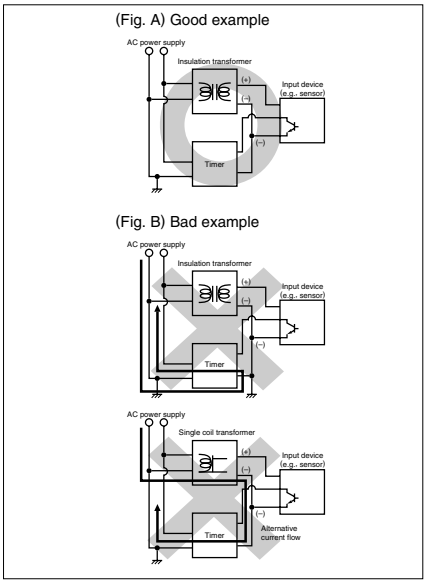
(The above example is for reset input)

2) The input mode and output mode change depending on the DIP switch settings. Therefore, before making any connections, be sure to confirm the operation mode and operation conditions currently set.

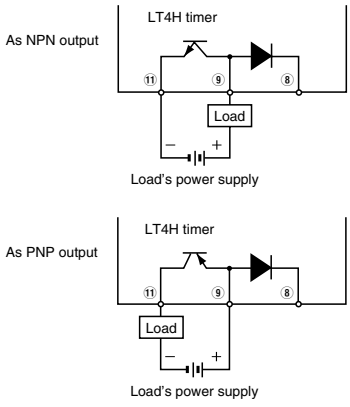
3) The LT4H series use power supply without a transformer (power and input terminals are not insulated). In connecting various kinds of input signals, therefore, use a power transformer in which the primary side is separated from the ungrounded secondary side as shown in Fig. A, for the power supply for a sensor and other input devices so that short-circuiting can be prevented.

# LT4H SERIES CAUTIONS FOR USE

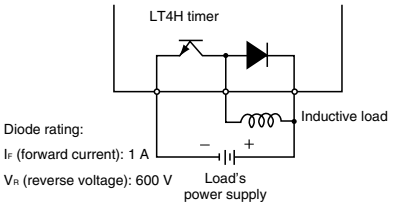
Once the wiring to be used is completely installed and prior to installing this timer, confirm that there is complete insulation between the wires connected to the power terminals (2 each) and the wires connected to each input terminal. If the power and input lines are not insulated, a short-circuit may occur inside the timer and result in internal damage.
In addition, when moving your equipment to a new installation location, confirm that there is no difference in environmental conditions as compared to the previous location.




4) The input signal is applied by the shorting of each input terminal with the common terminal (terminal ① for 8-pin types, terminal ③ for 11-pin types and terminal 6 for screw terminal types). Never connect other terminals or voltages higher than 40V DC, because it may destroy the internal circuitry.
5) Transistor output
(1) Since the transistor output is insulated from the internal circuitry by a photocoupler, it can be used as an NPN output or PNP (equal value) output. (The above example is 11-pin type)




Note: With the 8-pin type, there is no diode between points ⑧ and ⑨.




(2) Use the diode connected to the output transistor's collector for absorbing the reverse voltage from induced loads.
6) When wiring, use shielded wires or metallic wire tubes, and keep the wire lengths as short as possible.
7) For the load of the controlled output, make sure that it is lower than the rated control capacity.

**4. Operation of LT4H digital timer**

1) Turning on and off the power supply while operating in A2* (Power on delay 2) or G (Totalizing On delay) will result in a timer error to be generated due to the characteristics of the internal circuitry. Therefore, use the start input or stop input.
* Not related to the start input.
2) When controlling the timer by turning on the power supply, use only A (Power on delay 1) or A2 (Power on delay 2). Use of other modes in this situation will result in timer errors. When using the other modes, control the timer with the start input or stop input.

**5. Operation mode and time range setting**

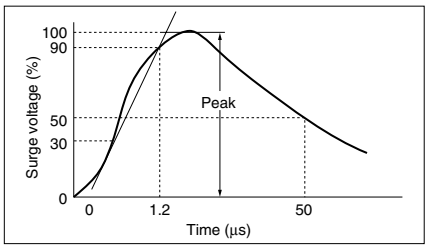
The operation mode and time range can be set with the DIP switches on the side of the timer. Make the DIP switch settings before installing the timer on the panel.
The operation mode of LT4H-W series can be set with the keys and switches on the front of the timer.

**6. Conditions of usage**

1) Avoid locations subject to flammable or corrosive gases, excessive dust, oil, vibrations, or excessive shocks.
2) Since the cover of the timer is made of polycarbonate resin, avoid contact with or use in environments containing methyl alcohol, benzene, thinners, and other organic solvents; and ammonia, caustic sodas, and other alkaline substances.
3) If power supply surges exceed the values given below, the internal circuits may become damaged. Be sure to use surge absorbing element to prevent this from happening.

| Operating voltage | Surge voltage (peak value) |
|---|---|
| AC type | 6,000V |
| DC type 24V AC type | 1,000V |

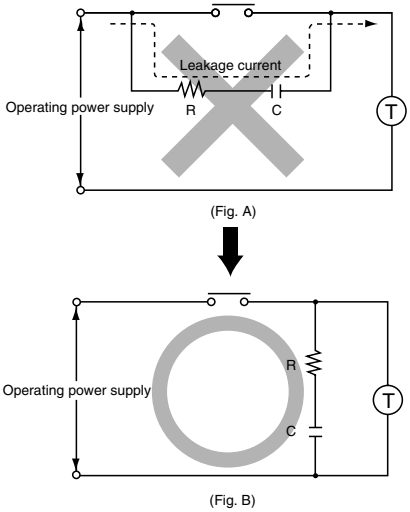
**• Surge wave form**
[± (1.2x50) μs uni-polar full wave voltage]



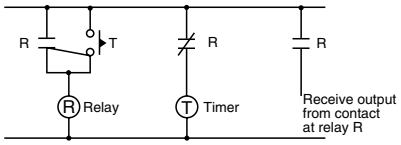

4) Regarding external noise, the values below are considered the noise-resistant voltages. If voltages rise above these values, malfunctions or damage to the internal circuitry may result, so take the necessary precautions.

| | Power supply terminals | | Input terminals |
|---|---|---|---|
| | AC type | DC type 24V AC type | |
| Noise voltage | 1,500V | 1,000V | 600V |

Noise wave form (noise simulator)
Rise time: 1 ns
Pulse width: 1 μs, 50 ns
Polarity: ±
Cycle: 100 cycles/second
5) When connecting the operating power supply, make sure that no leakage current enters the timer. For example, when performing contact protection, if set up like that of fig. A, leaking current will



pass through C and R, enter the unit, and cause incorrect operation. The fig. B shows the correct setup.
6) Long periods of continuous operation in the time-up completed condition (one month or more) will result in the weakening of the internal electrical components from the generated heat and, therefore, should be avoided. If you do plan to use




the unit for such continuous operation, use in conjunction with a relay as shown in the circuit in the diagram below.

**7. Acquisition of CE marking**

Please abide by the conditions below when using in applications that comply with EN61812-1.
1) Overvoltage category III, pollution level 2
2) This timer employs a power supply without a transformer, so the power and input signal terminals are not insulated.
(1) When a sensor is connected to the input circuit, install double insulation on the sensor side.
(2) In the case of contact input, use dual-insulated relays, etc.
3) The load connected to the output contact should have basic insulation. This timer is protected with basic insulation and can be double-insulated to meet EN/IEC requirements by using basic insulation on the load.
4) Please use a power supply that is protected by an overcurrent protection device which complies with the EN/IEC standard (example: 250 V 1 A fuse, etc.).
5) You must use a terminal socket or socket for the installation. Do not touch the terminals or other parts of the timer when it is powered. When installing or un-installing, make sure that no voltage is being applied to any of the terminals.
6) Do not use this timer as a safety circuit. For example when using a timer in a heater circuit, etc., provide a protection circuit on the machine side.

**7. Self-diagnosis function**

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

| Display | Contents | Output condition | Restoration procedure | Preset values after restoration |
|---|---|---|---|---|
| E r r - 0 0 | Malfunctioning CPU. | OFF | Enter reset input, RESET key, or restart unit. | The values at start-up before the CPU malfunction occurred. |
| E r r - 0 1 | Malfunctioning memory. See note. | | | 0 |

Note: Includes the possibility that the EEPROM's life has expired.

Panasonic
ideas for life

# DIN 48 SIZE DIGITAL TIMER

# QM4H

S Type
(with MODE switch)

G Type

## Features

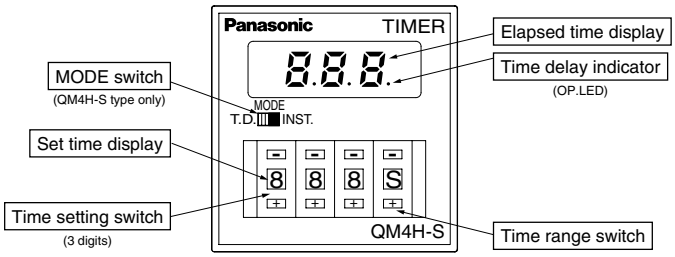
- **Possible to set and change the time and the time range even when the power is off.**
- **Furthermore single unit has a time range of 0.01 s to 9990hrs.**
- **Selectable 8 different time ranges with front digit switches.**
- **[QM4H-S Type]**
  **It can select the mode with MODE switch.**
  **T.D. MODE: Time delay 2C (2 Form C)**
  **INST. MODE: Time delay 1C (1 Form C)**
  **Instantaneous 1C (1 Form C)**
  **[QM4H-G Type]**
  **Reset and stop signal input enable to external control.**
- **Compliant with UL/c-UL and CE.**

## Product types

| Product name | Time delay direction | Time range | Operating mode | Contact arrangement | Operating voltage | Part number |
|---|---|---|---|---|---|---|
| S Type QM4H digital timer | Addition | 0.01s/0.1s/1s/0.1min/ 1min/0.1h/1h/10h (8 time ranges) | Power ON delay | T.D. mode: Time delay 2C INST. mode: Time delay 1C and Instantaneous 1C (Use MODE switch on front) | 12 to 48 V AC/DC | QM4HS-U2C-48V |
| | | | | | 100 to 240 V AC/DC | QM4HS-U2C-240V |
| G Type QM4H digital timer | | | Power ON delay (with reset and stop terminals) | Time delay 1C | 12 to 48 V AC/DC | QM4HG-U1C-48V |
| | | | | | 100 to 240 V AC/DC | QM4HG-U1C-240V |

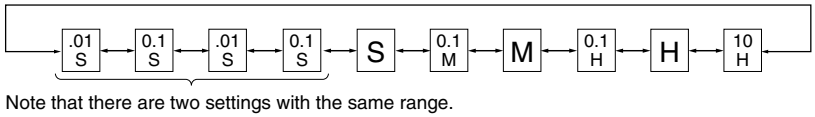
Note: Time delay directional subtraction types are also available by order

## Part names




## Time range settings

| Time range switch | .01 S | 0.1 S | S | 0.1 M | M | 0.1 H | H | 10 H |
|---|---|---|---|---|---|---|---|---|
| Operating time range | 0.01s to 9.99s | 0.1s to 99.9s | 1s to 999s | 0.1min. to 99.9min | 1min. to 999min | 0.1h to 99.9h | 1h to 999h | 10h to 9990h |




Note that there are two settings with the same range.

## Changing the time setting

**• It is possible to use the up and down keys to change the time setting even during timer delay. However, attention should be paid to the following.**

1) When the time setting is shorter than the elapsed time, and timer delay is set in the plus direction, the time setting will return to "0" after the timer delay reaches full-scale, timer delay will be performed up to the changed time setting, and time up will be reached.
2) When timer delay is set in the minus direction, timer delay will be performed up to "0" regardless of the time, even if the time setting is shorter than the elapsed time, and time up will be reached.

## Specifications

| Item \ Type | | | QM4H-S | | QM4H-G | |
|---|---|---|---|---|---|---|
| Rating | Rated operating voltage | | 12 to 48 V AC/DC and 100 to 240 V AC/DC | | | |
| | Rated power consumption | 12 to 48 V AC/DC | During time delay | 12 V DC, 48 V DC: Max. 1.5W<br>12 V AC, 48 V AC: Max. 3.0 VA | During time delay | 12 V DC, 48 V DC: Max. 1.0W<br>12 V AC, 48 V AC: Max. 2.0 VA |
| | | | After time delay | 12 V DC, 48 V DC: Max. 2.5W<br>12 V AC, 48 V AC: Max. 5.0 VA | After time delay | 12 V DC, 48 V DC: Max. 1.5W<br>12 V AC, 48 V AC: Max. 3.5 VA |
| | | 100 to 240 V AC/DC | During time delay | 100 V DC, 240 V DC: Max. 1.5W<br>100 V AC, 240 V AC: Max. 3.0 VA | During time delay | 100 V DC, 240 V DC: Max. 1.0W<br>100 V AC, 240 V AC: Max. 2.5 VA |
| | | | After time delay | 100 V DC, 240 V DC: Max. 2.0W<br>100 V AC, 240 V AC: Max. 4.0 VA | After time delay | 100 V DC, 240 V DC: Max. 1.8W<br>100 V AC, 240 V AC: Max. 3.2 VA |
| | Rated frequency | | 50/60 Hz common (at AC) | | | |
| | Rated control capacity | | 5 A, 250V AC (resistive load) | | | |
| | Time range | | 0.01s to 9990h, Selection of 8 range: 0.01s/0.1s/1s/0.1min/1min/0.1h/1h/10h | | | |
| | Operation mode | | Power ON delay | | Power ON delay (with reset and stop terminals) | |
| | Min. input signal width | | — | | 20ms (Reset and Stop inputs)*4 | |
| Time accuracy*1 | Operating time fluctuation | | ±(0.01%+0.05s) in case of power on start<br>±(0.005%+0.03s) in case of input reset start*2<br>{Operating voltage: 85 to 110% V<br>Temperature: –10 to +55°C +14 to 131°F (20°C 68°F)<br>Stopped time: 0.1 sec to 1 hour} | | | |
| | Temperature error | | | | | |
| | Setting error | | | | | |
| | Voltage error | | | | | |
| Contact | Contact arrangement | | T.D. mode: Time delay 2C<br>INST. mode: Time delay 1C and Instantaneous 1C (Use MODE switch on front) | | Time delay 1C | |
| | Contact material | | Silver alloy | | | |
| Life*3 | Mechanical (contact) | | Min. $10^7$ | | | |
| | Electrical (contact) | | Min. $10^5$ (at rated control vltage) | | | |
| Electrical | Allowable operating voltage range | | 85 to 110% of rated operating voltage | | | |
| | Breakdown voltage (Initial value) | | Between live and dead metal parts, between input and output, between contact sets, between contacts<br>Min. 100 MΩ (at 500 V DC megger) | | | |
| | Insulation resistance (Initial value) | | Between live and dead metal parts: 2, 000 Vrms for 1 min<br>Between input and output: 2, 000 Vrms for 1 min<br>Between contact sets: 2, 000 Vrms for 1 min<br>Between contacts: 1, 000 Vrms for 1 min | | | |
| | Reset time | | Max. 0.1s | | | |
| Mechanical | Vibration resistance | Functional | 10 to 55 Hz: 1 cycle/min. single amplitude of 0.25 mm .010 inch (10 min on 3 axes) | | | |
| | | Destructive | 10 to 55 Hz: 1 cycle/min. single amplitude of 0.375 mm .015 inch (1h on 3 axes) | | | |
| | Shock resistance | Functional | 98 $m/s^2$ (4 times on 3 axes) | | | |
| | | Destructive | 980 $m/s^2$ (5 times on 3 axes) | | | |
| Operating conditions | Ambient temperature | | –10°C to 55°C +14°F to +131°F | | | |
| | Ambient humidity | | Min. 35 to 85% RH (non-condensing) | | | |
| | Air pressure | | 860 to 1060 hPa | | | |
| Others | Mass (Weight) | | Approx. 130 g 4.59 oz | | Approx. 120 g 4.23 oz | |
| | Available standards | | UL, c-UL, CE | | | |
| | Operating display | | LED (red), During time delay: blinking, After time delay: OFF | | | |

Notes: 1. Unspecified measuring conditions are rated operating voltage (in case of DC type, ripple rate of 5% or less), ambient temp. 20°C 68°F, and stop time 1 second.
2. Reset start applies to QM4H-G type.
3. Excluding switches
4. Note that if the QM4H-G type is set to zero "0" and a STOP signal is input, output will begin when the power is turned on.
5. The protective structure on the AQM4801 is IP50, and IP64 for the AQM4803.

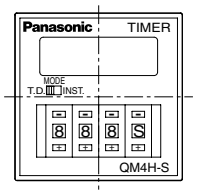
## Applicable standard

| Safety standard | EN61010-1 | Pollution Degree 2/Overvoltage Category II | |
|---|---|---|---|
| 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<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 | 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 | 2 kV (power supply line) |
| | Surge immunity | EN61000-4-5 | 1 kV (power 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) |
| | Voltage dip/Instantaneous stop/Voltage fluctuation immunity | EN61000-4-11 | 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

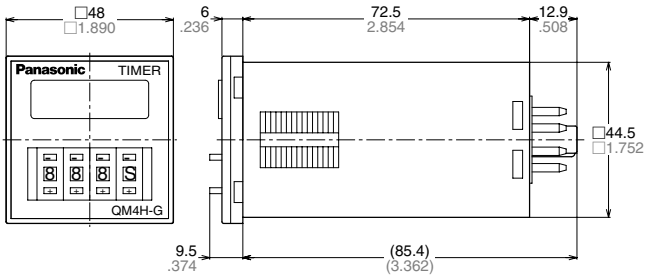
## Dimensions

(units: mm inch)
Tolerance: ±1.0 ±.039

• S Type

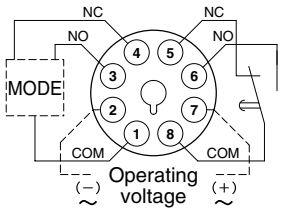


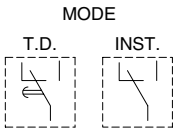

• G Type




Terminal layouts and Wiring diagrams

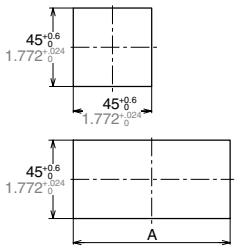
• QM4H-S Type



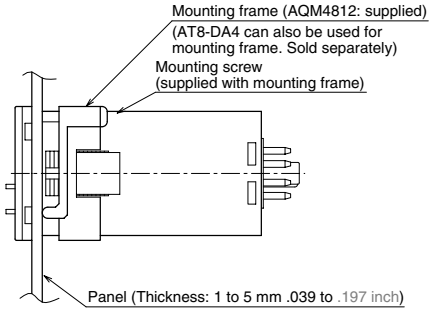

TD mode: Time delay 2C
INST mode:
Time delay 1C and
Instantaneous 1C
*Use MODE switch on front

Panel cut-out dimensions



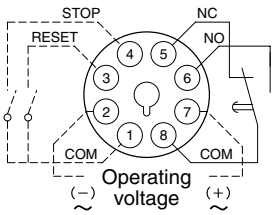

Dimensions A when n products are installed continuously:
A = (48∗n–2.5 +0.6 0) A = (1.890∗n–.098 +.024 0)

Panel Mounting Diagram




Notes:
1. Operating voltage signs in parentheses ( ) indicate the polarity of the DC type.
2. is a time delay contact.
   is an instantaneous contact.

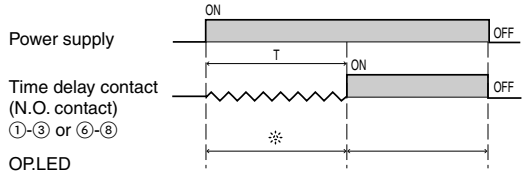
• QM4H-G Type



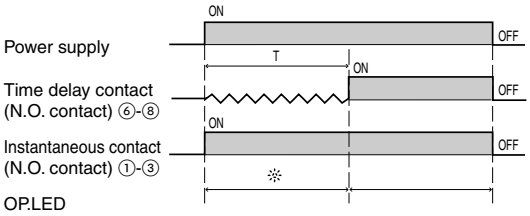
# Operation mode

**• QM4H-S Type**

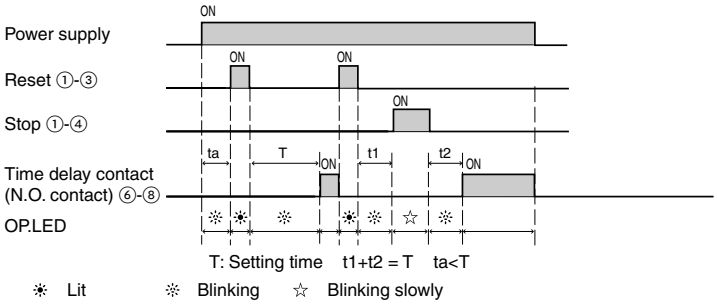
1) T.D. mode




2) INST. mode




**• QM4H-G Type**




* Set the reset inputs ① to ③ and stop inputs ① to ④ to 20 ms or higher.
* When shorting a signal, please set the inter-terminal resistance to 1 kΩ or less, and the inter-terminal residual voltage to 2 V or less.
When releasing, please set the inter-terminal resistance to 100 kΩ or greater.

# Precautions in using the QM4H

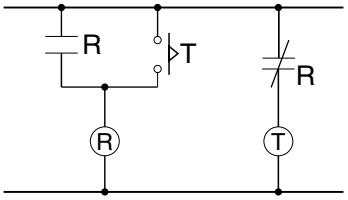
**1. Avoid locations subject to flammable or corrosive gases, excessive dust, oil, vibrations, or excessive shocks.**
**2. Since the main-unit is made of polycarbonate resin, avoid contact with or use in environments containing methyl alcohol, benzene, thinners, and other organic solvents; and ammonia, caustic sodas, and other alkaline substances.**
**3. Power supply superimposed surge protector**
Although a surge protector will withstand standard-waveform voltage with the values in the next table, anything above this will destroy the internal circuit. You should therefore use a surge absorber.

| 12 to 48 V AC/DC | 100 to 240 V AC/DC |
|---|---|
| 1,000 V | 6,000 V |

• Surge waveform
[±(1.2×50) μs uni-polar full wave voltage]

**4. In order to maintain the characteristics, do not remove the timer case.**
**5. When installing the panel, use the supplied AQM4812 main-unit mounting frame. Note that the ATA4811 is also available for sale separately.**
**6. If you change the operating voltage, be sure not to allow leak current into the timer.**

**7. Avoid leaving the unit powered continuously. Leaving the unit powered up with output set to ON continuously for a long period of time (about 1 month or more) will wear out the electronic components. If you will be keeping it powered continuously, combine with a relay to create the circuit shown below:**




# Compliance with the CE marking

**• When using in applications to which EN61010-1/IEC61010-1 applies, abide by the following conditions.**
1) Ambient conditions
• Overvoltage category II, pollution level 2
• Indoor use
• Acceptable temperature and humidity range: –10 to +55°C, 30 to 85%RH (with no condensation at 20°C)
• Under 2000 m elevation

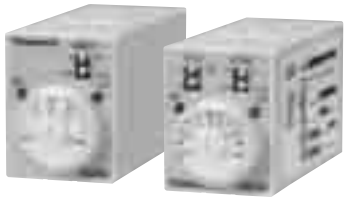
2) Use the unit in a location that matches the following conditions.
• There is minimal dust and no corrosive gas.
• There is no combustible or explosive gas.
• There is no mechanical vibration or impacts.
• There is no exposure to direct sunlight.
• Located away from large-volume electromagnetic switches 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.

Panasonic
ideas for life

# MULTI-RANGE ANALOG TIMER

# S1DXM-A/M



**UL File No.: E122222**
**C-UL File No.: E122222**

## FEATURES

**• Multiple functions built in**
The operation mode and time range can be switched by using the MODE and RANGE switches on the front panel.
**• Part number consolidation**
1) The lineup consists of 64 easy-to-choose models.
2) An operation mode fixed type (S1DXM-A) and 4-operation mode switching type (S1DXM-M) are available.
**• Cadmium-free contacts used**
To eliminate environmentally harmful chemical substances, relays with cadmium-free contacts are used.
**• Economically priced**
1) Prices set to lower costs.
2) Further cost reduction when used with HJ Relay terminal socket.
**• CE marking supported**
UL and C-UL approved.

## Product types

**1. S1DXM-A multi-range timer**
**No MODE switch, Operation mode (fixed): Power ON-delay**

| Operating voltage | Time range | Timed-out 2 Form C | Timed-out 4 Form C |
|---|---|---|---|
| | | Part number | Part number |
| 12V DC | 0.05 s to 10 min | S1DXM-A2C10M-DC12V | S1DXM-A4C10M-DC12V |
| | 0.2 s to 30 min | S1DXM-A2C30M-DC12V | S1DXM-A4C30M-DC12V |
| | 0.5 s to 60 min | S1DXM-A2C60M-DC12V | S1DXM-A4C60M-DC12V |
| | 0.05 min to 10 hr | S1DXM-A2C10H-DC12V | S1DXM-A4C10H-DC12V |
| 24V DC | 0.05 s to 10 min | S1DXM-A2C10M-DC24V | S1DXM-A4C10M-DC24V |
| | 0.2 s to 30 min | S1DXM-A2C30M-DC24V | S1DXM-A4C30M-DC24V |
| | 0.5 s to 60 min | S1DXM-A2C60M-DC24V | S1DXM-A4C60M-DC24V |
| | 0.05 min to 10 hr | S1DXM-A2C10H-DC24V | S1DXM-A4C10H-DC24V |
| 24V AC | 0.05 s to 10 min | S1DXM-A2C10M-AC24V | S1DXM-A4C10M-AC24V |
| | 0.2 s to 30 min | S1DXM-A2C30M-AC24V | S1DXM-A4C30M-AC24V |
| | 0.5 s to 60 min | S1DXM-A2C60M-AC24V | S1DXM-A4C60M-AC24V |
| | 0.05 min to 10 hr | S1DXM-A2C10H-AC24V | S1DXM-A4C10H-AC24V |
| 100 to 120V AC | 0.05 s to 10 min | S1DXM-A2C10M-AC120V | S1DXM-A4C10M-AC120V |
| | 0.2 s to 30 min | S1DXM-A2C30M-AC120V | S1DXM-A4C30M-AC120V |
| | 0.5 s to 60 min | S1DXM-A2C60M-AC120V | S1DXM-A4C60M-AC120V |
| | 0.05 min to 10 hr | S1DXM-A2C10H-AC120V | S1DXM-A4C10H-AC120V |
| 200 to 220V AC | 0.05 s to 10 min | S1DXM-A2C10M-AC220V | S1DXM-A4C10M-AC220V |
| | 0.2 s to 30 min | S1DXM-A2C30M-AC220V | S1DXM-A4C30M-AC220V |
| | 0.5 s to 60 min | S1DXM-A2C60M-AC220V | S1DXM-A4C60M-AC220V |
| | 0.05 min to 10 hr | S1DXM-A2C10H-AC220V | S1DXM-A4C10H-AC220V |
| 220 to 240V AC | 0.05 s to 10 min | S1DXM-A2C10M-AC240V | S1DXM-A4C10M-AC240V |
| | 0.2 s to 30 min | S1DXM-A2C30M-AC240V | S1DXM-A4C30M-AC240V |
| | 0.5 s to 60 min | S1DXM-A2C60M-AC240V | S1DXM-A4C60M-AC240V |
| | 0.05 min to 10 hr | S1DXM-A2C10H-AC240V | S1DXM-A4C10H-AC240V |

**2. S1DXM-M multi-range timer**

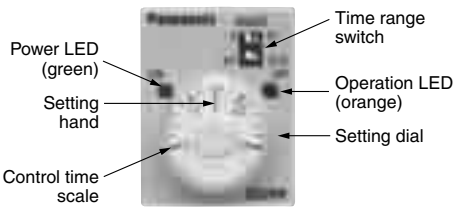
**With MODE switch, Operation mode (switchable): Power ON-delay, Power Flicker ON start, Power Flicker OFF start, Power One-shot**

| Operating voltage | Time range | Timed-out 2 Form C | Timed-out 4 Form C |
|---|---|---|---|
| | | Part number | Part number |
| 12V DC | 0.05 s to 10 min | S1DXM-M2C10M-DC12V | S1DXM-M4C10M-DC12V |
| | 0.2 s to 30 min | S1DXM-M2C30M-DC12V | S1DXM-M4C30M-DC12V |
| | 0.5 s to 60 min | S1DXM-M2C60M-DC12V | S1DXM-M4C60M-DC12V |
| | 0.05 min to 10 hr | S1DXM-M2C10H-DC12V | S1DXM-M4C10H-DC12V |
| 24V DC | 0.05 s to 10 min | S1DXM-M2C10M-DC24V | S1DXM-M4C10M-DC24V |
| | 0.2 s to 30 min | S1DXM-M2C30M-DC24V | S1DXM-M4C30M-DC24V |
| | 0.5 s to 60 min | S1DXM-M2C60M-DC24V | S1DXM-M4C60M-DC24V |
| | 0.05 min to 10 hr | S1DXM-M2C10H-DC24V | S1DXM-M4C10H-DC24V |
| 24V AC | 0.05 s to 10 min | S1DXM-M2C10M-AC24V | S1DXM-M4C10M-AC24V |
| | 0.2 s to 30 min | S1DXM-M2C30M-AC24V | S1DXM-M4C30M-AC24V |
| | 0.5 s to 60 min | S1DXM-M2C60M-AC24V | S1DXM-M4C60M-AC24V |
| | 0.05 min to 10 hr | S1DXM-M2C10H-AC24V | S1DXM-M4C10H-AC24V |
| 100 to 120V AC | 0.05 s to 10 min | S1DXM-M2C10M-AC120V | S1DXM-M4C10M-AC120V |
| | 0.2 s to 30 min | S1DXM-M2C30M-AC120V | S1DXM-M4C30M-AC120V |
| | 0.5 s to 60 min | S1DXM-M2C60M-AC120V | S1DXM-M4C60M-AC120V |
| | 0.05 min to 10 hr | S1DXM-M2C10H-AC120V | S1DXM-M4C10H-AC120V |
| 200 to 220V AC | 0.05 s to 10 min | S1DXM-M2C10M-AC220V | S1DXM-M4C10M-AC220V |
| | 0.2 s to 30 min | S1DXM-M2C30M-AC220V | S1DXM-M4C30M-AC220V |
| | 0.5 s to 60 min | S1DXM-M2C60M-AC220V | S1DXM-M4C60M-AC220V |
| | 0.05 min to 10 hr | S1DXM-M2C10H-AC220V | S1DXM-M4C10H-AC220V |
| 220 to 240V AC | 0.05 s to 10 min | S1DXM-M2C10M-AC240V | S1DXM-M4C10M-AC240V |
| | 0.2 s to 30 min | S1DXM-M2C30M-AC240V | S1DXM-M4C30M-AC240V |
| | 0.5 s to 60 min | S1DXM-M2C60M-AC240V | S1DXM-M4C60M-AC240V |
| | 0.05 min to 10 hr | S1DXM-M2C10H-AC240V | S1DXM-M4C10H-AC240V |

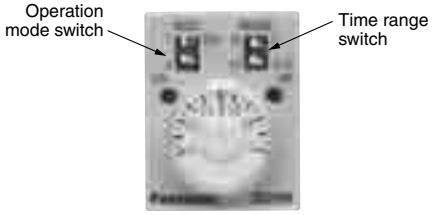


## Part names

S1DXM-A



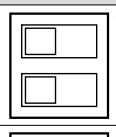
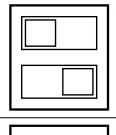
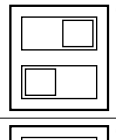
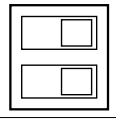

S1DXM-M



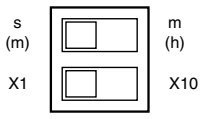

- [RANGE] Time range switch
  (4 different time ranges can be switched.)
  10M type: 1 s/10 s/1 min/10 min
  30M type: 3 s/30 s/3 min/30 min
  60M type: 6 s/60 s/6 min/60 min
  10H type: 1 min/10 min/1 hr/10 hr

- [MODE] Operation mode switch
  (4 different operation modes can be switched.)
  Power ON-delay
  Power Flicker OFF start
  Power Flicker ON start
  Power One-shot

## Operation mode and time range setting

| Operation mode | Operation mode switch |
|---|---|
| Power ON-delay |  |
| Power Flicker OFF start |  |
| Power Flicker ON start |  |
| Power One-shot |  |



| Time range switch |
|---|
|  |



The time setting can be switched among 4 ranges each for 4 types for an interval between 0.05 seconds and 10 hours.

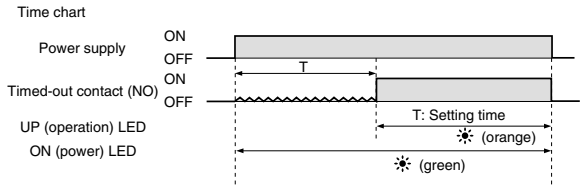
Notes: 1. The product is factory shipped with all settings on the OFF side (left).
2. Do not operate the switches with a sharp-edged object such as a knife blade.
3. The power must be turned off when setting the time range or operation mode. Operating the switches with the power on is a cause of breakdown and malfunction.
4. Use a force of under 5 N to operate the DIP switches when setting the time range and operation mode.

## Operation mode

### 1. S1DXM-A multi-range timer

**Power ON-delay operation**

• When power is turned on, the output contact operates after the set time. The output contact remains on until the power is turned off.

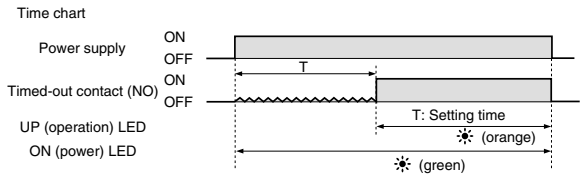



### 2. S1DXM-M multi-range timer

**Power ON-delay operation**

**[MODE] switch 1: OFF, switch 2: OFF**

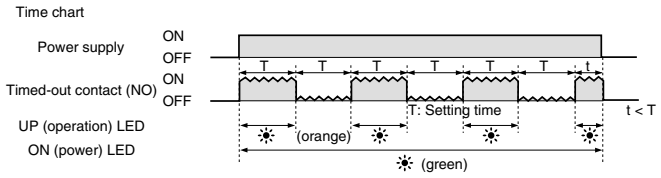
• When power is turned on, the output contact operates after the set time. The output contact remains on until the power is turned off.




**Power Flicker ON start operation**

**[MODE] switch 1: ON, switch 2: OFF**

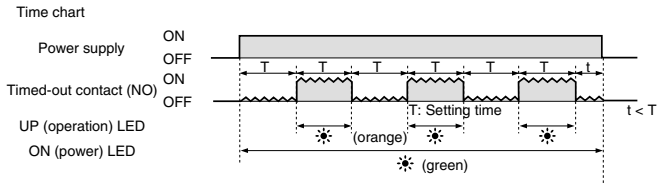
• When power is turned on, the output contact operates repeatedly at the set time. The output contact outputs at the same time power turns on.




**Power Flicker OFF start operation**

**[MODE] switch 1: OFF, switch 2: ON**

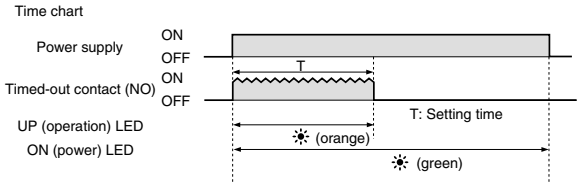
• When the power is turned on, the output contacts repeatedly operate at the set time. The output contact begins from the off state.




**Power One-shot operation**

**[MODE] switch 1: ON, switch 2: ON**

When power is turned on, the output contact performs the on operation at the same time power turns on, only for the set time.




## Time range setting

| Type | | Time scale | | Time unit | | Min. scale | Max. scale | Setting range | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| S1DXM-A | 10M type | X1 | X10 | s | m | 0.05 | 1 | 0.05 to 1s | 0.5 to 10s | 0.05 to 1m | 0.5 to 10m |
| | 30M type | | | s | m | 0.2 | 3 | 0.2 to 3s | 2 to 30s | 0.2 to 3m | 2 to 30m |
| | 60M type | | | s | m | 0.5 | 6 | 0.5 to 6s | 5 to 60s | 0.5 to 6m | 5 to 60m |
| | 10H type | | | m | h | 0.05 | 1 | 0.05 to 1m | 0.5 to 10m | 0.05 to 1h | 0.5 to 10h |
| S1DXM-M | 10M type | X1 | X10 | s | m | 0.05 | 1 | 0.05 to 1s | 0.5 to 10s | 0.05 to 1m | 0.5 to 10m |
| | 30M type | | | s | m | 0.2 | 3 | 0.2 to 3s | 2 to 30s | 0.2 to 3m | 2 to 30m |
| | 60M type | | | s | m | 0.5 | 6 | 0.5 to 6s | 5 to 60s | 0.5 to 6m | 5 to 60m |
| | 10H type | | | m | h | 0.05 | 1 | 0.05 to 1m | 0.5 to 10m | 0.05 to 1h | 0.5 to 10h |

Note: The time setting range is the combination of the time scale (X1 or X10) on the dial and the time unit (s, m, or h).
Example: When dial reads 1, time scale is X1 and time units is seconds, then it is 1 second.

## Ordering information

Ex. S1DXM- [A] [2C] [30M] — [DC24V]

| Operation mode | Control output arrangement | Time range | Operating voltage* |
|---|---|---|---|
| A<br>M | 2C: Timed-out 2 Form C<br>4C: Timed-out 4 Form C | 10M: 0.05 s to 10 min<br>30M: 0.2 s to 30 min<br>60M: 0.5 s to 60 min<br>10H: 0.05 min to 10 hr | DC12V: 12 V DC<br>DC24V: 24 V DC<br>AC24V: 24 V AC<br>AC120V: 100 to 120 V AC<br>AC220V: 200 to 220 V AC<br>AC240V: 220 to 240 V AC |

* For other operating voltage types, please consult us.

## Specifications

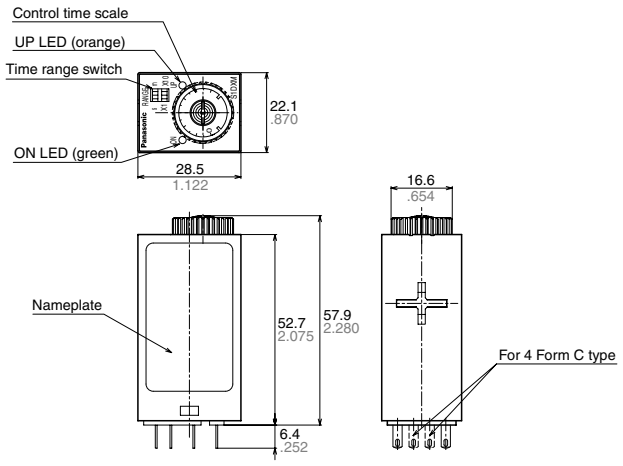
| Item | | | Specifications | | | | | |
|---|---|---|---|---|---|---|---|---|
| Rating | Rated operating voltage | | 24VAC | 100 to 120VAC | 200 to 220VAC | 220 to 240VAC | 12VDC | 24VDC |
| | Rated frequency | | 50/60Hz common | | | | — | |
| | Rated power consumption | | Max. 3 VA (at 24 VAC) | Max. 3 VA (at 100 VAC) | Max. 3 VA (at 200 VAC) | Max. 3 VA (at 220 VAC) | Max. 2 W (at 12 VDC) | Max. 2 W (at 24 VDC) |
| | | During time delay | Approx. 3mA | Approx. 3mA | Approx. 3mA | Approx. 3mA | Approx. 5mA | Approx. 3mA |
| | | After time delay | Approx. 80mA | Approx. 20mA | Approx. 13mA | Approx. 13mA | Approx. 70mA | Approx. 40mA |
| | Rated control capacity | | Timed -out 2 Form C: 7A 250V AC (resistive load) | | | | | |
| | | | Timed -out 4 Form C: 5A 250V AC (resistive load) | | | | | |
| | Operation mode | | S1DXM-A<br>Power on delay operation fixed<br>(Power display: ON/green; Operation display (when output is on): UP/orange) | | | | | |
| | | | S1DXM-M<br>4 switchable operations: Power ON-delay/Power Flicker OFF start/Power Flicker ON start/Power One-shot<br>(Power display: ON/green; Operation display (when output is on): UP/orange) | | | | | |
| Time accuracy*1 | Operating time fluctuation & Power off time change error | | Max. ±1 %, (power off time change at the range of 0.1 s to 1 h), 1 s range: Max. ±1 % and 10 ms*2 | | | | | |
| | Voltage error | | Max. ±1 % (at the operating voltage changes between –20 to +10%), 1 s range: Max. ±1 % and 10 ms*2 | | | | | |
| | Temperature error | | Max. ±5% (at 20°C ambient temp. at the range of –10 to +50°C +14 to +122°F) | | | | | |
| | Setting error | | Max. ±10%, 1 s range: Max. ±10% and 20 ms | | | | | |
| Contact | Contact arrangement | | Timed-out 2 Form C, Timed-out 4 Form C | | | | | |
| | Contact resistance (Initial value) | | Max. 100mΩ (at 1A, 6V DC) | | | | | |
| | Contact material | | Timed-out 2 Form C type: Silver alloy, Au plating | | | | | |
| | | | Timed-out 4 Form C type: Silver alloy, Au plating | | | | | |
| Life | Mechanical (constant) | | Min. $10^7$ | | | | | |
| | Electrical (constant) | | $2\times10^5$ (at rated control capacity) | | | | | |
| Mechanical | Vibration resistance | Functional | 10 to 55Hz: 1 cycle/min double amplitude of 0.25mm (10min on 3 axes) | | | | | |
| | | Destructive | 10 to 55Hz: 1 cycle/min double amplitude of 0.375mm (1h on 3 axes) | | | | | |
| | Shock resistance | Functional | Min. 98m/s² (4 times on 3 axes) | | | | | |
| | | Destructive | Min. 980m/s² (5 times on 3 axes) | | | | | |
| Electrical | Allowable operating voltage range | | 80 to 110% of rated operating voltage | | | | | |
| | Reset time | | Max. 0.1s | | | | | |
| | Insulation resistance (Initial value) | | Between live and dead metal parts, between input and output, between contact sets, between contacts<br>Min. 100 MΩ (at 500 V DC megger) | | | | | |
| | Breakdown voltage (Initial value) | | Between live and dead metal parts: 2,000 Vrms for 1 min<br>Between input and output: 2,000 Vrms for 1 min<br>Between contact sets: 2,000 Vrms for 1 min<br>Between contacts: 1,000 Vrms for 1 min | | | | | |
| | Max. temperature rise | | 70°C 158°F | | | | | |
| Operating conditions | Ambient temperature | | –10 to 50°C +14 to 122°F | | | | | |
| | Ambient humidity | | 35 to 85% RH (non-condensing) | | | | | |
| | Air pressure | | 860 to 1060 hPa | | | | | |
| | Ripple rate | | DC type only, transmission wave rectification (ripple rate: approx. 48%)*3 | | | | | |
| | Mass (Weight) | | Approx. 45 g | | | | | |
| | Protective construction | | IEC standard: IP40 (IP50 when using ADX18008 protective cover) | | | | | |

Notes: *1. Unspecified measuring conditions are rated operating voltage (in case of DC type, ripple rate of 5% or less), ambient temp. 20°C 68°F, and power off time 1 second.
*2. Power one-shot 1 s range: +2% and 10 ms
*3. When using with a transmission wave rectification, vibration resistance and shock resistance properties worsen compared to when using a stabilized power supply.

## Dimensions

mm inch

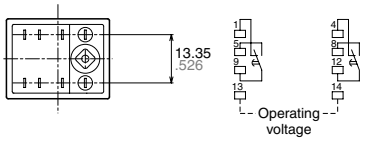
1. S1DXM-A



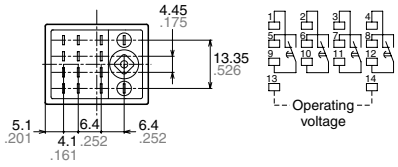

Tolerance: ±0.5 ±.020

Terminal layouts and Wiring diagram

Timed-out 2 Form C type

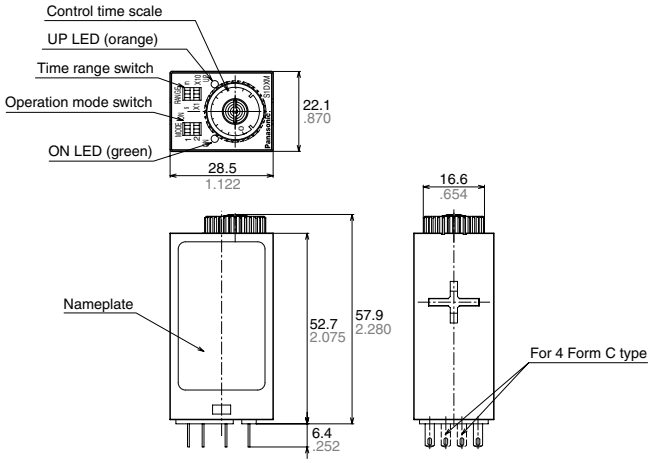



Timed-out 4 Form C type




* For the DC operating type, terminal 14 is "+" and terminal 13 is "–".

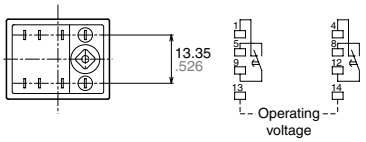
2. S1DXM-M



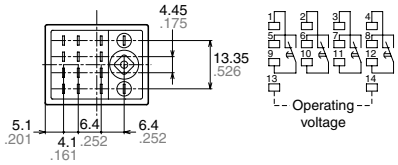

Tolerance: ±0.5 ±.020

Terminal layouts and wiring diagram

Timed-out 2 Form C type




Timed-out 4 Form C type




* For the DC operating type, terminal 14 is "+" and terminal 13 is "–".

## Applicable standard

| Safety standard | EN61812-1 | Pollution Degree 2/Overvoltage Category II (2 Form C type); Pollution Degree 1/Overvoltage Category II (4 Form C type) |
|---|---|---|
| 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<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 2 kV (power supply line)<br>1 kV (signal line) |
| | Surge immunity | EN61000-4-5 1 kV (power 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) |
| | Voltage dip/Instantaneous stop/Voltage fluctuation immunity | EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

## Precautions during usage

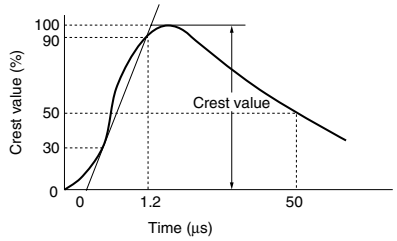
**1. Reset periods**

After unscheduled operations have been completed, or if the timer operation power supply has been turned off at any time during operation, a reset period of at least 0.1 seconds should be allowed before resuming operation.

**2. External surge protection**

External surge protection may be required if the following values are exceeded. Otherwise, the internal circuit will be damaged. The typical surge absorption elements include a varistor, a capacitor, and a diode. If a surge absorption element is used, use an oscilloscope to see whether or not the foreign surge exceeding the specified value appears.

**• Single-pole, full-wave voltage for surge waveform [±(1.2 × 50) μs]**




| Operation voltage | Surge voltage |
|---|---|
| 100 to 120V AC, 200 to 220V AC | 4,000V |
| 12V DC, 24V DC | 1,000V |

Since the main body cover and knob are made of polycarbonate resin, prevent contact with organic solvents such as methyl alcohol, benzine and thinner, or strong alkali materials such as ammonia and caustic soda.

**3. Terminal wiring**

Make sure that terminals are wired carefully and correctly, referring to the terminal layout and wiring diagrams. Particularly, since the DC type has polarity, do not operate it with reverse polarity.

**4. Assembly**

1) When installing, use a terminal socket or socket intended for the HC/HJ relay. For adjacent installations, be sure to first verify the installation conditions of the terminal sockets or sockets you will be using.

2) Use the separately-sold dedicated socket leaf holding clip to secure terminal sockets and sockets to the timer unit. The conditions of use for dedicated socket leaf holding clip will differ depending on the terminal socket or socket you will be using. Therefore, please test under actual conditions before putting into operation.

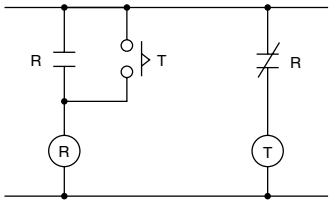
3) If terminals are to be soldered directly, please hand solder with a 30 to 60 W solder iron with a tip temperature of 300°C for no more than 3 seconds. Automatic soldering should be avoided.

4) A flux-tight construction is not used with this timer, so be careful that flux or cleaning fluid does not get inside the case.

5) To assure that characteristics are maintained, do not remove the case.

**5. Long Continuous Current Flow**

Long continuous current flow through the timer cause generation of heat internally, which degrade the electronic parts. Use the timer in combination with a relay and avoid long continuous current flow through the timer. (Refer to the circuit diagram below when using a safety circuit for continuous operation.)




**6. Phase synchronization using AC load**

If the turning on of the timer output relay is synchronized to the AC power supply phase, there may be times when the service life is shortened because of electrical factors, or when a locking phenomenon (defective relay return) occurs because of contact point welding or a shift in the contact relay. Check the operation using the actual timer.

**7. Acquisition of CE marking**

Please abide by the conditions below when using in applications that comply with EN61812-1.

1) Overvoltage category II, pollution level 2 (2 Form C type)
Overvoltage category II, pollution level 1 (4 Form C type)

2) The load connected to the output contact should have basic insulation. This timer is protected with basic insulation and can be double-insulated to meet EN/IEC requirements by using basic insulation on the load.

3) Please use a power supply that is protected by an overcurrent protection device which complies with the EN/IEC standard (example: 250 V 1 A fuse, etc.).

4) You must use a terminal socket or socket for the installation. Do not touch the terminals or other parts of the timer when it is powered. When installing or un-installing, make sure that no voltage is being applied to any of the terminals.

5) Do not use this timer as a safety circuit. For example when using a timer in a heater circuit, etc., provide a protection circuit on the machine side.

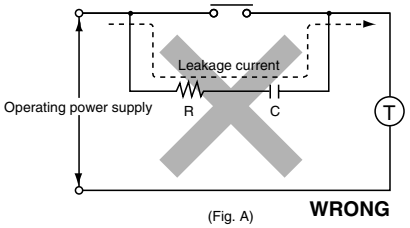
**8. Others**

1) When setting the time, the dial should be kept within the range indicated on the dial face. The “0” marking on the dial indicates the minimum time during which the control time can be varied (it does not indicate 0 seconds).

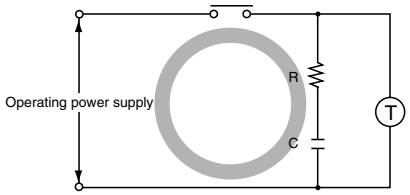
2) Do not rotate the knob past the stopper.

3) Turn off the power before changing the DIP switch settings. Changing the DIP switch with the power on can cause breakdown.

4) When connecting the operating power supply, make sure that no leakage current enters the timer. For example, when performing contact protection, if set up like that of fig. A, leaking current will pass through C and R, enter the timer, and cause incorrect operation. The fig. B shows the correct setup.




(Fig. A) **WRONG**

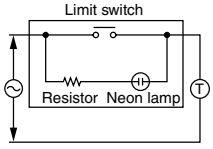



(Fig. B) **CORRECT**

When a contact switch having an operation indicating lamp (lamp equipped limit switch, etc.) is used to apply power to the timer, a resistor having a value equal to or greater than the value below shall be connected in series with the lamp.

100 to 120V AC operating type:
Min. 33kΩ

200 to 220V AC operating type:
Min. 82kΩ



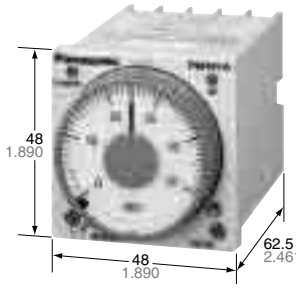

Example of limit switches with lamp.
VL with lamp, Vertical type with lamp, ML with lamp.

Panasonic
ideas for life

# DIN48 SIZE MULTI-RANGE ANALOG TIMER

# PM4H-A
# PM4H-S
# PM4H-M







Pin type


Screw terminal type

**UL File No.: E122222**
**CSA File No.: LR39291**

## Features

- **100-240V AC free-voltage input, 48-125V DC type available**
- **Short body — 62.5mm 2.461 inch (screw terminal type)**
- **Front panel of IP65 type is protected against water-splash and dust**
- **Built-in Screw terminals**
  **Screw terminal type is used for easy wiring and reducing additional cost for accessories.**
- **0 setting instantaneous output operation**
- **Multiple time ranges — 1 s to 500 h (Max.)**
- **8 different operation modes: (PM4H-A)**
- **Compliant with UL/CSA, CE and LLOYD**

## Product types

| Type | Operation mode | Contact arrangement | Time range | Protective construction | Rated operating voltage | Terminal type | Part number |
|---|---|---|---|---|---|---|---|
| PM4H-A | 8 operation modes<br>• Pulse ON-delay<br>• Pulse Flicker<br>• Pulse ON-flicker<br>• Differential ON/OFF-delay (1) (2)<br>• Signal OFF-delay<br>• Pulse One-shot<br>• Pulse One-cycle | Relay<br>Timed-out<br>2 Form C | 16 selectable ranges<br>1s to 500h | IP65 | 100 to 240V AC | 11 pins | PM4HA-H-AC240VW |
| | | | | | | Screw terminal | PM4HA-H-AC240VSW |
| | | | | | 48 to 125V DC | 11 pins | PM4HA-H-DC125VW |
| | | | | | | Screw terminal | PM4HA-H-DC125VSW |
| | | | | | 24V AC/DC | 11 pins | PM4HA-H-24VW |
| | | | | | | Screw terminal | PM4HA-H-24VSW |
| | | | | | 12V DC | 11 pins | PM4HA-H-DC12VW |
| | | | | | | Screw terminal | PM4HA-H-DC12VSW |
| | | | | IP50 | 100 to 240V AC | 11 pins | PM4HA-H-AC240V |
| | | | | | | Screw terminal | PM4HA-H-AC240VS |
| | | | | | 48 to 125V DC | 11 pins | PM4HA-H-DC125V |
| | | | | | | Screw terminal | PM4HA-H-DC125VS |
| | | | | | 24V AC/DC | 11 pins | PM4HA-H-24V |
| | | | | | | Screw terminal | PM4HA-H-24VS |
| | | | | | 12V DC | 11 pins | PM4HA-H-DC12V |
| | | | | | | Screw terminal | PM4HA-H-DC12VS |
| PM4H-S | Power ON-delay | Relay<br>Timed-out<br>2 Form C | | IP65 | 100 to 240V AC | 8 pins | PM4HS-H-AC240VW |
| | | | | | | Screw terminal | PM4HS-H-AC240VSW |
| | | | | | 48 to 125V DC | 8 pins | PM4HS-H-DC125VW |
| | | | | | | Screw terminal | PM4HS-H-DC125VSW |
| | | | | | 24V AC/DC | 8 pins | PM4HS-H-24VW |
| | | | | | | Screw terminal | PM4HS-H-24VSW |
| | | | | | 12V DC | 8 pins | PM4HS-H-DC12VW |
| | | | | | | Screw terminal | PM4HS-H-DC12VSW |
| | | | | IP50 | 100 to 240V AC | 8 pins | PM4HS-H-AC240V |
| | | | | | | Screw terminal | PM4HS-H-AC240VS |
| | | | | | 48 to 125V DC | 8 pins | PM4HS-H-DC125V |
| | | | | | | Screw terminal | PM4HS-H-DC125VS |
| | | | | | 24V AC/DC | 8 pins | PM4HS-H-24V |
| | | | | | | Screw terminal | PM4HS-H-24VS |
| | | | | | 12V DC | 8 pins | PM4HS-H-DC12V |
| | | | | | | Screw terminal | PM4HS-H-DC12VS |
| PM4H-M | 5 operation modes<br>(With instantaneous contact)<br>• Power ON-delay<br>• Power Flicker<br>• Power ON-flicker<br>• Power One-shot<br>• Power One-cycle | Relay<br>Timed-out<br>1 Form C<br>Instantaneous<br>1 Form C | | IP65 | 100 to 240V AC | 8 pins | PM4HM-H-AC240VW |
| | | | | | | Screw terminal | PM4HM-H-AC240VSW |
| | | | | | 48 to 125V DC | 8 pins | PM4HM-H-DC125VW |
| | | | | | | Screw terminal | PM4HM-H-DC125VSW |
| | | | | | 24V AC/DC | 8 pins | PM4HM-H-24VW |
| | | | | | | Screw terminal | PM4HM-H-24VSW |
| | | | | | 12V DC | 8 pins | PM4HM-H-DC12VW |
| | | | | | | Screw terminal | PM4HM-H-DC12VSW |
| | | | | IP50 | 100 to 240V AC | 8 pins | PM4HM-H-AC240V |
| | | | | | | Screw terminal | PM4HM-H-AC240VS |
| | | | | | 48 to 125V DC | 8 pins | PM4HM-H-DC125V |
| | | | | | | Screw terminal | PM4HM-H-DC125VS |
| | | | | | 24V AC/DC | 8 pins | PM4HM-H-24V |
| | | | | | | Screw terminal | PM4HM-H-24VS |
| | | | | | 12V DC | 8 pins | PM4HM-H-DC12V |
| | | | | | | Screw terminal | PM4HM-H-DC12VS |

If you use this timer under harsh environment, please order above sealed type (IP65 type). IP65 type — Protection dust and water jet splay on the front face.

## Time range

| Scale \ Time unit | | sec | min | hrs | 10h |
|---|---|---|---|---|---|
| 1 | Control time range | 0.1s to 1s | 0.1 min to 1 min | 0.1h to 1h | 1.0h to 10h |
| 5 | | 0.5s to 5s | 0.5 min to 5 min | 0.5h to 5h | 5h to 50h |
| 10 | | 1.0s to 10s | 1.0 min to 10 min | 1.0h to 10h | 10h to 100h |
| 50 | | 5s to 50s | 5 min to 50 min | 5h to 50h | 50h to 500h |

Note: 0 setting is for instantaneous output operation.

PM4H-A/PM4H-S/PM4H-M
All types of PM4H timer have multi-time range.
16 time ranges are selectable.
1s to 500h (Max. range) is controlled.

## Specifications

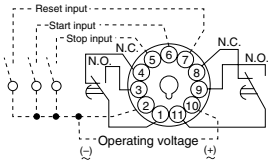
| Item \ Type | | | PM4H-A | PM4H-S | PM4H-M |
|---|---|---|---|---|---|
| Rating | Rated operating voltage | | 100 to 240V AC, 48 to 125V DC, 12V DC, 24V AC/DC | | |
| | Rated frequency | | 50/60Hz common (AC operating type) | | |
| | Rated power consumption | | Approx. 10VA (100 to 240V AC)<br>Approx. 2.5VA (24V AC)<br>Approx. 1.5W (12V DC, 24V DC, 48 to 125V DC) | | |
| | Rated control capacity | | 5A 250V AC (resistive load) | | |
| | Operating mode | | Pulse ON-delay<br>Pulse Flicker<br>Pulse ON-Flicker<br>Differential ON/OFF-delay (1) (2)<br>Signal OFF-delay<br>Pulse One-shot<br>Pulse One-cycle | Power ON-delay | Power ON-delay<br>Power Flicker<br>Power ON-flicker<br>Power One-shot<br>Power One-cycle<br>(with instantaneous contact) |
| | Time range | | 1s to 500h (Max.) 16 time ranges switchable | | |
| Time accuracy Note:1) | Operating time fluctuation | | ±0.3% (power off time change at the range of 0.1s to 1h) | | |
| | Setting error | | ±5% (Full-scale value) | | |
| | Voltage error | | ±0.5% (at the operating voltage changes between 85 to 110%) | | |
| | Temperature error | | ±2% (at 20°C ambient temp. at the range of –10 to +50°C +14 to +122°F) | | |
| Contact | Contact arrangement | | Timed-out 2 Form C | | Timed-out 1 Form C<br>Instantaneous 1 Form C |
| | Contact resistance (Initial value) | | Max. 100mΩ (at 1A 6V DC) | | |
| | Contact material | | Silver alloy | | Au flash on Silver alloy |
| Life | Mechanical (contact) | | $2\times10^7$ | | |
| | Electrical (contact) | | $10^5$ (at rated control capacity) | | |
| Electrical function | Allowable operating voltage range | | 85 to 110% of rated operating voltage (at 20°C coil temp.) | | |
| | Insulation resistance (Initial value) | | Min. 100MΩ | Between live and dead metal parts<br>Between input and output<br>Between contacts of different poles<br>Between contacts of same pole | (At 500V DC) |
| | Breakdown voltage (Initial value) | | 2,000Vrms for 1 min Between live and dead metal parts<br>2,000Vrms for 1 min Between input and output<br>2,000Vrms for 1 min Between contacts of different poles<br>1,000Vrms for 1 min Between contacts of same pole | | |
| | Min. power off time | | 100ms | | |
| | Max. temperature rise | | 55°C 131°F | | 65°C 149°F |
| Mechanical function | Vibration resistance | Functional | 10 to 55Hz: 1 cycle/min double amplitude of 0.25mm (10min on 3 axes) | | |
| | | Destructive | 10 to 55Hz: 1 cycle/min double amplitude of 0.375mm (1h on 3 axes) | | |
| | Shock resistance | Functional | Min. 98m/s² (4 times on 3 axes) | | |
| | | Destructive | Min. 980m/s² (5 times on 3 axes) | | |
| Operating condition | Ambient temperature | | –10 to +50°C +14 to +122°F | | |
| | Ambient humidity | | 30 to 85%RH (at 20°C 68°F, non-condensing) | | |
| | Atmospheric pressure | | 860 to 1,060hPa | | |
| | Ripple factor (DC type) | | 20% | | |
| Others | Protective construction | | IP65 on front panel (using rubber gasket ATC18002) <only for IP65 type> | | |
| | Weight | | 100g 3.527 oz (Pin type) | | |
| | | | 110g 3.880 oz (Screw terminal type) | | |

Note: 1) Unless otherwise specified, the measurement conditions at the maximum scale time standard are specified to be the rated operating voltage (within 5% ripple factor for DC), 20°C 68°F ambient temperature, and 1s power off time.
2) For the 1s range, the tolerance for each specification becomes ±10ms.

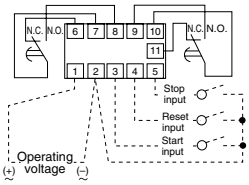
## Terminal layouts and wiring diagrams

**PM4H-A**

Pin type
- Timed-out 2 Form C

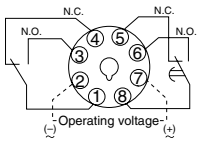



Screw terminal type
- Timed-out 2 Form C

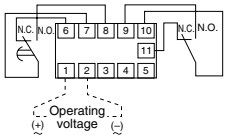



**PM4H-M**

Pin type
- Timed-out 1 Form C
- Instantaneous 1 Form C

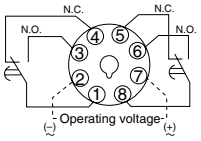



Screw terminal type
- Timed-out 1 Form C
- Instantaneous 1 Form C

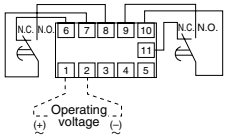



**PM4H-S**

Pin type
- Timed-out 2 Form C




Screw terminal type
- Timed-out 2 Form C




**1) DC Type**

| Type | Pin | Screw terminal |
|---|---|---|
| **PM4H-A** | Connect the terminal ② to negative (–), and the terminal ⑩ to positive (+). | Connect the terminal 2 to negative (–), and the terminal 1 to positive (+). |
| **PM4H-S** **PM4H-M** | Connect the terminal ② to negative (–), and the terminal ⑦ to positive (+). | |

**2) Contact**


**3)** Voltage should not be applied to the various inputs (reset, start, and stop) of the PM4H-A multi-range timer. These inputs should be input without voltage.

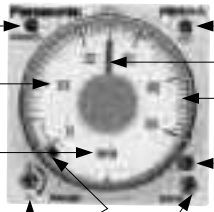
## Part names

**PM4H-S**

Time range selector

16 time settings selectable
(1 s to 500 h)
1s 5s 10s 50s
1min 5min 10min 50min
1h 5h 10h 50h
10h 50h 100h 500h

**PM4H-A**




Instantaneous output area

When the hand is in this area, instantaneous operation starts.

Operation mode selector

Selectable from 8 operation modes
ON : Pulse ON-delay
FL : Pulse Flicker
FO : Pulse ON-flicker
OF1 : Differential ON/OFF-delay (1)
SF : Signal OFF-delay
OS : Pulse One-shot
OF2 : Differential ON/OFF-delay (2)
OC : Pulse One-cycle

**PM4H-M**

Operation mode selector

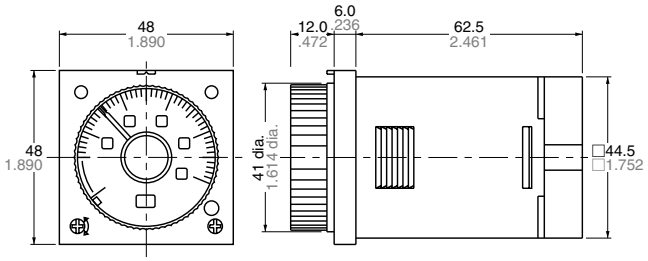
Selectable from
5 operation modes
ON : Power ON-delay
FL : Power flicker
FO : Power ON-flicker
OS : Power One-shot
OC : Power One-cycle

## Dimensions

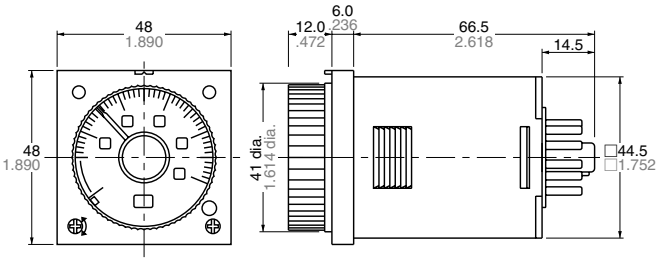
mm inch
Tolerance: ±0.5 ±.020

**• PM4H-□**

Screw terminal type
(Flush mount)

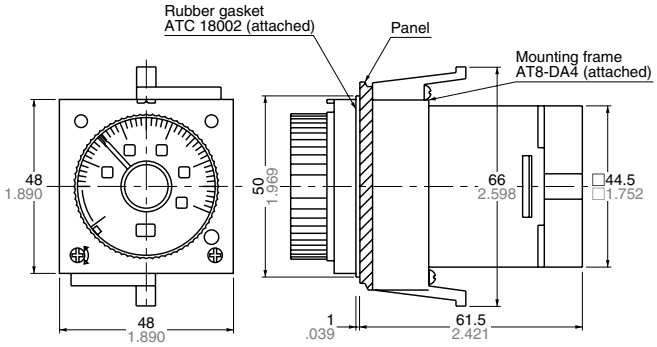



Pin type
(Flush mount/Surface mount)

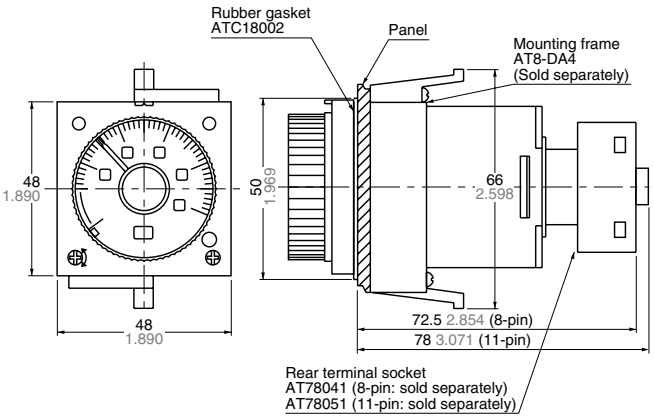



**• Panel mount dimensions (with mounting frame)**

Screw terminal type

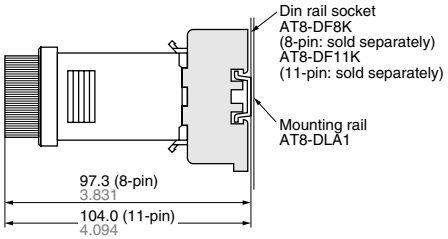



Pin type



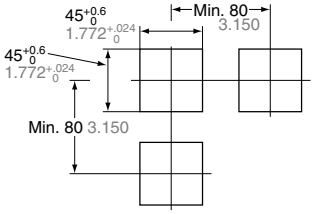

**• Surface mount dimensions**

Pin type

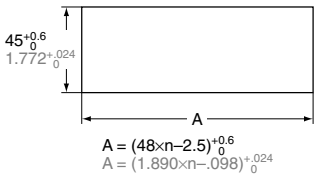



**• Panel cut out dimensions**

Standard cut out dimensions are shown below.
Use mounting frame (AT8-DA4) and rubber gasket (ATC18002).




**• Adjacent mounting**

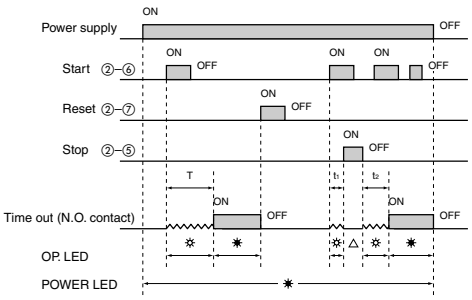
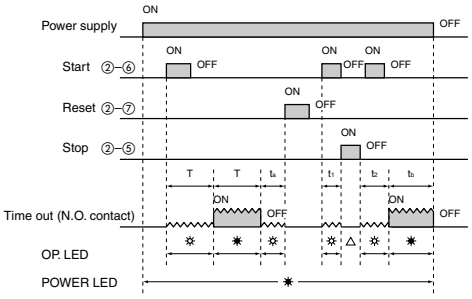
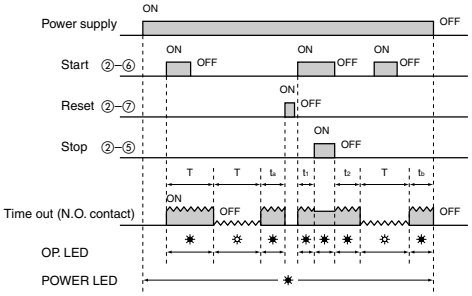
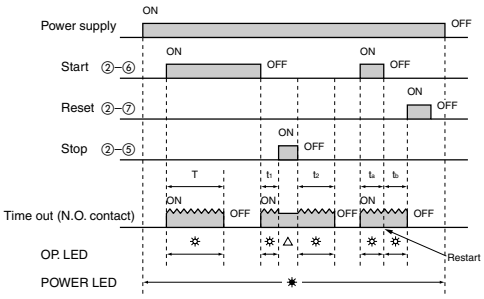
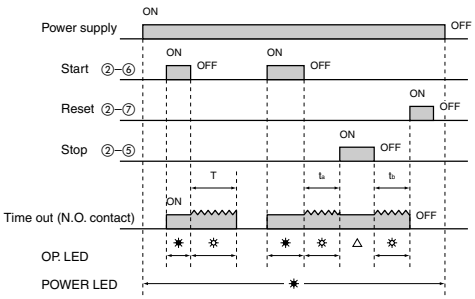



Note) 1. The proper thickness of mounting panel is between 1 to 5mm.
2. Adjacent mount is less water-resistant.

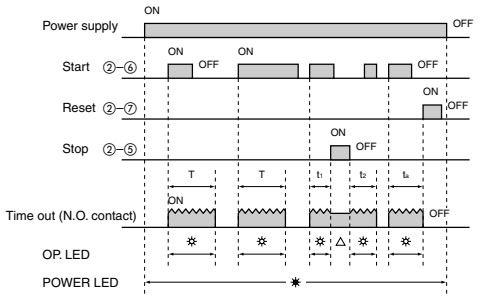
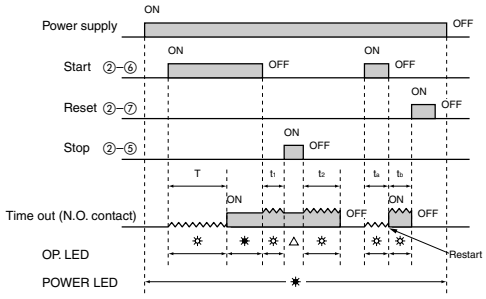
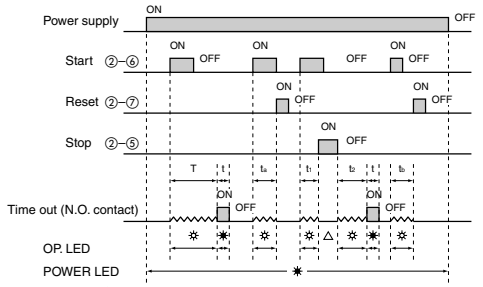
## Operation mode

### PM4H-A

(✷ LED lighting ✲ LED flickering
T: Setting time $t_1$, $t_2$, $t_a$, $t_b$<T $t_1+t_2$=T)

| Operation type | Explanation | Time chart |
|---|---|---|
| **Pulse ON-delay** (ON) | • If using a time-limit start when the power is turned on, and a reset when the power is turned off, pins ② to ⑥ (screw-tightening pins 2 and 3) should be shorted ahead of time.<br>• Turn the operation mode selector switch to the (ON) position.<br>If pins ② to ⑥ (screw-tightening pins 2 and 3) are shorted (the start input is turned on) with the power supply on, the output will go on after the set time has elapsed.<br>If the power supply is turned off, or pins ② to ⑦ (screw-tightening pins 2 to 4) are shorted (the reset input is turned on), a reset is carried out.<br>Note) During time-limited operation, the time-limited operation is stopped while the pins ② to ⑤ (screw-tightening pins 2 to 5) are being shorted (the stop input is on). When the pins are released, time-limited operation resumes. |  <br>△Note: ✷ LED lighting or No LED lighting |
| **Pulse Flicker** (FL) | • If using a time-limit start when the power is turned on, and a reset when the power is turned off, pins ② to ⑥ (screw-tightening pins 2 and 3) should be shorted ahead of time.<br>• Turn the operation mode selector switch to the (FL) position.<br>When pins ② to ⑥ (screw-tightening pins 2 and 3) are shorted (the start input is turned on) with the power supply on, the limited time interval begins, and the output goes on after the set time has elapsed. After the output has gone on, it goes off when the set time has elapsed, and this process is subsequently repeated.<br>If the power supply is turned off, or pins ② to ⑦ (screw-tightening pins 2 to 4) are shorted (the reset input is turned on), a reset is carried out.<br>Note) During time-limited operation, the time-limited operation is stopped while the pins ② to ⑤ (screw-tightening pins 2 to 5) are being shorted (the stop input is on). When the pins are released, time-limited operation resumes. |  <br>△Note: ✷ LED lighting or No LED lighting |
| **Pulse ON-flicker** (FO) | • If using a time-limit start when the power is turned on, and a reset when the power is turned off, pins ② to ⑥ (screw-tightening pins 2 and 3) should be shorted ahead of time.<br>• Turn the operation mode selector switch to the (FO) position.<br>When pins ② to ⑥ (screw-tightening pins 2 and 3) are shorted (the start input is turned on) with the power supply on, the output goes on, and after the set time has elapsed, it goes off. This process is subsequently repeated.<br>If the power supply is turned off, or pins ② to ⑦ (screw-tightening pins 2 to 4) are shorted (the reset input is turned on), a reset is carried out.<br>Note) During time-limited operation, the time-limited operation is stopped while the pins ② to ⑤ (screw-tightening pins 2 to 5) are being shorted (the stop input is on). When the pins are released, time-limited operation resumes. |  |
| **Differential ON/OFF-delay (1)** (OF1) | • Turn the operation mode selector switch to the (OF1) position.<br>When pins ② to ⑥ (screw-tightening pins 2 and 3) are shorted (the start input is turned on) with the power supply on, the output goes on, and after the set time has elapsed, it goes off.<br>Also, when pins ② to ⑥ are released (the start input goes off), the output goes on, and after the set time has elapsed, it goes off.<br>If the status of pins ② to ⑥ (screw-tightening pins 2 and 3) changes during the time-limit interval (the start input goes from on to off, or from off to on), the time-limit interval is restarted from the point at which the change took place.<br>If the power supply is turned off, or pins ② to ⑦ (screw-tightening pins 2 to 4) are shorted (the reset input is turned on), a reset is carried out.<br>Note) During time-limited operation, the time-limited operation is stopped while the pins ② to ⑤ (screw-tightening pins 2 to 5) are being shorted (the stop input is on). When the pins are released, time-limited operation resumes. |  <br>△Note: ✷ LED lighting or No LED lighting |
| **Signal OFF-delay** (SF) | • Turn the operation mode selector switch to the (SF) position.<br>When pins ② to ⑥ (screw-tightening pins 2 and 3) are shorted (the start input is turned on) with the power supply on, the output goes on, and when pins ② to ⑥ (screw-tightening pins 2 and 3) are released (the start input is turned off), the time limit interval begins. After the set time has elapsed, the output goes off. If start input is entered at any point during the time limit interval, the time limit interval is reset.<br>Note) During time-limited operation, the time-limited operation is stopped while the pins ② to ⑤ (screw-tightening pins 2 to 5) are being shorted (the stop input is on). When the pins are released, time-limited operation resumes. |  <br>△Note: ✷ LED lighting or No LED lighting |

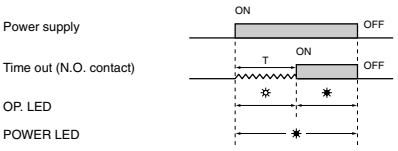
Note: Keep 0.1s or more for power off time.
Keep 0.05s or more for start, stop, reset input time.

| Operation type | Explanation | Time chart |
|---|---|---|
| **Pulse One-shot** (0S) | • If using a time-limit start when the power is turned on, and a reset when the power is turned off, pins ② to ⑥ (screw-tightening pins 2 and 3) should be shorted ahead of time.<br>• Turn the operation mode selector switch to the (0S) position.<br>When pins ② to ⑥ (screw-tightening pins 2 and 3) are shorted (the start input is turned on) with the power supply on, the output goes on for the set time limit interval.<br>If the power supply is turned off, or pins ② to ⑦ (screw-tightening pins 2 to 4) are shorted (the reset input is turned on), a reset is carried out.<br>Note) During time-limited operation, the time-limited operation is stopped while the pins ② to ⑤ (screw-tightening pins 2 to 5) are being shorted (the stop input is on). When the pins are released, time-limited operation resumes. |  <br>△Note: ✷ LED lighting or No LED lighting |
| **Differential ON/OFF-delay (2)** (0F2) | • Turn the operation mode selector switch to the (0F2) position.<br>When pins ② to ⑥ (screw-tightening pins 2 and 3) are shorted (the start input is turned on) with the power supply on, the time limit interval begins, and after the set time interval has elapsed, the output goes on.<br>Also, when pins ② to ⑥ are released (the start input goes off), the time limit interval begins, and after it has elapsed, the output goes off.<br>If the status of pins ② to ⑥ (screw-tightening pins 2 and 3) changes during the time-limit interval (the start input goes from on to off, or from off to on), the time limit interval is restarted from the point at which the change took place.<br>If the power supply is turned off, or pins ② to ⑦ (screw-tightening pins 2 to 4) are shorted (the reset input is turned on), a reset is carried out.<br>Note) During time-limited operation, the time-limited operation is stopped while the pins ② to ⑤ (screw-tightening pins 2 to 5) are being shorted (the stop input is on). When the pins are released, time-limited operation resumes. |  <br>△Note: ✷ LED lighting or No LED lighting |
| **Pulse One-cycle** (0C) | • If using a time-limit start when the power is turned on, and a reset when the power is turned off, pins ② to ⑥ (screw-tightening pins 2 and 3) should be shorted ahead of time.<br>• Turn the operation mode selector switch to the (0C) position.<br>When pins ② to ⑥ (screw-tightening pins 2 and 3) are shorted (the start input is turned on) with the power supply on, the output goes on after the set time limit interval has elapsed. After it has gone on, it goes off after one pulse (approximately 0.8 seconds).<br>If the power supply is turned off, or pins ② to ⑦ (screw-tightening pins 2 to 4) are shorted (the reset input is turned on), a reset is carried out.<br>Note) During time-limited operation, the time-limited operation is stopped while the pins ② to ⑤ (screw-tightening pins 2 to 5) are being shorted (the stop input is on). When the pins are released, time-limited operation resumes. |  <br>One pulse time (t): Approx. 0.8s<br>△Note: ✷ LED lighting or No LED lighting |

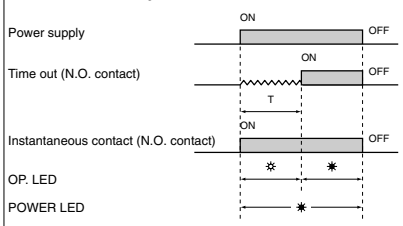
Note: Keep 0.1s or more for power off time.
Keep 0.05s or more for start, stop, reset input time.

## PM4H-S

(✷ LED lighting ✲ LED flickering
T: Setting time)

| Operation type | Explanation | Time chart |
|---|---|---|
| **Power ON-delay** | Time limit contact relay<br>When the power supply is turned on, the output goes on after the set time interval has elapsed.<br>When the power supply is turned off, a reset is carried out. |  |

## PM4H-M

| Operation type | Explanation | Time chart |
|---|---|---|
| **Power ON-delay** (ON)<br>**Power Flicker** (FL)<br>**Power ON-flicker** (FO)<br>**Power One-shot** (0S)<br>**Power One-cycle** (0C) | Turn the operation mode selector switch to display the various operations.<br>When the power supply is turned on, the time limit interval begins, and operation is carried out.<br>When the power supply is turned off, a reset is carried out. | Power ON-delay<br>  |

Note: Keep 0.1s or more for power off time. PM4H-M timers do not have each input which is start, reset and stop.

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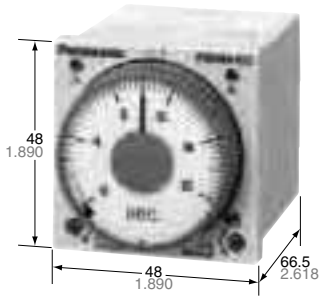
# DIN48 SIZE ANALOG STAR (⅄)-DELTA (△) TIMERS

# PM4H -SD/SDM






mm inch

**UL File No.: E122222**
**CSA File No.: LR39291**

## Features

- **Select four types of time ranges between 0.2 s and 100 s on a single unit.**
- **Select between five types of time ranges between 0.04 s and 0.7 s for the ⅄-△ switching times.**
- **There is a ⅄-△ switching indicator so you can check the operation at a glance.**
- **The AC free power supply and shorter body make it easier to use.**
- **Compliant with UL, CSA, CE and LLOYD.**

## Specifications

| Item | | | Type: PM4H-SD/SDM |
|---|---|---|---|
| Rating | Rated operating voltage | | 100 to 240V AC, 24V AC |
| | Rated frequency | | 50/60Hz common |
| | Rated power consumption | | Approx. 6VA (100 to 240V AC), Approx. 1.4VA (24V AC) |
| | Rated control capacity | | 5A 250V AC (resistive load) |
| | Operation mode | | ⅄-△ star-delta switching (Power ON-delay) |
| | ⅄ operation control time range | | 2s to 100s, 4 time ranges switchable |
| | ⅄-△ switching time | | 0.04, 0.1, 0.3, 0.5, 0.7s (5 time range selectable) |
| Time accuracy Note:1) | Operation time fluctuation | | ±0.3% (power off time change at the range of 0.5s to 1h) |
| | Setting error | | ±5% (Full-scale value) |
| | Voltage error | | ±0.5% (at the operating voltage changes between 85 to 110%) |
| | Temperature error | | ±2% (at 20°C ambient temp. at the range of –10 to +50°C +14 to +122°F) |
| Contact | Contact arrangement | | Star (⅄) side: Timed-out 1 Form A, Delta (△) side: Timed-out 1 Form A<br>Instantaneous: 1 Form A (Instantaneous for PM4H-SDM type only) |
| | Contact resistance (Initial value) | | Max. 100mΩ (at 1A 6V DC) |
| | Contact material | | Au flash on Silver alloy |
| Life | Mechanical (contact) | | $2\times10^7$ |
| | Electrical (contact) | | $10^5$ (at rated control capacity) |
| Electrical function | Allowable operating voltage range | | 85 to 110% of rated operating voltage (at 20°C coil temp.) |
| | Insulation resistance (Initial value) | | Min. 100MΩ (At 500V DC)<br>Between live and dead metal parts<br>Between input and output<br>Between contacts of different poles (*3)<br>Between contacts of same pole |
| | Breakdown voltage (Initial value) | | 2,000Vrms for 1 min Between live and dead metal parts<br>2,000Vrms for 1 min Between input and output<br>2,000Vrms for 1 min Between contacts of different poles (*3)<br>1,000Vrms for 1 min Between contacts of same pole |
| | Min. power off time | | 500ms |
| | Max. temperature rise | | 65°C 131°F |
| Mechanical function | Vibration resistance | Functional | 10 to 55Hz: 1 cycle/min double amplitude of 0.25mm (10min on 3 axes) |
| | | Destructive | 10 to 55Hz: 1 cycle/min double amplitude of 0.375mm (1h on 3 axes) |
| | Shock resistance | Functional | Min. 294m/s² (4 times on 3 axes) |
| | | Destructive | Min. 980m/s² (5 times on 3 axes) |
| Operating condition | Ambient temperature | | –10 to +50°C +14 to +122°F |
| | Ambient humidity | | Max. 85%RH (non-condensing) |
| | Atmospheric pressure | | 860 to 1,060hPa |
| Others | Protective construction | | IP65 on front panel (using rubber gasket ATC18002) <only for IP65 type> |
| | Weight | | 100g 3.527 oz (Pin type), 110g 3.880 oz (Screw terminal type) |

Notes: 1) Unless otherwise specified, the measurement conditions at the maximum scale time standard are specified to be the rated operating voltage, 20°C 68°F ambient temperature, and 1s power off time.
2) For the 2s range, the tolerance for each specification becomes ±10ms.
3) Between contacts of different poles for PM4H-SDM type only.

## Time range

| Time range / Time range unit | Operating (s) | ⅄-△ switching time (s) |
|---|---|---|
| 2 | 0.2 to 2 | 0.04 |
| 10 | 1 to 10 | 0.1 |
| 20 | 2 to 20 | 0.3 |
| 100 | 10 to 100 | 0.5 |
| | | 0.7 |

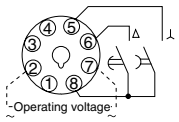
## Product types

| Type | Operation mode | Contact arrangement | Time range | Protective construction | Rated operating voltage | Terminal type | Part number |
|---|---|---|---|---|---|---|---|
| **PM4H-SD Star (⅄)-Delta (△) switching** | Star (⅄)-Delta (△) switching | Relay Timed-out ⅄ side: 1 Form A △ side: 1 Form A | 4 selectable ranges over 2s to 100s (⅄-△ switching time: 0.04, 0.1, 0.3, 0.5, 0.7s) | IP65 | 100 to 240V AC | 8 pins | PM4HSD-S-AC240VW |
| | | | | | | Screw terminal | PM4HSD-S-AC240VSW |
| | | | | | 24V AC | 8 pins | PM4HSD-S-AC24VW |
| | | | | | | Screw terminal | PM4HSD-S-AC24VSW |
| **PM4H-SDM Star (⅄)-Delta (△) switching (Instantaneous contact)** | | Relay Timed-out ⅄ side: 1 Form A △ side: 1 Form A Instantaneous: 1 Form A | | | 100 to 240V AC | 8 pins | PM4HSDM-S-AC240VW |
| | | | | | | Screw terminal | PM4HSDM-S-AC240VSW |
| | | | | | 24V AC | 8 pins | PM4HSDM-S-AC24VW |
| | | | | | | Screw terminal | PM4HSDM-S-AC24VSW |
| **PM4H-SD Star (⅄)-Delta (△) switching** | | Relay Timed-out ⅄ side: 1 Form A △ side: 1 Form A | | IP50 | 100 to 240V AC | 8 pins | PM4HSD-S-AC240V |
| | | | | | | Screw terminal | PM4HSD-S-AC240VS |
| | | | | | 24V AC | 8 pins | PM4HSD-S-AC24V |
| | | | | | | Screw terminal | PM4HSD-S-AC24VS |
| **PM4H-SDM Star (⅄)-Delta (△) switching (Instantaneous contact)** | | Relay Timed-out ⅄ side: 1 Form A △ side: 1 Form A Instantaneous: 1 Form A | | | 100 to 240V AC | 8 pins | PM4HSDM-S-AC240V |
| | | | | | | Screw terminal | PM4HSDM-S-AC240VS |
| | | | | | 24V AC | 8 pins | PM4HSDM-S-AC24V |
| | | | | | | Screw terminal | PM4HSDM-S-AC24VS |

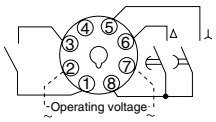
## Terminal layouts and wiring diagrams

**Pin type**

• No instantaneous contact



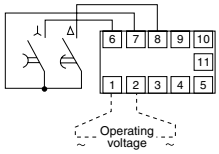

• With instantaneous contact



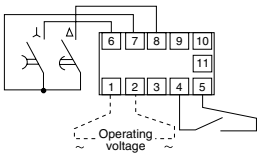

⑤—⑧: ⅄ side time-delay contact
⑥—⑧: △ side time-delay contact
①—③: Instantaneous contact
(PM4H-SDM type)

**Screw terminal type**

• No instantaneous contact



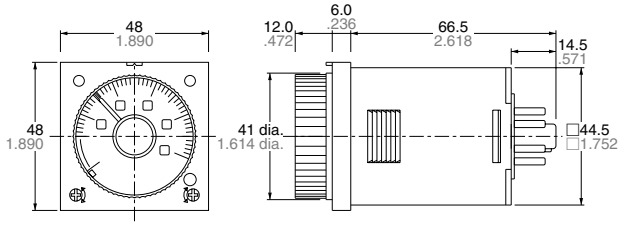

• With instantaneous contact



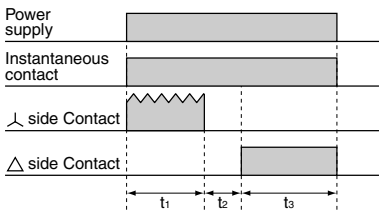

6—7: ⅄ side time-delay contact
8—7: △ side time-delay contact
4—5: Instantaneous contact
(PM4H-SDM type)

## Dimensions

mm inch




## Operation




t1: ⅄ operation time
(⅄ indicator LED lights)
t2: ⅄ – △ switching time
t3: △ operation time
(△ indicator LED lights)

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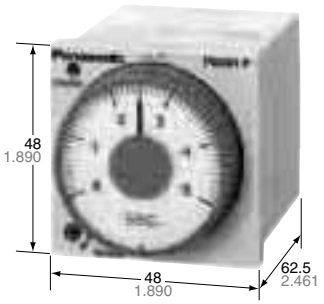
# DIN48 SIZE ANALOG MULTI-RANGE POWER OFF-DELAY TIMERS

# PM4H-F






mm inch

**UL File No.: E122222**
**CSA File No.: LR39291**

## Features

- **Switch operation times between three types of time ranges of 1 s to 10 s and 1 min to 10 min.**
- **Instantaneous reset available.**
- **The shorter body makes it easier to use.**
- **Compliant with UL, CSA, CE and LLOYD.**

## Specifications

| Item | | | Type | PM4H-F8 | PM4H-F8R | PM4H-F11R |
|---|---|---|---|---|---|---|
| Rating | Rated operating voltage | | | 100 to 120V AC, 200 to 240V AC, 24V AC, 12V DC, 24V DC | | |
| | Rated frequency | | | 50/60Hz common (AC operating type) | | |
| | Rated power consumption | | | Approx. 1.6VA (100 to 120V AC, 200 to 240V AC), Approx. 2.3VA (24V AC)<br>Approx. 1.1W (12V DC, 24V DC) | | |
| | Rated control capacity | | | 3A 250V AC (resistive load) | | |
| | Operation mode | | | Power OFF-delay | Power OFF-delay (with reset) | |
| | Time range | | | 1s to 10s: 3 range switchable 1 min to 10 min: 3 range selectable | | |
| Time accuracy *1 | Operation time fluctuation | | | ±0.3% | | |
| | Setting error | | | ±5% (Full-scale value) | | |
| | Voltage error | | | ±0.5% (at the operating voltage changes between 85 to 110%) | | |
| | Temperature error | | | ±2% (at 20°C ambient temp. at the range of –10 to +50°C +14 to +122°F) | | |
| Contact | Contact arrangement | | | Timed-out 2 Form C | Timed-out 1 Form C | Timed-out 2 Form C |
| | Contact resistance (Initial value) | | | Max. 100mΩ (at 1A 6V DC) | | |
| | Contact material | | | Au flash on Silver alloy | | |
| Life | Mechanical (contact) | | | $10^7$ | | |
| | Electrical (contact) | | | $10^5$ (at rated control capacity) | | |
| Electrical function | Allowable operating voltage range | | | 85 to 110% of rated operating voltage (at 20°C coil temp.), 90 to 110% (DC Type) | | |
| | Insulation resistance (Initial value) | | | Min. 100MΩ (At 500V DC)<br>Between live and dead metal parts<br>Between input and output<br>Between contacts of different poles (*3)<br>Between contacts of same pole | | |
| | Breakdown voltage (Initial value) | | | 1,500Vrms for 1 min Between live and dead metal parts<br>1,500Vrms for 1 min Between input and output<br>1,000Vrms for 1 min Between contacts of different poles (*3)<br>750Vrms for 1 min Between contacts of same pole | | |
| | Min. power supply width | | | s range type: 100ms<br>min range type: 2s | | |
| | Min. reset time | | | ——— | 50ms | |
| | Max. temperature rise | | | 55°C 131°F | | |
| Mechanical function | Vibration resistance | Functional | | 10 to 55Hz: 1 cycle/min double amplitude of 0.25mm (10min on 3 axes) | | |
| | | Destructive | | 10 to 55Hz: 1 cycle/min double amplitude of 0.375mm (1hr on 3 axes) | | |
| | Shock resistance | Functional | | Min. 98m/s$^2$ (4 times on 3 axes) | | |
| | | Destructive | | Min. 980m/s$^2$ (5 times on 3 axes) | | |
| Operating condition | Ambient temperature | | | –10 to +50°C +14 to +122°F | | |
| | Ambient humidity | | | 30 to 85%RH (non-condensing) | | |
| | Atmospheric pressure | | | 860 to 1,060hPa | | |
| | Ripple factor (DC type) | | | 20% | | |
| Others | Protective construction | | | IP65 on front panel (using rubber gasket ATC18002) <only for IP65 type> | | |
| | Weight | | | 100g 3.527 oz (Pin type), 110g 3.880 oz (Screw terminal type) | | |

*Notes: 1) Unless otherwise specified, the measurement conditions at the maximum scale time standard are specified to be the rated operating voltage (within 5% ripple factor for DC), 20°C 68°F ambient temperature.
2) For the 1s range, the tolerance for each specification becomes ±10ms. When the power goes on, in rush current (0.3A) flows. Cautions should be taken. The minimum power supplying time after forced reset input is 2s or more.
3) Between contacts of different pools for PM4H-F8, PM4H-F11R types only.

## Time range

| Time range \ Time range unit | s range type | min range type |
|---|---|---|
| 1 | 0.04s to 1s | 0.04 min to 1 min |
| 5 | 0.2s to 5s | 0.2 min to 5 min |
| 10 | 0.4s to 10s | 0.4 min to 10 min |

## Product types

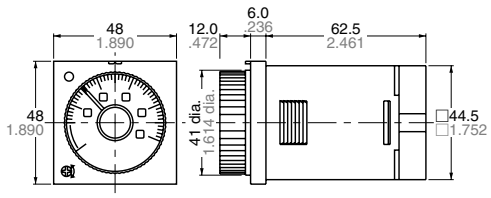
| Type | Operation mode | Contact arrangement | Time range | Protective construction | Rated operating voltage | Terminal type | Part number |
|---|---|---|---|---|---|---|---|
| PM4H-F8 | Power OFF-delay (without reset) | Relay Timed-out 2 Form C | 3 selectable time ranges over 1s to 10s | IP65 | 100 to 120V AC | 8 pins | PM4HF8-S-AC120VW |
| | | | | | 200 to 240V AC | 8 pins | PM4HF8-S-AC240VW |
| | | | | | 24V AC | 8 pins | PM4HF8-S-AC24VW |
| | | | | | 12V DC | 8 pins | PM4HF8-S-DC12VW |
| | | | | | 24V DC | 8 pins | PM4HF8-S-DC24VW |
| | | | 3 selectable time ranges over 1 min to 10 min | | 100 to 120V AC | 8 pins | PM4HF8-M-AC120VW |
| | | | | | 200 to 240V AC | 8 pins | PM4HF8-M-AC240VW |
| | | | | | 24V AC | 8 pins | PM4HF8-M-AC24VW |
| | | | | | 12V DC | 8 pins | PM4HF8-M-DC12VW |
| | | | | | 24V DC | 8 pins | PM4HF8-M-DC24VW |
| | | | 3 selectable time ranges over 1s to 10s | IP50 | 100 to 120V AC | 8 pins | PM4HF8-S-AC120V |
| | | | | | 200 to 240V AC | 8 pins | PM4HF8-S-AC240V |
| | | | | | 24V AC | 8 pins | PM4HF8-S-AC24V |
| | | | | | 12V DC | 8 pins | PM4HF8-S-DC12V |
| | | | | | 24V DC | 8 pins | PM4HF8-S-DC24V |
| | | | 3 selectable time ranges over 1 min to 10 min | | 100 to 120V AC | 8 pins | PM4HF8-M-AC120V |
| | | | | | 200 to 240V AC | 8 pins | PM4HF8-M-AC240V |
| | | | | | 24V AC | 8 pins | PM4HF8-M-AC24V |
| | | | | | 12V DC | 8 pins | PM4HF8-M-DC12V |
| | | | | | 24V DC | 8 pins | PM4HF8-M-DC24V |
| PM4H-F8R | Power OFF-delay (with instantaneous reset) | Relay Timed-out 1 Form C | 3 selectable time ranges over 1s to 10s | IP65 | 100 to 120V AC | 8 pins | PM4HF8R-S-AC120VW |
| | | | | | 200 to 240V AC | 8 pins | PM4HF8R-S-AC240VW |
| | | | | | 24V AC | 8 pins | PM4HF8R-S-AC24VW |
| | | | | | 12V DC | 8 pins | PM4HF8R-S-DC12VW |
| | | | | | 24V DC | 8 pins | PM4HF8R-S-DC24VW |
| | | | 3 selectable time ranges over 1 min to 10 min | | 100 to 120V AC | 8 pins | PM4HF8R-M-AC120VW |
| | | | | | 200 to 240V AC | 8 pins | PM4HF8R-M-AC240VW |
| | | | | | 24V AC | 8 pins | PM4HF8R-M-AC24VW |
| | | | | | 12V DC | 8 pins | PM4HF8R-M-DC12VW |
| | | | | | 24V DC | 8 pins | PM4HF8R-M-DC24VW |
| | | | 3 selectable time ranges over 1s to 10s | IP50 | 100 to 120V AC | 8 pins | PM4HF8R-S-AC120V |
| | | | | | 200 to 240V AC | 8 pins | PM4HF8R-S-AC240V |
| | | | | | 24V AC | 8 pins | PM4HF8R-S-AC24V |
| | | | | | 12V DC | 8 pins | PM4HF8R-S-DC12V |
| | | | | | 24V DC | 8 pins | PM4HF8R-S-DC24V |
| | | | 3 selectable time ranges over 1 min to 10 min | | 100 to 120V AC | 8 pins | PM4HF8R-M-AC120V |
| | | | | | 200 to 240V AC | 8 pins | PM4HF8R-M-AC240V |
| | | | | | 24V AC | 8 pins | PM4HF8R-M-AC24V |
| | | | | | 12V DC | 8 pins | PM4HF8R-M-DC12V |
| | | | | | 24V DC | 8 pins | PM4HF8R-M-DC24V |

| Type | Operation mode | Contact arrangement | Time range | Protective construction | Rated operating voltage | Terminal type | Part number |
|---|---|---|---|---|---|---|---|
| PM4H-F11R | Power OFF-delay (with instantaneous reset) | Relay Timed-out 2 Form C | 3 selectable time ranges over 1s to 10s | IP65 | 100 to 120V AC | 11 pins | PM4HF11R-S-AC120VW |
| | | | | | | Screw terminal | PM4HF11R-S-AC120VSW |
| | | | | | 200 to 240V AC | 11 pins | PM4HF11R-S-AC240VW |
| | | | | | | Screw terminal | PM4HF11R-S-AC240VSW |
| | | | | | 24V AC | 11 pins | PM4HF11R-S-AC24VW |
| | | | | | | Screw terminal | PM4HF11R-S-AC24VSW |
| | | | | | 12V DC | 11 pins | PM4HF11R-S-DC12VW |
| | | | | | | Screw terminal | PM4HF11R-S-DC12VSW |
| | | | | | 24V DC | 11 pins | PM4HF11R-S-DC24VW |
| | | | | | | Screw terminal | PM4HF11R-S-DC24VSW |
| | | | | IP50 | 100 to 120V AC | 11 pins | PM4HF11R-S-AC120V |
| | | | | | | Screw terminal | PM4HF11R-S-AC120VS |
| | | | | | 200 to 240V AC | 11 pins | PM4HF11R-S-AC240V |
| | | | | | | Screw terminal | PM4HF11R-S-AC240VS |
| | | | | | 24V AC | 11 pins | PM4HF11R-S-AC24V |
| | | | | | | Screw terminal | PM4HF11R-S-AC24VS |
| | | | | | 12V DC | 11 pins | PM4HF11R-S-DC12V |
| | | | | | | Screw terminal | PM4HF11R-S-DC12VS |
| | | | | | 24V DC | 11 pins | PM4HF11R-S-DC24V |
| | | | | | | Screw terminal | PM4HF11R-S-DC24VS |
| | | | 3 selectable time ranges over 1 min to 10 min | IP65 | 100 to 120V AC | 11 pins | PM4HF11R-M-AC120VW |
| | | | | | | Screw terminal | PM4HF11R-M-AC120VSW |
| | | | | | 200 to 240V AC | 11 pins | PM4HF11R-M-AC240VW |
| | | | | | | Screw terminal | PM4HF11R-M-AC240VSW |
| | | | | | 24V AC | 11 pins | PM4HF11R-M-AC24VW |
| | | | | | | Screw terminal | PM4HF11R-M-AC24VSW |
| | | | | | 12V DC | 11 pins | PM4HF11R-M-DC12VW |
| | | | | | | Screw terminal | PM4HF11R-M-DC12VSW |
| | | | | | 24V DC | 11 pins | PM4HF11R-M-DC24VW |
| | | | | | | Screw terminal | PM4HF11R-M-DC24VSW |
| | | | | IP50 | 100 to 120V AC | 11 pins | PM4HF11R-M-AC120V |
| | | | | | | Screw terminal | PM4HF11R-M-AC120VS |
| | | | | | 200 to 240V AC | 11 pins | PM4HF11R-M-AC240V |
| | | | | | | Screw terminal | PM4HF11R-M-AC240VS |
| | | | | | 24V AC | 11 pins | PM4HF11R-M-AC24V |
| | | | | | | Screw terminal | PM4HF11R-M-AC24VS |
| | | | | | 12V DC | 11 pins | PM4HF11R-M-DC12V |
| | | | | | | Screw terminal | PM4HF11R-M-DC12VS |
| | | | | | 24V DC | 11 pins | PM4HF11R-M-DC24V |
| | | | | | | Screw terminal | PM4HF11R-M-DC24VS |

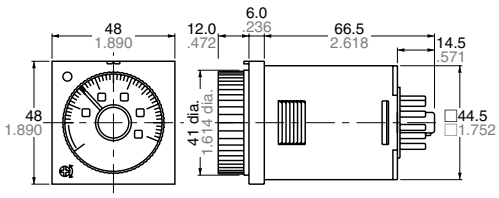
## Dimensions

mm inch
Toletance: ±0.5 ±.020

**• Screw terminal type (Flush mount)**

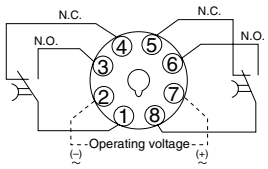



**• Pin type (Flush mount/surface mount)**



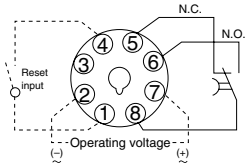
## Terminal layouts and wiring diagrams

- **PM4H-F8 (without reset input)**
  Pin type
  Time-out 2 Form C



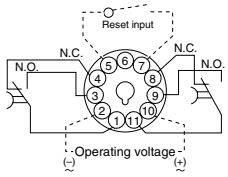

Screw-tightening pin type
The PM4H-F11R should be used for the time-limit 2C.

- **PM4H-F8R (with reset input)**
  Pin type
  Time-out 1 Form C, with reset input

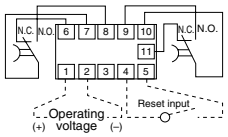



Screw-tightening pin type
The PM4H-F11R should be used for the time-limit 1C and to connect reset input.

- **PM4H-F11R (with reset input)**
  Pin type
  Time-out 2 Form C, with reset input

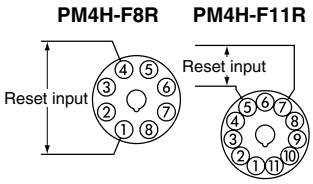



Screw terminal type
Time-out 2 Form C, with reset input



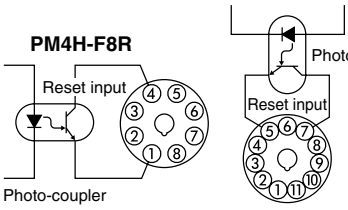

## PM4H-F (with reset) input conditions

**1. Contact input (pin type example)**




Use a contact with good contact reliability for the input. Contact bounce can lead to erroneous operation of the timer, so use a contact with short bounce time. Make the resistance between terminals for a short circuit less than 1k-ohms. Make the resistance between terminals for an open circuit greater than 100k-ohms.

**2. Non-contact input (pin type example)**

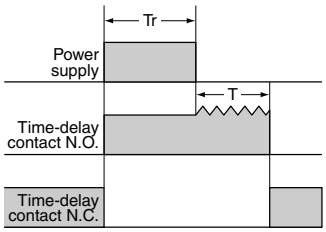



Be sure to use a photo-coupler for non-contact input.

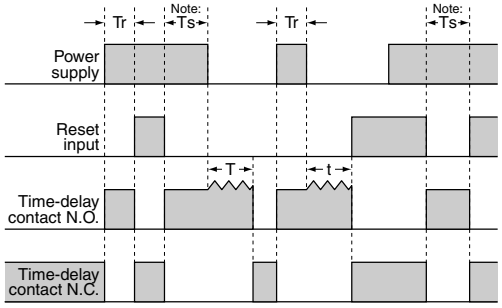
Check that Vce = 0.6V Max. when ON.

## Operation

**• PM4H-F8 (without reset input)**




**• PM4H-F8R/F11R (with reset input)**




Note: t<T: Time setting
Tr: Minimum power supply application time
Ts: Min. 2s (Time to restart operation after reset input is set to OFF: both second type and minute type)

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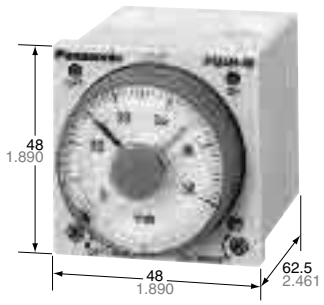
# DIN48 SIZE ANALOG MULTI-RANGE CYCLIC TWIN TIMERS

# PM4H-W






mm inch

**UL File No.: E122222**
**CSA File No.: LR39291**

## Features

- **A single twin timer unit that repeats (variable) ON/OFF.**
- **Multiple ranges with a 0.1 s to 500 h time specification on a single unit.**
- **The output ON/OFF operation is indicated by red and green LED's. It's easy to check the operation at a glance.**
- **The AC free power supply and shorter body make it easier to use.**
- **A new screw terminal type has been added to the conventional pin type. Wiring can be done easily with a screwdriver.**
- **Compliant with UL, CSA, CE and LLOYD.**

## Specifications

| Item \ Type | | | PM4H-W |
|---|---|---|---|
| Rating | Rated operating voltage | | 100 to 240V AC, 48 to 125V DC, 12V DC, 24V AC/DC |
| | Rated frequency | | 50/60Hz common (AC operating type) |
| | Rated power consumption | | Approx. 10VA (100 to 240V AC)<br>Approx. 2.5VA (24V AC)<br>Approx. 1.5W (12V DC, 24V DC, 48 to 125V DC) |
| | Rated control capacity | | 5A 250V AC (resistive load) |
| | Operation mode | | Cyclic (OFF-start/Twin operation) |
| | Time range | | 1s to 500h 16 time ranges switchable ($T_1$, $T_2$ time setting individually) |
| Time accuracy Note:1) | Operation time fluctuation | | ±0.3% (power off time change at the range of 0.3s to 1h) |
| | Setting error | | ±5% (Full-scale value) |
| | Voltage error | | ±0.5% (at the operating voltage changes between 85 to 110%) |
| | Temperature error | | ±2% (at 20°C ambient temp. at the range of –10 to +50°C +14 to 122°F) |
| Contact | Contact arrangement | | Timed-out 2 Form C |
| | Contact resistance (Initial value) | | Max. 100mΩ (at 1A 6V DC) |
| | Contact material | | Silver alloy |
| Life | Mechanical (contact) | | $2\times10^7$ |
| | Electrical (contact) | | $10^5$ (at rated control capacity) |
| Electrical function | Allowable operating voltage range | | 85 to 110% of rated operating voltage (at 20°C coil temp.) |
| | Insulation resistance (Initial value) | | Min. 100MΩ (At 500V DC)<br>Between live and dead metal parts<br>Between input and output<br>Between contacts of different poles<br>Between contacts of same pole |
| | Breakdown voltage (Initial value) | | 2,000Vrms for 1 min Between live and metal parts<br>2,000Vrms for 1 min Between input and output<br>2,000Vrms for 1 min Between contacts of different poles<br>1,000Vrms for 1 min Between contacts of same pole |
| | Min. power off time | | 300ms |
| | Max. temperature rise | | 55°C 131°F |
| Mechanical function | Vibration resistance | Functional | 10 to 55Hz: 1 cycle/min double amplitude of 0.25mm (10min on 3 axes) |
| | | Destructive | 10 to 55Hz: 1 cycle/min double amplitude of 0.375mm (1h on 3 axes) |
| | Shock resistance | Functional | Min. 98m/s² (4 times on 3 axes) |
| | | Destructive | Min. 980m/s² (5 times on 3 axes) |
| Operating condition | Ambient temperature | | –10 to +50°C +14 to +122°F |
| | Ambient humidity | | 30 to 85%RH (non-condensing) |
| | Atmospheric pressure | | 860 to 1,060hPa |
| | Ripple factor (DC type) | | 20% |
| Others | Protective construction | | IP65 on front panel (using rubber gasket ATC18002) <only for IP65 type> |
| | Weight | | 120g 4.233 oz (Pin type), 130g 4.586 oz (Screw terminal type) |

Notes: 1) Unless otherwise specified, the measurement conditions at the maximum scale time standard are specified to be the rated operating voltage (within 5% ripple factor for DC), 20°C 68°F ambient temperature, and 1s power off time.
2) For the 1s range, the tolerance for each specification becomes ±10ms.
3) As internal components may become worn when using continuous conduction, the product should be replaced periodically.

## Time range

All types of PM4H-W timer have multi-time range.
16 time ranges are selectable.
1s to 500h (Max. range) is controlled.

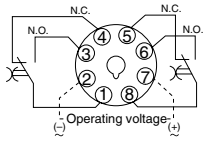
| Scale \ Time unit | | sec | min | hrs | 10h |
|---|---|---|---|---|---|
| 1 | Control time range | 0.1s to 1s | 0.1 min to 1 min | 0.1h to 1h | 1.0h to 10h |
| 5 | | 0.5s to 5s | 0.5 min to 5 min | 0.5h to 5h | 5h to 50h |
| 10 | | 1.0s to 10s | 1.0 min to 10 min | 1.0h to 10h | 10h to 100h |
| 50 | | 5s to 50s | 5 min to 50 min | 5h to 50h | 50h to 500h |

## Product types

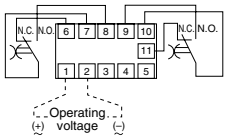
| Type | Operating mode | Contact arrangement | Time range | Protective structure | Rated Operating voltage | Terminal type | Part number |
|---|---|---|---|---|---|---|---|
| **PM4H-W Twin timer** | Cyclic (OFF-start, Twin) | Relay Timed-out 2 Form C | 16 selectable ranges (1s to 500h) | IP65 | 100 to 240V AC | 8 pins | PM4HW-H-AC240VW |
| | | | | | | Screw terminal | PM4HW-H-AC240VSW |
| | | | | | 48 to 125V DC | 8 pins | PM4HW-H-DC125VW |
| | | | | | | Screw terminal | PM4HW-H-DC125VSW |
| | | | | | 24V AC/DC | 8 pins | PM4HW-H-24VW |
| | | | | | | Screw terminal | PM4HW-H-24VSW |
| | | | | | 12V DC | 8 pins | PM4HW-H-DC12VW |
| | | | | | | Screw terminal | PM4HW-H-DC12VSW |
| | | | | IP50 | 100 to 240V AC | 8 pins | PM4HW-H-AC240V |
| | | | | | | Screw terminal | PM4HW-H-AC240VS |
| | | | | | 48 to 125V DC | 8 pins | PM4HW-H-DC125V |
| | | | | | | Screw terminal | PM4HW-H-DC125VS |
| | | | | | 24V AC/DC | 8 pins | PM4HW-H-24V |
| | | | | | | Screw terminal | PM4HW-H-24VS |
| | | | | | 12V DC | 8 pins | PM4HW-H-DC12V |
| | | | | | | Screw terminal | PM4HW-H-DC12VS |

## Terminal layouts and wiring diagrams

**Pin Type**
Cyclic timed-out relay contact: 2C



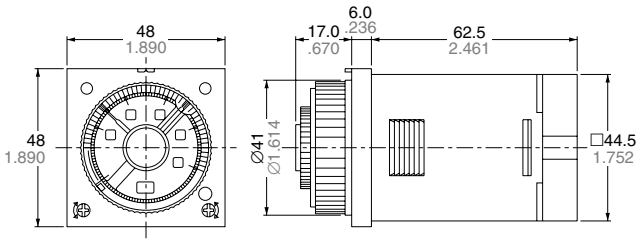

**Screw terminal type**
Cyclic timed-out relay contact: 2C



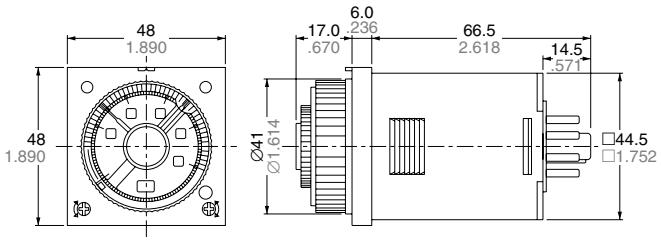

## Dimensions

mm inch
Toletance: ±0.5 ±.020

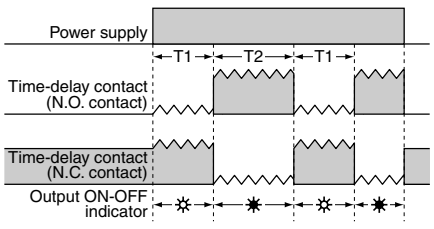
**• Screw terminal type: M3.5**




**• Pin type**




## Operation




☼: Output OFF indicator (green)
✷: Output ON indicator (orange)
T1: OFF set time
T2: ON set time

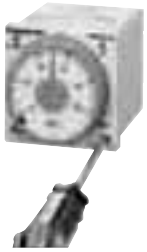
# PM4H SERIES MODES AND TIME SETTING



**1. Operation method**

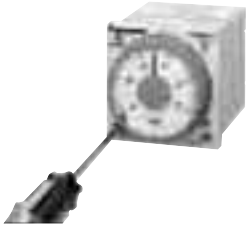
**1) Operation mode setting [PM4H-A type]**

8 operation modes are selectable with operation mode selector.
Turn the operation mode selector with screw driver.
Operation mode is shown up through the window above the mode selector. The marks are ⓞⓝ, Ⓕⓛ, ⓕⓞ, ⓞⓕⓛ, Ⓢⓕ, ⓞⓢ, ⓞⓕⓩ, ⓞⓒ.
Turn the mode selector to the mark until you can check by clicking sound.
Confirm the mode selector position if it is correct.
If the position is not stable, the timer might mis-operate.



**2) Time range setting [PM4H series common]**

16 time ranges are selectable between 1s to 500h.
Turn the time range selector with the screw driver.
Clockwise turning increases the time range, and Counter-clockwise turning decrease the time range.
Confirm the range selector position if it is correct.
If the position is not stable, the timer might mis-operate.



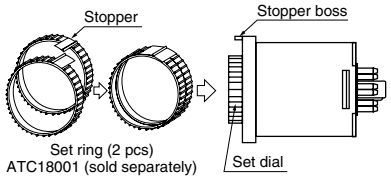
**3) Time setting [common]**

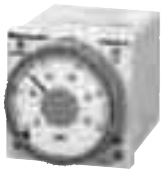
To set the time, turn the set dial to a desired time within the range.
Instantaneous output will be on when the dial is set to “0”.
When the instantaneous output is used, the dial should be set under “0” range. (Instantaneous output area)
When power supply is on, the time range, setting time and operation mode cannot be changed.
Turn off the power supply or a reset signal is applied to set the new operation mode.
If the position is not stable, the timer might mis-operate.

**2. How to use “Set ring” [PM4H series common]**

**1) Fixed time setting**

Set the desired time and put 2 set rings together.
Insert the rings into stopper to fix the time.



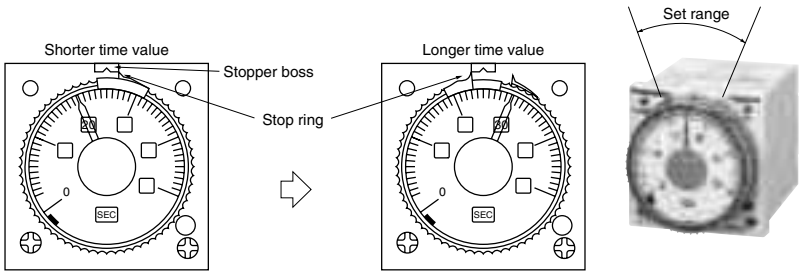



**2) Time range setting**

Example: Time range 20s to 30s.

① Shorter time value setting
Set the dial to 20s.
Place the stop ring at the right side of stopper.

② Longer time value setting
Set the dial to 30s.
Place the stop ring at the left side of stopper.




Note) The stoppers for the lower limit setting set ring and the upper limit setting set ring face the opposite directions.

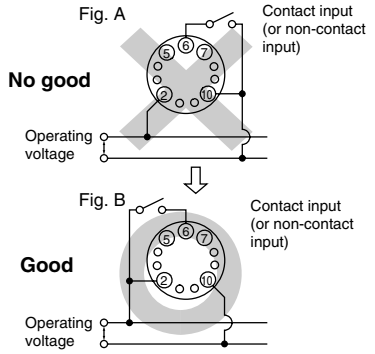
## Applicable standard (PM4H series common)

| Safety standard | EN61812-1 | 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<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 | 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 | 2 kV (power supply line)<br>1 kV (signal line) |
| | Surge immunity | EN61000-4-5 | 1 kV (power 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) |
| | Voltage dip/Instantaneous stop/Voltage fluctuation immunity | EN61000-4-11 | 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

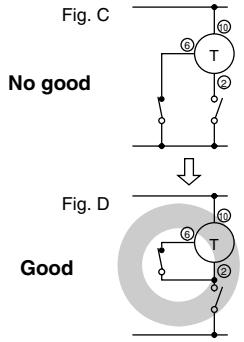
# PRECAUTIONS IN USING THE PM4H SERIES

**1. Input connections (PM4H-A type)**

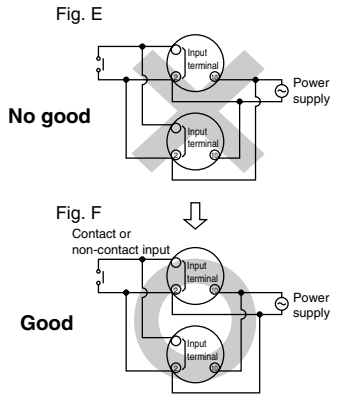
1) Be sure not to use terminal ⑩ as the common terminal of the input signal as shown in Fig. A. Otherwise, the internal circuit of the timer may be damaged. Use terminal ② as the common terminal as shown in Fig. B.




If the circuits is connected as in Fig. C, the internal circuits must be broken. Be sure to connect the circuit as in Fig. D.




2) When one input signal is simultaneously applied to more than one timer, be sure to avoid the wiring shown in Fig. E. Otherwise, the short-circuit current will flow and cause damage. Be sure to align the polarity of the power supply as shown in Fig. F.




3) Terminal ②-⑥ (screw terminal 2-3) should be connected as the start input. Connect terminals ②-⑦ (screw terminal 2-4) for reset signal input. Connect terminals ②-⑤ (screw terminal 2-5) for stop signal input. Be sure not to connect with other terminals and apply excessive voltage. The internal circuit will be damaged.

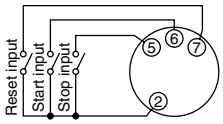
4) The input wiring other than the power supply circuit should avoid these conditions, high-voltage wiring and parallel wiring with power wire. Wire in short with using the shielding wire or metal wiring tube.

5) For start, reset and stop input, use gold-plated contact with high reliability. Since contact bouncing causes errors in the start, use an input contact less bounce time.

6) Keep the minimum signal input time over 0.05 s.

**2. Input signal conditions (PM4H-A type)**

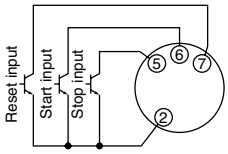
1) Connection of contact input (Pin type example




Use gold-plated contacts with high-reliability. The bounce time at the contacts causes errors in the timer operation time. Accordingly, use start input contact whose bounce time is short. The resistance when shorted should be less than 1kΩ, and when open resistance should be more than 100kΩ.

For the screw terminal type, connect the terminal 2 to the each input signal.

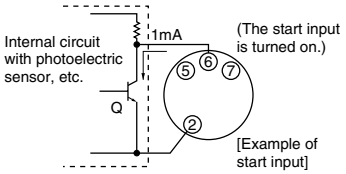
2) Connection of non-contact input (Pin type example)
(open-collector)




Apply the open-collector connection. The characteristics of the transistor used must be $V_{CEO}$=10V or more, $I_C$=10mA or more, and $I_{CBO}$=6μA or less. Additionally, the input impedance must be 1kΩ or less, and the residual voltage must be 0.6V or less.

For the screw terminal type, connect the terminal 2 to the each input signal.

3) Connection of non-contact input (Pin type example)
(voltage input)




Even if the open collector is not used, input is also possible from the non-contact circuit of 6 to 30V DC. In this case, the start input is turned on when the signal is turned from H to L.

The residual voltage must be 0.6V or less when Q is on. On the AC type, an insulated transformer is required as the power supply for the photoelectric sensor, etc. (power supply for the input devices).

Note: Keep the minimum input signal time of each signal to 0.05s or more.

**3. Checking the contacts before use (PM4H-F only)**

When the power ON time is less than the minimum power application time, the contacts may remain in an ON state, so the state of the contacts should be checked before use. When the contacts are in an ON state, activating them once will return them to their normal state (the OFF state after time-out). (Be aware that relay characteristics may result in the contacts being in that same ON state if exposed to excessive vibration and impact during transport.)

**4. Time setting**

To set the time, turn the set dial to a desired time within the range.

Instantaneous output will be on when the dial is set to “0”.

When the instantaneous output is used, the dial should be set under “0” range. (Instantaneous output area)

Note) When power supply is on, the time range, setting time and operation mode cannot be changed.

Turn off the power supply or a reset signal is applied to set the new operation mode.

If the position is not stable, the timer might mis-operate.

**5. Superimposed surge of power supply (PM4H series common)**

For the superimposed surge of power supply, the standard waveform is taken as the standard value for surge-proof voltage.

If external surge occurs exceeding the specified value, the internal circuit may break down. In this case, use a surge absorption element.

| Operation voltage | Surge voltage |
|---|---|
| 100 to 240V AC<br>100 to 120V AC<br>200 to 240V AC<br>48 to 125V DC | 4,000V |
| 12V DC, 24V DC<br>24V AC/DC | 500V |

The positive and negative voltages are applied each five times between the power pins.

The typical surge absorption elements include a varistor, a capacitor, and a diode. If a surge absorption element is used, use an oscilloscope to see whether or not the foreign surge exceeding the specified value appears.

**6. Acquisition of CE marking**

Please abide by the conditions below when using in applications that comply with EN61812-1.

1) Overvoltage category III, pollution level 2

2) This timer employs a power supply without a transformer, so the power and input signal terminals are not insulated. (PM4H-A only)

(1) When a sensor is connected to the input circuit, install double insulation on the sensor side.

(2) In the case of contact input, use dual-insulated relays, etc.

3) The load connected to the output contact should have basic insulation.

This timer is protected with basic insulation and can be double-insulated to meet EN/IEC requirements by using basic insulation on the load.

4) Please use a power supply that is protected by an overcurrent protection device which complies with the EN/IEC standard (example: 250 V 1 A fuse, etc.).

5) You must use a terminal socket or socket for the installation. Do not touch the terminals or other parts of the timer when it is powered. When installing or un-installing, make sure that no voltage is being applied to any of the terminals.

6) Do not use this timer as a safety circuit. For example when using a timer in a heater circuit, etc., provide a protection circuit on the machine side.

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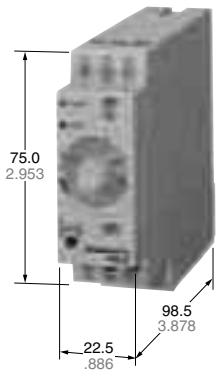
# DIN 24 SIZE MULTI-RANGE ANALOG TIMER

# PM5S-A
# PM5S-S
# PM5S-M




mm inch

**C-UL File No.: E59504 (Vol. 3)**

## Features

- **24-240V AC/DC free-voltage input**
- **Built-in Screw terminals**
- **6 different operation modes: (PM5S-A)**
- **Multiple time ranges — 1 s to 500 h (Max.)**
- **Slim body — DIN 22.5 mm .886 inch**
- **0 setting instantaneous output operation.**
- **UL/C-UL/CE approval.**



## Product types

| Type | Operation mode | Contact arrangement | Time range | Protective construction | Rated operating voltage | Part number |
|---|---|---|---|---|---|---|
| **PM5S-A** | 6 operation modes<br>• Pulse ON-delay<br>• Pulse Flicker<br>• Pulse ON-flicker<br>• Signal OFF-delay<br>• Pulse One-shot<br>• Pulse One-cycle | Relay<br>Timed-out<br>2 Form C | 16 selectable ranges<br>1s to 500h | IP40 | 24 to 240V AC/DC | PM5S-A-24-240V |
| **PM5S-S** | Power ON-delay | Relay<br>Timed-out<br>2 Form C | | | | PM5S-S-24-240V |
| **PM5S-M** | 6 operation modes<br>(With instantaneous contact)<br>• Pulse ON-delay<br>• Pulse Flicker<br>• Pulse ON-flicker<br>• Signal OFF-delay<br>• Pulse One-shot<br>• Pulse One-cycle | Relay<br>Timed-out<br>1 Form C<br>Instantaneous<br>1 Form C | | | | PM5S-M-24-240V |

Note: PM5S-M timer will be released soon.

## Time range

| Scale \ Time unit | | sec | min | hrs | 10h |
|---|---|---|---|---|---|
| 1 | Control time range | 0.1s to 1s | 0.1 min to 1 min | 0.1h to 1h | 1.0h to 10h |
| 5 | | 0.5s to 5s | 0.5 min to 5 min | 0.5h to 5h | 5h to 50h |
| 10 | | 1.0s to 10s | 1.0 min to 10 min | 1.0h to 10h | 10h to 100h |
| 50 | | 5s to 50s | 5 min to 50 min | 5h to 50h | 50h to 500h |

Note: 0 setting is for instantaneous output operation.

PM5S-A/PM5S-S/PM5S-M
All types of PM5S timer have multi-time range.
16 time ranges are selectable.
1s to 500h (Max. range) is controlled.

## Specifications

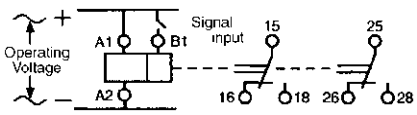
| Item | | Type | PM5S-A | PM5S-S | PM5S-M |
|---|---|---|---|---|---|
| Rating | Rated operating voltage | | 24 to 240V AC/DC | | |
| | Rated frequency | | 50/60Hz common | | |
| | Rated power consumption | | 2.6 VA (AC), 1.4 W (DC) | | |
| | Rated control capacity | | 5A 250V AC (resistive load) | | |
| | Operating mode | | Pulse ON-delay<br>Pulse Flicker<br>Pulse ON-Flicker<br>Signal OFF-delay<br>Pulse One-shot<br>Pulse One-cycle | Power ON-delay | Pulse ON-delay<br>Pulse Flicker<br>Pulse ON-flicker<br>Signal OFF-delay<br>Pulse One-shot<br>Pulse One-cycle<br>(with instantaneous contact) |
| | Time range | | 1s to 500h (Max.) 16 time ranges switchable | | |
| Time accuracy Note:1) | Operating time fluctuation | | ±0.3% (power off time change at the range of 0.1s to 1h) | | |
| | Setting error | | ±10% (Full-scale value) | | |
| | Voltage error | | ±0.5% (at the operating voltage changes between 85 to 110%) | | |
| | Temperature error | | ±2% (at 20°C ambient temp. at the range of –10 to +55°C +14 to +131°F) | | |
| Contact | Contact arrangement | | Timed-out 2 Form C | | Timed-out 1 Form C<br>Instantaneous 1 Form C |
| | Contact resistance (Initial value) | | Max. 100mΩ (at 1A 6V DC) | | |
| | Contact material | | Silver alloy | | Au flash on Silver alloy |
| Life | Mechanical (contact) | | $2\times10^7$ | | $1\times10^7$ |
| | Electrical (contact) | | $10^5$ (at rated control capacity) | | |
| Electrical function | Allowable operating voltage range | | 85 to 110% of rated operating voltage (at 20°C coil temp.) | | |
| | Insulation resistance (Initial value) | | Min. 100MΩ | Between live and dead metal parts<br>Between input and output<br>Between contacts of different poles<br>Between contacts of same pole | (At 500V DC) |
| | Breakdown voltage (Initial value) | | 2,000Vrms for 1 min Between live and dead metal parts<br>2,000Vrms for 1 min Between input and output<br>2,000Vrms for 1 min Between contacts of different poles<br>1,000Vrms for 1 min Between contacts of same pole | | |
| | Min. power off time | | 100ms | | |
| | Max. temperature rise | | 55°C 131°F | | 65°C 149°F |
| Mechanical function | Shock resistance | Functional | Min. 98m/s² (4 times on 3 axes) | | |
| | | Destructive | Min. 980m/s² (5 times on 3 axes) | | |
| | Vibration resistance | Functional | 10 to 55Hz: 1 cycle/min Single amplitude of 0.35mm (10min on 3 axes) | | |
| | | Destructive | 10 to 55Hz: 1 cycle/min Single amplitude of 0.75mm (1h on 3 axes) | | |
| Operating condition | Ambient temperature | | –10 to +55°C +14 to +131°F | | |
| | Ambient humidity | | Max. 85%RH (non-condensing) | | |
| | Atmospheric pressure | | 860 to 1,060hPa | | |
| | Ripple factor (DC) | | 20% | | |
| Others | Protective construction | | IP40 | | |
| | Weight | | 120g 4.233 oz | | |

Note: 1) Unless otherwise specified, the measurement conditions at the maximum scale time standard are specified to be the rated operating voltage (within 5% ripple factor for DC), 20°C 68°F ambient temperature, and 1s power off time.
2) For the 1s range, the tolerance for each specification becomes ±10ms.

## Terminal layouts and wiring diagrams

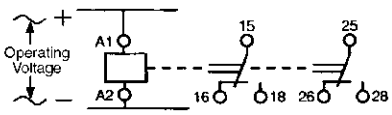
**PM5S-A**

• Timed-out 2 Form C



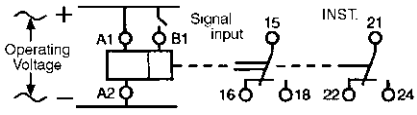

**PM5S-S**

• Timed-out 2 Form C

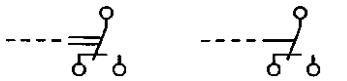



**PM5S-M**

• Timed-out 1 Form C
• Instantaneous 1 Form C

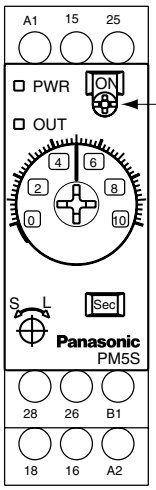



**Contact**



## Mode selection

**PM5S-A/M type**




Operation mode indicator
Selectable from 8 operation modes
ON: ON-delay
FL: Flicker
FO: ON-flicker
SF: Signal OFF-delay
OS: Pulse One-shot
OC: Pulse One-cycle

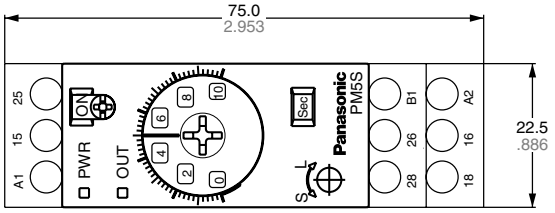
The 6 operation modes of PM5S-A and PM5S-M can be selected by the operation mode selector switch. In the next pages the different modes will be explained.

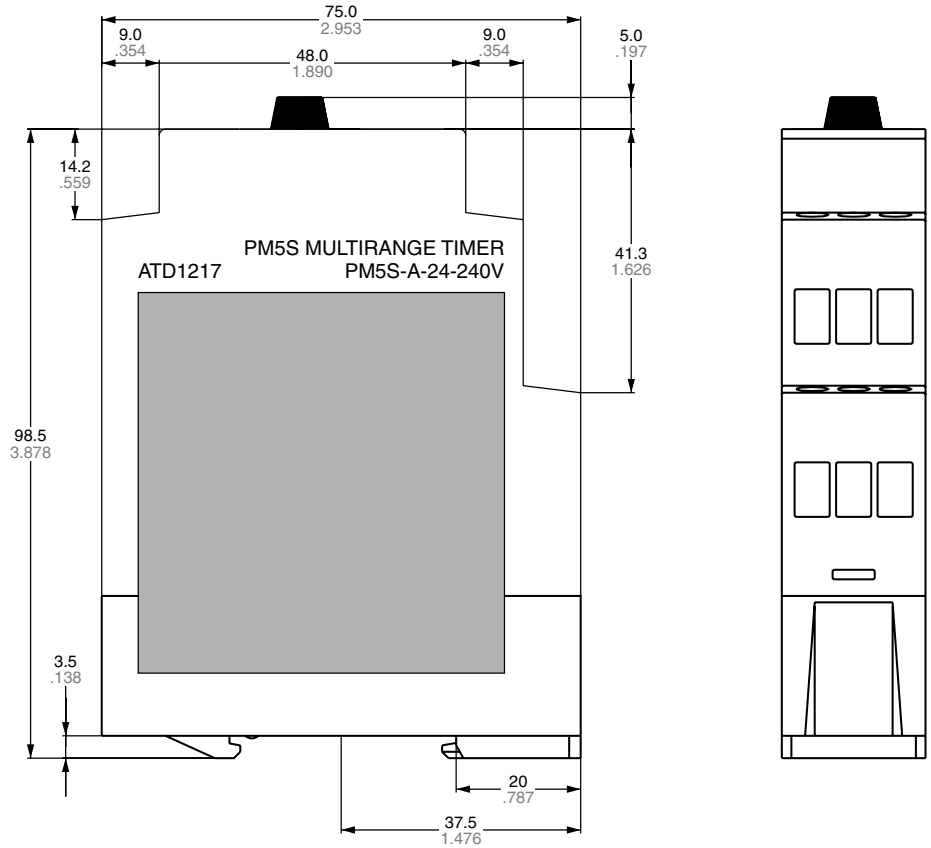


## Dimensions

mm inch

**PM5S-□**

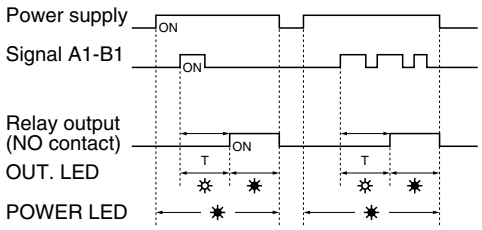
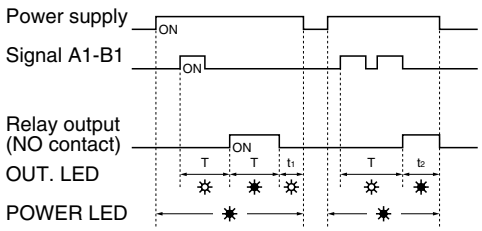
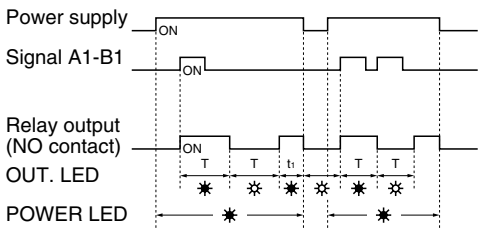
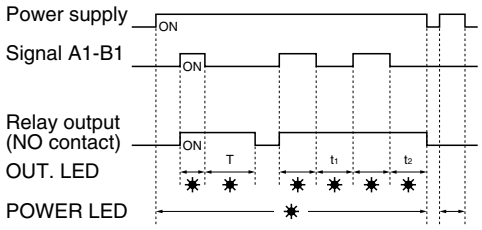
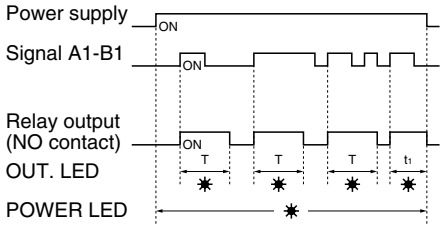


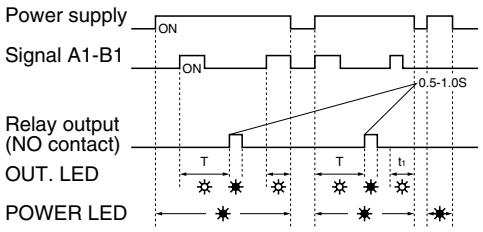
## Operation mode

### PM5S-A/M

(✱ LED lighting ✲ LED flickering
T: Setting time $t_1$, $t_2$<T)

| Operation type | Operation | Time chart |
|---|---|---|
| **ON-delay** ON | Turn the operation selector to ON.<br>Timing operation starts when terminals A1 – B1 are connected while power is on. Control output is turned on after the set time regardless of duration of operation signal |  |
| **Flicker** FL | Turn the operation selector to FL.<br>Timing operation starts when terminals A1 – B1 are connected while power is on. Control output repeatedly turn OFF and ON regardless of operation signal input time. |  |
| **ON-flicker** FO | Turn the operation selector to FO.<br>Timing operation starts when terminals A1 – B1 are connected while power is on. Control output repeatedly turns ON and OFF regardless of operation signal input time. |  |
| **Signal OFF-delay** SF | Turn the operation selector to SF.<br>Timing operation starts when terminals A1 – B1 are opened while power is on. Control output is turned off after the set time.<br>If the signal input turns OFF during timing operation, the timing operation starts at that point again. |  |
| **One-shot** OS | Turn the operation selector to OS.<br>Timing operation starts when terminals A1 – B1 are connected while power is ON.<br>Control output continues ON state while timing operation. |  |

Note: Keep 0.1s or more for power off time.
Keep 0.05s or more for signal, input time.

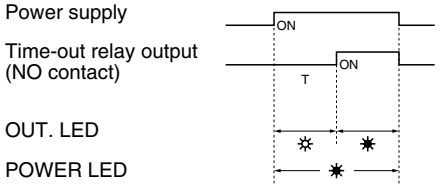
| Operation type | Operation | Time chart |
|---|---|---|
| **One-cycle** OC | Turn the operation selector to OC.<br>Timing operation starts when terminals A1 – B1 are connected while power is ON.<br>Control output is turned on after the set time, the pulse is 0.5 to 1.0 s. |  |

Note: Keep 0.1s or more for power off time.
Keep 0.05s or more for signal, input time.



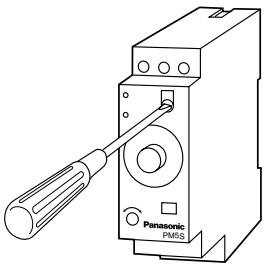
## PM5S-S

(✷ LED lighting ✲ LED flickering
T: Setting time)

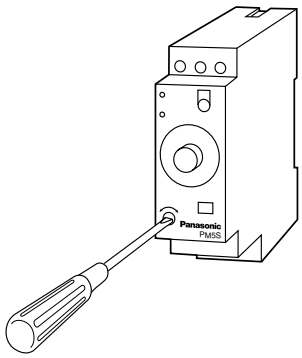
| Operation type | Operation | Time chart |
|---|---|---|
| **Power ON-delay** | When power is applied continuously, the time cycle begins. The output contacts change state after the time delay is completed. |  |

# Modes and time setting

**1) Operation mode setting [PM5S-A]**
6 operation modes are selectable with operation mode selector.
Turn the operation mode selector with screw driver.
Operation mode is shown up through the window above the mode selector. The marks are ON, FL, FO, SF, OS, OC. Turn the mode selector to the mark until you can check by clicking sound.
Confirm the mode selector position if it is correct.
If the position is not stable, the timer might mis-operate.




**2) Time setting [common]**
16 time ranges are selectable between 1s to 500h.
Turn the time range selector with the screw driver.
Clockwise turning increases the time range, and Counter-clockwise turning decrease the time range.
Confirm the range selector position if it is correct.




**3) Time setting [common]**
To set the time, turn the set dial to a desired time within the range.
Instantaneous output will be on when the dial is set to “0”.
When the instantaneous output is used, the dial should be set under “0” range. (Instantaneous output area)
When power supply is on, the time range, setting time and operation mode cannot be changed.
Turn off the power supply is applied to set the new operation mode.
To set the time in the range, turn the dial to a desired time scale. Do not turn the dial beyond the stopper.

**• Cautions for Time setting/Operating mode setting**

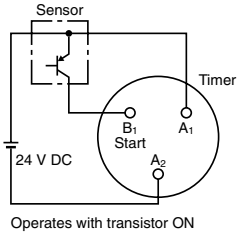
1) Time chart
• T shots setting time, t1 and t2 means the time in setting time. (t1, t2<T)
• When the output relay is turned on, No contact is closed and NC contact is opened.
• LED indication ✷ shows “Turn ON”

2) Timing opera- tion starts when power is applied to terminals A1 – B1
Input signal time should be taken over 0.05 sec.
Short-circuited condition: Max. 1kΩ
Open-circuited condition: Min. 100kΩ

## Input connections

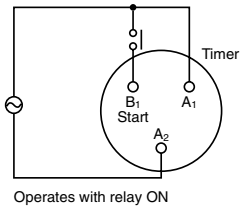
The inputs of the PM5S-A/M are voltage (voltage imposition or open) inputs.

No-contact input
(Connection to PNP output sensor.)




Operates with transistor ON

Contact input



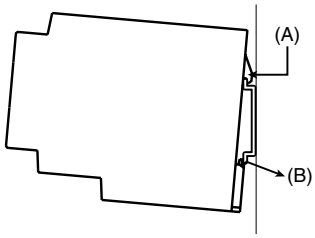

Operates with relay ON

**Voltage Input Signal Levels**

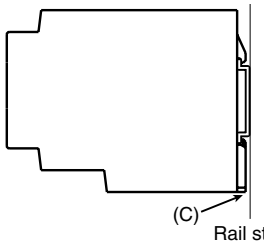
| | |
|---|---|
| No-contact input | 1. Transistor ON<br>Residual voltage: 1 V max.<br>(Voltage between terminals $B_1$ and $A_2$ must be more than the rated "H-level" voltage (20.4 V DC min.).) |
| | 2. Transistor OFF<br>Leakage current: 0.01 mA max.<br>(Voltage between terminals $B_1$ and $A_2$ must be less than the rated "L-level" voltage (2.5 V DC max.).) |
| Contact input | Use contacts that can adequately switch 0.1 mA at each voltage to be imposed. (When the contacts are ON or OFF, voltage between terminals $B_1$ and $A_2$ must be within the following ranges:<br>When contacts are ON: 20.4 to 264 V AC/DC<br>When contacts are OFF: 0 to 2.5 V AC/DC |

## Mounting and dismounting

The PM5S should be mounted as horizontally as possible. When mounting the PM5S on a socket mounting track, hook portion (A) of the Timer to an edge of the track first, and then depress the Timer in the direction of (B).




When dismounting the PM5S pull out portion (C) with a flat-blade screwdriver and remove the Timer from the mounting track.




## Cautions for use

**Cautions**

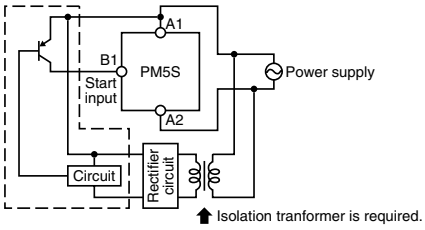
1) Prevent using the timer in such places where flammable or corrosive gas is generated, a lot of dust exisits, oil is splashed or considerable shock and vibration occur.

2) Since the body cover is consisted of polycarbonate resin, prevent from contact with organic solvents such as methyl alcohol, benzine and thinner, or strong alkali materials such as ammonia and caustic soda.

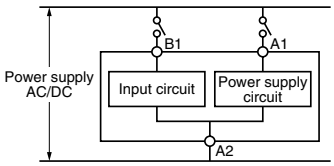
## Power supplies

The PM5S Series is provided with a transformerless power supply system. An electric shock may be received if the input terminal or the output type selector switch is touched while power is being supplied.
Use the bar terminal for wiring the PM5S. Using a stranded-wire terminal may cause a short-circuit due to a stray wire entering into the Timer.

For the power supply of the input device, use a single-phase or double-phase insulated power transformer. The second-phase side must not be grounded.




• Input and Power supply circuit (PM5S-A/M)




• Since input circuit and power supply circuit is independent, it is possible to switch ON and OFF for input circuit regardless power ON and OFF.
Note that the contact of input circuit is given same voltage as power voltage.

## Terminal connections

• Refer to the terminal layout and wiring diagram and securely connect the terminals accordingly.
• Do not allow control output to exceed rated control capacity.

1. When one input signal is simultaneously applied to more than one timer, be sure to avoid the wiring shown in Fig. A. Otherwise, the short-circuit current will flow and cause damage. Be sure to align the polarity of the power supply as shown in Fig. B.

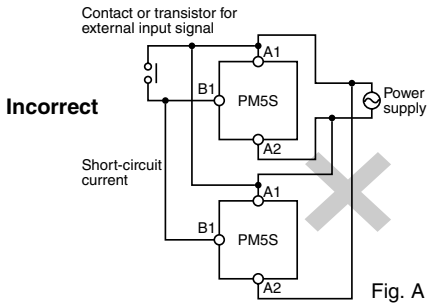



Fig. A

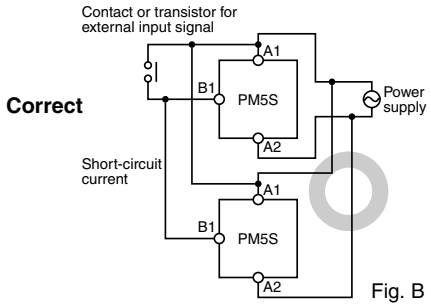


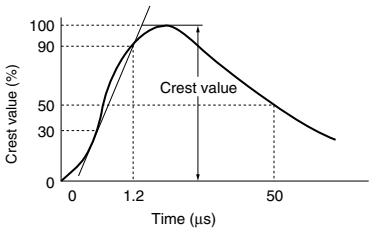

Fig. B

The PM5S series is provided with a transformer less power supply system.

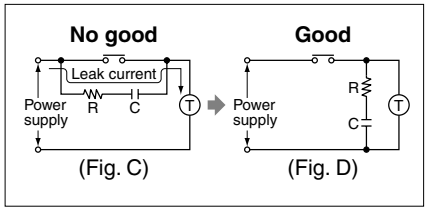
2. External surge protection may be required if the following values are exceeded. Otherwise, the internal circuit will be damaged.

| | |
|---|---|
| Operating voltage | 24 to 240 V AC |
| Surge voltage | 4,000 V |

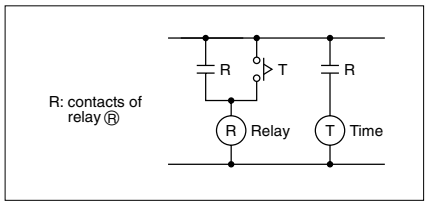
Surge wave form [±(1.2 50)μs single polarity full wave voltage]




3. For connecting and disconnecting operating voltage to the timer, a circuit should be used to prevent the flow of leakage current. For example, a circuit for contact protection as shown in Fig. C will permit leakage current to flow through R and C, causing erroneous operation of the timer. Instead, the circuit shown in Fig. D should be used.




4. In order to maintain the characteristics of the timer, long continuous current flow through the timer, causing generation of heat internally should be avoided because of the degradation it can cause. For such long continuous operation, the circuit shown below should be used.



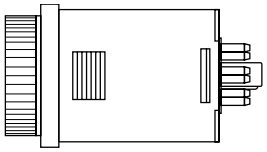
# INSTALLING DIN SIZE TIMER



## Installations

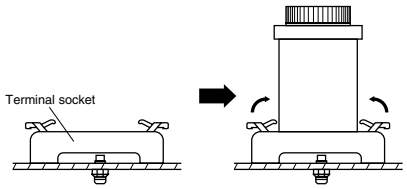
**1. Surface mount**

1) For the timers of PM4H and LT4H series, use the pin type timer. With the PM4S and QM4H series, only pin-type timers are available.

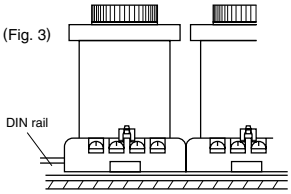


2) Put the terminal socket on the board directly or put it on the DIN rail (Fig. 1).
3) Insert the timer into the terminal socket and fix it with clip (Fig. 2)
4) On DIN rail mounting, mount the timer on the DIN rail tightly to get the proper dimension (Fig. 3).

(Fig. 1) (Fig. 2)



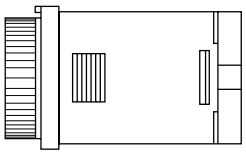

(Fig. 3)




5) 8-pin type should be connected with terminal socket (AT8-DF8K). 11-pin type should be connected with terminal socket (AT8-DF11K).
6) DIN rail (AT8-DLA1) is also available (1 m).

**2. Flush mount**

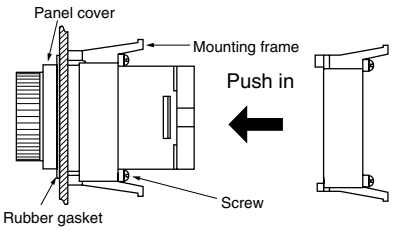
1) For the timers of PM4H and LT4H series, it is recommended to use the built-in screw terminal type for flush mount. (Mounting frame and rubber gasket are provided when timer is shipped.)



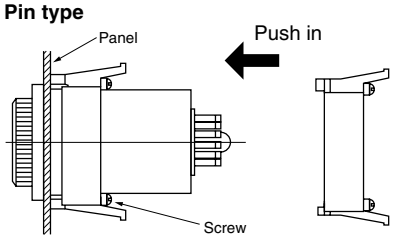
If the pin type is used, the mounting frame (AT8-DA4) and rubber gasket (ATC18002 for surface waterproofing) that are available at extra costs are necessary. If the pin connection socket is the 8-pin type, use the 8P cap (AD8-RC); or if it is the 11-pin type, use the 11P cap (AT8-DP11).

2) How to mount the timer
From the panel front, pass the timer through the square hole. Fit the mounting frame from the rear, and then push it in so that the clearance between the mounting frame and the panel surface is minimized. In addition, lock the mounting frame with a screw.

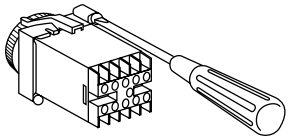
**• Screw terminal type**



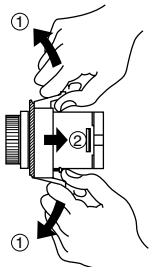

**• Pin type**



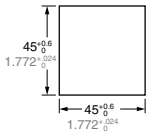

3) Caution in mounting the timer
• PM4H, and LT4H series
ⓐ If the PM4H and the LT4H series are used as the waterproof types, tighten the reinforcing screws on the mounting frames so that the timers, the rubber gaskets, and the panel surfaces are tightly contacted with each other. (Tighten the two screws with uniform force and make sure that there is no rattling. If the screws are tightened too excessively, the mounting frame may come off.)
ⓑ If the timer is installed with the panel cover and the rubber gasket removed, the waterproofing characteristic is lost.
4) Installation
Loosen the screws on the mounting frame, spread the edge of frame and remove it.



Pull the mounting frame backward while spreading out its hooks with your thumbs and index fingers.

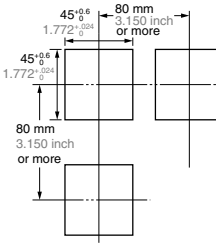



5) Correctly connect the pins while seeing the pin connection diagram.
Tighten the terminal screws with a torque of 0.8 N·cm or less. The screws are M3.5. (screw-tightened terminal type)
6) If the pin type is used, the rear terminal block (ATC78041) or the 8P cap (AD8-RC) is necessary to connect the pins. For the 11-pin type, use the rear terminal block (ATC78051) or the 11P cap (AT8-DP11) and avoid directly soldering the round pins on the timer.
7) Panel cutout dimensions

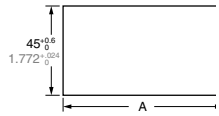



The standard panel cutout dimensions are shown in the left figure (Panel thickness: 1 to mm .039 to .197 inch)

8) Although the timers can be mounted adjacent to each other in this case, it is recommended to arrange the mounting holes as shown in the right figure to facilitate attaching and detaching the mounting frame.

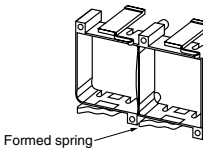



9) Adjacent mounting
Although the timers can be mounted adjacent to each other, remember that the panel surface of PM4H or LT4H series timer will lose its water-resistant effect. (Panel thickness: 1 to 5 mm .039 to .197 inch)

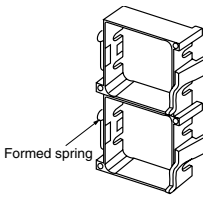



$A = (48 \times n - 2.5)^{+0.6}_{0}$ (mm)

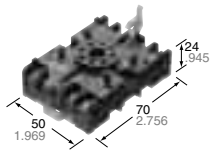
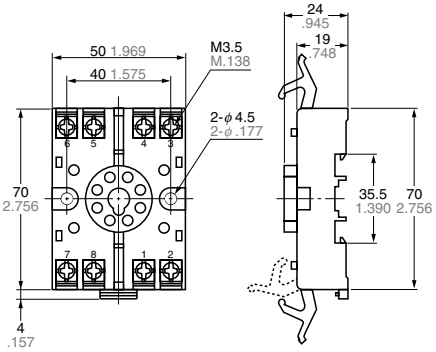
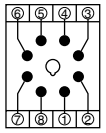
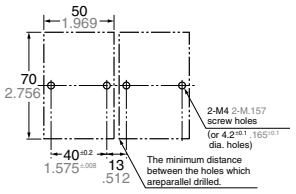
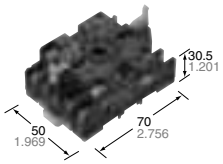
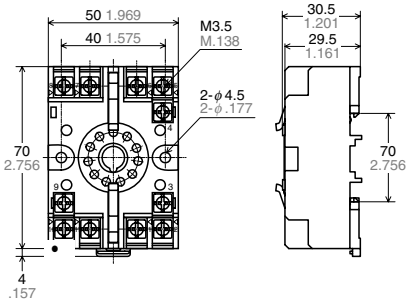
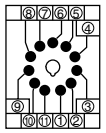
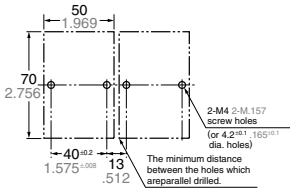
When lining up the timers horizontally, set the frames in such a position so the formed spring areas are at the top and bottom.




When lining up the timers vertically, set the frames in such a position as the formed spring areas are at the right and left.

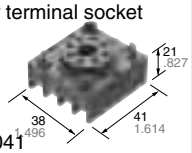
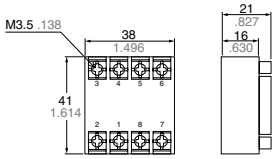
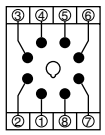
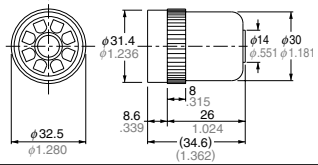
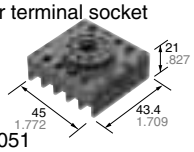
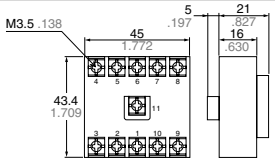
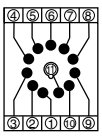
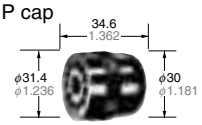
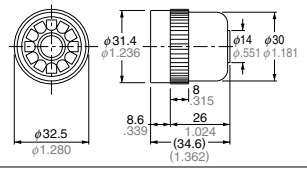
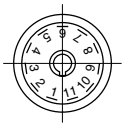


## Terminal sockets (Unit: mm inch, Tolerance: ±1 ±.039)

| Type | Appearance | Dimensions | Terminal wiring (Top view) | Mounting hole dimensions |
|---|---|---|---|---|
| PM4H-S<br>PM4H-M<br>PM4H-SD<br>PM4H-F8<br>PM4H-F8R<br>PM4H-W<br>LT4H<br>LT4H-W<br>QM4H<br>(8-pin type) | • DIN rail socket (8-pin)<br>  <br>ATC180031 |  |  <br>Note: Terminal No. on the main body are identifical to those on the terminal socket. |  |
| PM4H-A<br>PM4H-F11R<br>LT4H<br>LT4H-W<br>(11-pin type) | • DIN rail socket (11-pin)<br>  <br>ATC180041 |  |  <br>Note: Terminal No. on the main body are identifical to those on the terminal socket. |  |

Note: The socket's numbering system matches that of the timer terminals.

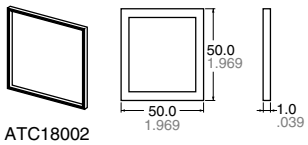
## Sockets (Unit: mm inch, Tolerance: ±1 ±.039)

| Type | Appearance | Dimensions | Terminal wiring (Top view) | Mounting hole dimensions |
|---|---|---|---|---|
| PM4H-S<br>PM4H-M<br>PM4H-SD<br>PM4H-F8<br>PM4H-F8R<br>PM4H-W<br>LT4H<br>LT4H-W<br>(8-pin type)<br>QM4H | • Rear terminal socket<br>  <br>AT78041 |  |  | — |
| | • 8P cap<br>  <br>AD8-RC |  |  | — |
| PM4H-A<br>PM4H-F11R<br>LT4H<br>LT4H-W<br>(11-pin type) | • Rear terminal socket<br>  <br>AT78051 |  |  | — |
| | • 11P cap<br>  <br>AT8-DP11 |  |  | — |

Note: The terminal socket's numbering system matches that of the timer terminals.

# DIN SIZE TIMERS COMMON OPTIONS

**• Rubber gasket**

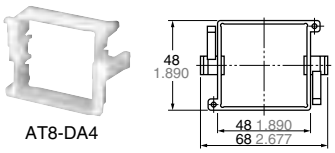



ATC18002

Applicable for PM4H series and LT4H series

The rubber gasket is enclosed in the PM4H (screw terminal type) and the LT4H series.

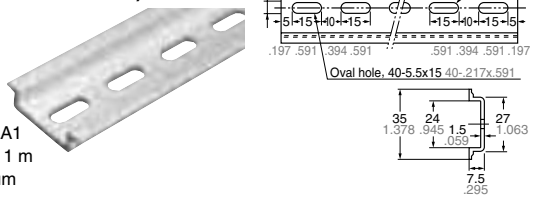
**• Mounting frame**




AT8-DA4

Applicable for PM4H series LT4H series and QM4H series

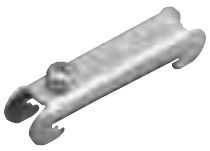
**• Mounting rails (Applicable for DIN and IEC standards)**



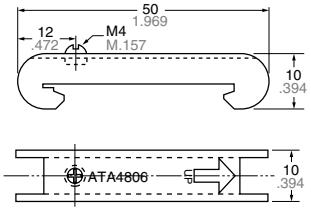
AT8-DLA1
Length: 1 m
aluminum




**• Fastening plate**



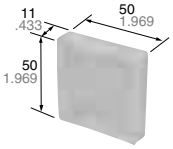
ATA4806




For holding DIN rails

**• Protective cover for DIN 48 size: LT4H, QM4H series**

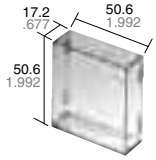
Flexible type




AQM4803

**• Protective cover for DIN 48 size: QM4H series**

Hard type




AQM4801

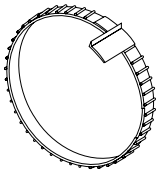
## Accessories

### PM4H series

**• Panel cover (Black)**

| | | |
|---|---|---|
| PM4H-A  ATC18011 | PM4H-S  ATC18012 | PM4H-M  ATC18013 |
| PM4H-W  ATC18014 | PM4H-SD  ATC18015 | PM4H-F  ATC18016 |

**• Set ring**



ATC18001

When you control the fixed time range, the setting rings (a set of 2 pcs.) make it easy to do the time setting and keep the time range all the time. (Excluding PM4H-W)

### LT4H series

**• Panel cover (Black)**

| | |
|---|---|
| LT4H  ATL58011 | LT4H-W  ATL68011 |

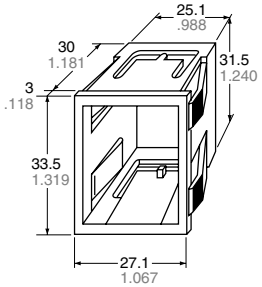
The black panel cover is also available so that you can change the appearance of the panel by changing the panel cover. The color of the standard panel cover is ash gray.

## Accessories Note: Accessories are the same as those for the S1DX timer.

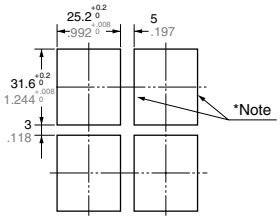
• Mounting frame

ADX18002 (Titanium-gray)
ADX18006 (Gray)
ADX18007 (Black)

Appearance

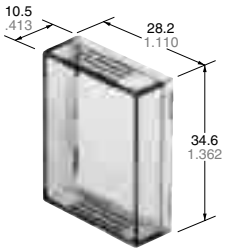



Panel cutout dimensions



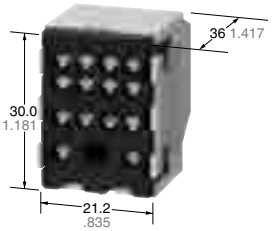

Board thickness 1 to 3 mm
Note: Make sure the holes area stays as right angles.

• Protective cover




ADX18008

• Cap block

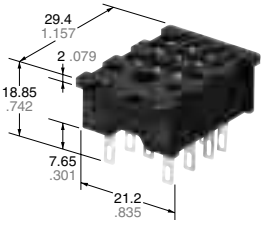



ADX18011

• Cap

ADX18004

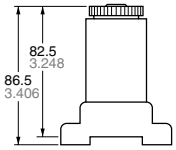
• Socket




ADX18003

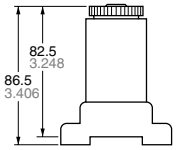
## Terminal socket

• HC2 slim DIN terminal socket



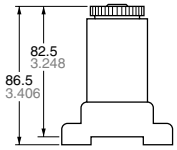

HC2-SFD-S

• HC2 DIN high terminal socket



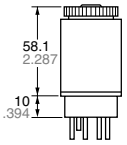

HC2-SFD-K

• HC4 DIN high terminal socket



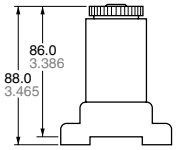

HC4-SFD-K

• HC4 socket



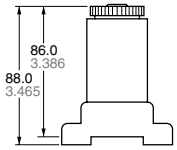

HC4-SS-K

• HJ2 terminal socket



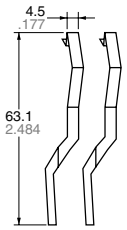
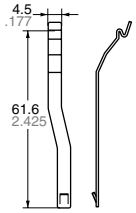
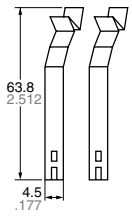

HJ2-SFD/HJ2-SFD-S

• HJ4 terminal socket

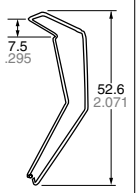



HJ4-SFD/HJ4-SFD-S

## Socket leaf holding clip

| 18012 | | | | AD68002 | |
|---|---|---|---|---|---|
| Figure | Dimensions | Figure | Dimensions | Figure | Dimensions |
|  (2 pieces per set) |   |  (2 pieces per set) |   |  (2 pieces per set) |   |

## Socket line holding clip for S1DXM-A/M

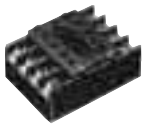
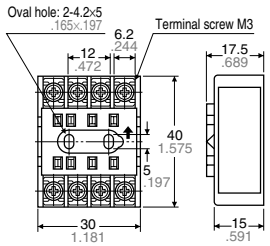
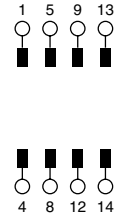
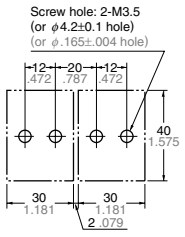
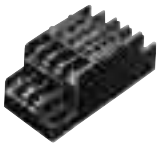
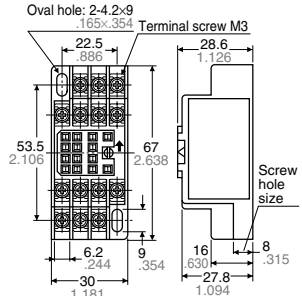
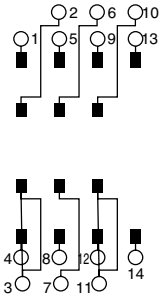
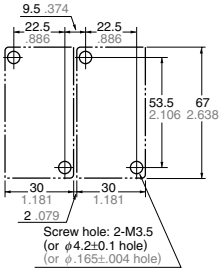
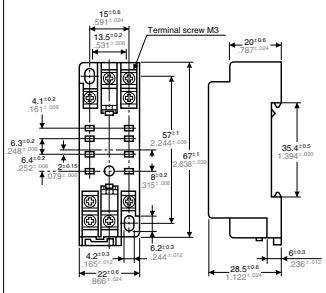
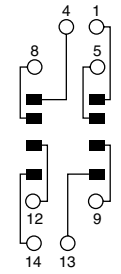
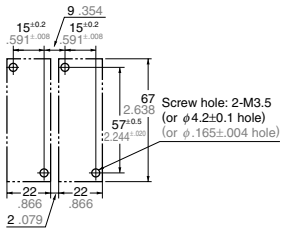
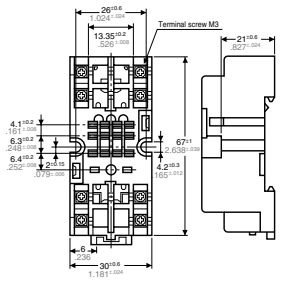
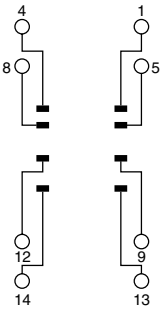
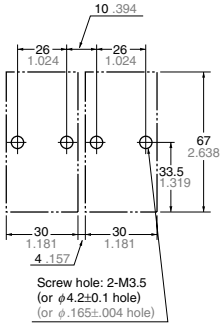
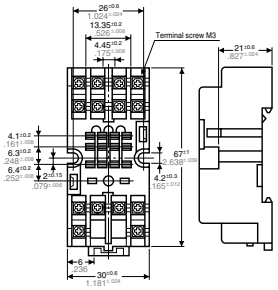
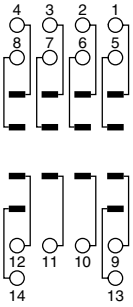
| ADX28005 |
|---|
| Dimensions |
|   |

| Terminal socket | Type | Application | | | |
|---|---|---|---|---|---|
| | | ADX18001 | ADX18012 | AD68002 | ADX28005 |
| For HC relay | HC2-SFD-S | — | — | ○ | ○ |
| | HC2-SFD-K | ○ | — | Δ | ○ |
| | HC4-SFD-K | ○ | — | Δ | ○ |
| For HJ relay | HJ2-SFD | — | ○ | — | — |
| | HJ2-SFD-S | — | ○ | — | — |
| | HJ4-SFD | — | Δ | — | — |
| | HJ4-SFD-S | — | Δ | — | — |

Note: The triangles indicate that removal will be slightly difficult when installed laterally in succession.

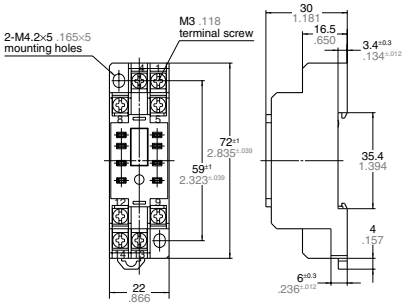
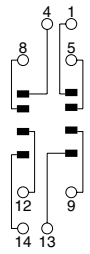
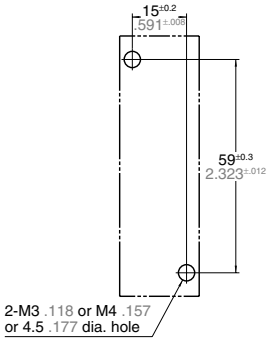
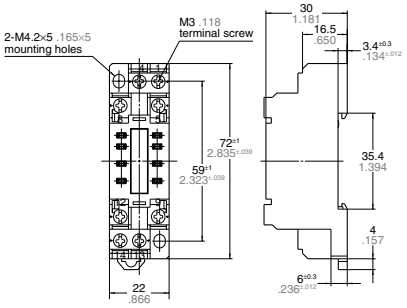
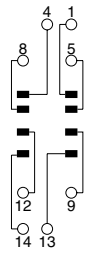
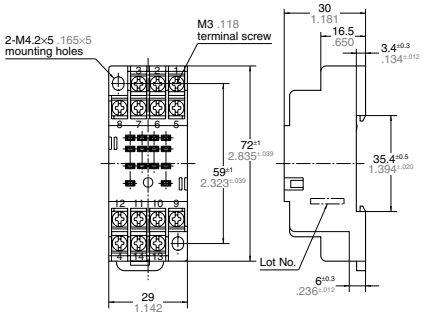
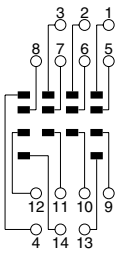
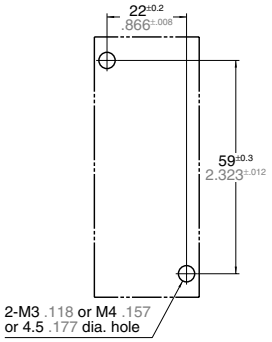
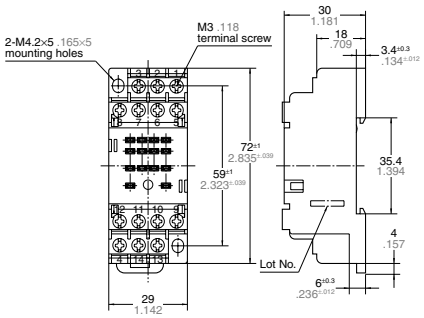
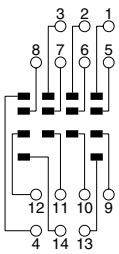
# S1DX TIMER OPTIONS

## HC relay terminal sockets

| | Name/Part No. | Dimensions | Terminal layout | Mounting hole dimensions | Applicable timers S1DX(2c) S1DXM(2c) | Applicable timers S1DX(4c) S1DXM(4c) |
|---|---|---|---|---|---|---|
| For general rails | • Terminal socket, HC 2-pin<br>  <br>HC2-SF-K |  <br>Note) Only wire springs can be used.<br>(Plate springs cannot be used.) |  |  <br>Drilling size of panel holes for installing the terminal sockets parallel | Available | Not available |
| | • High terminal socket, HC 1-, 2- and 4-pin<br>  <br>HC4-HSF-K |  <br>Note) Only wire springs can be used.<br>(Plate springs cannot be used.) |  |  <br>Drilling size of panel holes for installing the terminal sockets parallel | Available | Available |
| For DIN rails | • Slim DIN terminal socket, HC2<br>  <br>HC2-SFD-S |  |  |  | Available | Not available |
| | • DIN high terminal socket, HC2<br>  <br>HC2-SFD-K |  |  |  <br>Drilling size of panel holes for installing the terminal sockets parallel | Available | Not available |
| | • DIN high terminal socket, HC4<br>  <br>HC4-SFD-K |  |  | | Available | Available |

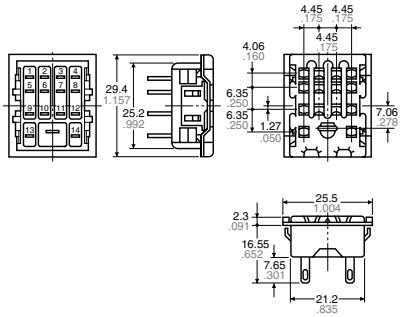
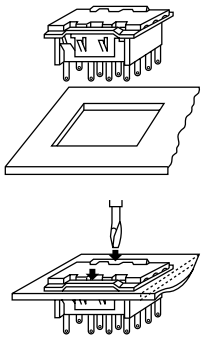
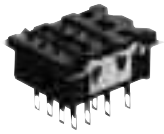
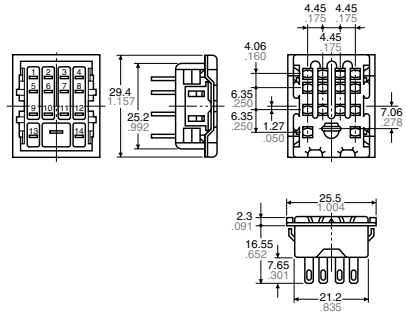
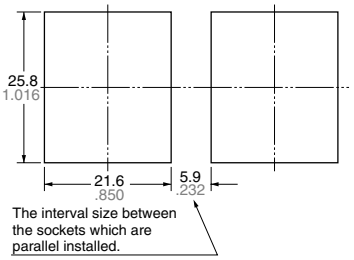
# S1DXM-A/M/S1DX COMMON OPTIONS

## HJ relay terminal sockets

| Name/Part No. | Dimensions | Terminal layout | Mounting hole dimensions | Applicable timers | |
|---|---|---|---|---|---|
| | | | | S1DX(2c) S1DXM(2c) | S1DX(4c) S1DXM(4c) |
| • HJ2 terminal socket<br>  <br>HJ2-SFD |  |  |  | Available | Not available |
| • HJ2 terminal socket (Finger protect type)<br>  <br>HJ2-SFD-S |  |  | | Available | Not available |
| • HJ4 terminal socket<br>  <br>HJ4-SFD |  |  |  | Available | Available |
| • HJ4 terminal socket (Finger protect type)<br>  <br>HJ4-SFD-S |  |  | | Available | Available |

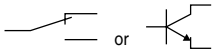
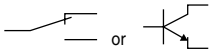
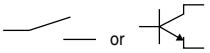
# S1DXM-A/M/S1DX COMMON OPTIONS

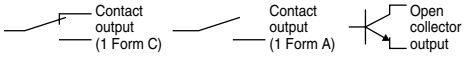
## Sockets

| Name/Order No. | Dimensions | Mounting hole dimensions | Applicable timers | |
|---|---|---|---|---|
| | | | S1DX(2c) S1DXM(2c) | S1DX(4c) S1DXM(4c) |
| • Socket, HC 2-pin<br>  <br>HC2-SS-K | • The difference between the HC2 and HC4 sockets is only the number of the pins. Their appearances and sizes are the same.<br>  <br>General tolerance: ±0.5 | • The thickness of applicable chassis plates ranges from 1.0 to 2.0 mm.<br>• To install the socket easily, insert the socket top surface into the drilled holes and press the two points on the fastening plate indicated by arrows as shown in the fig. below.<br>  | Available | Not available |
| • Socket, HC 4-pin<br>  <br>HC4-SS-K |  |  <br>Dimensional tolerance of machining: ±0.1 ±.004 | Available | Available |

• Sockets for PC board
HC2 – Socket for PC board: AP3825K
HC4 – Socket for PC board: AP3845K

# COUNTERS SELECTOR CHART

| | Electronic counters | | | | |
|---|---|---|---|---|---|
| **Appearance** |  Flush mounting type<br>PC board mounting type<br>AEL3 |  <br>AEL3 |  <br>4-digit display 6-digit display |  <br>4-digit display 6-digit display |  |
| **Name of product** | **LC2H Counter** | **LC2H Counter** | **LC4H Counter** | **LC4H-S Counter** | **LC4H-W Counter** |
| **Type** | Total counter | Preset counter | Preset counter | Preset counter | Preset counter |
| **Input mode/Input method** | UP type | UP, DOWN type | UP, DOWN, and DIR (multi-mode)/DIP switch | UP, DOWN, and DIR (multi-mode)/DIP switch | UP, DOWN, and DIR (multi-mode) 2 modes selectable/DIP switch |
| **Features** | 8.7 mm tall 8-digit display<br>Bright 2-color back light | 8.7 mm tall 8-digit display<br>Preset function equipped in half size<br>Display has backlight for instant recognition | Bright and easy-to-read display<br>Simple operation<br>Short body<br>Conforms to IP66's weather resistant standards | Bright and easy-to-read display<br>Simple operation<br>Pre-scale function Built-in power supply for high-capacity sensor (100 to 240 V AC type)<br>Conforms to IP66's weather resistant standards | Bright and easy-to-read display<br>Simple operation<br>Upper and lower limit settings are available.<br>Conforms to IP66's weather resistant standards |
| **Rated operating voltage** | Flush mounting type:<br>Unnecessary (Built-in battery)<br>PC board mounting type:<br>3 V DC (Battery in externally installed) | 24 V DC | 100 to 240 V AC<br>24 V AC, 12 to 24 V DC | 100 to 240 V AC | 100 to 240 V AC<br>24 V AC<br>12 to 24 V DC |
| **Number of digits (counter capacity)** | 8-digit<br>0<br>9 9 9 9 9 9 9 9 | 8-digit<br>0<br>9 9 9 9 9 9 9 9 | 4-digit 6-digit<br>0 0<br>9 9 9 9 9 9 9 9 9 9 | 4-digit 6-digit<br>0<br>9 9 9 9 9 9 9 9 9 | 6-digit<br>0<br>9 9 9 9 9 9 |
| **Counter/Indication** | Zero-suppress function (LCD) | Zero-suppress function (LCD) | 7-segment LCD<br>Counter value (backlight red LED)<br>Setting value (backlight yellow LED) | 7-segment LCD<br>Counter value (backlight red LED)<br>Setting value (backlight yellow LED) | 7-segment LCD<br>Counter value (backlight red LED)<br>Setting value (backlight yellow LED) |
| **Counting speed** | Flush mounting type:<br>2kHz/30Hz<br>(Changeable by a switch)<br>PC board mounting type:<br>2kHz/30Hz<br>(Different type) | 30Hz/5kHz switchable | 30Hz/5kHz | 30Hz/5kHz | 30Hz/5kHz |
| **Input** | Counting (signal) input and reset input<br>• Input by short-circuiting or opening contacts<br>• Open collector input<br>• Voltage input | Counting (signal) input and reset input<br>• Input by short-circuiting or opening contacts<br>• Open collector input | 2-input (multi-mode) and reset input<br>• Input by short-circuiting or opening contacts.<br>• Open collector input | 2-input (multi-mode) and reset input<br>• Input by short-circuiting or opening contacts.<br>• Open collector input | 2-input (multi-mode) and reset input<br>• Input by short-circuiting or opening contacts.<br>• Open collector input |
| **Reset (Reset input specifications conform to those of counting input)** | • Front reset button and external reset input terminal<br>• External reset dip terminal | • Manual reset with and external terminal and front reset key<br>• Manual reset types inside one-short output models | • Manual reset with and external terminal and front reset key<br>• Manual reset types inside one-short output models | • Manual reset with and external terminal and front reset key<br>• Manual reset types inside one-short output models | • Manual reset with and external terminal and front reset key<br>• Manual reset types inside one-short output models |
| **Preset** | — | • Counter number setting with key switches | • Operation mode setting with dip switches<br>• Counter number setting with key switches | • Operation mode setting with dip switches<br>• Counter number setting with key switches | • Output mode setting with dip switches<br>• Counter number setting with key switches |
| **Control output** | — |  |  or |  or |  or |
| **Power supply output** | — | — | — | External power supply 12 V DC 100 mA max. (AC type only) | — |
| **Options** | Flush mounting type (No need for easy installation type)<br>Mounting frame, rubber gasket | Mounting frame, rubber gasket | 11 P plug-in (terminal block, socket)<br>8 P plug-in (terminal block, socket) | 11 P plug-in (terminal block, socket) | 11 P plug-in (terminal block, socket) |
| **Available standards** | UL/C-UL | UL/C-UL | UL/C-UL | UL/C-UL | UL/C-UL |



# COUNTER-RELATED TERMINOLOGY

## Types of Counters

**1. Electro Preset Counter**
The counter is equipped with semiconductor counting circuitry. When the counter counts up to a preset number, its output circuit sends a signal.

**2. Electro Magnetic Counter**
A magnet is magnetized and demagnetized to drive the dial and count up numbers.

## Rating

**1. Rated Operating Voltage**
The voltage is applied to start the counter.

## Countings

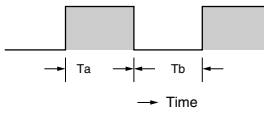
**1. Pulse**
This is a voltage or current signal sent at intermittent time intervals.

**2. Count**
Pulses are used to count up and down.

**3. Miss-count**
This happens if the number of pulses does not correspond to the number of counts.

**4. Hertz**
This unit of counting speed is used to give the number of counts per one second.

**5. Make Ratio**
This is the ratio of ON time (Ta) to OFF time (Tb).




**6. Maximum Counting Speed**
Suppose that the counter is operated with an input pulse of a make ratio of 1. The highest counting speed is the peak of a range in which the output circuit can send signals without mis-counting. The speed is expressed in units of Hz (cps: counts per a second).

**7. Over Count**
Counting continues beyond a preset number.

**8. Recount**
When counting is up, the counter display resets to zero and counting restarts.

**9. Down Count**
Numbers are counted down one by one from a preset number.

**10. Up Count**
Numbers are counted up one by one from zero.

**11. Up/Down Count**
Numbers are counted up or down depending on input conditions.

**12. Rejection (gate) Input**
This signal is used to keep the counter from counting.

## Outputs

**1. Count Up**
When a preset number is reached, the output circuit sends a signal.

**2. Retained Output**
The output is held until a reset signal is sent.

**3. One Shot Output**
This output has a specified width of time.

## Resettings

**1. Reset**
The counting process, display and output sections are all brought back to the initial status.

**2. Power off Reset**
The operating voltage is turned off to reset the counter.

**3. Manual Reset**
The counter is manually reset.

**4. Remote Reset**
A signal is sent from a remote point to the reset terminal so as to reset the counter.

**5. Automatic Reset**
When counting is up, internal circuitry is activated to automatically reset the counter.

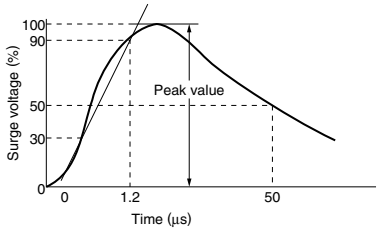
**6. Reset Signal Width**
This is the time during which the power is off so as to reset the counter or during which an external (manual) reset signal is sent.

**7. Reset time**
This is the time from the moment a reset signal is sent to the instant the counter is ready to start counting again.

## OTHERS

**1. Function of Memorizing Condition**
Counting data up until the operating voltage is turned off can be stored in memory. When the power is reactivated, the data can be reproduced.

**2. Anti-surge**
The strength against power voltage surge is determined by applying a single-pole full-wave voltage (several hundred to several thousand volt wave for ±(1.2x50) μs) acrosss the control power terminals.
Surge waveform
**[Single-pole full-wave voltage for ±(1.2x50) μs]**



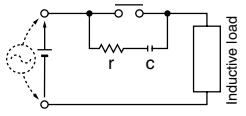
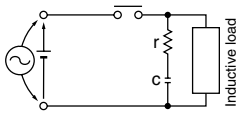
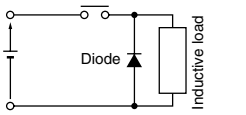
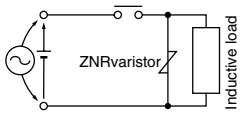

**3. Noise Immunity**
This is the strength against external noise. Relay noise tests, noise simulator tests, etc. are conducted.

# PRECAUTIONS IN USING THE COUNTER

## Cautions for circuits

**1. Protective circuit for counter contact**

In the circuit that switches an inductive load, a contact failure may occur at a contact point due to surge or inrush current resulting from that switching. Therefore, it is recommended that the following protective circuit be used to protect the contact point.

| | | CR circuit (r: resistor c: capacitor) | | Diode circuit | Varistor circuit |
|---|---|---|---|---|---|
| Circuit | | Counter contact<br>  | Counter contact<br>  | Counter contact<br>  | Counter contact<br>  |
| Application | AC | (see note.) | Available | Not available | Available |
| | DC | Available | Available | Available | Available |
| Features/Others | | If the load is a relay or solenoid, the release time lengthens. Effective when connected to both contacts if the power supply voltage is 24 or 48 V and the voltage across the load is 100 to 200 V. | | The diode connected in parallel causes the energy stored in the coil to flow to the coil in the form of current and dissipates it as joule heat at the resistance component of the inductive load. This circuit further delays the release time compared to the CR circuit. (2 to 5 times the release time listed in the catalog) | Using the rated voltage characteristics of the varistor, this circuit prevents excessively high voltages from being applied across the contacts. This circuit also slightly delays the release time. |
| | | If the load is a timer, leakage current flows through the CR circuit causing faulty operation. Note: If used with AC voltage, be sure the impedance of the load is sufficiently smaller than that of the CR circuit. | — | | |
| Device Selection | | As a guide in selecting r and c,<br>c: 0.5 to 1 μF per 1 A contact current<br>r: 0.5 to 1 Ω per 1 V contact voltage<br>Values vary depending on the properties of the load and variations in counter characteristics.<br>Capacitor c acts to suppress the discharge the moment the contacts open. Resistor r acts to limit the current when the power is turned on the next time. Test to confirm.<br>Use a capacitor with a breakdown voltage of 200 to 300 V. Use AC type capacitors (non-polarized) for AC circuits. | | Use a diode with a reverse breakdown voltage at least 10 times the circuit voltage and a forward current at least as large as the load current.<br>In electronic circuits where the circuit voltages reverse breakdown voltage of about 2 to 3 times the power supply voltage. | — |

**2. Type of Load and Inrush Current**

The type of load and its inrush current characteristics, together with the switching frequency, are important factors which cause contact welding. Particularly for loads with inrush currents, measure the steady state current and inrush current and use a relay or magnet switch which provides an ample margin of safety. The table below shows the relationship between typical loads and their inrush currents.

| Type of load | Inrush current |
|---|---|
| Resistive load | Steady state current |
| Solenoid load | 10 to 20 times the steady state current |
| Motor load | 5 to 10 times the steady state current |
| Incandescent lamp load | 10 to 15 times the steady state current |
| Mercury lamp load | 1 to 3 times the steady state current |
| Sodium vapor lamp load | 1 to 3 times the steady state current |
| Capacitive load | 20 to 40 times the steady state current |
| Transformer load | 5 to 15 times the steady state current |

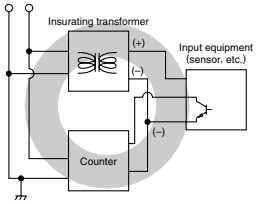
When you want large load and long life of the counter, do not control the load direct with a counter. When the counter is designed to use a relay or a magnet switch, you can acquire the longer life of the counter.

**3. Connection of input (Except for LC4H-S/AC type)**

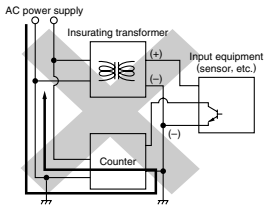
The LC4H series use power supply without a transformer (power and input terminals are not insulated). In connecting various kinds of input signals, therefore, use a power transformer in which the primary side is separated from the ungrounded secondary side as shown in Fig. A, for the power supply for a sensor and other input devices so that short-circuiting can be prevented.

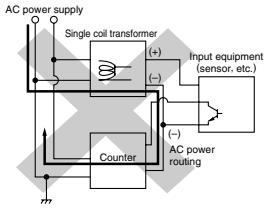
Do not use a single coil transformer (e.g., Sly-Duck). Otherwise, the internal circuit of the counter will be short-circuited as shown in Fig. B resulting in breakdown.

(Fig. A) Good



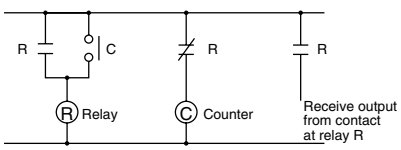

(Fig. B) No good



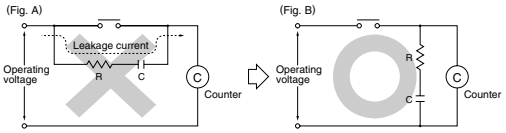

**4. Long Continuous Current Flow**

Avoid keeping the counter on for a long period of time (over one month). Otherwise heat is generated and accumulated inside the counter, which may deteriorate its electronic parts. If the counter must be kept on for a long period of time, a relay is added. See the circuit diagram below.




**5. Leakage current**

1) For connecting operating voltage to the counter, a circuit should be used, which will prevent the flow of leakage current. For example, a circuit for contact protection as shown in Fig A. will permit leakage current flow through R and C, causing erroneous operation of the counter. Instead, the circuit shown in Fig. B should be used.




2) If the counter is directly switched with a non-contact element, leak current may flow into the counter and cause it to malfunction.

## Cautions for use (common for all models)

**1. Terminal connections**

Correctly connect the pins while seeing the terminal layout/wiring diagram. In particular, the DC type, which has polarities, does not operate with the polarities connected reverse. Any incorrect connection can cause abnormal heating or ignition.

**2. Connection to operating voltage**

1)Apply the entire supply voltage through a switch, relay or other contact.
2) The operating voltage for the DC type must be at the specified ripple percentage or less. The average voltage must fall within the allowable operating voltage range.

| Rectification type | Ripple percentage |
|---|---|
| Single-phase, full-wave | Approx. 48% |
| Three-phase, full-wave | Approx. 4% |
| Three-phase, half-wave | Approx. 17% |

3) Make sure that no induced voltage and residual voltage are applied between the power terminals on the counter after the power switch is turned OFF.
(If the power line is wired in parallel with the high-voltage and motor lines, induced voltage may be produced between the power pins.)

**3. Control output**

1) Keep the load capacity below the counter's rated control capacity. If used above the rating, the counter's service life may shorten. With the transistor output type counters, transistors may be damaged.

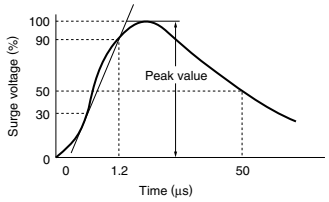
**4. Installing the counter**

1) To install the counter, use the dedicated pin bracket or socket (cap). Avoid connecting the pins on the counter by directly soldering them.
2) In order to maintain the characteristics, do not remove the counter cover (case).

**5. Superimposed surge of power supply**

For the superimposed surge of power supply, the standard waveform (±1.2x50µs or ±1x40µs) is taken as the standard value for surge-proof voltage. (The positive and negative voltages are applied each three or five times between the power pins.)
For the standard values for the LC4H type counters, see the respective items in „Cautions for use."

**• Single-pole, full-wave voltage for surge waveform [±(1.2x50) µs]**



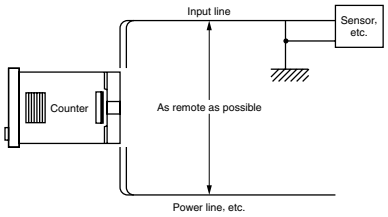

If external surge occurs exceeding the specified value, the internal circuit may break down. In this case, use a surge absorption element. The typical surge absorption elements include a varistor, a capacitor, and a diode. If a surge absorption element is used, use an oscilloscope to see whether or not the foreign surge exceeding the specified value appears.

**6. Signal input**

The counter's signal input comes in two ways. One is by opening and closing the input terminal. The other is by applying a specified H-level or L-level voltage to the input terminal.
For an input sensor's residual voltage, input impedance, input voltage level and other signal input conditions, see the ratings for each type of product.

**7. Operating environment**

1) For the ambient operating temperature and humidity, see the ratings for each type of product.
2) Avoid using the counter in a location where inflammable or corrosive gas is generated, the counter is exposed to much dust and other foreign matter; water or oil is splashed on the counter; or vibrations or shocks are given to the counter.
3) The counter cover (case), the knobs, and the dials are made of polycarbonated resin. Therefore, prevent the counter from being exposed to organic solvents such as methyl alcohol, benzine, and thinner, strong acid substances such as caustic soda, and ammonia and avoid using the counter in atmosphere containing any of those substances.
4) If the counter is used where noises are emitted frequently, separate the input signal elements (such as a sensor), the wiring for the input signal line, and the counter as far as possible from the noise source and the high power line containing noises.




**8. Checking the actual load**

In order to increase the reliability in the actual use, check the quality of the counter in the actual usage.

**9. Others**

1) If the counter is used exceeding the ratings (operating voltage and control capacity), the contact life, or any other specified limit, abnormal heat, smoke, or ignition may occur.
2) The LC2H series counter, incorporates a lithium battery.
Never disassemble the lithium battery or throw it into fire because this may affect humans and facilities. The lithium battery must be disposed of as an incombustible like other used batteries.
3) If any malfunction of the counter is likely to affect human life and properties, give allowance to the rated values and performance values. In addition, take appropriate safety measures such as a duplex circuit from the viewpoint of product liabilities.

Panasonic
ideas for life

# DIN HALF SIZE LCD COUNTER

# LC2H

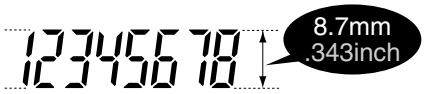
Panel mounting type
One-touch installation type

Panel mounting type
Installation frame type

PC board mounting type

## Features

• **8.7 mm .343 inch Character Height (previously 7 mm)**
Easy-to-read character height increased from 7 mm to 8.7 mm .276 inch to .343 inch.




• **Plenty of Digits**


• **Counting Speed Switchable between 2 kHz and 30 Hz**
• **Panel Mounting Type Features**
• **Installation Methods**
Comes with very easy one-touch installation type and also installation frame type that uses the bracket on the timer/counter. Choose a method that suits the application.
• **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.

• **Screw Terminals Designed for Safety**
Built in finger protection.
• **Panel Covers Replacable**
(Standard color is ash gray.)
Change the panel design by replacing with a black panel cover.
• **Conforms to IP66 Protective Construction (Only installation frame type.) (Front panel surface)**
• **Input Methods**
1) Non-voltage input method
2) Voltage input method
3) Free voltage input method
• **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).
• **Compliant with UL, c-UL and CE.**

## Product chart

| Installation type \ 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) |
| Panel mounting 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 | Counting speed | Front reset | Input method | Part No. |
|---|---|---|---|---|
| 8 digits | 2 kHz/30 Hz switchable | Yes | Non-voltage input type | LC2H-FE-2KK |
| | | | Voltage input type (4.5 to 30 V DC) | LC2H-FE-DL-2KK |
| | 30 Hz | | Free voltage input type (24 to 240 V AC/DC) | LC2H-FE-FV-30 |

Note) Please ask us about types without front resetting.

② Backlight type

| No. digits | Counting speed | Front reset | Input method | Part No. |
|---|---|---|---|---|
| 8 digits | 2 kHz/30 Hz switchable | Yes | Voltage input type (4.5 to 30 V DC) | LC2H-FE-DL-2KK-B |

2) Installation frame type

① Standard type

| No. digits | Counting speed | Front reset | Input method | Part No. |
|---|---|---|---|---|
| 8 digits | 2 kHz/30 Hz switchable | Yes | Non-voltage input type | LC2H-F-2KK |
| | | | Voltage input type (4.5 to 30 V DC) | LC2H-F-DL-2KK |
| | 30 Hz | | Free voltage input type (24 to 240 V AC/DC) | LC2H-F-FV-30 |

Note) Please ask us about types without front resetting.

② Backlight type

| No. digits | Counting speed | Front reset | Input method | Part No. |
|---|---|---|---|---|
| 8 digits | 2 kHz/30 Hz switchable | Yes | Voltage input type (4.5 to 30 V DC) | LC2H-F-DL-2KK-B |

**2. PC board mounting type**

| No. digits | Counting speed | Front reset | Input method | Part No. |
|---|---|---|---|---|
| 8 digits | 2 kHz | No | Non-voltage input type | LC2H-C-2K-N |
| | 30 Hz | | | LC2H-C-30-N |

# Specifications

**1. Panel mounting type**

| Item \ Type | | Standard type | | Backlight type | Standard type |
|---|---|---|---|---|---|
| | | Non-voltage input | Voltage input | | Free voltage type |
| No. digits | | 8 digits | | | |
| External power supply | | Not required (built-in battery) | | | |
| Max. counting speed | | 2 kHz/30 Hz (Switchable by switch) | | | 30 Hz (Note 2) |
| Count input | Min. input signal width (ON: OFF = 1:1) | 0.25 ms/16.7 ms (Switchable by switch) | | | 16.7 ms |
| | Input method (signal) | Non-voltage input using contacts or open collector connection | High level: 4.5 to 30 V DC<br>Low level: 0 to 2 V DC | | High level:<br>24 to 240 V AC/DC<br>Low level:<br>0 to 2.4 V AC/DC |
| | Input impedance | When shorted:<br>Max. 10 kΩ<br>When open:<br>Max. 750 kΩ | Approx. 4.7 kΩ | | — |
| | Residual voltage | Max. 0.5 V | — | | — |
| Reset 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<br>Low level: 0 to 2 V DC | | Non-voltage input using contacts or open collector connection |
| | Input impedance | When shorted:<br>Max. 10 kΩ<br>When open:<br>Max. 750 kΩ | Appox. 4.7 kΩ | | When shorted:<br>Max. 10 kΩ<br>When open:<br>Max. 750 kΩ |
| | Residual voltage | Max 0.5 V | — | | Max. 0.5 V |
| Display method | | 7-segment LCD | | 7-segment LCD<br>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 MΩ (measured at 500 V DC) Measurement location same as for break down voltage. | | | |
| Backlight power | | — | | 24 V DC (±10%) | — |
| Protective construction (Note 3) | | IEC Standard IP66 (only panel front: when using rubber gasket) | | | |
| Accessories (Note 3) | | Rubber gasket, mounting bracket | | | |
| Battery life | | 7 years (at 25°C 77°F) Note 1 | | | 6 years (at 25°C 77°F) |

Notes) 1. The value given for battery life is calculated based on continuous operation (count input signal ON/OFF = 1:1), therefore, this value is not guaranteed.
Also, battery life is decreased 30% when operation is continuous with 2 kHz count inputting in 2 kHz mode.
2. Operation is at 25 Hz when using 24 V AC.
3. Only for installation frame type.

**2. PC board mounting type**

| Item \ Type | | PC board mounting type | |
|---|---|---|---|
| Input method | | Non DC voltage input | |
| No. digits | | 8 digits | |
| Rated operation voltage | | 3 V DC | |
| Allowable operation voltage range | | 2.7 to 3.3 V DC | |
| Current consumption | | Max. 30 μA (max. 250 μA during reset input) | |
| Max. counting speed | | 2 kHz | 30 Hz |
| Count input | Min. input signal width (ON: OFF = 1:1) | 0.25 ms | 16.7 ms |
| | Input method | Non-voltage input using contacts or open collector connection | |
| | Input impedance | When shorted: Max. 10 kΩ<br>When open: Max. 750 kΩ | |
| | 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 kΩ<br>When open: Max. 750 kΩ | |
| | 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 MΩ (measured at 500 V DC) Measurement location same as for break down voltage. | |

**3. Common**

| Item \ Type | | Panel mounting/PC board mounting types |
|---|---|---|
| Vibration resistance | Functional | 10 to 55 Hz (1 cycle/min.), single amplitude: 0.15 mm .006 inch (10 min. on 3 axes) |
| | Destructive | 10 to 55 Hz (1 cycle/min.), single amplitude: 0.375 mm .015 inch (1 hr. on 3 axes) |
| Shock resistance | Functional | Min. 98 m/s² (4 times on 3 axes) |
| | Destructive | Min. 294 m/s² (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<br>Radiation interference electric field strength<br>Noise terminal voltage<br>(EMS)EN61000-6-2<br>Static discharge immunity<br><br>RF electromagnetic field immunity<br><br>EFT/B immunity<br><br>Conductivity noise immunity<br>Power frequency magnetic field immunity | <br>EN55011 Group1 ClassA<br>EN55011 Group1 ClassA<br><br>EN61000-4-2 4 kV contact<br>8 kV air<br>EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz)<br>EN61000-4-4 2 kV (power supply line)<br><br>EN61000-4-6 10 V/m AM modulation (0.15 MHz to 80 MHz)<br>EN61000-4-8 30 A/m (50 Hz) |

## Part names

**1. Front reset button**

This button resets the count value. 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.)**

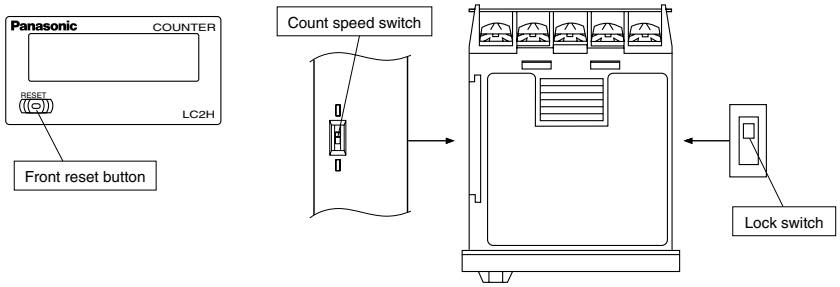
Disable the front reset button.

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

**3. Count speed switch (Refer to chart on right.)**

Use this switch to switch the count speed between 30 Hz and 2 kHz. (On the non-voltage and voltage input types, 30 Hz is on the LCD side and 2 kHz is on the terminal block side. Fixed at 30 Hz for free voltage input type.)

Note) You must press the front reset button when you change the count speed switch setting. Confirm, however, that the Lock Switch is OFF (front switches operable).




| | Non-voltage input/voltage input | Free voltage input |
|---|---|---|
| Lock switch (Unit display 1) | (Terminal block side) ↕ (LCD side) — OFF✳ ↕ ON | |
| Count speed switch (Unit display 2) | (Terminal block side) ↕ (LCD side) — 2k Hz ↕ 30Hz✳ | — (Fixed at 30 Hz) |

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

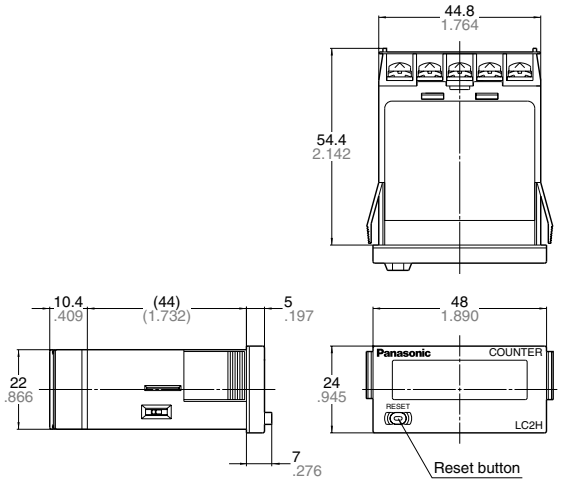
## Dimensions

mm inch
General tolerance: ±1.0 ±.039

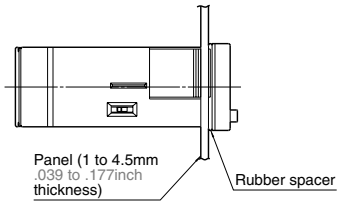
**1. Panel mounting type**

**• External dimensions**

1) One-touch installation type




**• Panel installation diagram**

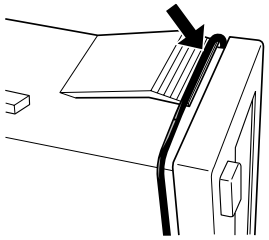



Note) When installing to a 4.5 mm .177 inch thick panel, remove the rubber spacer first.

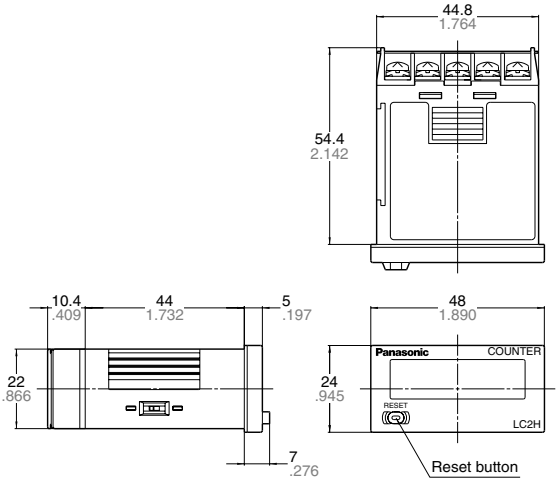
When installing the one-touch installation type model, make sure that the installation spring does not pinch the rubber gasket.

To prevent the installation spring from pinching the rubber gasket:

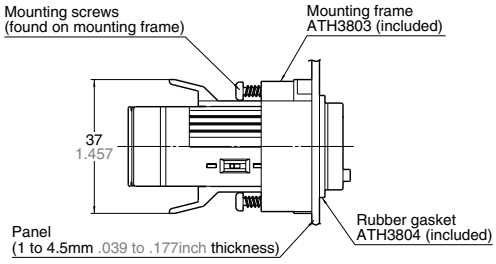
1. Set the rubber gasket on both ends of the installation spring (left and right).
2. Confirm that the installation spring is not pinching the rubber gasket, and then insert and fix the installation spring in place from the rear of the timer unit.



2) Installation frame type

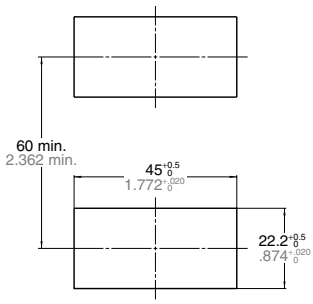



**• Panel mounting diagram**

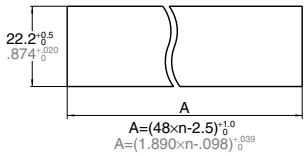



**• Panel cut-out dimensions**

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



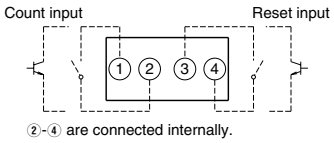
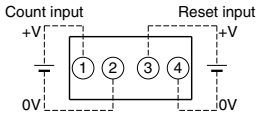
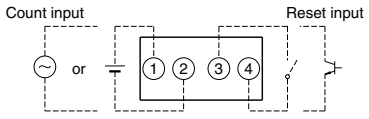

**• For connected installation (sealed installation) (Only installation frame type.)**




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)

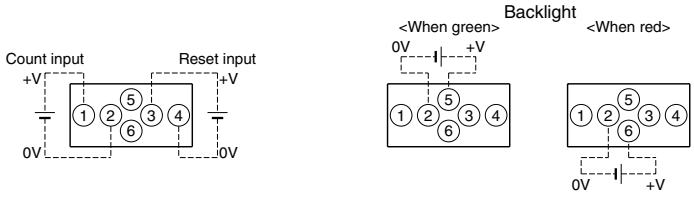
**• Terminal layout and wiring diagrams**

1) Standard type

| Non voltage input type | Voltage input type | Free voltage input type |
|---|---|---|
|  |  |  |



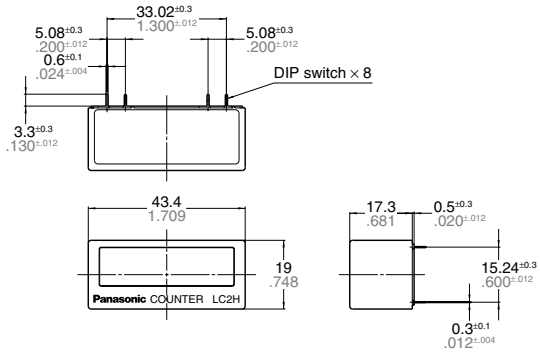
2) Backlight type

| Voltage input type |
|---|
|  |

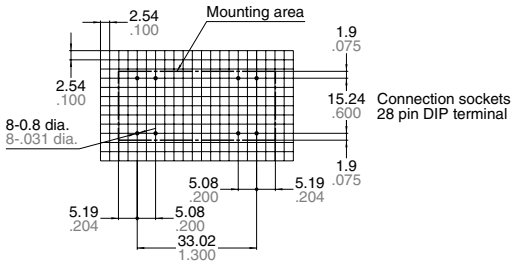
### 2. PC board mounting type

General tolerance: ±1.0 ±.039 mm incl

**• External dimensions**

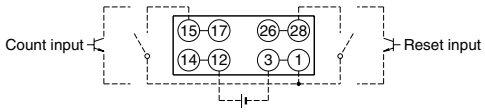



PC board pattern (BOTTOM VIEW)




General tolerance: ±0.1 ±.00

**• Terminal layout and wiring diagrams**

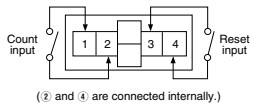
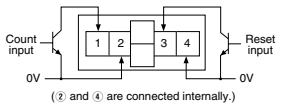
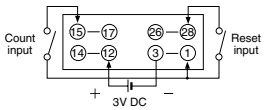
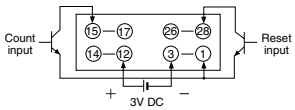



Note: The AXS212811K is recommended as a compatible connection socket.

①-③, ⑫-⑭, ⑮-⑰ and ㉖-㉘ are connected internally.
An external power supply is required.

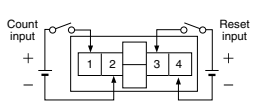
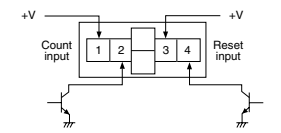
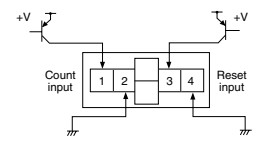
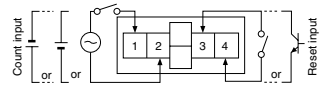
## Input method

### 1. Standard type

| Non-voltage input type | | | |
|---|---|---|---|
| Panel mounting type | | PC board mounting type | |
| Contact input | Transistor input<br>NPN transistor | Contact input | Transistor input<br>NPN transistor |
|  |  |  |  |



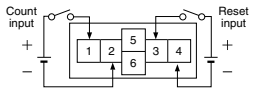
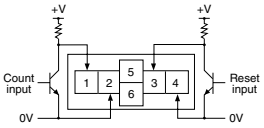
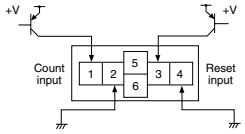
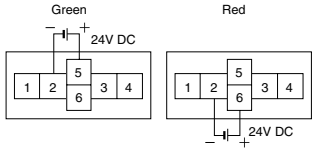
Notes) 1. When using contact input, since current flow is small from terminals ① and ③ on the panel mounting type and terminals ⑮ to ⑰ and ㉖ to ㉘ on the PC board mounting type, please use relays and switches with high contact reliability.
2. When using transistor input, use the following as a guide for which transistors (Tr) to use for inputting. (Collector withstand voltage ≧ 50 V, leakage current < 1 μA

| 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 μA)
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**

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

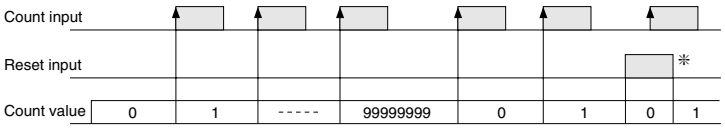


Notes) 1. Do not reverse the polarities when connecting the DC voltage for the backlight.
2. ② and ④. (The input and reset circuits are functionally insulated.)
3. When using transistor (Tr) input, use the right as a guide. (Collector withstand voltage ≧ 50 V, leakage current < 1 μA)
4. Be aware that 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. Counting takes place when the count input signal is ON.
2. Counting resumes again when the count value reaches 99999999 (full scale value) and then returns to “0” with a new count input.
3. No measurement takes place when a reset is input.
1) When reset is ON, resetting takes place and the count becomes “0”.
2) Press the front reset button when you want to reset manually (only panel installation type).

Note) Be aware that battery life will decrease if the count input or reset input are left ON.




Note) ⁎Count becomes “1” when the reset input is turned OFF while the count signal is being input.

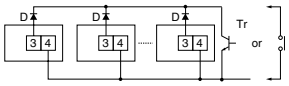
## Cautions for use

**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. Also, since there is a possibility of erroneous operation, do not connect in parallel the inputs of a non-voltage input type and another counter from a single input signal.
2) Since the current flow is very small from the count input and reset input terminals (① and ③ on the panel mounting type and terminals ⑮ to ⑰ and ㉖ to ㉘ on the PC board mounting type) please use relays and switches with high contact reliability.
3) 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.
4) When wiring, try to keep all the input lines to the count 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). When using 2 kHz mode, use with a wiring floating capacitance of 120 pF (3 m 9.843 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 counter 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: LC2H 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 count 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 counter will not work if reversed.
3) When wiring, try to keep all the input lines to the count 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).

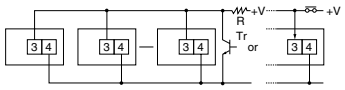
**3. Free voltage input type**
1) Use count input terminals ① and ② for free voltage input and reset terminals ③ and ④ for non-voltage input.
2) Be aware that the application of voltage that exceeds the voltage range of the H level to the count input terminal, and the application of voltage to the reset 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**



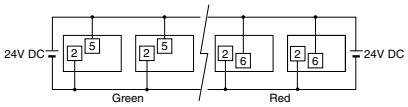

Notes) 1. Use the following as a guide for choosing transistors used for input (Tr).
Leakage current < 1 μA
2. Use as small a diode (D) as possible in the forward voltage so that the voltage between terminals 3 and 4 during reset input meets the standard value (0.5 V).
( At IF = 20 μA, forward voltage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

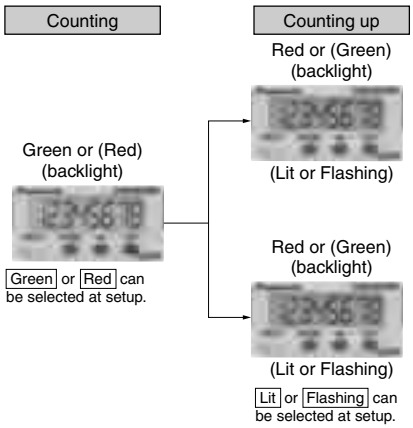
Panasonic
ideas for life

# PRESET COUNTERS

# LC2H

## Features

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




- **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.


- **Plenty of Digits**


- **Counting Speed Switchable between 30 Hz and 5 kHz**
- **Conforms to IP66 Protective Construction (Front panel surface)**

Weatherproofing supported by using optional mounting frame and rubber gasket

- **Includes reassuring lock mode and lock switch to prevent erroneous operation.**
- **Screw terminals are constructed to protect fingers to ensure safety.**
- **Compliant with UL, c-UL and CE.**

## Product types

| No. digits | Counting speed | Output mode | Output | Operating voltage | Part No. | |
|---|---|---|---|---|---|---|
| 8 digits | 30 Hz/5 kHz switchable | • Maintain output/hold count<br>• Maintain output/over count<br>• One shot/over count<br>• One shot/recount | Transistor (1a) | 24 V DC | LC2HP-FEW-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 capacity | 100 mA 30 V DC |
| | Input mode | Addition/Subtraction (selectable by front switch) |
| | Max. counting speed | 30 Hz/5 kHz (selectable by slide switch on side) |
| | Counting input | Min. input signal width: 16.7 ms at 30 Hz/0.1 ms at 5 kHz,<br>ON time : OFF time = 1 : 1 |
| | Reset input | Min. input signal width: Min. 30 ms |
| | Input signal | • Non-voltage input using contacts or open-collector connection<br>• Input impedance; when shorted: Max. 1 kΩ, when open: Min. 100 kΩ<br>• Residual voltage: Max. 2 V |
| | Output mode | • Maintain output/hold count • Maintain output/over count<br>• One shot/over count • One shot/recount<br>(Selectable by front switch) |
| | Display method | 7-segment LCD<br>(Switch between red and green for backlight, and between lit and flashing for count up.) |
| | Digit | –9999999 to 99999999 (–7 digits to +8 digits)<br>(0 to 99999999 for preset value) |
| | Memory | EEP-ROM (Overwriting times: $10^5$ operations or more) |
| 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 MΩ (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 | 30 to 85% RH (at 25°C 77°F, non-condensing) |
| Protective construction | | IP66 (front panel with mounting bracket and rubber gasket) |

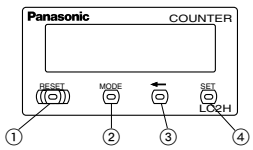
* The factory default preset value is set to 1000000.

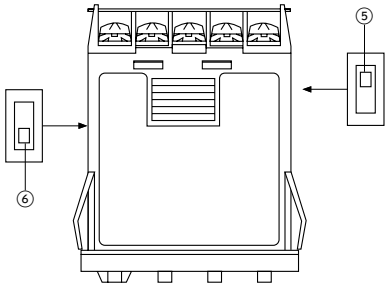
## Applicable standard

| | | |
|---|---|---|
| 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<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 2 kV (power supply line)<br>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) |

## Part names

**1. Front reset key**
This key resets the count value. It does not work when the lock switch is ON.
**2. Mode key**
Use 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. Lock switch**
Disable the operation of the front panel reset key and the mode key. With the lock switch on, [Lock] is displayed for about two seconds when the reset key or mode switch is operated.
**6. Count speed switch**
Use this switch to switch the count speed between 30 Hz and 5 kHz.




✳: Default setting when shipped.

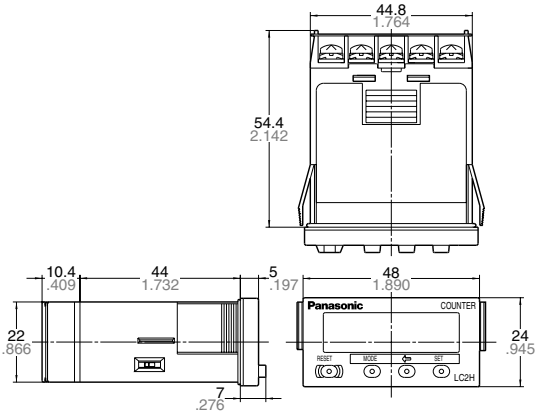
| | | |
|---|---|---|
| ⑤ | Lock switch (unit display 1) | (Terminal block side) ↕ (LCD side) — OFF✳ / ON |
| ⑥ | Count speed switch (unit display 2) | (Terminal block side) ↕ (LCD side) — 5kHz / 30Hz✳ |

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

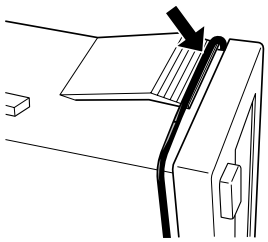
## Dimensions

mm inch
General tolerance: ±1.0 ±.039

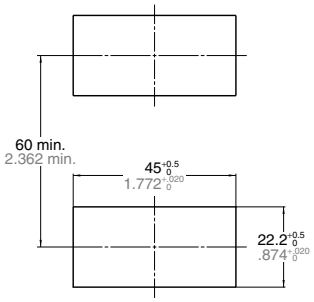
**• External dimensions**



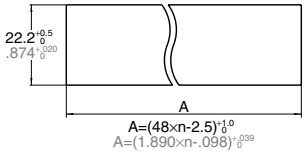

When installing the one-touch installation type model, make sure that the installation spring does not pinch the rubber gasket.
To prevent the installation spring from pinching the rubber gasket:
1. Set the rubber gasket on both ends of the installation spring (left and right).
2. Confirm that the installation 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 bracket (ATH3803) and the rubber gasket (ATH3804).
(Only installation frame type)




**• When installing repeatedly (sealed installation) (Only installation frame type)**

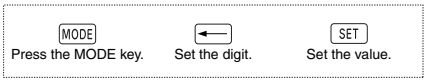



Notes: 1. Suitable installation panel thickness is 1 to 4.5 mm 0.39 to 0.177 inch.
2. Waterproofing will be lost when installing repeatedly (sealed installation).

## 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.

Sample display in preset value setting mode (when preset value is 1000)

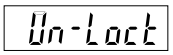
2) Pressing the setting key moves the flashing digit left by one. Following the highest digit it returns to the lowest digit and each time the digit setting key is pressed it moves one to the left.
3) Pressing the set key increases the value by one. (After 9 it returns to 0 and then changes to 1, 2, 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.

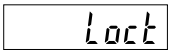

1) Pressing the set key while holding down the mode key takes you to the lock mode.

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



Display after entering lock mode (Example showing “Un-Lock”.)

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



(Example showing “ Lock”.)

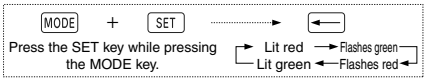
4) Pressing the front panel reset key sets the content displayed and returns you to regular operation mode.

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

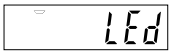
5) When the lock mode display reads “ Lock”, you will not be able to move to the backlight setting mode, the input setting mode, or the output setting mode.

**3. Backlight setting mode**

This is the mode for setting the backlight during count 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”



Display after entering the backlight setting mode.

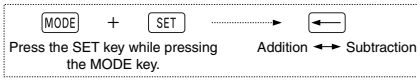
3) The LED backlight will be red (initial setting).

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. Input 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 input setting mode.
2) The display after entering the input setting mode reads “ UP” (initial setting).

Display after entering input setting mode (Example showing “UP”)

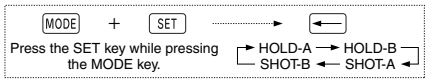
3) Pressing the setting key changes the display to “dn” (subtraction) and pressing it again changes it to “UP” (addition). The display alternates between “dn” and “UP”

(Example showing “dn”)

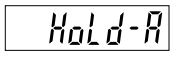
4) Pressing the front panel reset key sets the content displayed and returns you to regular operation mode.

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

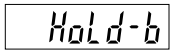
**5. Output setting mode**
This sets the operation mode.



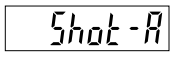

1) Pressing the SET key four times while holding down the MODE key takes you to the output setting mode.
2) The display reads “HoLd-A” (initial setting) after entering the output setting mode.



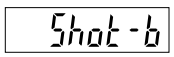

3) Pressing the setting key causes the display to change as follows:
HOLD-B (Output maintain/over count I)



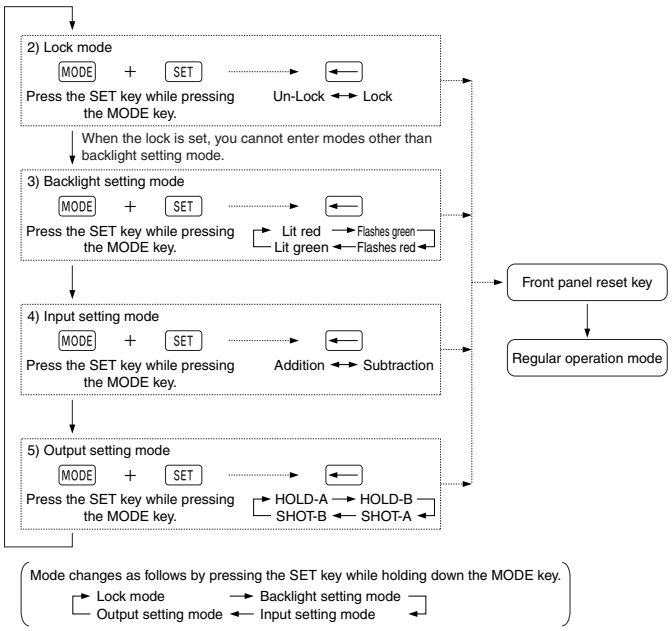

SHOT-A (One shot/over count)




SHOT-B (One shot/recount I)




HOLD-A (Output maintain/hold count)
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, count value and output will be as shown in this table.

| | Preset value | Count value | Output change |
|---|---|---|---|
| Lock mode | × | × | × |
| Backlight setting mode | × | × | × |
| Input setting mode | × | Addition: “0” Subtraction: “Preset value” | ON→OFF |
| Output setting mode | × | Addition: “0” Subtraction: “Preset value” | ON→OFF |

Note: “×” sign: No change

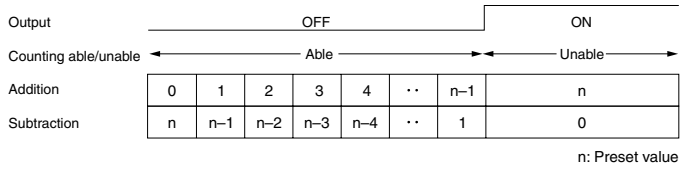
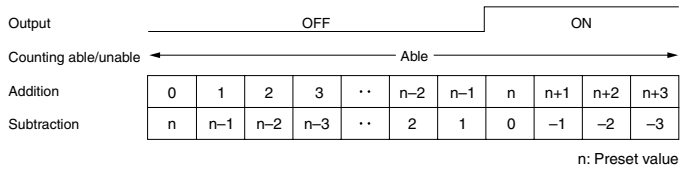
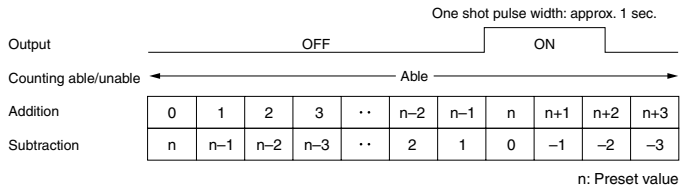
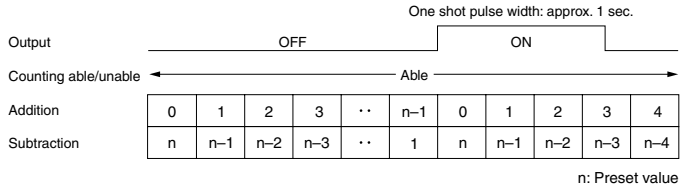
## Changing the preset value

**1. It is possible to change the preset value even during counting. However, be aware of the following points.**
1) If the preset value is changed to less than the count value with counting set to the addition direction, counting will continue until it reaches full scale, returns to zero, and then reaches the new preset value. If the preset value is changed to a value above the count value, counting will continue until the count value reaches the new preset value.
2) Suppose that the counter is preset to count down. Whether a preset count down value is smaller or larger than the count value, the counter counts down to “0 (zero)”.
**2. If the preset value is changed to “0”, the counter will not complete count-up. It starts counting up when the counting value comes to “0 (zero)” again.**
1) Addition (up-count) input when counting is set to the addition direction, counting will continue until full scale is reached, return to zero, and then complete count-up.
2) Subtraction (down-count) input when counting is set to the subtraction direction, counting will continue until full scale “–9999999” is reached, and then the display will change to “ - - - - - - - ”.

## Compliance with the CE marking

**• EMC Directive (89/336/EEC)**
**The LC2H Preset Counter conforms to the EMC Directive as a simple counter.**
**Applicable standards: EN61000-6-4, EN61000-6-2**

## Operation mode

| Output mode | Operation | Example when input mode is either addition or Subject:ubtraction |
|---|---|---|
| Output maintain/ hold count<br>HOLD-A | Output control is maintained after count-up completion and until resetting.<br>During that time, the count display does not change from that at count-up completion. |  |
| Output maintain/ over count I<br>HOLD-B | Output control is maintained after count-up completion and until resetting. However, counting is possible despite completion of count-up. |  |
| One shot/ over count<br>SHOT-A | Output control is maintained after count-up completion for a fixed time (approx. 1 sec.). Counting is possible despite completion of count-up. |  |
| One shot/ recount I<br>SHOT-B | Output control is maintained after count-up completion for a fixed time (approx. 1 sec.). Counting is possible despite completion of count-up. However, reset occurs simultaneous with completion of count-up. While output is being maintained, restarting of the count is not possible. |  |

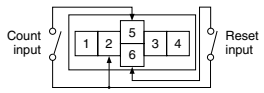
## Cautions for use

**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 count value, use contacts with as short a bounce time as possible. In general, select input to have a maximum counting speed of 30 Hz.




(2) Non-contact input (Transistor input)

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

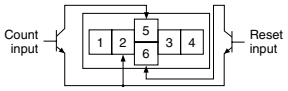
VCEO = Min. 20 V
IC = Min. 20 mA
ICBO = Max. 6 μA

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 kΩ.

(When the impedance is 0 Ω, the current coming from the count 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 kΩ.



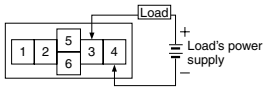

(3) Input wiring

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

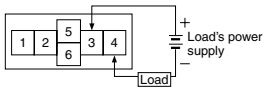
2) Output connection

Since the transistor output of counter 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 counter | The preset value at start-up before the CPU malfunction occurred. |
| Err-01 | Malfunctioning memory* | | | 0 |

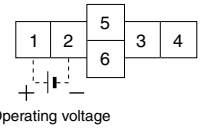
* Includes the possibility that the EEP-ROM's life has expired.

**3. 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.

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.



Operating voltage

2) After turning the counter 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.

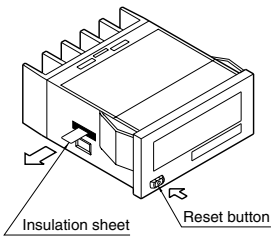
## Cautions for use

**1. Insulation sheet**

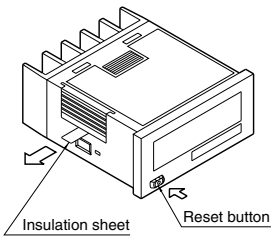
Before using a panel mounting type, please pull and remove the insulation sheet from the side of the product in the direction of the arrow.

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.

**• LC2H total counter (one-touch installation type)**




**• LC2H total counter (installation frame type)**




**2. Waterproof construction**

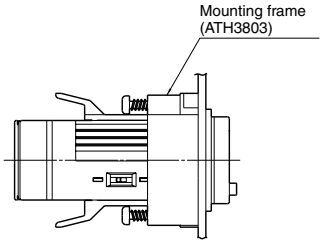
**• LC2H total counter (installation frame type)**

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 reinforcement screws when installing the mounting frame (ATH3803).

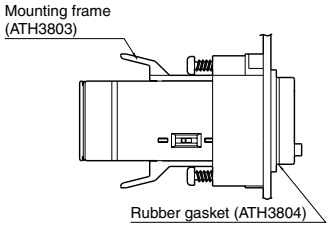
Note: The one-touch installation type is not waterproof.




**• LC2H preset counter**

1) The front plate will not be waterproof when this product is installed on a panel. To make the front plate waterproof, please install the following.

When using the waterproof type (IP66: panel front only), install the counter 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 counter 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.

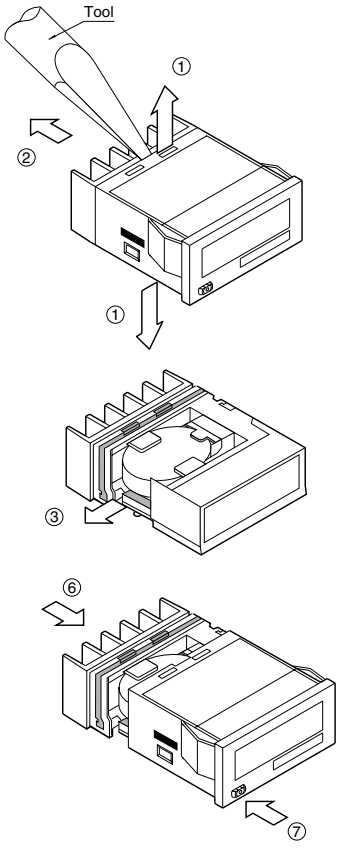
2) Since the cover is made of polycarbonate resin, do not use in places where the unit might come into contact with or be exposed to environments that contain organic solvents such as methyl alcohol, benzene and thinner, or strong alkali substances such as ammonia and caustic soda.

**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.

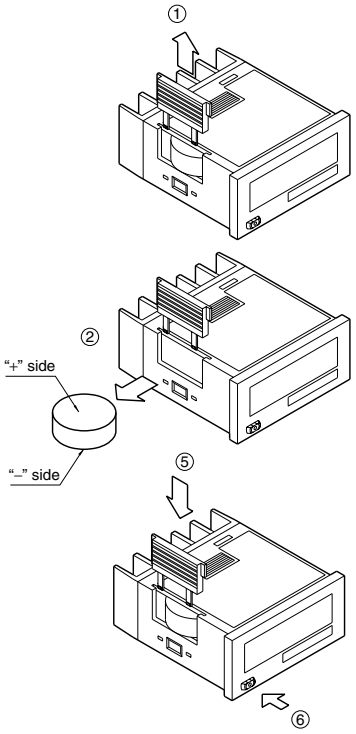
2) Make sure you are not carrying a static electric charge when replacing the battery.

3) Battery replacement procedure
   For LC2H total counter (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.



For LC2H total counter
(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.

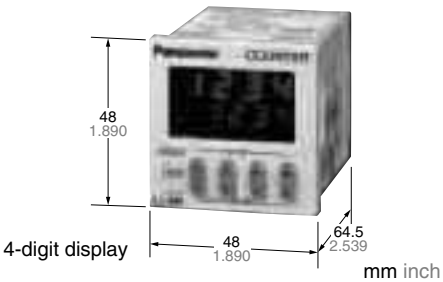


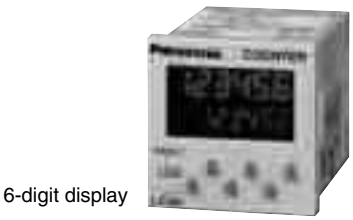

**6. Terminal connection**
Tighten the terminal screws with a torque of 0.8 N·cm or less.

Panasonic
ideas for life

# DIN 48 SIZE LCD ELECTRONIC COUNTER

# LC4H




Pin type Screw terminal type

**UL File No.: E122222**
**C-UL File No.: E122222**

## Features

- **Bright and Easy-to-Read Display**
  A brand new bright 2-color backlight LCD display. The easy-to-read screen in any location makes checking and setting procedures a cinch.
- **Simple Operation**
  Seesaw buttons make operating the unit even easier than before.
- **Short Body of only 64.5 mm 2.539 inch (screw type) or 70.1 mm 2.760 inch (pin type)**
  With a short body, it easily installs in even narrow control panels.
- **Conforms to IP66's Weather Resistant Standards**
  The water-proof panel keeps out water and dirt for reliable operation even in poor environments.
- **Screw terminal and Pin Type are Both Standard Options**
  The two terminal types are standard options to support either front panel installation or embedded installation.
- **Changeable Panel Cover**
  Also offers a black panel cover to meet your design considerations.
- **4-digit or 6-digit display**
  Two sizes of displays are offered for you to choose the one that suits your needs.
- **Compliant with UL, c-UL and CE.**



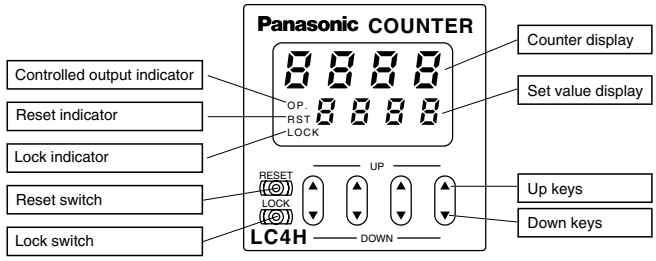
## Product types

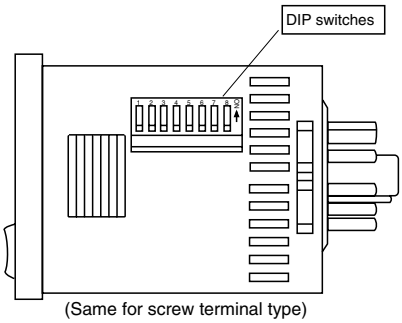
| Digit | Count speed | Output mode | Output | Operating voltage | Power down insurance | Terminal type | Part number |
|---|---|---|---|---|---|---|---|
| 4 | 30 Hz (cps)/ 5 KHz (Kcps) switchable | • Maintain output/ hold count • Maintain output/ over count I • Maintain output/ over count II • One shot/over count • One shot/recount I • One shot/recount II • One shot/hold count (7 modes) | Relay (1c) | 100 to 240 V AC | Available | 8 pins | LC4H8-R4-AC240V |
| | | | | | | 11 pins | LC4H-R4-AC240V |
| | | | | | | Screw terminal | LC4H-R4-AC240VS |
| | | | | 24 V AC | | 8 pins | LC4H8-R4-AC24V |
| | | | | | | 11 pins | LC4H-R4-AC24V |
| | | | | | | Screw terminal | LC4H-R4-AC24VS |
| | | | | 12 to 24 V DC | | 8 pins | LC4H8-R4-DC24V |
| | | | | | | 11 pins | LC4H-R4-DC24V |
| | | | | | | Screw terminal | LC4H-R4-DC24VS |
| | | | Transistor (1a) | 100 to 240 V AC | | 8 pins | LC4H8-T4-AC240V |
| | | | | | | 11 pins | LC4H-T4-AC240V |
| | | | | | | Screw terminal | LC4H-T4-AC240VS |
| | | | | 24 V AC | | 8 pins | LC4H8-T4-AC24V |
| | | | | | | 11 pins | LC4H-T4-AC24V |
| | | | | | | Screw terminal | LC4H-T4-AC24VS |
| | | | | 12 to 24 V DC | | 8 pins | LC4H8-T4-DC24V |
| | | | | | | 11 pins | LC4H-T4-DC24V |
| | | | | | | Screw terminal | LC4H-T4-DC24VS |
| 6 | | | Relay (1c) | 100 to 240 V AC | | 8 pins | LC4H8-R6-AC240V |
| | | | | | | 11 pins | LC4H-R6-AC240V |
| | | | | | | Screw terminal | LC4H-R6-AC240VS |
| | | | | 24 V AC | | 8 pins | LC4H8-R6-AC24V |
| | | | | | | 11 pins | LC4H-R6-AC24V |
| | | | | | | Screw terminal | LC4H-R6-AC24VS |
| | | | | 12 to 24 V DC | | 8 pins | LC4H8-R6-DC24V |
| | | | | | | 11 pins | LC4H-R6-DC24V |
| | | | | | | Screw terminal | LC4H-R6-DC24VS |
| | | | Transistor (1a) | 100 to 240 V AC | | 8 pins | LC4H8-T6-AC240V |
| | | | | | | 11 pins | LC4H-T6-AC240V |
| | | | | | | Screw terminal | LC4H-T6-AC240VS |
| | | | | 24 V AC | | 8 pins | LC4H8-T6-AC24V |
| | | | | | | 11 pins | LC4H-T6-AC24V |
| | | | | | | Screw terminal | LC4H-T6-AC24VS |
| | | | | 12 to 24 V DC | | 8 pins | LC4H8-T6-DC24V |
| | | | | | | 11 pins | LC4H-T6-DC24V |
| | | | | | | Screw terminal | LC4H-T6-DC24VS |

* A rubber gasket (ATC18002) and a mounting frame **(AT8-DA4)** are included.

## Part names

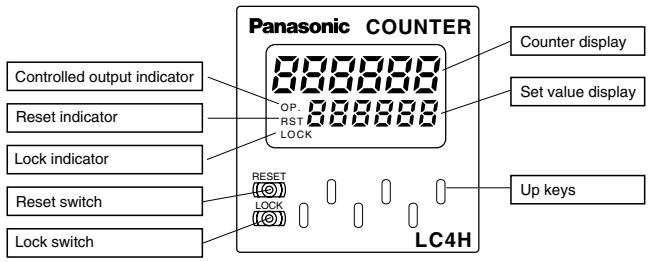
**• 4-digit display type**

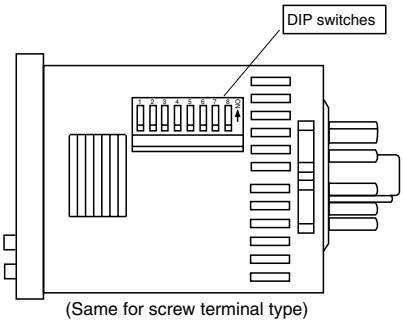



(Same for screw terminal type)

**• 6-digit display type**




(Same for screw terminal type)

## Specifications

| Item | | | Relay output type | | Transistor output type | |
|---|---|---|---|---|---|---|
| | | | AC type | DC type | AC type | DC type |
| Rating | Rated operating voltage | | 100 to 240 V AC, 24 V AC | 12 to 24 V DC | 100 to 240 V AC, 24 V AC | 12 to 24 V DC |
| | Rated frequency | | 50/60 Hz common | — | 50/60 Hz common | — |
| | Rated power consumption | | Max. 10 V A | Max. 3 W | Max. 10 V A | Max. 3 W |
| | Rated control capacity | | 5 A 250 V AC (resistive load) | | 100 mA 30 V DC | |
| | Input mode | | Addition (UP)/Subtraction (DOWN)/Direction (DIR)/Individuality (IND)/Phase (PHASE)<br>5 modes selectable by DIP switch | | | |
| | Max. counting speed | | 30 Hz/5 kHz (selectable by DIP switch) | | | |
| | Counting input (Input 1, 2) | | Min. input signal width: 16.7 ms at 30 Hz/0.1 ms at 5 kHz, ON time: OFF time = 1:1 | | | |
| | Reset input | | Min. input signal width: 1 ms, 20 ms (selected by DIP switch) | | | |
| | Lock input | | Min. input signal width: 20 ms | | | |
| | Input signal | | Contact or Open collector input/Input impedance: 1 kΩ or less, Input residual voltage: 2 V or less,<br>Open impedance: 100 kΩ or more, Max. energized voltage: 40 V DC | | | |
| | Output mode | | HOLD-A/HOLD-B/HOLD-C/SHOT-A/SHOT-B/SHOT-C/SHOT-D (7 modes selectable by DIP switch) | | | |
| | One shot output time | | Approx. 1 s | | | |
| | Indication | | 7-segment LCD, Counter value (backlight red LED), Setting value (backlight yellow LED) | | | |
| | Digit | | 4-digit display type –999 to 9999 (–3 digits to +4 digits) (0 to 9999 for setting)<br>6-digit display type –99999 to 999999 (–5 digits to 6 digits) (0 to 999999 for setting) | | | |
| | Memory | | EEP-ROM (Overwriting times: $10^5$ ope. or more) | | | |
| Contact | Contact arrangement | | 1 Form C | | 1 Form A (Open collector) | |
| | Initial contact resistance | | 100 mΩ (at 1 A 6 V DC) | | — | |
| | Contact material | | Ag alloy/Au flush | | — | |
| Life | Mechanical (contact) | | 2x$10^7$ ope. (Except for switch operation parts) | | — | |
| | Electrical (contact) | | $10^5$ ope. (At rated control voltage) | | $10^7$ ope. (At rated control voltage) | |
| Electrical | Allowable operating voltage range | | 85 to 110 % of rated operating voltage | | | |
| | Break down voltage (Initial value) | | Between live and dead metal parts: 2,000 Vrms for 1 min (11-pin type)<br>Between input and output: 2,000 Vrms for 1 min<br>Between open contacts: 1,000 Vrms for 1 min | | Between live and dead metal parts: 2,000 Vrms for 1 min (11-pin type)<br>Between input and output: 2,000 V AC for 1 min | |
| | Insulation resistance (At 500 V DC) (Initial value) | | Between live and dead metal parts: Min. 100 MΩ (11-pin type)<br>Between input and output: Min. 100 MΩ<br>Between open contact: Min. 100 MΩ | | Between live and dead metal parts: Min. 100 MΩ (11-pin type)<br>Between input and output: Min. 100 MΩ | |
| | Temperature rise | | Max. 65° C (under the flow of nominal operating current at nominal voltage) | | | |
| Mechanical | Vibration resistance | Functional | 10 to 55 Hz (1 cycle/min), single amplitude: 0.35 mm (10 min on 3 axes) | | | |
| | | Destructive | 10 to 55 Hz (1 cycle/min), single amplitude: 0.75 mm (1 h on 3 axes) | | | |
| | Shock resistance | Functional | Min. 98 m 321.522 ft./$s^2$ (4 times on 3 axes) | | | |
| | | Destructive | Min. 294 m 964.567 ft./$s^2$ (5 times on 3 axes) | | | |
| Operating conditions | Ambient temperature | | –10° C to 55° C +14° F to +131° F | | | |
| | Ambient humidity | | Max. 85 % RH (non-condensing) | | | |
| | Air pressure | | 860 to 1,060 h Pa | | | |
| | Ripple rate | | — | 20 % or less | — | 20 % or less |
| Connection | | | 8-pin/11-pin/screw terminal | | | |
| Protective construction | | | IP66 (front panel with a rubber gasket) | | | |

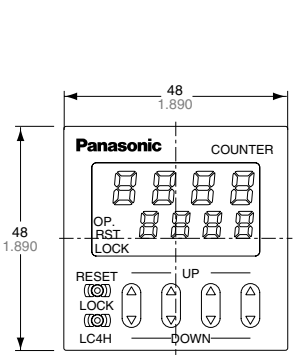
## Applicable standard

| Safety standard | EN61812-1 | Pollution Degree 2/Overvoltage Category II |
|---|---|---|
| EMC | (EMI)EN61000-6-4<br>Radiation interference electric field strength<br>Noise terminal voltage<br>(EMS)EN61000-6-2<br>Static discharge immunity<br><br>RF electromagnetic field immunity<br><br>EFT/B immunity<br><br>Surge immunity<br>Conductivity noise immunity<br>Power frequency magnetic field immunity<br>Voltage dip/Instantaneous stop/Voltage fluctuation immunity | <br>EN55011 Group1 ClassA<br>EN55011 Group1 ClassA<br><br>EN61000-4-2 4 kV contact<br>8 kV air<br>EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz)<br>EN61000-4-4 2 kV (power supply line)<br>1 kV (signal line)<br>EN61000-4-5 1 kV (power line)<br>EN61000-4-6 10 V/m AM modulation (0.15 MHz to 80 MHz)<br>EN61000-4-8 30 A/m (50 Hz)<br>EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

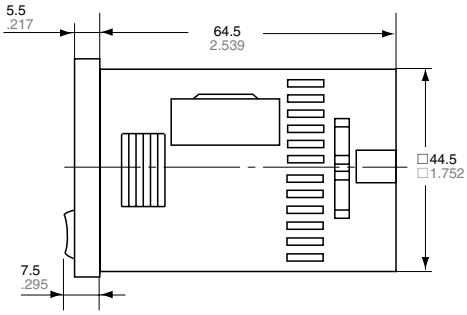
## Dimensions

mm inch
General tolerance: ±1.0 ±.039

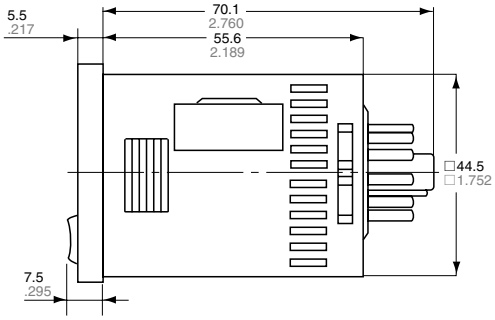
**• 4-digit display type**



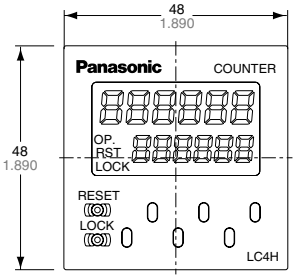

Screw terminal type: M3.5
(Flush mount)



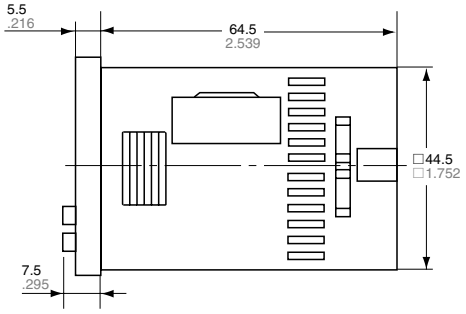

Pin type
(Flush mount/Surface mount)



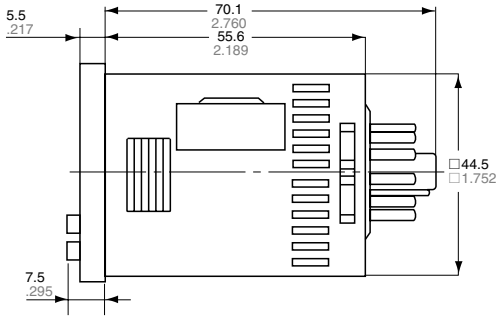

**• 6-digit display type**




Screw terminal type: M3.5
(Flush mount)

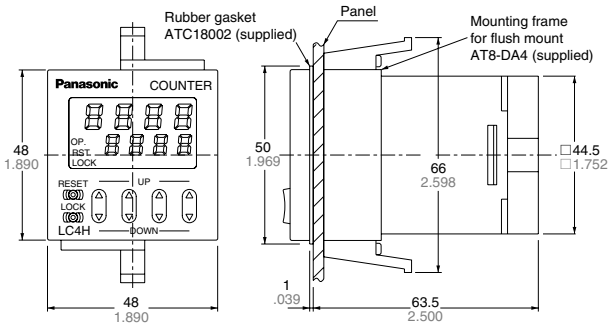



Pin type
(Flush mount/Surface mount)

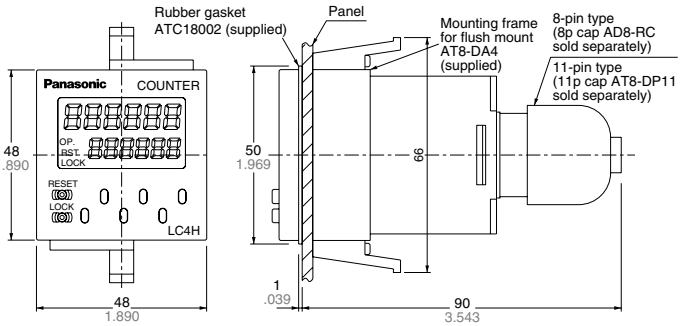


**• Dimensions for flush mounting (with adapter installed)**

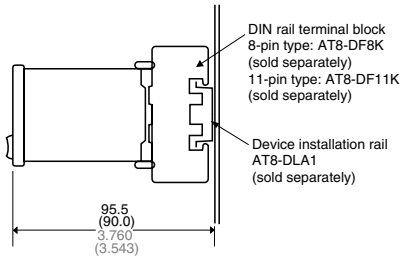
Screw terminal type: M3.5




Pin type



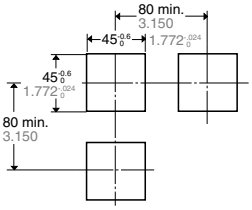

**• Dimensions for front panel installations**



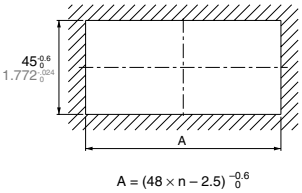

( ) Dimensions for 8-pin type.

**• Installation panel cut-out dimensions**

The standard panel cut-out dimensions are shown below. Use the mounting frame (AT8-DA4) and rubber gasket (ATC18002).




**• For connected installations**




$A = (48 \times n - 2.5)\ ^{-0.6}_{0}$

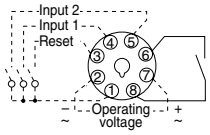
Note 1: The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.

Note 2: For connected installations, the waterproofing ability between the unit and installation panel is lost.

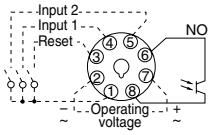
# Terminal layouts and wiring diagrams

**• 8-pin type**

Relay output type

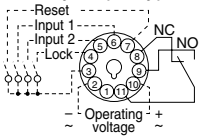



Transistor output type

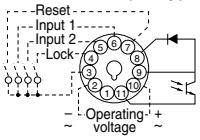



**• 11-pin type**

Relay output type

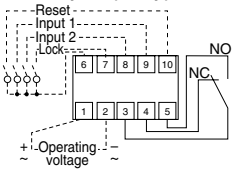



Transistor output type

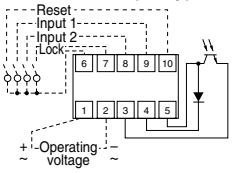



**• Screw terminal type**

Relay output type




Transistor output type




Note) For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 115.

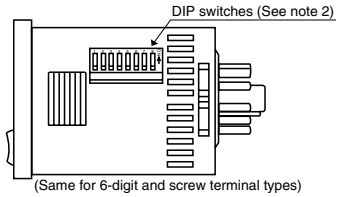
## Setting the operation mode and set value

**Setting procedure 1) Setting the operation mode (input mode and output mode)**

Set the input and output modes with the DIP switches on the side of the counter.

**DIP switches**

| | Item | DIP switch | |
|---|---|---|---|
| | | OFF | ON |
| 1 | Output mode | Refer to table 1 | |
| 2 | | | |
| 3 | | | |
| 4 | Minimum reset input signal width | 20 ms | 1 ms |
| 5 | Maximum counter speed | 30 Hz | 5 kHz |
| 6 | Input mode | Refer to table 2 | |
| 7 | | | |
| 8 | | | |



(Same for 6-digit and screw terminal types)

Table 1: Setting the output mode

| DIP switch No. | | | Output mode |
|---|---|---|---|
| 1 | 2 | 3 | |
| ON | ON | ON | SHOT-A |
| OFF | OFF | OFF | SHOT-B |
| ON | OFF | OFF | SHOT-C |
| OFF | ON | OFF | SHOT-D |
| ON | ON | OFF | HOLD-A |
| OFF | OFF | ON | HOLD-B |
| ON | OFF | ON | HOLD-C |
| OFF | ON | ON | — (See note 1) |

Table 2: Setting the input mode

| DIP switch No. | | | Input mode |
|---|---|---|---|
| 6 | 7 | 8 | |
| ON | ON | ON | Addition input |
| OFF | OFF | OFF | Subtraction input |
| ON | OFF | OFF | Directive input |
| OFF | ON | OFF | Independent input |
| ON | ON | OFF | Phase input |
| OFF | OFF | ON | — (See note 1) |
| ON | OFF | ON | — (See note 1) |
| OFF | ON | ON | — (See note 1) |

Notes:1) The counter and set value displays will display DIP Err.
2) Set the DIP switches before installing the counter on the panel.
3) When the DIP SW setting is changed, turn off the power once.
4) The DIP switches are set as ON before shipping.

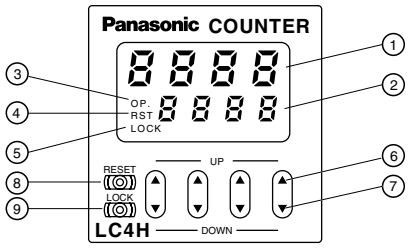
**Setting procedure 2) Setting the set value**

Set the set value with the UP and DOWN keys on the front of the counter.

**Front display section**

**• 4-digit display type**

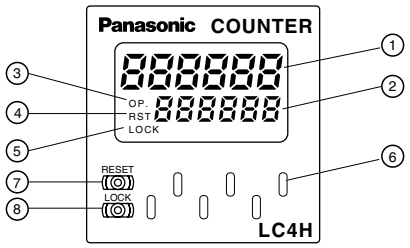
① Counter display
② Set value display
③ Controlled output indicator
④ Reset indicator
⑤ Lock indicator
⑥ UP keys
Changes the corresponding digit of the set value in the addition direction (upwards).




⑦ DOWN keys
Changes the corresponding digit of the set value in the subtraction direction (downwards).
⑧ RESET switch
Resets the counting value and the output.
⑨ LOCK switch
Locks the operation of all keys on the counter.

**• 6-digit display type**

① Counter display
② Set value display
③ Controlled output indicator
④ Reset indicator
⑤ Lock indicator




⑥ UP keys
Changes the corresponding digit of the set value in the addition direction (upwards).
⑦ RESET switch
Resets the counting value and the output.
⑧ LOCK switch
Locks the operation of all keys on the counter.

**• Changing the set value**

**1. It is possible to change the set value with the up and down keys (4-digit type only) even during counting. However, be aware of the following points.**

1) If the set value is changed to less than the count value with counting set to the addition direction, counting will continue until it reaches full scale (9999 with the 4-digit type and 999999 with the 6-digit type), returns to zero, and then reaches the new set value. If the set value is changed to a value above the count value, counting will continue until the count value reaches the new set value.

2) Suppose that the counter is preset to count down. Whether a preset count-down value is smaller or larger than the count value, the counter counts down to "0(Zero)".

**2. If the set value is changed to "0," the unit will not complete count-up. It starts counting up when the counting value comes to "0 (Zero)" again.**

1) Up-count (addition) input when counting is set to the addition direction, counting will continue until full scale is reached (9999 with the 4-digit type and 999999 with the 6-digit type), return to zero, and then complete count-up.

2) Down-count (subtraction) input when counting is set to the subtraction direction, counting will continue until full scale is reached (-999 with the 4-digit type and -99999 with the 6-digit type), and then the display will change to with the 4-digit type and with the 6-digit type. The counting value does not become "0" and so the counter does not count up.

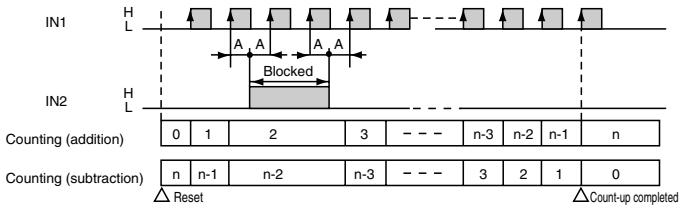
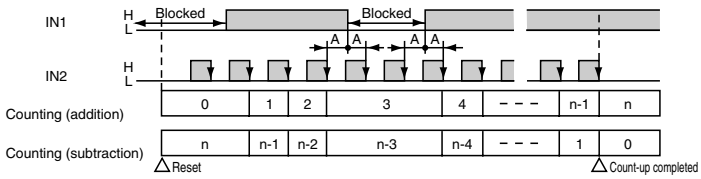
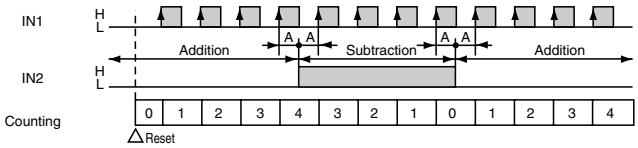
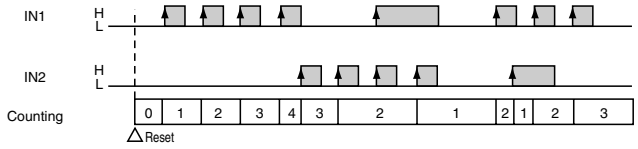
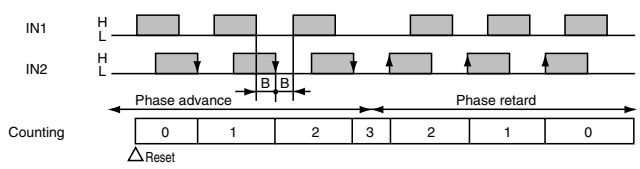
3) For directive, independent, and phase input, when the counting value increases or decreases from the value „0" and then returns back to the value „0," count-up is completed.

## Operation modes

**1. Input mode**

For the input mode, you can choose one of the following five modes

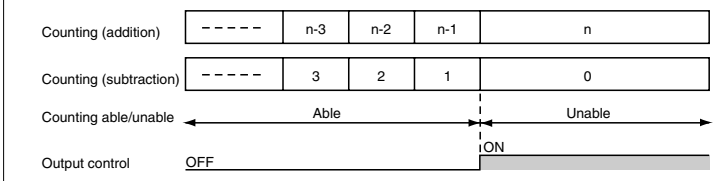
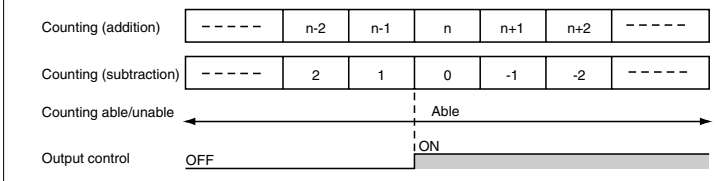
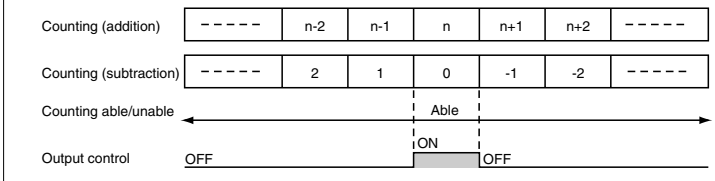
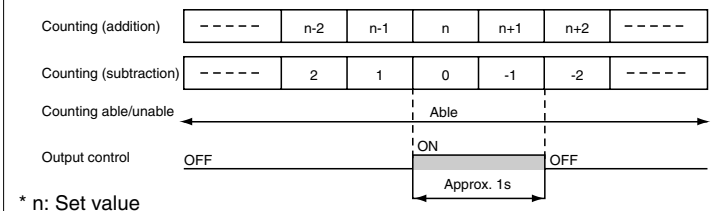
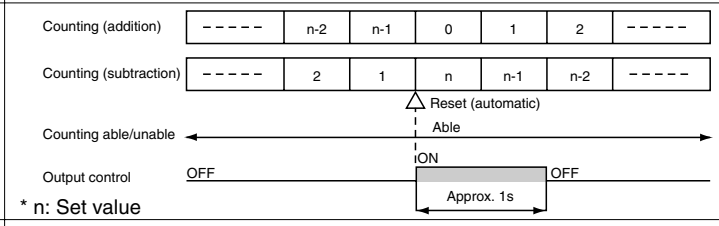
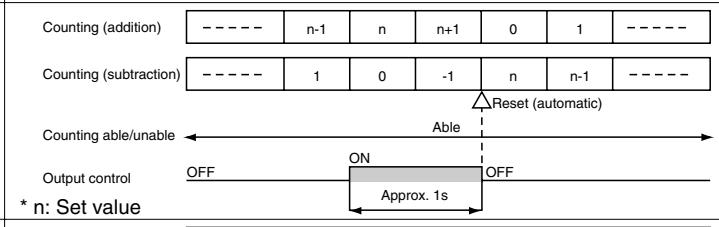
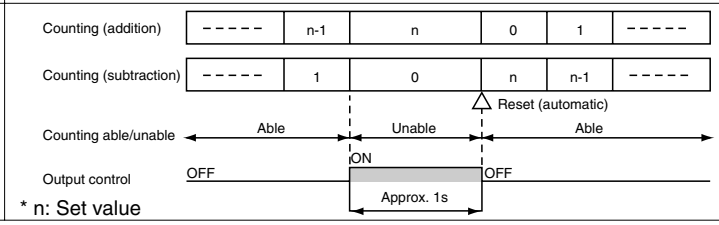
- Addition UP
- Subtraction DOWN
- Directive DIR
- Independent IND
- Phase PHASE

| Input mode | Operation | *Minimum input signal width 30 Hz: 16.7 ms; 5 kHz: 0.1 ms |
|---|---|---|
| Addition UP | IN1 or IN2 works as an input block (gate) for the other input. | • Example where IN1 is the count counting and IN2 is the input block (gate).<br>  |
| Subtraction DOWN | | • Example where IN2 is the counting input and IN1 is the input block (gate).<br>  <br>* "A" must be more than the minimum input signal width. |
| Directive DIR | IN1 is the counting input and IN2 is the addition or subtraction directive input. IN2 adds at L level and subtracts at H level. |  <br>* "A" must be more than the minimum input signal width. |
| Independent IND | IN1 is addition input and IN2 is subtraction input. |  <br>* IN1 and IN2 are completely independent, so there is no restriction on signal timing. |
| Phase PHASE | Addition when the IN1 phase advances beyond IN2, and subtraction when the IN2 phase advances beyond IN1. |  <br>* "B" must be more than the minimum input signal width. |

**2. Output mode**

For the output mode, you can choose one of the following seven modes

- Maintain output/hold count HOLD-A
- Maintain output/over count I HOLD-B
- Maintain output/over count II HOLD-C
- One shot/over count SHOT-A
- One shot/recount I SHOT-B
- One shot/recount II SHOT-C
- One shot/hold count SHOT-D

| Output mode | Operation | (Example when input mode is either addition or subtraction) |
|---|---|---|
| Maintain output Hold count HOLD-A | Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion. |  * n: Set value |
| Maintain output Over count I HOLD-B | Output control is maintained after count-up completion and until resetting. However, counting is possible despite completion of count-up. |  * n: Set value |
| Maintain output Over count II HOLD-C | Output control is maintained after count-up completion and until the next signal enters. However, counting is possible despite completion of count-up. |  * n: Set value |
| One shot Over count SHOT-A | Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. |  * n: Set value |
| One shot Recount I SHOT-B | Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. However, reset occurs simultaneous with completion of count-up. While output is being maintained, restarting of the count is not possible |  * n: Set value |
| One shot Recount II SHOT-C | Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. However, reset occurs simultaneous with output OFF. |  * n: Set value |
| One shot Hold count SHOT-D | Output control is maintained after count-up completion for a fixed time (approx. 1 sec). During that time, the count display does not change from that at count-up completion. Reset occurs simultaneous with output OFF. |  * n: Set value |

Panasonic
ideas for life

# DIN 48 SIZE LCD ELECTRONIC COUNTER

# LC4H-S

4-digit type

6-digit type

11 pin type

Screw terminal type

**UL File No.: E122222**
**C-UL File No.: E122222**

## Features

- **Bright and Easy-to-Read Display**
  A brand new bright 2-color backlight LCD display. The easy-to-read screen in any location makes checking and setting procedures a cinch.
- **Easy to use, simple operation, simple settings**
- Operation modes (input/output modes) can be set easily, using DIP switches on the side panel.
- Values can be set easily, using key switches on the front panel.
- **Pre-scaling function provided**
  A pre-scaling function enables conversion of lengths and volumes to any desired values, and displays the results.
- **Built-in power supply for high-capacitance sensor**
  An internal power supply drives a 12 VDC, 100 mA high-capacitance sensor. (AC power supply types only) Photoelectric switches, proximity switches and encoders can be directly connected.
- **Dual-path AC sensor can be connected.**
- **Basic insulation between the power supply and the input terminal (only for the sensor type model with power supply)**
  There is no need for caution when connecting between terminals.
- **Conforms to IP66's Weather Resistant Standards**
  The water-proof panel keeps out water and dirt for reliable operation even in poor environments.
- **4-digit or 6-digit display**
  Two sizes of displays are offered for you to choose the one that suits your needs.
- **Screw terminal and Pin Type are Both Standard Options**
  The two terminal types are standard options to support either front panel installation or embedded installation.
- **Compliant with UL, c-UL and CE.**

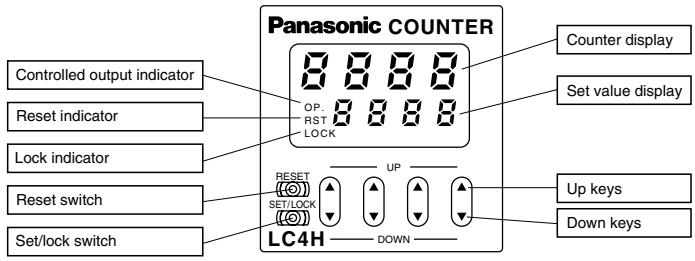


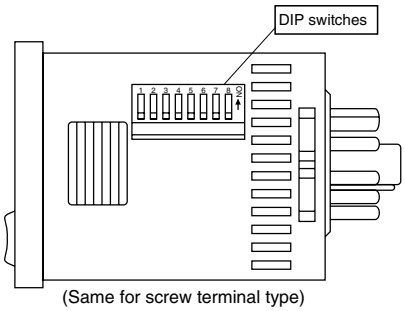
## Product types

| Digit | Count speed | Output | Operation voltage | Power down insurane | Additional function | Terminal | P/N |
|---|---|---|---|---|---|---|---|
| 4 | 30 Hz (cps) 5 kHz (kcps) switchable | Relay | 100-240 V AC with 12V DC power supply | Available | Scale Factor | 11 Pin | LC4H-PS-R4-AC240V |
| | | | | | Scale Factor | Screw | LC4H-PS-R4-AC240VS |
| | | | | | Scale Factor / Voltage Signal Input | 11 Pin | LC4H-PSV-R4-AC240V |
| | | | | | Scale Factor / Voltage Signal Input | Screw | LC4H-PSV-R4-AC240VS |
| | | | 12-24 V DC / 24 V AC | | Scale Factor | 11 Pin | LC4H-S-R4-24V |
| | | | | | Scale Factor | Screw | LC4H-S-R4-24VS |
| | | | | | Scale Factor / Voltage Signal Input | 11 Pin | LC4H-SV-R4-24V |
| | | | | | Scale Factor / Voltage Signal Input | Screw | LC4H-SV-R4-24VS |
| | | Transistor | | | Scale Factor | 11 Pin | LC4H-S-T4-24V |
| | | | | | Scale Factor | Screw | LC4H-S-T4-24VS |
| | | | | | Scale Factor / Voltage Signal Input | 11 Pin | LC4H-SV-T4-24V |
| | | | | | Scale Factor / Voltage Signal Input | Screw | LC4H-SV-T4-24VS |
| 6 | | Relay | 100-240 V AC with 12V DC power supply | | Scale Factor | 11 Pin | LC4H-PS-R6-AC240V |
| | | | | | Scale Factor | Screw | LC4H-PS-R6-AC240VS |
| | | | | | Scale Factor / Voltage Signal Input | 11 Pin | LC4H-PSV-R6-AC240V |
| | | | | | Scale Factor / Voltage Signal Input | Screw | LC4H-PSV-R6-AC240VS |
| | | | 12-24 V DC / 24 V AC | | Scale Factor | 11 Pin | LC4H-S-R6-24V |
| | | | | | Scale Factor | Screw | LC4H-S-R6-24VS |
| | | | | | Scale Factor / Voltage Signal Input | 11 Pin | LC4H-SV-R6-24V |
| | | | | | Scale Factor / Voltage Signal Input | Screw | LC4H-SV-R6-24VS |
| | | Transistor | | | Scale Factor | 11 Pin | LC4H-S-T6-24V |
| | | | | | Scale Factor | Screw | LC4H-S-T6-24VS |
| | | | | | Scale Factor / Voltage Signal Input | 11 Pin | LC4H-SV-T6-24V |
| | | | | | Scale Factor / Voltage Signal Input | Screw | LC4H-SV-T6-24VS |

## Part names

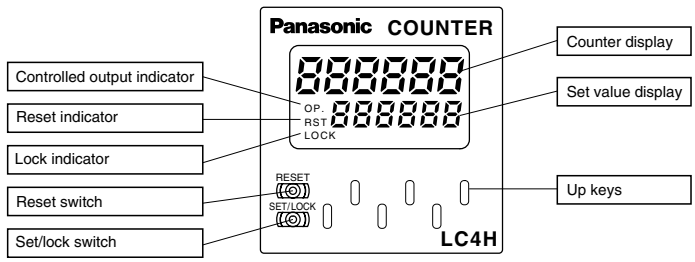
**• 4-digit display type**

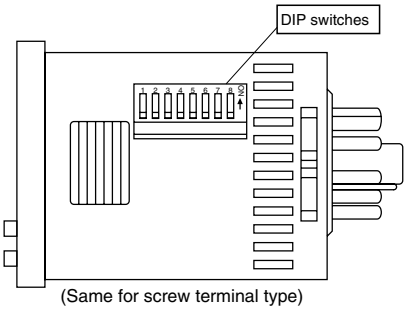



(Same for screw terminal type)

**• 6-digit display type**




(Same for screw terminal type)

## Specifications

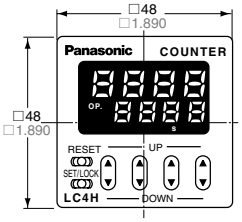
| Item | | | Relay output type | | Transistor output type |
|---|---|---|---|---|---|
| | | | AC type | DC/AC type | DC/AC type |
| Rating | Rated operating voltage | | 100 to 240 V | 12 to 24 V DC/24 V AC | 12 to 24 V DC/24 V AC |
| | Rated frequency | | 50/60 Hz common | | |
| | Rated power consumption | | Max. 10 V A | Max. 3 W | |
| | Rated control capacity | | 5 A 250 V AC (resistive load) | | 100 mA, 30 V DC |
| | Input mode | | Addition (UP)/Subtraction (DOWN)/Direction (DIR)/Individuality (IND)/Phase (PHASE)<br>5 modes selectable by DIP switches | | |
| | Max. counting speed | | 30 Hz, 5 kHz (selectable by DIP switches) | | |
| | Counting input (input 1, input 2) | | 16.7 ms at 30 Hz/0.1 ms at 5 kHz ON time: OFF time = 1:1 | | |
| | Reset input | | Min. input signal width: 1 ms, 20 ms (selected by DIP switches) | | |
| | Lock input | | Min. input signal width: 20 ms | | |
| | Input signal | | Contact, Open collector input/DC two-wire system sensor Input impedance: 1 kΩ or less, Input residual voltage: 2 V or less, Open impedance: 100 kΩ or less, Max. energized voltage: 40 V DC | | |
| | Output mode | | HOLD-A, HOLD-B, HOLD-C, SHOT-A, SHOT-B, SHOT-C, SHOT-D, 7 modes selectable by DIP switches | | |
| | One shot output time | | 1 s, 0.5s, 0.2s, 0.1s, 0.05, 0.01s | | |
| | Indication | | 7-segment LCD, Counter value (backlight red LED), Setting value (backlight yellow LED) | | |
| | Digit | | 4-digit display type –999 to 9999 (0 to 9999 for setting)<br>6-digit display type –99999 to 999999 (0 to 999999 for setting) | | |
| | Decimal point | | Can be set to three digits | | |
| | Pre-scaling | | 0.001 to 9.999 (4-digit type), 0.001 to 99.999 (6-digit type) | | |
| | Memory | | EEP-ROM (Overwriting times: $10^5$ ope. or more) | | |
| | Power for senser | | 12 V DC (±10%) 100 mA Max. | — | |
| Contact | Contact arrangement | | 1 Form C | | 1 Form A (Open collector) |
| | Initial contact resistance | | 100 mΩ (at 1 A 6 V DC) | | — |
| | Contact material | | Ag alloy/Au flush | | — |
| Life | Mechanical (contact) | | $2x10^7$ ope. (Except for switch operation parts) | | — |
| | Electrical (contact) | | $10^5$ ope. (At rated control voltage) | | $10^7$ ope. (At rated control voltage) |
| Electrical | Operating voltage range | | 85 to 264 V AC | 10.8 to 26.4 V DC, 20.4 to 26.4 V AC | |
| | Initial withstand voltage | | Between live and dead metal parts: 2,000 Vrms for 1 min (pin type)<br>Between input and output: 2,000 Vrms for 1 min | | |
| | Initial insulation resistance (At 500 V DC) | | Between live and dead metal parts: Min. 100 MΩ (pin type)<br>Between input and output: Min. 100 MΩ | | |
| | Temperature rise | | Max. 65° C (under the flow of nominal operating current at nominal voltage) | | |
| Mechanical | Vibration resistance | Functional | 10 to 55 Hz (1 cycle/min), single amplitude: 0.35 mm (10 min on 3 axes) | | |
| | | Destructive | 10 to 55 Hz (1 cycle/min), single amplitude: 0.75 mm (1 h 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) | | |
| Operating conditions | Ambient temperature | | –10° C to 55° C +14° F to +131° F | | |
| | Ambient humidity | | Max. 85 % RH (non-condensing) | | |
| | Air pressure | | 860 to 1,060 h Pa | | |
| Connection | | | 11-pin/screw terminal | | |
| Protective construction | | | IP66 (front panel with a rubber gasket) | | |

## Applicable standard

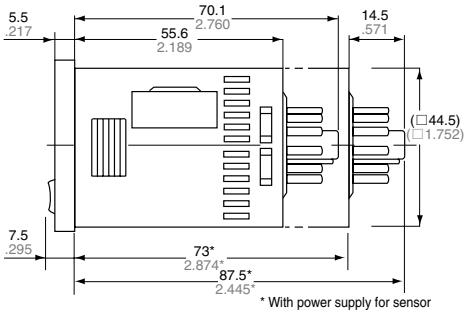
| Safety standard | EN61812-1 | Pollution Degree 2/Overvoltage Category II | |
|---|---|---|---|
| EMC | (EMI)EN61000-6-4 | | |
| | Radiation interference electric field strength | EN55011 Group1 ClassA | |
| | Noise terminal voltage | EN55011 Group1 ClassA | |
| | (EMS)EN61000-6-2 | | |
| | Static discharge immunity | EN61000-4-2 | 4 kV contact<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 | 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 | 2 kV (power supply line)<br>1 kV (signal line) |
| | Surge immunity | EN61000-4-5 | 1 kV (power 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) |
| | Voltage dip/Instantaneous stop/Voltage fluctuation immunity | EN61000-4-11 | 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

## Dimensions

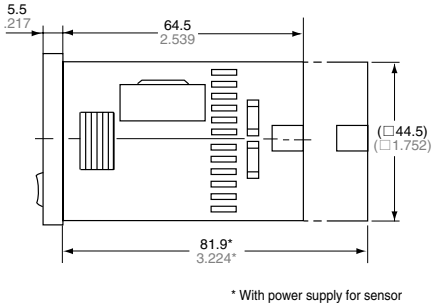
mm inch
General tolerance: ±1.0 ±.039




Pin type (Flush mount/Surface mount)



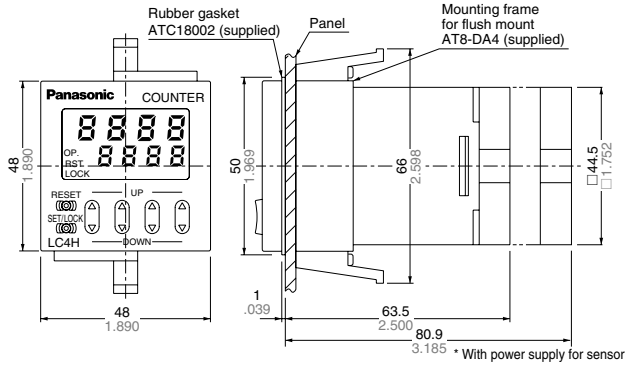

Screw terminal type: M3.5 (Flush mount)



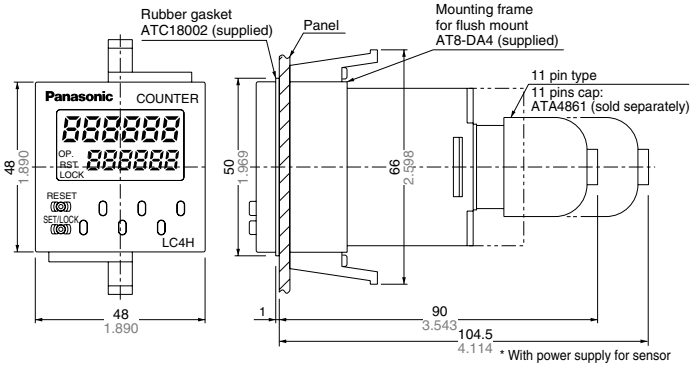

(* 6-digit display type has the same dimensions.)

**• Dimensions for flush mounting (with adapter installed)**

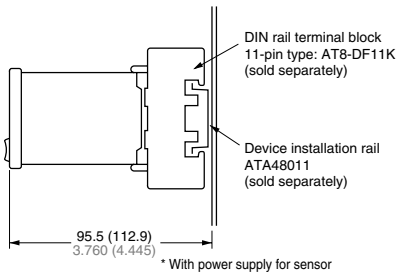
Screw terminal type




Pin type

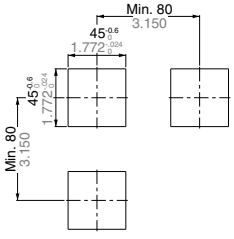



**• Dimensions for front panel installations**

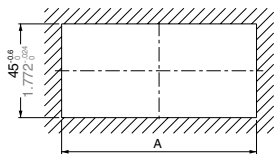



**• Installation panel cut-out dimensions**

The standard panel cut-out dimensions are shown below. Use the mounting frame (AT8-DA4) and rubber gasket (ATC18002).




**• For connected installations**




When n units are attached in a continuous series, the dimension of (A) is:

$A = (48 \times n - 2.5)\ ^{-0.6}_{0}$

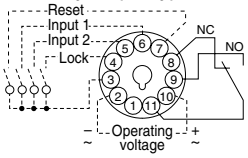
Note 1: The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.

Note 2: For connected installations, the waterproofing ability between the unit and installation panel is lost.

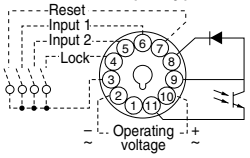
## Terminal layouts and wiring diagrams

**• Pin type**

Relay output type

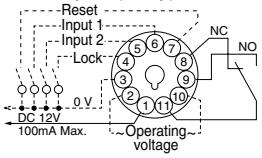



Transistor output type

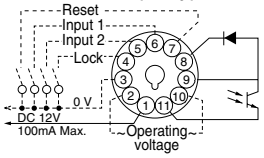



* With power supply for sensor

Relay output type

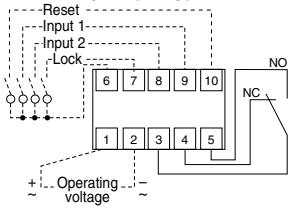



Transistor output type

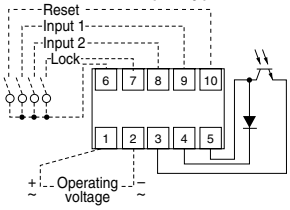



**• Screw terminal type**

Relay output type

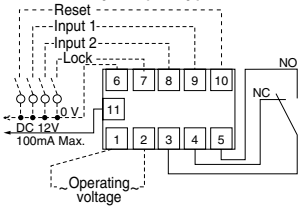



Transistor output type

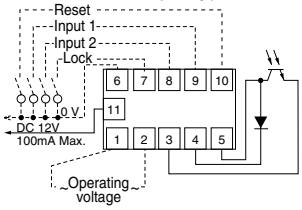



* With power supply for sensor

Relay output type




Transistor output type




Note) For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 115.

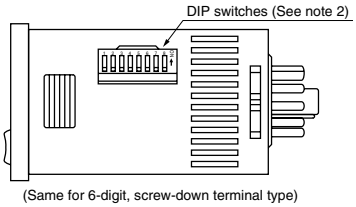
## Setting the operation mode and counter

**Setting procedure 1) Setting the operation mode (input mode and output mode)**

Set the input and output modes with the DIP switches on the side of the counter.

**DIP switches**

| | Item | DIP switch | |
|---|---|---|---|
| | | OFF | ON |
| 1 | Output mode | Refer to table 1 | |
| 2 | | | |
| 3 | | | |
| 4 | Minimum reset input signal width | 20 ms | 1 ms |
| 5 | Maximum counter setting | 30 Hz | 5 kHz |
| 6 | Input mode | Refer to table 2 | |
| 7 | | | |
| 8 | | | |



(Same for 6-digit, screw-down terminal type)

Table 1: Setting the output mode

| DIP switch No. | | | Output mode |
|---|---|---|---|
| 1 | 2 | 3 | |
| ON | ON | ON | SHOT-A |
| OFF | OFF | OFF | SHOT-B |
| ON | OFF | OFF | SHOT-C |
| OFF | ON | OFF | SHOT-D |
| ON | ON | OFF | HOLD-A |
| OFF | OFF | ON | HOLD-B |
| ON | OFF | ON | HOLD-C |
| OFF | ON | ON | — (See note 1) |

Table 2: Setting the input mode

| DIP switch No. | | | Input mode |
|---|---|---|---|
| 6 | 7 | 8 | |
| ON | ON | ON | Addition input |
| OFF | OFF | OFF | Subtraction input |
| ON | OFF | OFF | Directive input |
| OFF | ON | OFF | Independent input |
| ON | ON | OFF | Phase input |
| OFF | OFF | ON | — (See note 1) |
| ON | OFF | ON | — (See note 1) |
| OFF | ON | ON | — (See note 1) |

Notes:1) The counter and set value displays will display DIP Err.
2) Set the DIP switches before installing the counter on the panel.
3) When the DIP SW setting is changed, turn off the power once.
4) The DIP switches are set as ON before shipping.

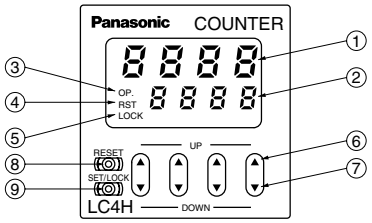
**Setting procedure 2) Setting the set value**

Set the set value with the UP and DOWN keys on the front of the counter.

**Front display section**

**• 4-digit display type**

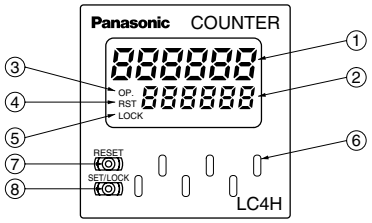
① Counter display
② Set value display
③ Controlled output indicator
④ Reset indicator
⑤ Lock indicator
⑥ UP keys
Changes the corresponding digit of the set value in the addition direction (upwards)




⑦ DOWN keys
Changes the corresponding digit of the set value in the subtraction direction (downwards)
⑧ RESET switch
Resets the counting value and the output
⑨ SET/LOCK switch
This is used to handle pre-scaling values, one-shot times, decimal point position settings, and key lock operations (to disable Up key, Down key, and Reset key operations).

**• 6-digit display type**

① Counter display
② Set value display
③ Controlled output indicator
④ Reset indicator
⑤ Lock indicator



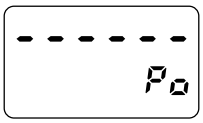

⑥ UP keys
Changes the corresponding digit of the set value in the addition direction (upwards)
⑦ RESET switch
Resets the counting value and the output
⑧ SET/LOCK switch
This is used to handle pre-scaling values, one-shot times, decimal point position settings, and key lock operations (to disable Up key, Down key, and Reset key operations).

**Setting procedure 3) Setting the input mode**

The input mode is set using the key switch in the [Display] section on the front of the counter.

**• Decimal point position setting mode**

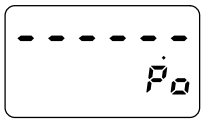
① Holding down the [SET/LOCK] key, press the key for the second digit to access the decimal point position setting mode.




Example) 6-digit type
Decimal point position setting mode display
(Example shows default value displayed)

② When the setting mode has been accessed, release the [SET/LOCK] key.

③ The decimal point is set using the [UP] and [DOWN] keys to specify the 2nd, 3rd, and 4th digits (this applies only to 4-digit models).(The 1st digit is set using the [UP] key or [DOWN] key in settings where there is no decimal point (this applies only to 4-digit models).)




Example) 6-digit type
Example shows 2nd digit displayed using [UP] key

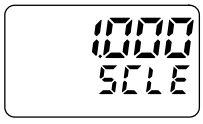
④ Press the [RESET] key to set the displayed decimal point position and return to normal operation.

**• Setting the pre-scaling value**

① Holding down the [SET/LOCK] key, press the key for the first digit to access the pre-scaling value setting mode.

Example) 4-digit type


Example) 6-digit type




Pre-scaling value setting mode displayed
(Example shows default values displayed)

② When the setting mode has been accessed, release the [SET/LOCK] key.

③ Use the [UP] or [DOWN] key to set the pre-scaling value (this applies only to 4-digit models).

Select either: 0.001 to 9.999 (4-digit) or 0.001 to 99.999 (6-digit)

④ Press the [RESET] key to set the displayed pre-scaling value and return to normal operation.

**• Setting the one-shot output time**

① Holding down the [SET/LOCK] key, press the key for the third digit to access the one-shot output time setting mode.


Example) 6-digit type
One-shot output time setting mode displayed
(Example shows default value displayed)

② When the setting mode has been accessed, release the [SET/LOCK] key.

③ Each time the 1st-digit [UP] key is pressed, the one-shot output time changes in the following sequence, moving to the right:

↱ 1 s → 0.5 s → 0.2 s → 0.1 s → 0.05 s → 0.01 s ↰

(With a 4-digit type, the [DOWN] key can also be used to move to the left.)

④ Press the [RESET] key to set the displayed one-shot output time and return to normal operation.



## Changing the set value

**1. It is possible to change the set value with the up and down keys (4-digit type only) even during counting. However, be aware of the following points.**

1) If the set value is changed to less than the count value with counting set to the addition direction, counting will continue until it reaches full scale (9999 with the 4-digit type and 999999 with the 6-digit type), returns to zero, and then reaches the new set value. If the set value is changed to a value above the count value, counting will continue until the count value reaches the new set value.

2) Suppose that thew counter is preset to count down. Whether a preset count-down value is smaller or larger than the count value, the counter counts down to "0 (zero)".

**2. If the set value is changed to "0," the unit will not complete count-up. It starts counting up when the counting value comes to "0 (zero)" again.**

1) Up-count (addition) input
When counting is set to the addition direction, counting will continue until full scale is reached (9999 with the 4-digit type and 999999 with the 6-digit type), return to zero, and then complete count-up.

2) Down-count (subtraction) input
When counting is set to the subtraction direction, counting will continue until full scale is reached (-999 with the 4-digit type and -99999 with the 6-digit type), and then the display will change to ▫▫▫▫ with the 4-digit type and ▫▫▫▫▫▫ with the 6-digit type.
The counting value does not become "0 (zero)" and so the counter does not count up.

3) Directive, independent, and phase inputs
The counting value is counted up or down to any number other than "0" once. When it comes to "0 (zero)" again, the counter starts counting up.

## Cautions for use

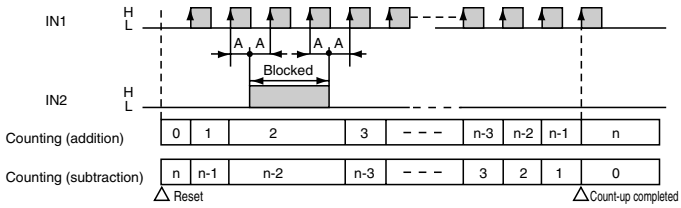
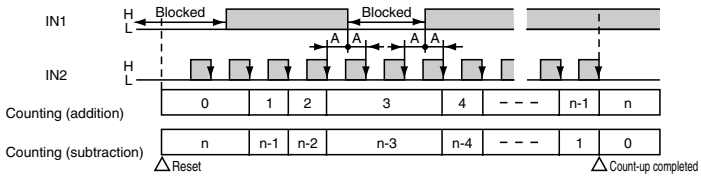
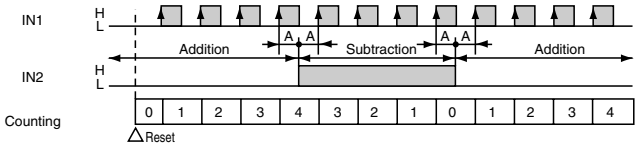
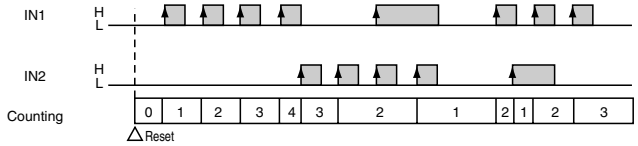
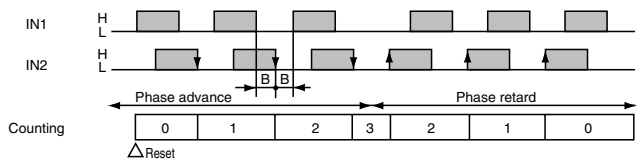
For more information regarding the cautions for use of LC4H series counter, refer to page 114 "PRECAUTIONS IN USING THE LC4H SERIES".

## Operation mode

**1. Input mode**

For the input mode, you can choose one of the following five modes

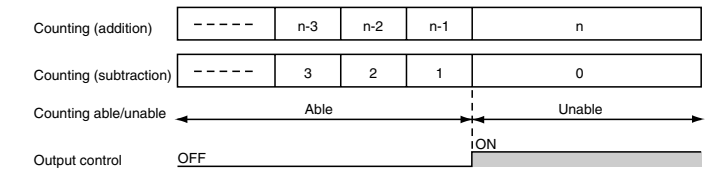
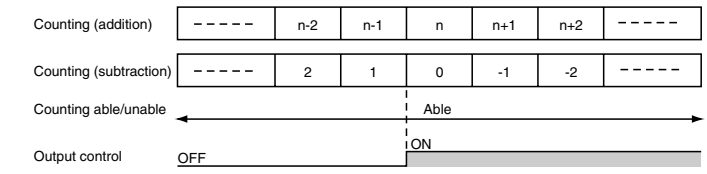
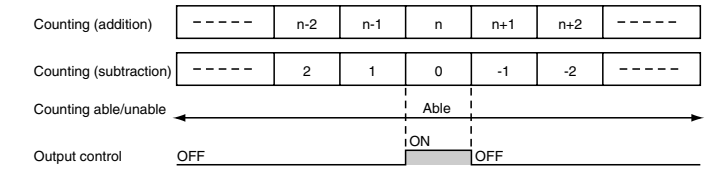
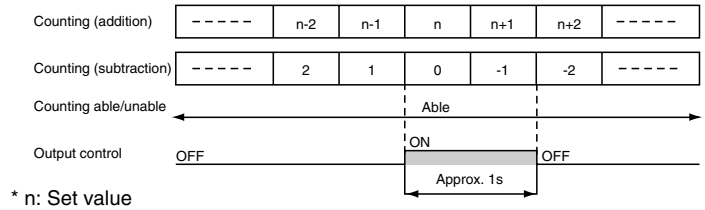
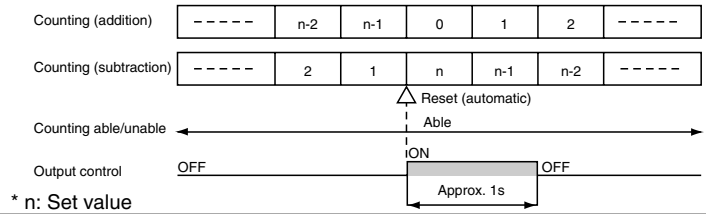
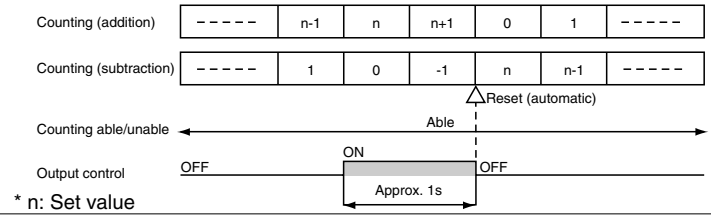
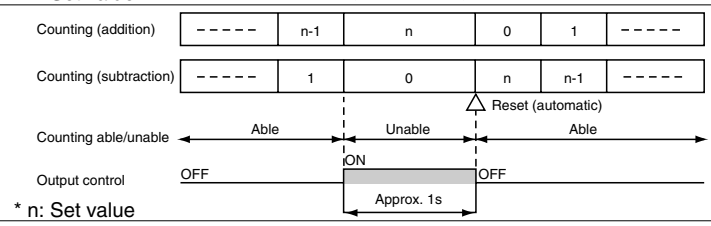
- Addition UP
- Subtraction DOWN
- Directive DIR
- Independent IND
- Phase PHASE

| Input mode | Operation | *Minimum input signal width 30 Hz: 16.7 ms; 5 kHz: 0.1 ms |
|---|---|---|
| Addition UP | IN1 or IN2 works as an input block (gate) for the other input. | • Example where IN1 is the counting input and IN2 is the input block (gate).<br>  |
| Subtraction DOWN | | • Example where IN2 is the counting input and IN1 is the input block (gate).<br>  <br>* "A" must be more than the minimum input signal width. |
| Directive DIR | IN1 is the counting input and IN2 is the addition or subtraction directive input. IN2 adds at L level and subtracts at H level. |  <br>* "A" must be more than the minimum input signal width. |
| Independent IND | IN1 is addition input and IN2 is subtraction input. |  <br>* IN1 and IN2 are completely independent, so there is no restriction on signal timing. |
| Phase PHASE | Addition when the IN1 phase advances beyond IN2, and subtraction when the IN2 phase advances beyond IN1. |  <br>* "B" must be more than the minimum input signal width. |

**2. Output mode**

For the output mode, you can choose one of the following seven modes

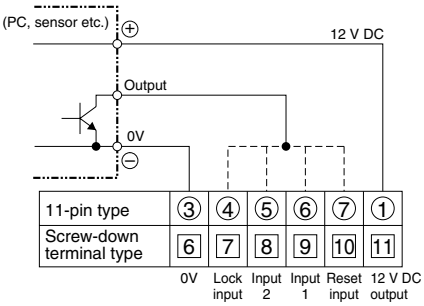
- Maintain output/hold count HOLD-A
- Maintain output/over count I HOLD-B
- Maintain output/over count II HOLD-C
- One shot/over count SHOT-A
- One shot/recount I SHOT-B
- One shot/recount II SHOT-C
- One shot/hold count SHOT-D

| Output mode | Operation | (Example when input mode is either addition or subtraction) |
|---|---|---|
| Maintain output Hold count HOLD-A | Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion. |  * n: Set value |
| Maintain output Over count I HOLD-B | Output control is maintained after count-up completion and until resetting. However, counting is possible despite completion of count-up. |  * n: Set value |
| Maintain output Over count II HOLD-C | Output control is maintained after count-up completion and until the next signal enters. However, counting is possible despite completion of count-up. |  * n: Set value |
| One shot Over count SHOT-A | Output control is maintained after count-up completion for one shot output time. Counting is possible despite completion of count-up. |  * n: Set value |
| One shot Recount I SHOT-B | Output control is maintained after count-up completion for one shot output time. Counting is possible despite completion of count-up. However, reset occurs simultaneous with completion of count-up. While output is being maintained, restarting of the count is not possible |  * n: Set value |
| One shot Recount II SHOT-C | Output control is maintained after count-up completion for one shot output time. Counting is possible despite completion of count-up. However, reset occurs simultaneous with output OFF. |  * n: Set value |
| One shot Hold count SHOT-D | Output control is maintained after count-up completion for one shot output time. During that time, the count display does not change from that at count-up completion. Reset occurs simultaneous with output OFF. |  * n: Set value |

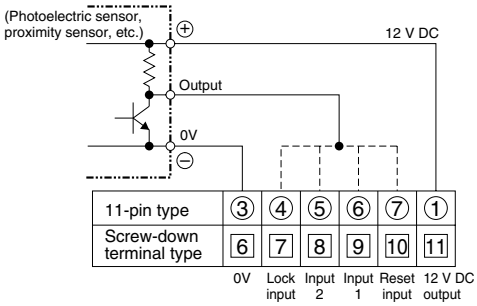
## Input connections

**• Signal input type**

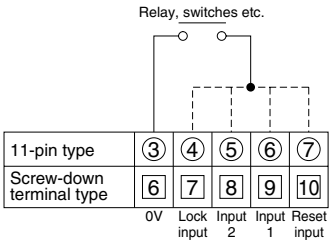
1) Open collector



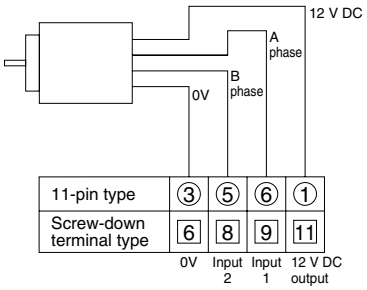

2) For voltage output




3) Contact input




4) For a rotary encoder

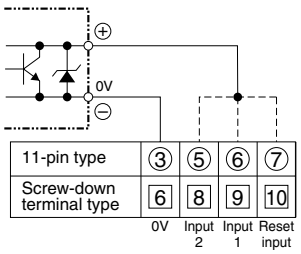



Input 1, input 2, and reset input specifications
- Impedance during short-circuit: 1 kΩ max. (At 0 Ω, the outflow current is approximately 12 mA.)
- Residual voltage during short-circuit: 2 V max.
- Impedance when released: 100 kΩ min.
- Max. applied voltage: 40 VDC max.

Lock input specifications
- Impedance during short-circuit: 1 kΩ max. (At 0 Ω, the outflow current is approximately 1.5 mA.)
- Residual voltage during short-circuit: 2 V max.
- Impedance when released: 100 kΩ min.
- Max. applied voltage: 40 DVC max.
- The contact relay should be one which can open/close 5 V, 1.5 mA.

* There is no 12 V DC with 12 - 24 V DC/24 V AC types.

5) For a dual-line sensor




Dual-line sensor specifications
- Leakage current: 1.5 mA max.
- Breaker capacitance: 5 mA min.
- Residual voltage: 3.0 V max.
- Usable voltage: Runs on 10 VDC

* If a dual-line sensor is connected to a 12 - 24 VDC/24 VAC type, 24 VDC (21.6 to 26.4 VDC) and 24 VAC (21.6 to 26.4 VAC) should be applied to the power supply voltage of the counter.

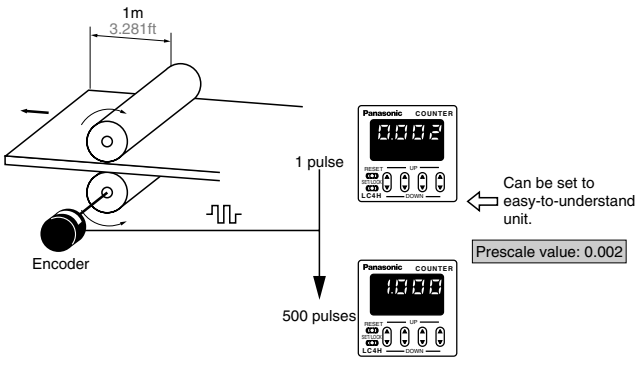
## What is the prescale function?

**The prescale function converts the count into an actual value (amount) and displays it.**

Example

For a device that outputs 500 pulses when 1 m has been fed:

1. Set decimal position to the last 3rd place.
2. Set the prescale value to 0.002 (1/500).

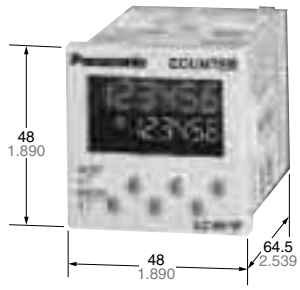


Panasonic
ideas for life

# DIN 48 SIZE LCD ELECTRONIC COUNTER

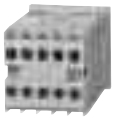
# LC4H-W

**UL File No.: E122222**
**C-UL File No.: E122222**




mm inch

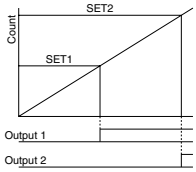
11-pin type



Screw terminal type

## Features

- **Two-stage presetting (upper and lower limits)**



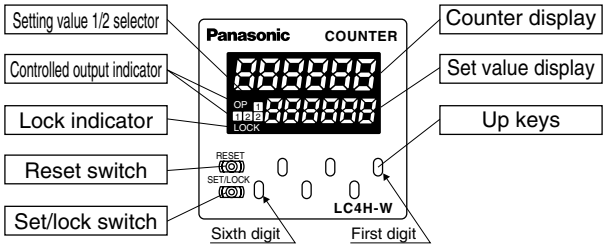

- **Bright and Easy-to-Read Display**
  A brand new bright 2-color backlight LCD display. The easy-to-read screen in any location makes checking and setting procedures a cinch.
- **Simple Operation**
  Seesaw buttons make operating the unit even easier than before.
- **Short Body of only 64.5 mm 2.539 inch (screw type) or 70.1 mm 2.760 inch (pin type)**
  With a short body, it easily installs in even narrow control panels.
- **Conforms to IP66's Weather Resistant Standards**
  The water-proof panel keeps out water and dirt for reliable operation even in poor environments.
- **Screw terminal and Pin Type are Both Standard Options**
  The two terminal types are standard options to support either front panel installation or embedded installation.
- **Changeable Panel Cover**
  Also offers a black panel cover to meet your design considerations.
- **Compliant with UL, c-UL and CE.**

## Product types

| Digit | Count speed | Output mode | | Output | Operating voltage | Power down insurance | Terminal type | Part number |
|---|---|---|---|---|---|---|---|---|
| | | Output 1 | Output 2 | | | | | |
| 6 | 30 Hz (cps)/ 5 KHz (Kcps) switchable | • Maintain output/over count I<br>• Maintain output/over count II<br>• Maintain output/over count III<br>• One shot/over count<br>(4 modes) | • Maintain output/hold count<br>• Maintain output/over count I<br>• Maintain output/over count II<br>• Maintain output/over count III<br>• One shot/over count<br>• One shot/recount I<br>• One shot/recount II<br>• One shot/hold count<br>(8 modes) | Relay (1a+1a) | 100 to 240 V AC | Available | 11 pins | LC4H-W-R6-AC240V |
| | | | | | | | Screw terminal | LC4H-W-R6-AC240VS |
| | | | | | 24V AC | | 11 pins | LC4H-W-R6-AC24V |
| | | | | | | | Screw terminal | LC4H-W-R6-AC24VS |
| | | | | | 12 to 24 V DC | | 11 pins | LC4H-W-R6-DC24V |
| | | | | | | | Screw terminal | LC4H-W-R6-DC24VS |
| | | | | Transistor (1a+1a) | 100 to 240 V AC | | 11 pins | LC4H-W-T6-AC240V |
| | | | | | | | Screw terminal | LC4H-W-T6-AC240VS |
| | | | | | 24V AC | | 11 pins | LC4H-W-T6-AC24V |
| | | | | | | | Screw terminal | LC4H-W-T6-AC24VS |
| | | | | | 12 to 24 V DC | | 11 pins | LC4H-W-T6-DC24V |
| | | | | | | | Screw terminal | LC4H-W-T6-DC24VS |

* A rubber gasket (ATC18002) and a mounting frame (AT8-DA4) are included.

## Part names




: Used to set the corresponding digits for the count-up mode.

: Used to reset counting and its output.

SET/LOCK key : Used to select between the Setting 1 display and Setting 2 display and to lock the keys (UP and RESET keys not responsive to touch). Used also to set and confirm the input mode.

## Specifications

| Item | | | Relay output type | | Transistor output type | |
|---|---|---|---|---|---|---|
| | | | AC type | DC type | AC type | DC type |
| Rating | Rated operating voltage | | 100 to 240 V AC<br>24 V AC | 12 to 24 V DC | 100 to 240 V AC<br>24 V AC | 12 to 24 V DC |
| | Rated frequency | | 50/60 Hz common | — | 50/60 Hz common | — |
| | Rated power consumption | | Max. 10 V A | Max. 3 W | Max. 10 V A | Max. 3 W |
| | Rated control capacity | | 3 A, 250 V AC (resistive load) | | 100 mA, 30 V DC | |
| | Input mode | | Addition (UP)/Subtraction (DOWN)/Direction (DIR)/Individuality (IND)/Phase (PHASE) (5 modes selectable by DIP switch) | | | |
| | Counting speed | | 30 Hz(cps)/5 KHz(cps) (selectable by DIP switch) | | | |
| | Counting input (Input 1, 2) | | Min. input signal width: 16.7 ms at 30 Hz(cps)/0.1 ms at 5 KHz(cps) ON time: OFF time = 1:1 | | | |
| | Reset input | | Min. input signal width: 1 ms, 20 ms (selected by DIP switch) | | | |
| | Input signal | | Contact or Open collector input/Input impedance: 1 kΩ or less, Input residual voltage: 2 V or less,<br>Open impedance: 100 kΩ or more, Max. energized voltage: 40 V DC | | | |
| | Output mode | | Output 1. HOLD-B, C, D SHOT-A (4 modes)<br>Output 2. HOLD-A, B, C SHOT-A, B, C, D (8 modes)<br>(selectable by DIP switch) | | | |
| | One shot output time | | Approx. 1 s | | | |
| | Indication | | 7-segment LCD, Counter value (backlight red LED), Setting value (backlight yellow LED) | | | |
| | Digit | | –99999 to 999999 (–5 digits to 6 digits) (0 to 999999 for setting) | | | |
| | Memory | | EEP-ROM (Overwriting times: $10^5$ ope. or more) | | | |
| Contact | Contact arrangement | | 1 Form A + 1 Form A | | 1 Form A + 1 Form A (Open collector) | |
| | Contact resistance (Intial value) | | 100 mΩ (at 1 A 6 V DC) | | — | |
| | Contact material | | Ag alloy/Au flush | | — | |
| Life | Mechanical (contact) | | Min. $2 \times 10^7$ ope. | | — | |
| | Electrical (contact) | | Min. $10^5$ ope. (At rated control voltage) | | Min. $10^7$ ope. (At rated control voltage) | |
| Electrical | Allowable operating voltage range | | 85 to 110 % of rated operating voltage | | | |
| | Break down voltage (Initial value) | | Between live and dead metal parts: 2,000 Vrms for 1 min (pin type)<br>Between input and output: 2,000 Vrms for 1 min<br>Between open contacts: 1,000 Vrms for 1 min | | Between live and dead metal parts: 2,000 Vrms for 1 min<br>Between input and output: 2,000 V AC for 1 min | |
| | Insulation resistance (At 500 V DC) (Initial value) | | Between live and dead metal parts: Min. 100 MΩ (pin type)<br>Between input and output: Min. 100 MΩ<br>Between open contact: Min. 100 MΩ | | Between live and dead metal parts: Min. 100 MΩ (pin type)<br>Between input and output: Min. 100 MΩ | |
| | Temperature rise | | Max. 65°C<br>(under the flow of nominal operating current at nominal voltage) | | — | |
| Mechanical | Vibration resistance | Functional | 10 to 55 Hz (1 cycle/min), single amplitude: 0.35 mm (10 min on 3 axes) | | | |
| | | Destructive | 10 to 55 Hz (1 cycle/min), single amplitude: 0.75 mm (1 h 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) | | | |
| Operating conditions | Ambient temperature | | –10°C to 55°C +14°F to +131°F | | | |
| | Ambient humidity | | Max. 85 % RH (non-condensing) | | | |
| | Air pressure | | 860 to 1,060 h Pa | | | |
| | Ripple rate | | — | 20 % or less | — | 20 % or less |
| Connection | | | 11-pin/screw terminal | | | |
| Protective construction | | | IP66 (front panel with a rubber gasket) | | | |

## Applicable standard

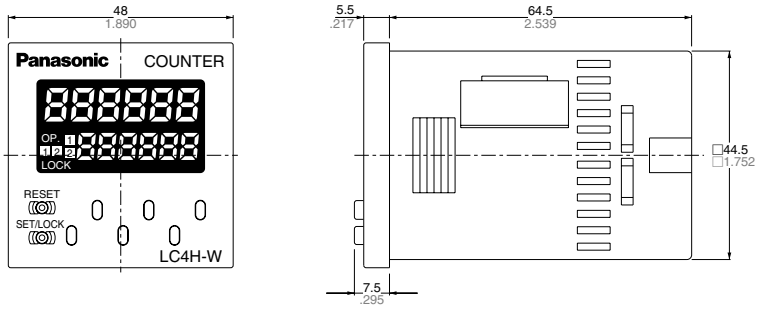
| Safety standard | EN61812-1 | Pollution Degree 2/Overvoltage Category II |
|---|---|---|
| EMC | (EMI)EN61000-6-4<br>Radiation interference electric field strength<br>Noise terminal voltage<br>(EMS)EN61000-6-2<br>Static discharge immunity<br><br>RF electromagnetic field immunity<br><br>EFT/B immunity<br><br>Surge immunity<br>Conductivity noise immunity<br>Power frequency magnetic field immunity<br>Voltage dip/Instantaneous stop/Voltage fluctuation immunity | <br>EN55011 Group1 ClassA<br>EN55011 Group1 ClassA<br><br>EN61000-4-2 4 kV contact<br>8 kV air<br>EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz)<br>EN61000-4-4 2 kV (power supply line)<br>1 kV (signal line)<br>EN61000-4-5 1 kV (power line)<br>EN61000-4-6 10 V/m AM modulation (0.15 MHz to 80 MHz)<br>EN61000-4-8 30 A/m (50 Hz)<br>EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

## Dimensions

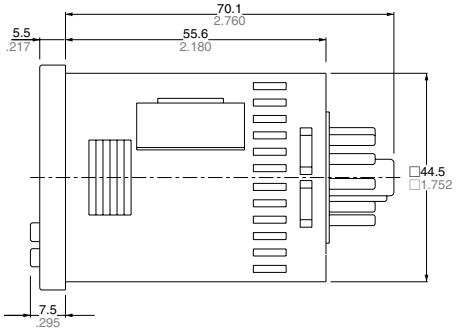
mm inch
General tolerance: ±1.0 ±.039

**• LC4H-W electrical counter**

Screw terminal type
(Flush mount): M3.5

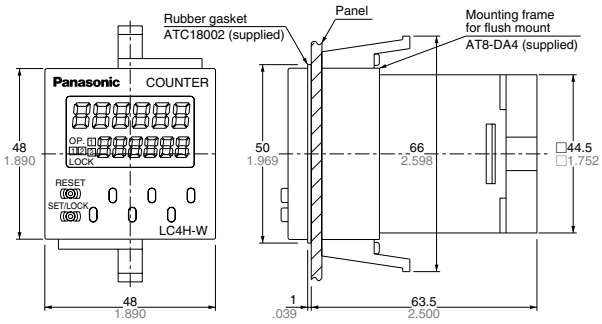



Pin type
(Flush mount/Surface mount)

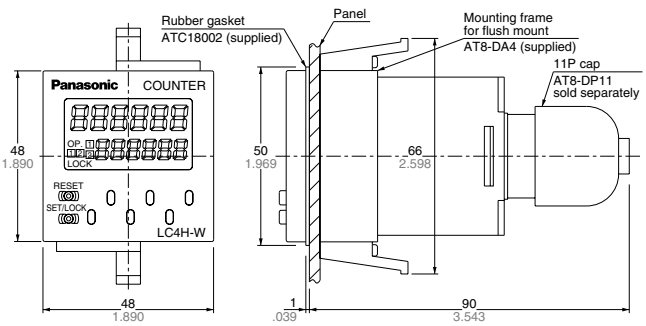



**• Dimensions for flush mounting (with adapter installed)**

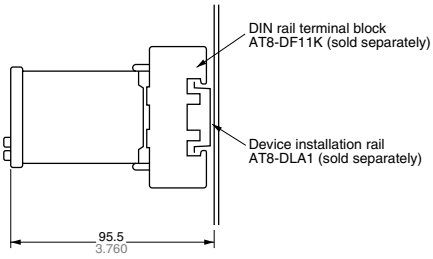
Screw terminal type




Pin type

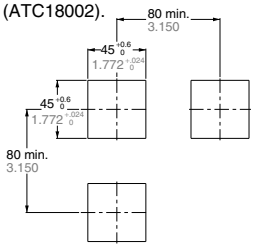



**• Dimensions for front panel installations**

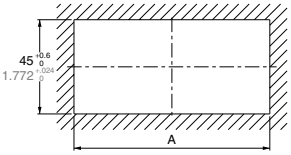



**• Installation panel cut-out dimensions**

The standard panel cut-out dimensions are shown below. Use the mounting frame (AT8-DA4) and rubber gasket (ATC18002).




**• For connected installations**




When n units are attached in a continuous series, the dimension of (A) is:

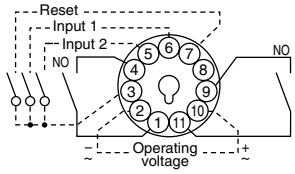
$A = (48 \times n - 2.5)^{+0.6}_{0}$

Note 1): The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.
2): For connected installations, the waterproofing ability between the unit and installation panel is lost.

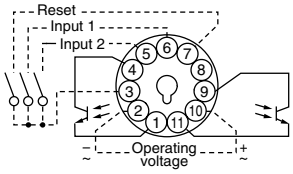
## Terminal layouts and wiring diagrams

**• Pin type**

Relay output type

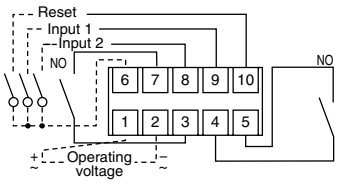



Transistor output type

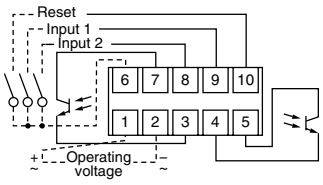



**• Screw terminal type**

Relay output type




Transistor output type




Note) For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 115.

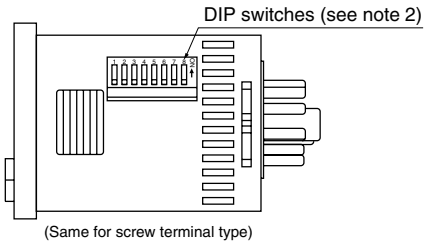
## Setting the operation mode and counter

**Setting procedure 1) Setting the output mode (output 1, 2)**

Set the output 1 and output 2 with the DIP switches on the side of the counter.
The minimum input signal width and maximum counting speed for the reset are set at the same time.

**DIP switches**

| | Item | OFF | ON |
|---|---|---|---|
| 1 | Output mode Output 1 | Refer to table 1 | |
| 2 | | | |
| 3 | | | |
| 4 | Minimum reset input signal width | 20ms | 1ms |
| 5 | Maximum counter setting | 30Hz | 5kHz |
| 6 | Output mode Output 2 | Refer to table 2 | |
| 7 | | | |
| 8 | | | |



(Same for screw terminal type)

Table 1

| DIP swith No. 1 | 2 | 3 | Output mode (Output 1) |
|---|---|---|---|
| ON | ON | ON | — (See note 1) |
| OFF | OFF | OFF | HOLD–B |
| ON | OFF | OFF | HOLD–C |
| OFF | ON | OFF | HOLD–D |
| ON | ON | OFF | SHOT–A |
| OFF | OFF | ON | — (See note 1) |
| ON | OFF | ON | — (See note 1) |
| OFF | ON | ON | — (See note 1) |

Table 2

| DIP swith No. 6 | 7 | 8 | Output mode (Output 2) |
|---|---|---|---|
| ON | ON | ON | HOLD–A |
| OFF | OFF | OFF | HOLD–B |
| ON | OFF | OFF | HOLD–C |
| OFF | ON | OFF | HOLD–D |
| ON | ON | OFF | SHOT–A |
| OFF | OFF | ON | SHOT–B |
| ON | OFF | ON | SHOT–C |
| OFF | ON | ON | SHOT–D |

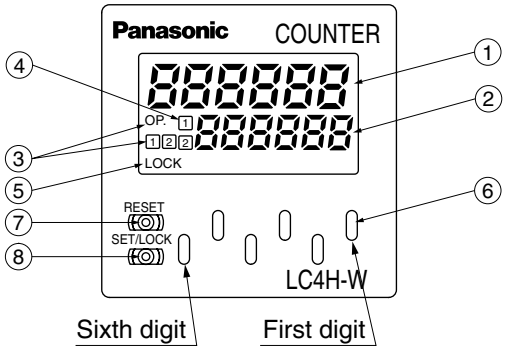
Notes:1) The counter and set value displays will display DIP Err.
2) Set the DIP switches before installing the counter on the panel.
3) When the DIP SW setting is changed, turn off the power once.
4) The DIP switches are set as ON before shipping.

**Setting procedure 2) Setting the set value**

Set the set value with the UP keys on the front of the counter.

① Counter display
② Set value display
③ Controlled output indicator
④ Setting 1/2 selection display (*Note)
⑤ Lock indicator

*Note:
Pressing the [SET/LOCK] key switches the display between the set value 1 and 2 displays.
Display either set value [1] or [2], and set the value.



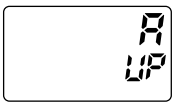

⑥ UP keys
[Changes the corresponding digit of the set value in the addition direction (upwards)]
⑦ RESET switch
Resets the counting value and the output
⑧ SET/LOCK switch
Used to select between the Setting 1 display and Setting 2 display, to set and confirm the input mode, and to lock the keys (UP and RESET keys not responsive to touch).

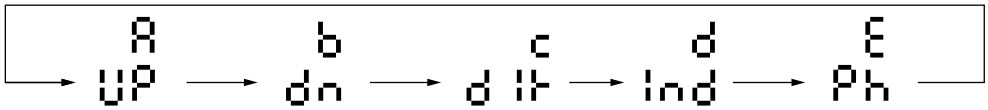
**Procedure 3) Setting the input mode**

Set the input mode using the key and switch in the front display section on the counter front.

(1) Hold down the SET/LOCK key and press the UP key for the first digit. The setting mode is accessed.
(2) Now release the SET/LOCK key.
(3) Press the UP key for the first digit and the input position changes counterclockwise.

Example)
Input mode displayed
(UP: addition mode)




Addition subtraction Directive Independent Phase difference

(4) Press the RESET key and the input mode being displayed is set. The display then goes back to normal.

**• Checking the input mode**
Hold down the SET/LOCK key and press the UP key for the second digit. The input mode is displayed for about 2 seconds and then the display goes back to normal. (During these 2 seconds, all operations other than the display are being performed.)

**• Locking the keys**
Hold down the SET/LOCK key and press the UP key for the sixth digit. The keys will lock. This means that the UP and RESET keys do not respond to touch. To unlock the keys,hold down the SET/LOCK key and press the UP key for the sixth digit again.

* The input mode, maximum counting speed and minimum reset signal width cannot be preset independently for Setting 1 and Setting 2.

**• Selecting the Setting 1 or Setting 2 display**
Press the SET/LOCK key and the display changes between Setting 1 and Setting 2. (This operation does not affect overall operation.)

**• Changing the setting**

**1. While the counter is working, the UP key can be used to change the setting. Keep the following points in mind, however.**

1) Suppose that a preset count-up value is smaller than the displayed count value. The counter counts up to the full scale mark (999999), goes back to "0", and counts up again to the preset number. When the preset count-up value is larger than the displayed count value, the counter counts up to the preset value.

2) Suppose that the counter is preset to count down. Whether a preset count-down value is smaller or larger than the count value, the counter counts down to "0".

**2. When the preset value is "0", the counter does not start in the count-up mode. It starts counting up when the count value comes to "0" again.**

1) Up-count input
The counter counts up to the full scale mark (999999), goes back to "0" and starts counting up again.

2) Down-count input
The counter counts down to the full scale mark (–99999) and the display reads - - - - - -. The count value does not become "0" and so the counter does not count up.

3) Direction input, individual input, and phase input
The preset value is counted up or down to any number other than "0" once. When it comes to "0" again, the counter starts counting up.

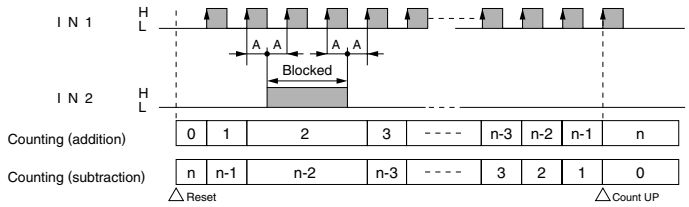
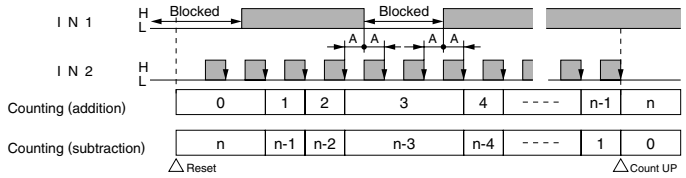
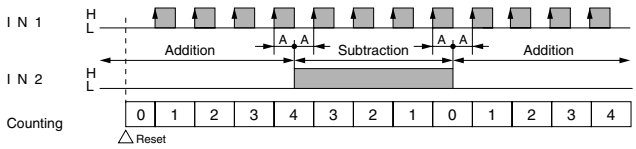
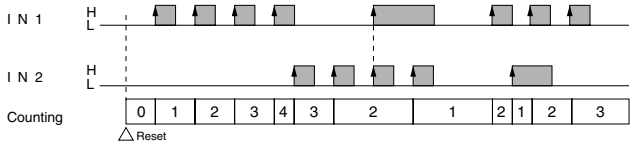
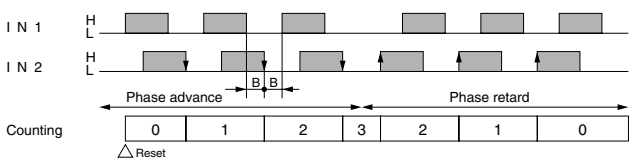
## Operation modes

**1. Input mode**

① For the input mode, you can choose one of the following five modes.

- Addition UP
- Subtraction DOWN
- Directive DIR
- Independent IND
- Phase PHASE

② After the counter has been reset, setting 2 is displayed in the count-down mode. „0“ appears instead in all other modes.

| Input mode | Operation | *Minimum input signal width 30 Hz: 16.7 ms; 5 kHz: 0.1 ms |
|---|---|---|
| Addition UP | IN1 or IN2 works as an input block (gate) for the other input. | • Example where IN1 is the counting input and IN2 is the input block (gate).<br>  |
| Subtraction DOWN | | • Example where IN2 is the counting input and IN1 is the input block (gate).<br>  <br>* “A” must be more than the minimum input signal width. *n: Set value 2 |
| Directive DIR | IN1 is the counting input and IN2 is the addition or subtraction directive input. IN2 adds at L level and subtracts at H level. |  <br>* “A” must be more than the minimum input signal width. *n: Set value 2 |
| Independent IND | IN1 is addition input and IN2 is subtraction input. |  <br>* IN1 and IN2 are completely independent, so there is no restriction on signal timing. |
| Phase PHASE | Addition when the IN1 phase advances beyond IN2, and subtraction when the IN2 phase advances beyond IN1. |  <br>* “B” must be more than the minimum input signal width. |

**2. Output mode**

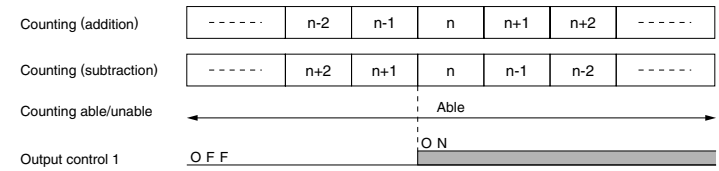
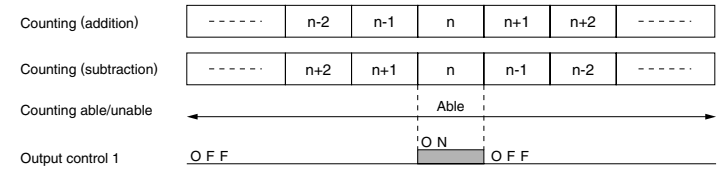
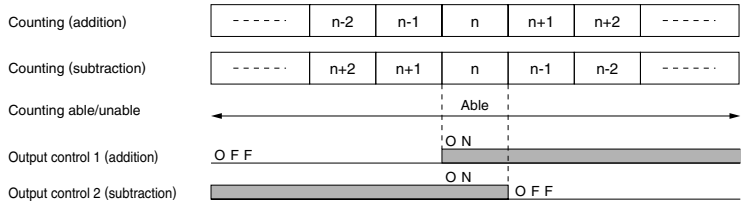
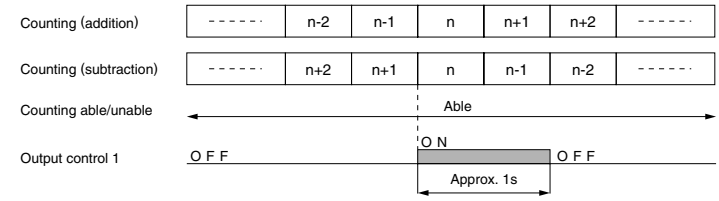
For the set value 1, you can choose one of the following four modes.

- Maintain output/over count I HOLD-B
- Maintain output/over count II HOLD-C
- Maintain output/over count III HOLD-D
- One shot/over count SHOT-A

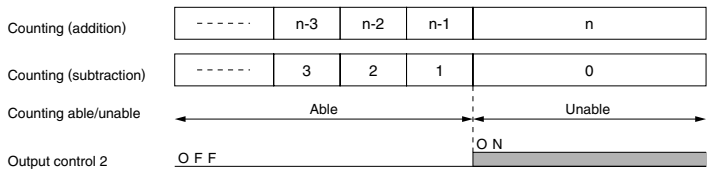
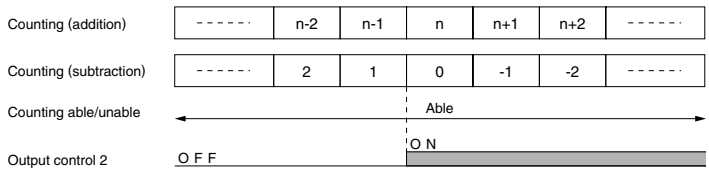
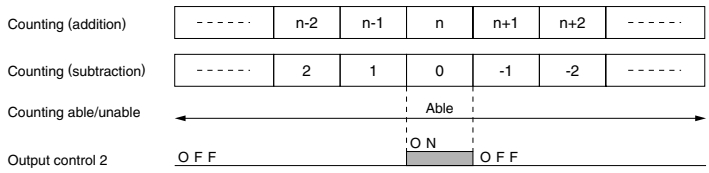
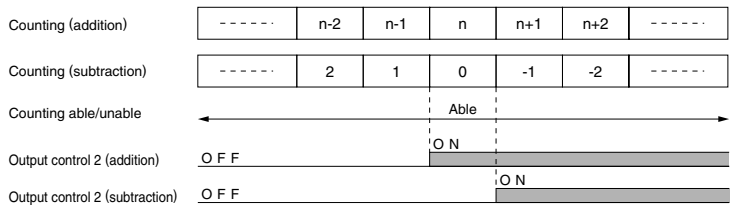
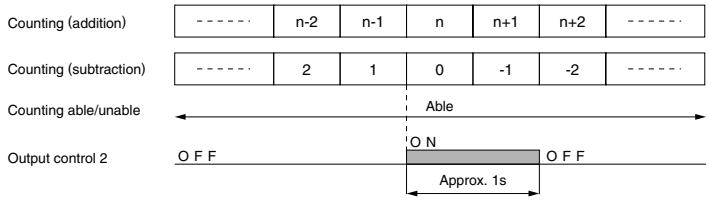
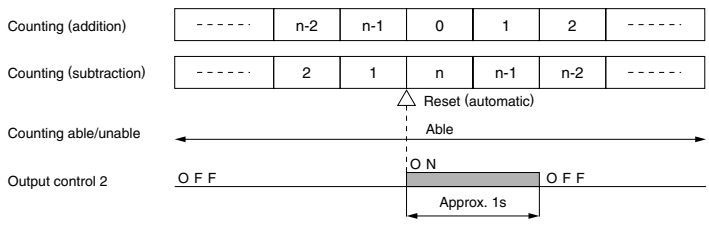
For the set value 2, you can choose one of the following eight modes.

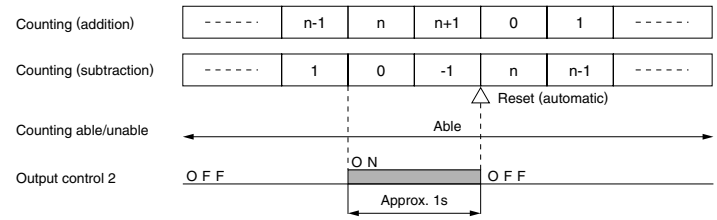
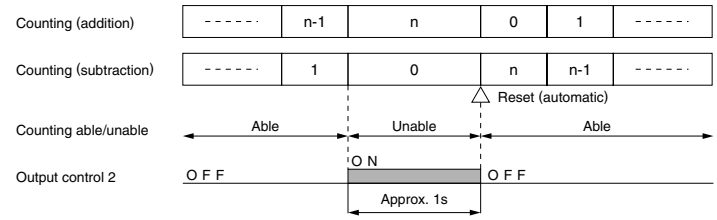
- Maintain output/hold count HOLD-A
- Maintain output/over count I HOLD-B
- Maintain output/over count II HOLD-C
- Maintain output/over count III HOLD-D
- One shot/over count SHOT-A
- One shot/recount I SHOT-B
- One shot/recount II SHOT-C
- One shot/hold count SHOT-D

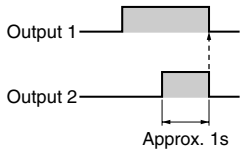
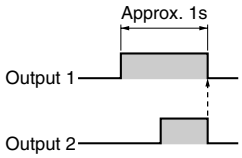
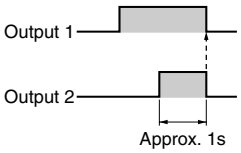
• Output mode for set value 1

| Output mode | Operation | (Example when input mode is either addition or subtraction) |
|---|---|---|
| Maintain output Over count I HOLD-B | Output control is maintained after count-up completion and until resetting. However, counting is possible despite completion of count-up. |  * n: Set value 1 |
| Maintain output Over count II HOLD-C | Output control is maintained after count-up completion and until the next signal enters. However, counting is possible despite completion of count-up. |  * n: Set value 1 |
| Maintain output Over count III HOLD-D | If the count value is greater than or equal to the preset value when counting up, the control output is held. The count operation is possible anyway. |  * n: Set value 1 |
| One shot Over count SHOT-A | Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. |  * n: Set value 1 |

• Output mode for set value 2

| Output mode | Operation | (Example when input mode is either addition or subtraction) |
|---|---|---|
| Maintain output Hold count HOLD-A | Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion. |  * n: Set value 2 |
| Maintain output Over count I HOLD-B | Output control is maintained after count-up completion and until resetting. However, counting is possible despite completion of count-up. |  * n: Set value 2 |
| Maintain output Over count II HOLD-C | Output control is maintained after count-up completion and until the next signal enters. However, counting is possible despite completion of count-up. |  * n: Set value 2 |
| Maintain output Over count III HOLD-D | If the count value is greater than or equal to the preset value when counting up, the counter starts counting up again. The count operation is possible anyway. |  * n: Set value 2 |
| One shot Over count SHOT-A | Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. |  * n: Set value 2 |
| One shot Recount I SHOT-B | Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. However, reset occurs simultaneous with completion of count-up. While output is being maintained, restarting of the count is not possible. |  * n: Set value 2 |

| Output mode | Operation | (Example when input mode is either addition or subtraction) |
|---|---|---|
| One shot<br>Recount II<br>SHOT-C | Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. However, reset occurs simultaneous with output OFF. |  <br>* n: Set value 2 |
| One shot<br>Hold count<br>SHOT-D | Output control is maintained after count-up completion for a fixed time (approx. 1 sec). During that time, the count display does not change from that at count-up completion. Reset occurs simultaneous with output OFF. |  <br>* n: Set value 2 |

| | | Output mode for set value 1 | | |
|---|---|---|---|---|
| | | HOLD-C HOLD-D | HOLD-B | SHOT-A |
| Output mode for set value 2 | SHOT-A | As usual<br>(this combination unchanged) | As usual<br>(this combination unchanged) | |
| | SHOT-B |  |  |  |
| | SHOT-C<br>SHOT-D | | | |

Note) When control output 1 is on, the output mode of setting 2 (SHOT-A, B, C, D) is also on and output 1 changes as shown in the above table.

**3. Count-up**

(1) In control output 1, when the count value is equal to the preset value 1, it is counted. (However, if the output mode of the preset value 1 is HOLD-D, it is counted when the count value is greater than or equal to the preset value 1, regardless of the input mode.)

(2) In control output 2, when the count value is equal to 0 in the count-down input mode, it is counted. In the other modes, when the count value is equal to the preset value 2, it is counted. (However, if the output mode of the preset value 2 is HOLD-D, it is counted when the count value is greater than or equal to the preset value 2, regardless of the input mode.)

(3) It is not counted even when the counting conditions are satisfied right after resetting. It can be counted from when the count value changes.

## Precautions during usage

**1. Terminal wiring**

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

2) When using the instrument with an flush mounting, the screw-down terminal type is recommended. For the pin type, use either the rear terminal block (AT78041) or the 8P cap (AD8-RC) for the 8-pin type, and the rear terminal block (AT78051) or the 11P cap (AT8-DP11) for the 11-pin type. Avoid soldering directly to the round pins on the unit. When using the instrument with a front panel installation, use the DIN rail terminal block (AT8-DF8K) for the 8-pin type and the DIN rail terminal block (AT8-DF11K) for the 11-pin type.

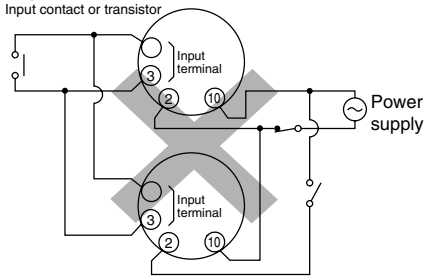
3) After turning the counter off, make sure that any resulting induced voltage or residual voltage is not applied to power supply terminals ② through ⑦ (8-pin type), ② through ⑩ (11-pin type) 1 or 2 and (screw terminal type). (If the power supply wire is wired parallel to the high voltage wire or power wire, an induced voltage may be generated between the power supply terminals.)

4) Have the power supply voltage pass through a switch or relay so that it is applied at one time. If the power supply is applied gradually, the counting may malfunction regardless of the settings, the power supply reset may not function, or other such unpredictable occurrence may result.

**2. Input connections (except LC4H-S/AC type)**

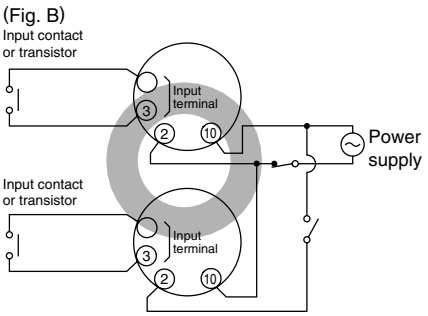
The power circuit has no transformer without a transformer (power and input terminals are not insulated). When an input signal is fed to two or more counters at once, do not arrange the power circuit in an independent way. If the counter is powered on and off independently as shown in Fig. A, the counter's internal circuitry may get damaged. Be careful never to allow such circuitry. (Figs. A, B and C show the circuitry for the 11-pin type.)

(Fig. A)



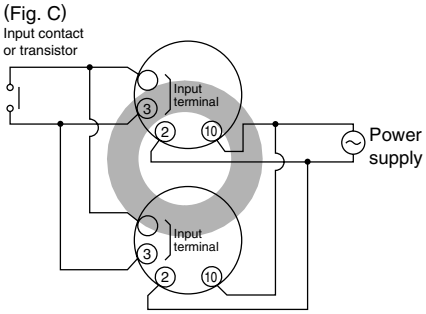

If independent power circuitry must be used, keep the input contacts or transistors separate from each other, as shown in Fig. B.

(Fig. B)




When power circuitry is not independent, one input signal can be fed to two or more counters at once, as shown in Fig. C.

(Fig. C)

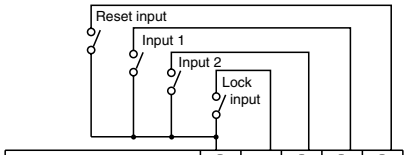



**3. Input and output**

1) Signal input type

(1) Contact point input

Use highly reliable metal plated contacts. Since the contact point's bounce time leads directly to error in the count value, use contacts with as short a bounce time as possible. In general, select Input 1 and Input 2 to have a maximum counting speed of 30 Hz and to be reset with a minimum input signal width of 20 ms.




| | | | | | |
|---|---|---|---|---|---|
| 8-pin type | ① | — | ⑤ | ④ | ③ |
| 11-pin type | ③ | ④ | ⑤ | ⑥ | ⑦ |
| Screw terminal type | 6 | 7 | 8 | 9 | 10 |

Note: The LC4H-W does not have the lock input 7④, .

(2) Non-contact point input

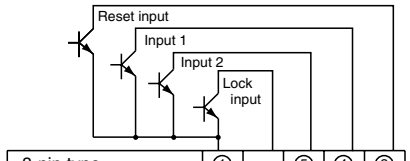
Connect with an open collector. Use transistors whose characteristics satisfy the criteria given below.

$V_{CEO}$ = 20 V min.

$I_C$ = 20 mA min.

$I_{CBO}$ = 6μA max.

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




| | | | | | |
|---|---|---|---|---|---|
| 8-pin type | ① | — | ⑤ | ④ | ③ |
| 11-pin type | ③ | ④ | ⑤ | ⑥ | ⑦ |
| Screw terminal type | 6 | 7 | 8 | 9 | 10 |

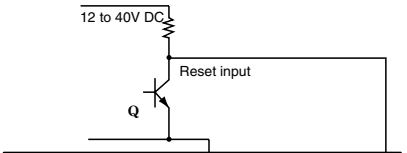
Note: The LC4H-W does not have the lock input 7④, .

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

[When the impedance is 0 Ω, the current coming from the input 1 and input 2 terminals is approximately 12 mA, and from the reset input and lock input terminals is approximately 1.5 mA.]

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

* As shown in the diagram below, from a non-contact point circuit (proximity switches, photoelectric switches, etc.) with a power supply voltage of between 12 and 40 V, the signal can be input without using an open collector transistor. In the case of the diagram below, when the non-contact point transistor Q switches from off to on (when the signal voltage goes from high to low), the signal is input.



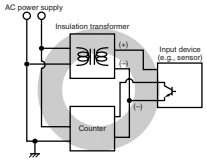

| | | | | | |
|---|---|---|---|---|---|
| 8-pin type | ① | — | ⑤ | ④ | ③ |
| 11-pin type | ③ | ④ | ⑤ | ⑥ | ⑦ |
| Screw terminal type | 6 | 7 | 8 | 9 | 10 |

(The above example is for reset input)

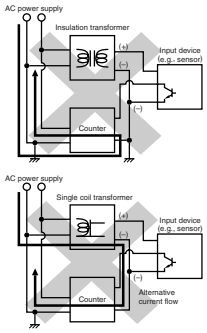
2) The input mode and output mode change depending on the DIP switch settings. Therefore, before making any connections, be sure to confirm the operation mode and operation conditions currently set.

3) The LC4H series use power supply without a transformer (power and input terminals are not insulated). In connecting various kinds of input signals, therefore, use a power transformer in which the primary side is separated from the ungrounded secondary side as shown in Fig. A, for the power supply for a sensor and other input devices so that short-circuiting can be prevented.
Once the wiring to be used is completely installed and prior to installing this counter, confirm that there is complete insulation between the wires connected to the power terminals (2 each) and the wires connected to each input terminal. If the power and input lines are not insulated, a short-circuit may occur inside the counter and result in internal damage.
In addition, when moving your equipment to a new installation location, confirm that there is no difference in environmental conditions as compared to the previous location.
(except LC4H-S/AC type)

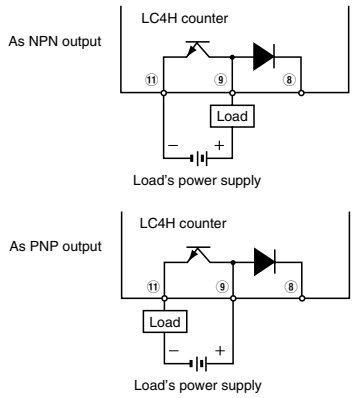
(Fig. A) Good example




(Fig. B) Bad example

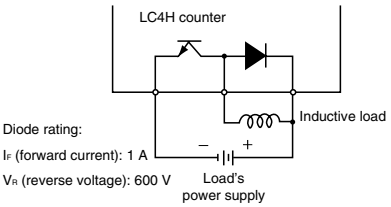



4) The input signal is applied by the shorting of each input terminal with the common terminal (terminal ① for 8-pin type, terminal ③ for 11-pin type and terminal 6 for screw terminal types). Never connect other terminals or voltages higher than 40 V DC , because it may destroy the internal circuitry.
5) Transistor output
(1) Since the transistor output is insulated from the internal circuitry by a photocoupler, it can be used as an NPN output or PNP (equal value) output. (The above example is 11-pin type)




Note: With the LC4H 8-pin type and the LC4H-W, there is no diode between points ⑧ and ⑨.

(2) Use the diode connected to the output transistor's collector for absorbing the reverse voltage from induced loads. (LC4H only)



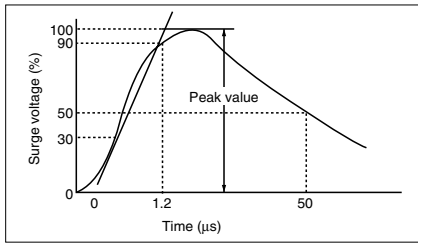

6) When wiring, use shielded wires or metallic wire tubes, and keep the wire lengths as short as possible.

**4. Output mode setting**
The output mode can be set with the DIP switches on the side of the counter. Make the DIP switch settings before installing the counter on the panel.

**5. Conditions of usage**
1) Avoid locations subject to flammable or corrosive gases, excessive dust, oil, vibrations, or excessive shocks.
2) Since the cover of the unit is made of polycarbonate resin, avoid contact with or use in environments containing methyl alcohol, benzene, thinners, and other organic solvents; and ammonia, caustic sodas, and other alkaline substances.
3) If power supply surges exceed the values given below, the internal circuits may become damaged. Be sure to use surge absorbing element to prevent this from happening.
4) Regarding external noise, the values

| Operating voltage | Surge voltage (peak value) |
|---|---|
| AC type | 6,000V |
| DC type 24V AC type | 1,000V |

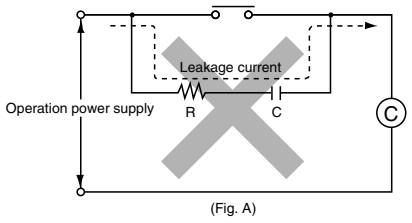
**• Surge wave form**
[± (1.2 × 50) ms uni-polar full wave voltage]



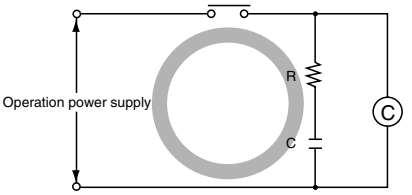

below are considered the noise-resistant voltages. If voltages rise above these values, malfunctions or damage to the internal circuitry may result, so take the necessary precautions.
Noise wave form (noise simulator)

| | Power supply terminals | | Input terminals |
|---|---|---|---|
| | AC type | DC type 24V AC type | |
| Noise voltage | 1,500V | 1,000V | 600V |

Rise time: 1 ns
Pulse width: 1 μs, 50 ns
Polarity: ±
Cycle: 100 cycles/second
5) When connecting the operation power supply, make sure that no leakage current enters the counter. For example, when performing contact protection, if set up like that of diagram A, leaking current will pass through C and R, enter the unit, and cause incorrect operation. Diagram B shows the correct setup.

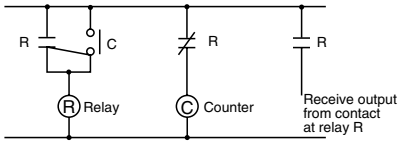



(Fig. A)




(Fig. B)

6) Long periods of continuous operation in the count-up completed condition (one month or more) will result in the weakening of the internal electrical components from the generated heat and, therefore, should be avoided. If you do plan to use the unit for such continuous operation, use in conjunction with a relay as shown in the circuit in the diagram below.



### 6. Self-diagnosis function

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

| Display | Contents | Output condition | Restoration procedure | Preset values after restoration |
|---|---|---|---|---|
| – – – –<br>or<br>– – – – – – | Minimum value went below –999 or –99999. See note 1. | No change | Enter reset or RESET key. | No change |
| d iPEt | Incorrect DIP switch setting. | | Restart unit (correct DIP switch settings) | |
| Er-00 | Malfunctioning CPU. | OFF | Enter reset, RESET key, or restart unit. | The values at start-up before the CPU malfunction occurred. |
| Er-01 | Malfunctioning memory. See note 2. | | | 0 |

Note 1: When the counter value goes below the minimum value during any of the subtraction, directive, independent, or phase input modes.
Note 2: Includes the possibility that the EEPROM's life has expired.

### 7. Compliance with the CE marking

When using in applications to which EN61812-1 applies, abide by the following conditions.

• Overvoltage category II, pollution level 2

(for sensor type model with power supply)

1. Connections between the power supply and input/output have basic insulation. Use a device with basic insulation to connect to the I/O terminals.

(for sensor type model without power supply)

1) This counter employs a power supply without a transformer, so the power and input signal terminals are not insulated.
   (1) When a sensor is connected to the input circuit, install double insulation on the sensor side.
   (2) In the case of contact input, use dual-insulated relays, etc.

• The load connected to the output contact should have basic insulation.
This counter is protected with basic insulation and can be double-insulated to meet EN/IEC requirements by using basic insulation on the load.

• Applied voltage should be protected with an overcurrent protection device (example: 250 V 1A fuse, etc.) that conforms to the EN/IEC standards.

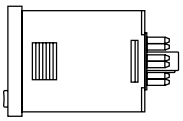
2) You must use a terminal block or socket for installing the pin-type counter. Do not touch the terminal section or other parts of the timer unit while an electric current is applied. Before installation or removal, confirm that there is no voltage being applied to any of the terminals.
3) Do not use this timer with a safety circuit. For example, when using a timer in a heater circuit, etc., provide a protection circuit on the machine side.

# INSTALLING DIN SIZE COUNTER (COMMON)

## Installation methods

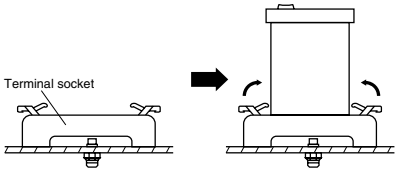
**1. Surface mount**

1) For the counters of LC4H series, use the pin type counter.

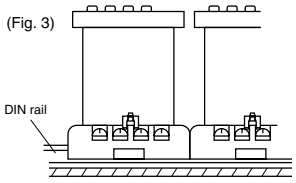


2) Put the terminal socket on the board directly or put it on the DIN rail (Fig. 1).
3) Insert the counter into the terminal socket and fix it with clip (Fig. 2)
4) On DIN rail mounting, mount the counter on the DIN rail tightly to get the proper dimension (Fig. 3).

(Fig. 1) (Fig. 2)



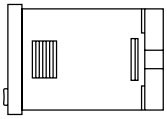

(Fig. 3)




5) 8-pin type should be connected with terminal socket AT8-DF8K. 11-pin type should be connected with terminal socket AT8-DF11K.
6) DIN rail (AT8-DLA1) is also available (1 m).

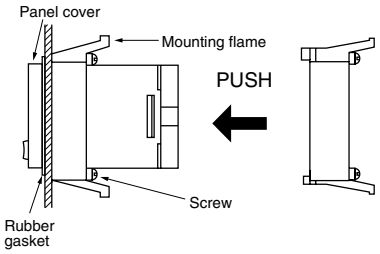
**2. Flush mount**

1) For the counters of LC4H series, it is recommended to use the built-in screw terminal type for flush mount. (Mounting frame and rubber gasket are provided when counter is shipped.)

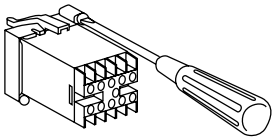


2) How to mount the counter
From the panel front, pass the counter through the square hole. Fit the mounting frame from the rear, and then push it in so that the clearance between the mounting frame and the panel surface is minimized. In addition, lock the mounting frame with a screw.

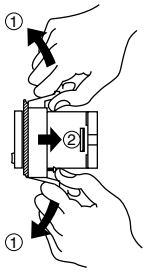
• LC4H series



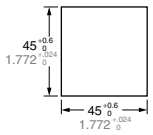

3) Caution in mounting the counter
• LC4H series
ⓐ If the LC4H series are used as the waterproof types (IEC IP66), tighten the reinforcing screws on the mounting frames so that the counters, the rubber gaskets, and the panel surfaces are tightly contacted with each other. (Tighten the two screws with uniform force and make sure that there is no rattling. If the screws are tightened too excessively, the mounting frame may come off.)
ⓑ If the counter is installed with the panel cover and the rubber gasket removed, the waterproofing characteristic is lost.
4) Removal
Loosen the screws on the mounting frame, spread the edge of frame and remove it.



Pull the mounting frame backward while spreading out its hooks with your thumbs and index fingers.

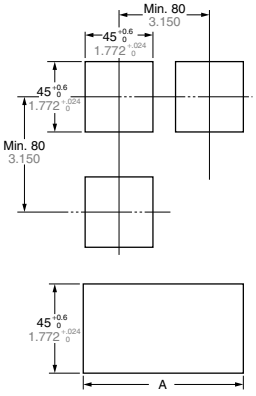



5) Correctly connect the terminals while seeing the terminal layout and wiring diagram.
6) If the pin type is used, the rear pin-bracket (AT8-RR) or the 8P cap (AD8-RC) is necessary to connect the pins. For the 11-pin type, use the 11P cap (AT8-DP11) and avoid directly soldering the round pins on the counter.
7) Panel cutout dimensions

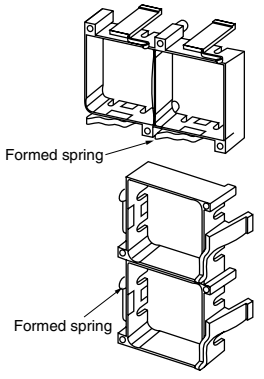



The standard panel cutout dimensions are shown in the left figure. (Panel thickness: 1 to 5 mm .039 to .197 inch)

8) Although the counters can be mounted adjacent to each other in this case, it is recommended to arrange the mounting holes as shown in the figure to facilitate attaching and detaching the mounting frame.




9) Adjacent mounting
Although the counters can be mounted adjacent to each other, remember that the panel surface of LC4H series counter will lose its water-resistant effect. (Panel thickness: 1 to 5 mm .039 to .197 inch)
$A = (48xn - 2.5)^{+0.6}_{0}$
When lining up the counters horizontally, set the frames in such a position so the formed spring areas are at the top and bottom.
When lining up the counters vertically, set the frames in such a position as the formed spring areas are at the right and left.



# 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<br>0 to 9999.9 hours<br>Without reset side<br>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<br>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,<br>48 V AC, 100 V AC,<br>110 V AC, 115 to 120 V AC,<br>200 V AC, 220 V AC, 240 V AC | 12 V AC, 24 V AC,<br>48 V AC, 100 V AC,<br>110 V AC, 115 to 120 V AC,<br>200 V AC, 220 V AC, 240 V AC | 12 V AC, 24 V AC,<br>48 V AC, 100 V AC,<br>110 V AC, 115 to 120 V AC,<br>200 V AC, 220 V AC, 240 V AC | 12 V AC, 24 V AC,<br>48 V AC, 100 V AC,<br>110 V AC, 115 to 120 V AC,<br>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:<br>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,<br>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. | | | | |

| 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:<br>0 to 999999.9 hours/0 to 3999 days 23.9 hours (selectable)<br>0 to 999 hours 59 min 59 sec/0 to 9999 hours 59.9 min (selectable)<br>PC board mounting type:<br>0 to 999999.9 hours/9999 hours 59.9 min (different type) | 0 to 999999.9 hours/<br>0 to 3999 days 23.9 hours (selectable)<br>0 to 999 hours 59 min 59 sec/<br>0 to 9999 hours 59.9 min (selectable) |
| **Features** | | For controlling total integrated hours | With zero reset function<br>For controlling measured integrated hours | Big 7-digit display, 8.7 mm tall display<br>Bright, 2-color back light (voltage input type)<br>Plenty of input methods<br>• 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,<br>48 V AC, 100 V AC,<br>110 V AC, 115 to 120 V AC,<br>200 V AC, 220 V AC, 240 V AC | 12 V AC, 24 V AC,<br>48 V AC, 100 V AC,<br>110 V AC, 115 to 120 V AC,<br>200 V AC, 220 V AC, 240 V AC | Flush mounting type: Unnecessary (Built-in battery)<br>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<br>±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<br>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.) | | — | — |

# 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<br>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,<br>115 to 120 V AC, 220 V AC, 240 V AC | 100 V AC, 200 V AC, 110 V AC,<br>115 to 120 V AC, 220 V AC, 240 V AC | 12 V DC, 24 V DC |
| | Frequency | 50 Hz or 60 Hz | 50 Hz or 60 Hz | — |
| Counting integral/<br>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.<br>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<br>The fourth number from the front of the part number indicates the required frequency as follows: 5:50 Hz, 6:60 Hz<br>Ex.) The part number for the TH13 series of 220 V & 50 Hz specification is TH1385. | | — |

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# DIN HALF SIZE HOUR METER

# LH2H

Panel mounting type
One-touch installation type

Panel mounting type
Installation frame type

PC board mounting type

## Features

• **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.


• **Plenty of Digits**


• **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

• **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.

• **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.

• **Screw Terminals Designed for Safety**
Built in finger protection.

• **Panel Covers Replacable (Standard color is ash gray.)**
Change the panel design by replacing with a black panel cover.

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

• **Input Methods**
1) Non-voltage input method
2) Voltage input method
3) Free voltage input method

• **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).

• **Compliant with UL, c-UL and CE marking.**



## Product chart

| Installation type \ 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) |
| Panel mounting 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)<br>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<br>Low level: 0 to 2 V DC | | High level:<br>24 to 240 V AC/DC<br>Low level:<br>0 to 2.4 V AC/DC |
| | Input impedance | When shorted:<br>Max. 10 kΩ<br>When open:<br>Max. 750 kΩ | Approx. 4.7 kΩ | | — |
| | 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<br>Low level: 0 to 2 V DC | | Non-voltage input using contacts or open collector connection |
| | Input impedance | When shorted:<br>Max. 10 kΩ<br>When open:<br>Max. 750 kΩ | Appox. 4.7 kΩ | | When shorted:<br>Max. 10 kΩ<br>When open:<br>Max. 750 kΩ |
| | Residual voltage | Max 0.5 V | — | | Max. 0.5 V |
| Display method | | 7-segment LCD | | 7-segment LCD<br>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:<br>2,000 V AC for 1 minute. |
| Insulation resistance (initial) | | Min. 100 MΩ (measured at 500 V DC) Measurement location same as for break down voltage. | | | |
| Backlight power | | — | | 24 V DC (±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 μA (max. 200 μA 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 kΩ<br>When open: Max. 750 kΩ | |
| | 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 kΩ<br>When open: Max. 750 kΩ | |
| | 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 MΩ (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 | | ±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/s² (4 times on 3 axes) |
| | Destructive | Min. 294 m/s² (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<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>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).

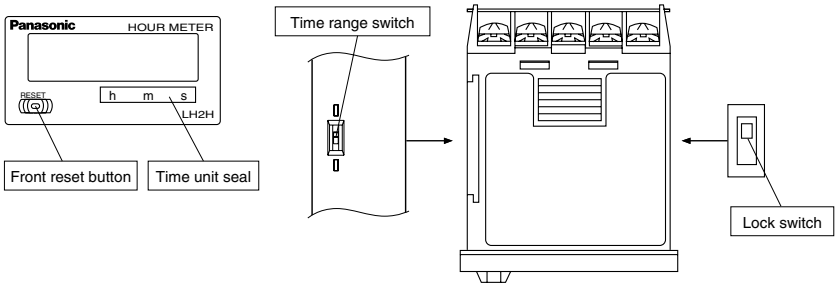
**3. Time range switch (See chart on right).**

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) ↕ (LCD side) OFF✻ ↕ ON | |
| Count speed 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. ✻Default setting when shipped.
2. Make the switch setting before installing to panel.

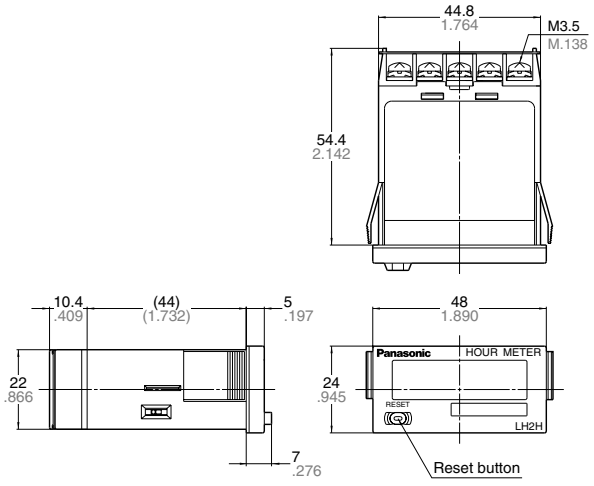
## Dimensions

mm inch
General tolerance: ±1.0 ±.039

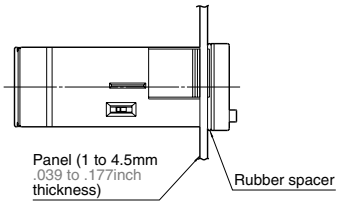
**1. Panel mounting type**

**• External dimensions**

1) One-touch installation type




**• Panel installation diagram**

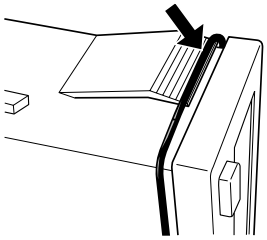



Note) When installing to a 4.5 mm .177 inch thick panel, remove the rubber spacer first.

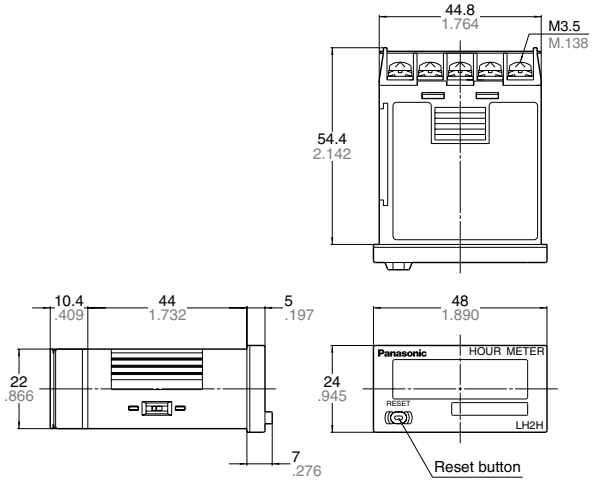
When installing the one-touch installation type model, make sure that the installation spring does not pinch the rubber gasket.

To prevent the installation spring from pinching the rubber gasket:

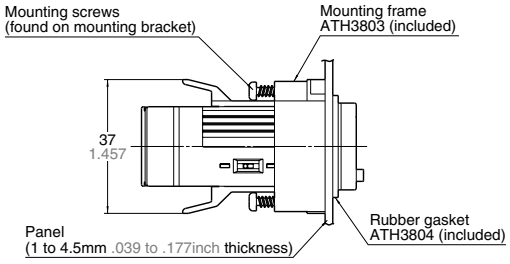
1. Set the rubber gasket on both ends of the installation spring (left and right).
2. Confirm that the installation spring is not pinching the rubber gasket, and then insert and fix the installation spring in place from the rear of the timer unit.



2) Installation frame type

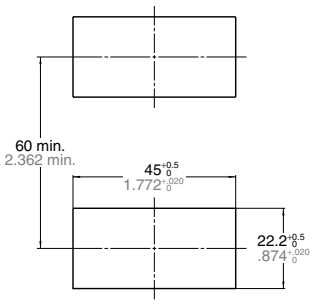



**• Panel mounting diagram**

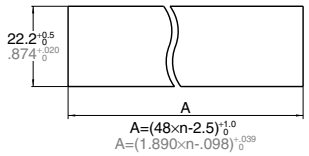



**• Panel cut-out dimensions**

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



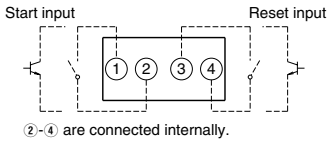
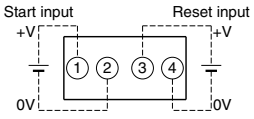
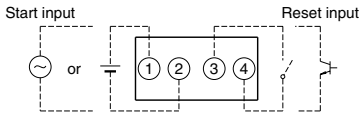

**• For connected installation (sealed installation) (Only installation frame type.)**




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).

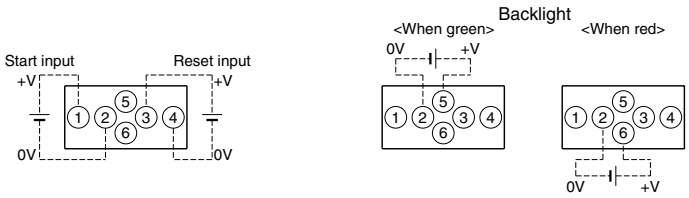
**• Terminal layout and wiring diagrams**

1) Standard type

| Non voltage input type | Voltage input type | Free voltage input type |
|---|---|---|
|  |  |  |



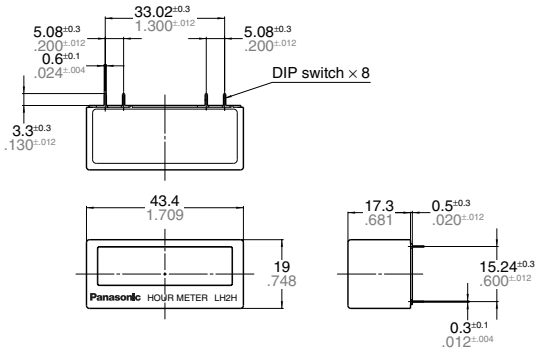
2) Backlight type

| Voltage input type |
|---|
|  |

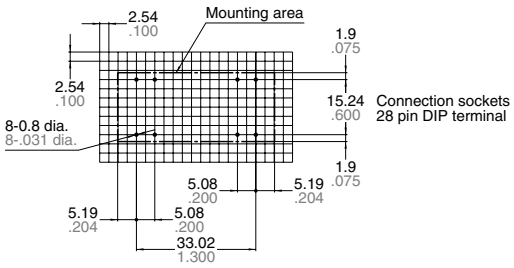
### 2. PC board mounting type

General tolerance: ±1.0 ±.039 mm inch

**• External dimensions**



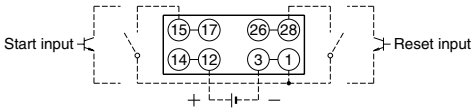

PC board pattern (BOTTOM VIEW)




General tolerance: ±0.1 ±.004

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

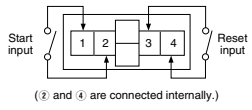
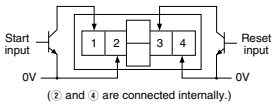
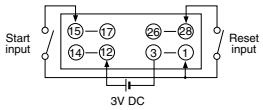
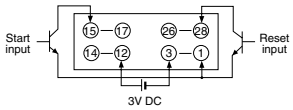
**• Terminal layout and wiring diagrams**



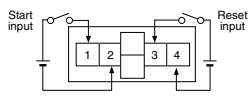
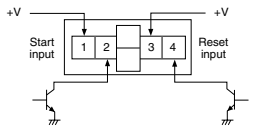
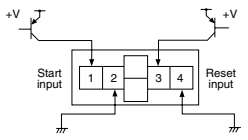
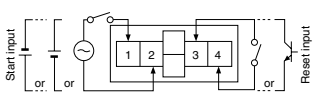

①-③, ⑫-⑭, ⑮-⑰ and ㉖-㉘ are connected internally.
An external power supply is required.

## Input method

### 1. Standard type

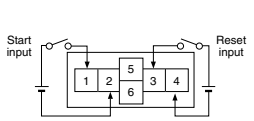
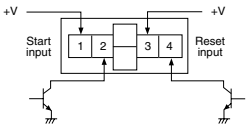
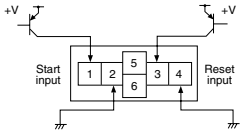
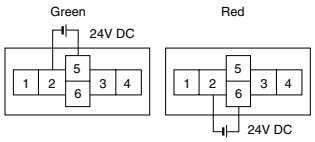
| Non-voltage input type | | | |
|---|---|---|---|
| Panel mounting type | | PC board mounting type | |
| Contact input | Transistor input<br>NPN transistor | Contact input | Transistor input<br>NPN transistor |
|  |  |  |  |

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 ㉖ to ㉘ 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 μA)

| 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 μA)
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**

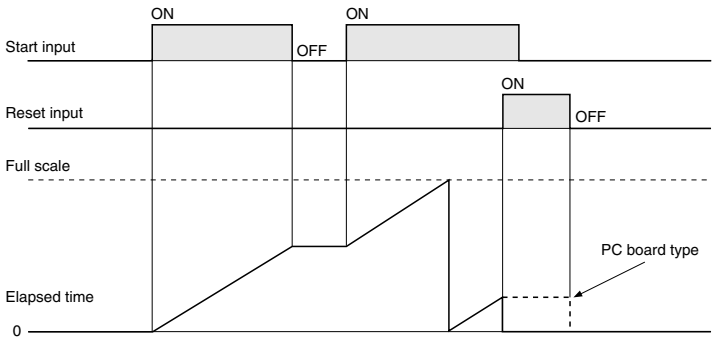
| Voltage input type | | | Backlight connection |
|---|---|---|---|
| Contact input | Transistor input | | |
| | NPN transistor | PNP transistor | |
|  |  |  |  |



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 μA)
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 ㉖ to ㉘ 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**

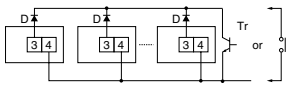
1) Be aware that applying more than 30 V DC to start input terminals ① and ②, and reset input terminals ③ and ④ will cause damage to the internal elements.
2) For external resetting use H level (application of 4.5 to 30 V DC) between reset terminals ③ and ④ of the rear terminals. In this case, connect + 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.

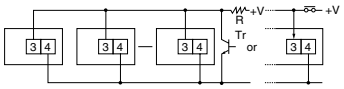
**4. How to reset multiple panel mounting type counters all at once (input is the same for count)**

**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.)

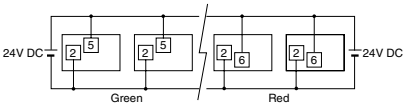
**Voltage input type**




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.

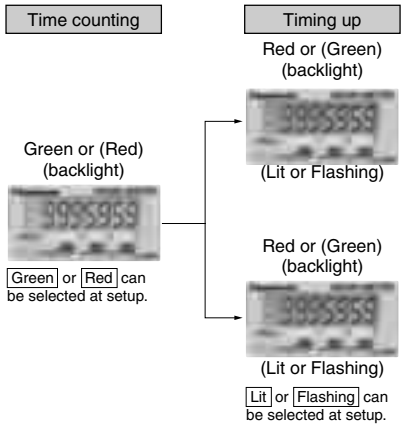
Panasonic
ideas for life

# PRESET HOUR METER

# LH2H

## Features

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




**• 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.


**• Plenty of Digits**


**• 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
**• Conforms to IP66 Protective Construction (Front panel surface)**
Weatherproofing supported by using optional mounting bracket and rubber gasket
**• Includes reassuring lock mode and lock switch to prevent erroneous operation.**
**• Screw terminals are constructed to protect fingers to ensure safety.**
**• Compliant with UL, c-UL and CE marking.**

## 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)<br>B (Signal ON delay)<br>F (Signal flicker)<br>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)<br>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 | • Non-voltage input using contacts or open-collector connection<br>• Input impedance; when shorted: Max. 1 kΩ, when open: Min. 100 kΩ<br>• 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<br>(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 | ±0.01% ±50 ms in case of power on start<br>±0.01% ±30 ms in case of input signal start<br>{ Rated operating voltage: 85 to 110%<br>Ambient temperature: –10 to +55°C +14 to +131°F } |
| | Voltage error | |
| | Temperature error | |
| | Setting error | |
| 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 MΩ (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/s² (4 times on 3 axes) |
| | Destructive shock resistance | Min. 294 m/s² (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) |

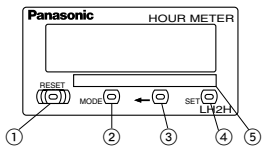
* The factory default preset value is set to 0.1.

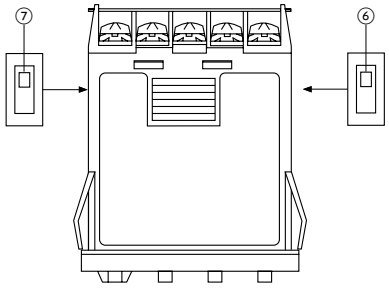
## Applicable standard

| | | |
|---|---|---|
| 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<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 2 kV (power supply line)<br>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) |

## 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, Lock 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.

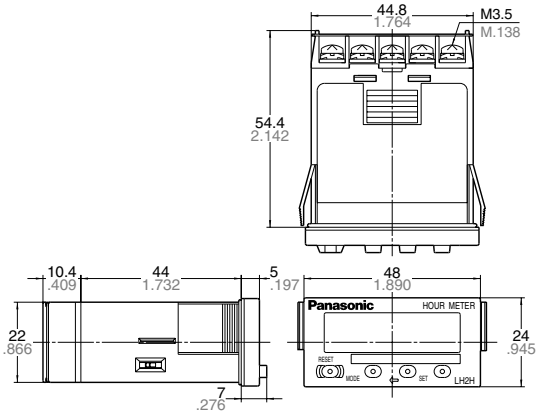
| | | LH2HP-FEW-DHK-B-DC24V | LH2HP-FEW-HMK-B-DC24V |
|---|---|---|---|
| ⑥ | Lock switch (unit display 1) | (Terminal block side) ↕ (LCD side) / OFF※ ↕ ON | |
| ⑦ | Time range switch (unit display 2) | (Terminal block side) ↕ (LCD side) / 0 to 999999.9h※ ↕ 0 to 3999d23.9h | (Terminal block side) ↕ (LCD 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.

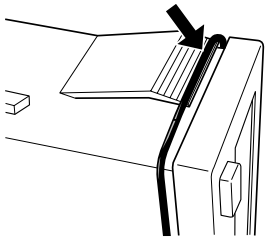
## Dimensions

mm inch
General tolerance: ±1.0 ±.039

**• External dimensions**

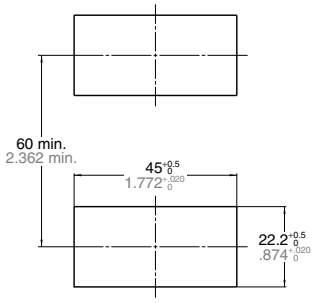



When installing the one-touch installation type model, make sure that the installation spring does not pinch the rubber gasket.
To prevent the installation spring from pinching the rubber gasket:
1. Set the rubber gasket on both ends of the installation spring (left and right).
2. Confirm that the installation spring is not pinching the rubber gasket, and then insert and fix the installation spring in place from the rear of the timer unit.

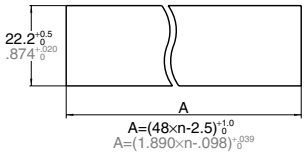


**• Panel cut out dimensions**

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)**

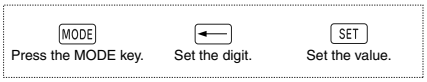



Notes: 1. Suitable installation panel thickness is 1 to 4.5 mm 0.39 to 0.177 inch.
2. Waterproofing will be lost when installing repeatedly (sealed installation).

## 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.


Sample display in preset value setting mode
(when preset value is 100.0h)

* The factory default preset value is set to 1.0.

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.

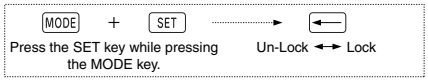
3) Pressing the set key increases the value by one. (After 9 it returns to 0 and then changes to 1, 2, 3, etc.)

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.

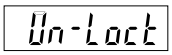
**2. Lock mode**

This mode prohibits everything except the preset value setting mode.



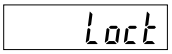

1) Pressing the set key while holding down the mode key takes you to the lock mode.

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




Display after entering lock mode
(Example showing “Un-Lock”.)

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




(Example showing “ Lock”.)

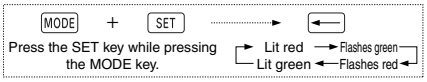
4) Pressing the front panel reset key sets the content displayed and returns you to regular operation mode.

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.

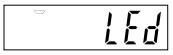
**3. Backlight setting mode**

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”




Display after entering
the backlight setting mode.

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).


Display after entering time counting direction setting mode
(Example showing “UP”)

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”.

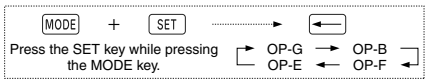

(Example showing “dn”)

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

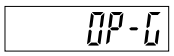
Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

**5. Operation mode**

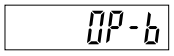
This sets the operation mode.



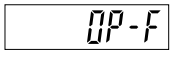

1) Pressing the SET key four times while holding down the MODE key takes you to the operation setting mode.
2) The display reads “OP-G” (Totalizing ON delay) after entering the operation setting mode.



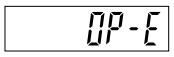

3) Pressing the setting key causes the display to change as follows:
OP-B (Signal ON delay)




OP-F (Signal flicker)

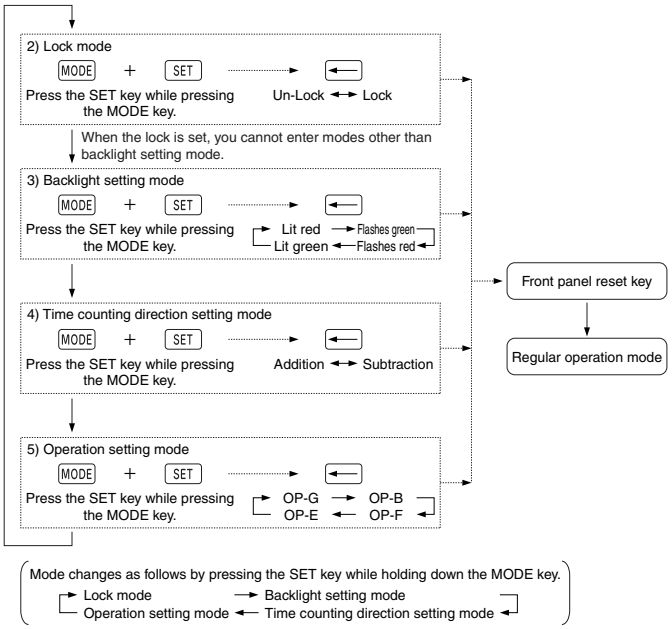



OP-E (Pulse ON delay)




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 |

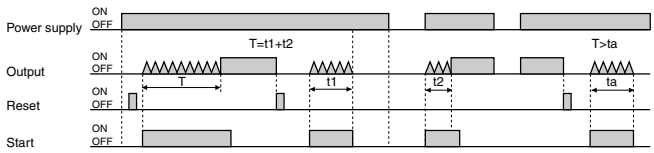
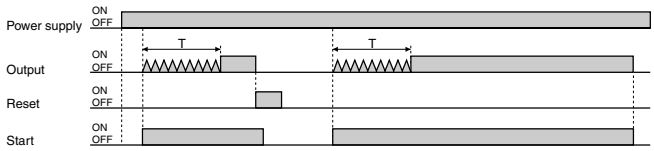
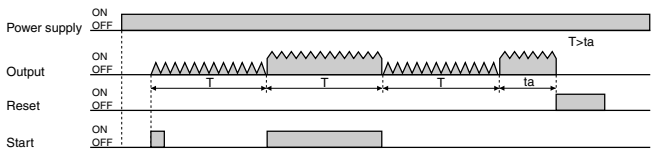
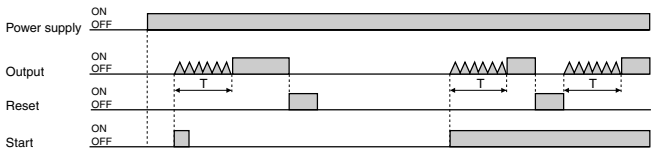
Note: “×” sign: No change

## 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 Ⓖ | • Elapsed value does not clear at power ON. (Power outage countermeasure function)<br>• The output remains ON even after the power is OFF and restarted. |  |
| Signal ON delay Ⓑ | • Clears elapsed value at power ON.<br>• Time delay starts at start ON and output resets at start OFF.<br>• Time delay starts at reset OFF and power ON while start is ON. |  |
| Signal Flicker Ⓕ | • Clears elapsed value at power ON.<br>• Time delay starts at start ON.<br>• After timer completion, control output reverses, elapsed value clears, and time delay starts.<br>• Ignores start input during time delay. |  |
| Pulse ON delay Ⓔ | • Clears elapsed value at power ON.<br>• Time delay starts at start ON.<br>• After timer completion, control output is ON.<br>• Ignores start input during time delay. |  |

# PRECAUTIONS IN USING THE LH2H SERIES

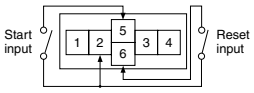
## Cautions for use

**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.

$V_{CEO}$ = Min. 20 V

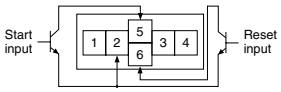
$I_C$ = Min. 20 mA

$I_{CBO}$ = Max. 6 μA

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 kΩ.

(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 kΩ.



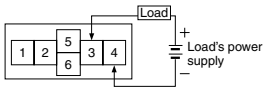

(3) Input wiring

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

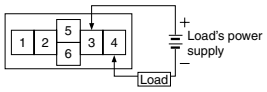
2) Output connection

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 EEP-ROM's life has expired.

**3. Power failure memory**

The EEP-ROM 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 |

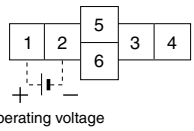
**4. Terminal connection**

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.**

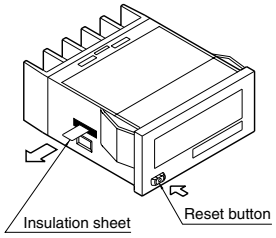
**Applicable standards: EN61000-6-4, EN61000-6-2**

## Cautions for use

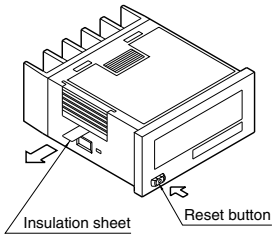
**1. Insulation sheet**

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)**



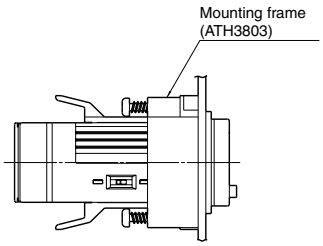

**• LH2H hour meter (installation frame type)**




**2. Waterproof construction**

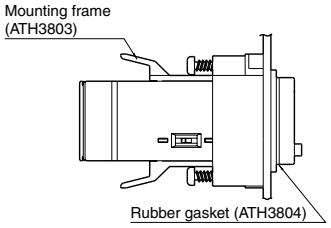
**• LH2H hour meter (installation frame type)**

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**

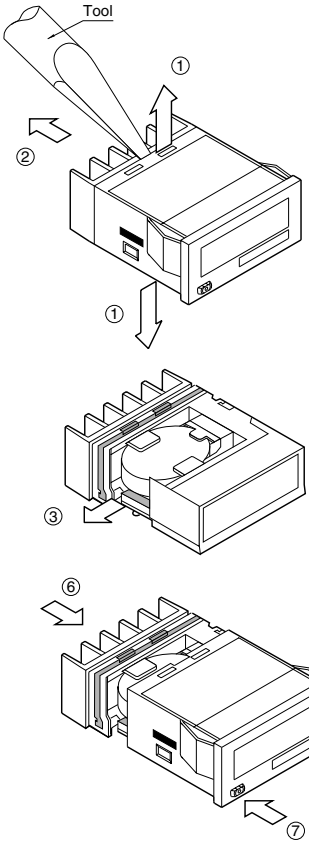
1) In places where the temperature changes drastically.
2) In places where humidity is high and there is the possibility of dew.
(When dew forms the display may vanish and other display errors may occur.)

**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**

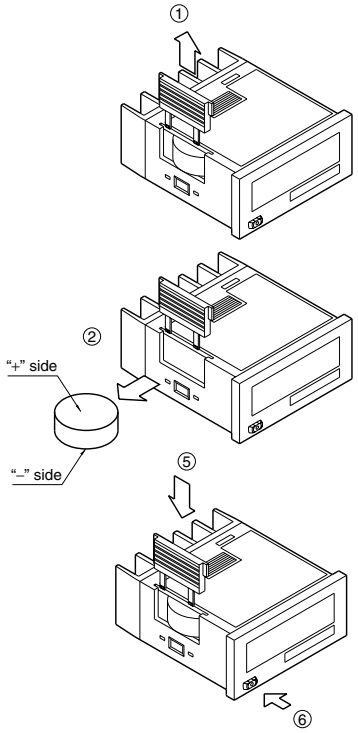
1) Remove wiring before replacing the battery. You may be electrocuted if you come into contact to a part where high voltage is applied.
2) Make sure you are not carrying a static electric charge when replacing the battery.
3) Battery replacement procedure
For LH2H hour meter (one-touch installation 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.



# PRECAUTIONS IN USING THE LH2H SERIES

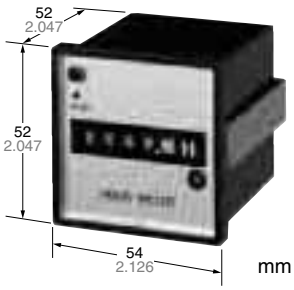
For LH2H hour meter
(installation frame type)

(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.



Panasonic
ideas for life

# HOUR METER TH13 / TH23




TH23 series (with reset function)

TH13 series (without reset function)

**UL File No.: E42876**
**CSA File No.: LR39291**

## Features

- **High-performance compact synchronous motor**
  The accurately turning motor is employed to provide for longer period of measurement.
- **Compact and stylish**
- **Easier wiring**
  The flat terminals (#187) are quick and easy to connect.
- **Rotary indicator**
  The rotary indicator makes one turn every 2 minutes for monitoring.
- **Compliant with UL, CSA and CE.**

## Typical applications

Maintenance management of machine tools, automated machines, control panels, forming machines, medical equipment, generators, compressors, water treatment facilities, presses, motors, etc.

## Specifications

| | | | |
|---|---|---|---|
| Rated operating voltage | | 100V AC, 200V AC, 110V AC, 115 to 120V AC, 220V AC, 240V AC | |
| Allowable operating voltage range | | 85 to 115% of rated operating voltage | |
| Rated frequency | | 50 Hz, 60 Hz (other model) | |
| Counting range | | 0 to 99999.9 hours (TH13 series)<br>0 to 9999.9 hours (TH23 series) | |
| Minimum time display | | 0.1 hours (6 min) | |
| Rated power consumption | | Approx. 1.5 W | |
| Insulation resistance (Initial value) | | Min. 100 MΩ, Between live and dead metal parts (At 500V DC) | |
| Breakdown voltage (Initial value) | | 2,000 Vrms, Between live and dead metal parts | |
| Max. temperature rise | | 55°C 131°F | |
| Vibration resistance | Functional | 10 to 55 Hz: 1 cycle/min double amplitude of 0.5 mm (10 min on 3 axes) | |
| Shock resistance | Functional | Min. 98 m/s² {10 G} (4 times on 3 axes) | |
| | Destructive | Min. 980 m/s² {100 G} (5 times on 3 axes) | |
| Ambient temperature | | –10 to +50°C +14 to 122°F | |
| Ambient humidity | | Max. 85% RH (non-condensing) | |
| Weight | | 135 g 4.76 oz | 130 g 4.59 oz |

## Product types

| Type | Operating voltage | Part number | | Operating voltage | Part number | |
|---|---|---|---|---|---|---|
| | | 50Hz | 60Hz | | 50Hz | 60Hz |
| TH13 types (without reset button) | 100V AC | TH1345 | TH1346 | 115V AC (115 to 120V AC) | TH1375 | TH1376 |
| | 200V AC | TH1355 | TH1356 | 220V AC | TH1385 | TH1386 |
| | 110V AC | TH1365 | TH1366 | 240V AC | TH1395 | TH1396 |
| TH23 types (with reset button) | 100V AC | TH2345 | TH2346 | 115V AC (115 to 120V AC) | TH2375 | TH2376 |
| | 200V AC | TH2355 | TH2356 | 220V AC | TH2385 | TH2386 |
| | 110V AC | TH2365 | TH2366 | 240V AC | TH2395 | TH2396 |

Note) The 115 to 120V AC, 220V AC and 240V AC types are UL-recognized and CSA-certified. For those products, specify “U” at the end of the part number when ordering.

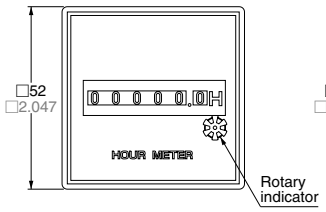
## Applicable standard

| Safety standard | EN61010-1 | Pollution Degree 2/Overvoltage Category II |
|---|---|---|
| EMC | (EMI)EN61000-6-4<br>Radiation interference electric field strength<br>Noise terminal voltage<br>(EMS)EN61000-6-2<br>Static discharge immunity<br><br>RF electromagnetic field immunity<br><br>EFT/B immunity<br>Surge immunity<br>Conductivity noise immunity<br>Power frequency magnetic field immunity<br>Voltage dip/Instantaneous stop/Voltage fluctuation immunity | <br>EN55011 Group1 ClassA<br>EN55011 Group1 ClassA<br><br>EN61000-4-2 4 kV contact<br>8 kV air<br>EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz)<br>EN61000-4-4 2 kV (power supply line)<br>EN61000-4-5 1 kV (power line)<br>EN61000-4-6 10 V/m AM modulation (0.15 MHz to 80 MHz)<br>EN61000-4-8 30 A/m (50 Hz)<br>EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

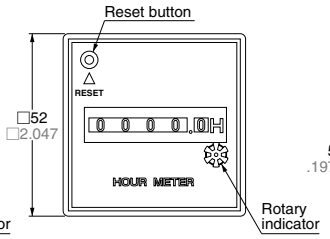
## Dimensions

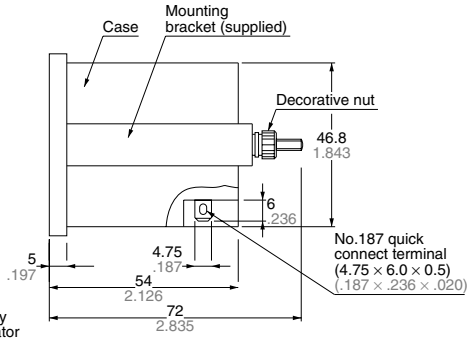
mm inch
General tolerance: ±1.0 ±.039

**• TH13 series**



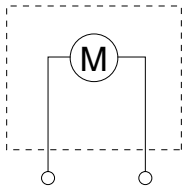

**• TH23 series**



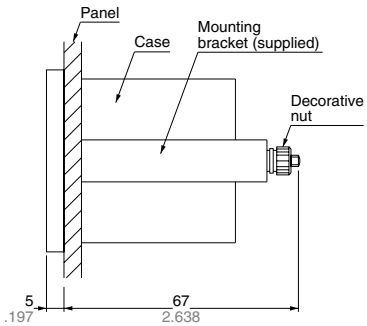

(TH13 and TH23 series common)

## Wiring diagram

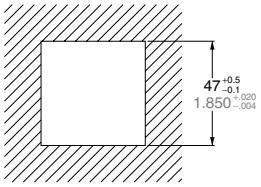



Operating power supply

## Panel mounting




**• Panel cutout dimensions**

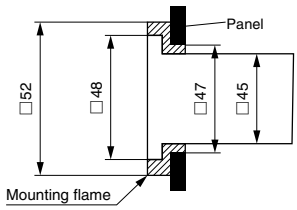



## Replacing the TH13/23 series with the TH14/24 series

The TH13/TH23 series hour meter are interchangeable with the TH14/24 series hour meter. Use the specified mounting frame because of a different setup method. It is advisable to introduce the TH14/24 series hour meters for the first time.

Mounting frame (sold separately): TH1400020

**DIN48 size and mounting frame setup**



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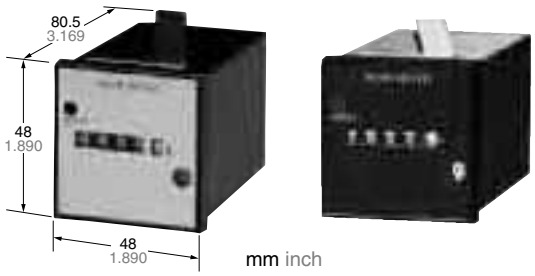
# DIN 48 SIZE HOUR METER

# TH14 / TH24




Silver panel Black panel

TH24 series (with reset button)

Silver panel Black panel

TH14 series (without reset button)

**UL File No.: E42876**
**CSA File No.: LR39291**

## Features

- **High-performance compact syncronous motor**
  The accurately turning motor is employed to provide for longer period of measurement.
- **Common for 50/60 Hz power frequency**

A lever is used to select 50 Hz or 60 Hz. There is no need to rearrange the control panel and other signal destinations.

- **Dimensions as per DIN 43700 standard**

The units are in the 48x48 DIN standard size. They can be fitted in panels and give refined metallic appearance.

- **Easier wiring**

The flat terminals (#187) are quick and easy to connect.

- **Rotary indicator**

The rotary indicator makes one turn every 2 minutes for monitoring.

- **Compliant with UL, CSA and CE.**

## Typical applications

Maintenance management of machine tools, automated machines, control panels, forming machines, medical equipment, generators, compressors, water treatment facilities, presses, motors, etc.

## Specifications

| | | |
|---|---|---|
| Rated operating 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 |
| Allowable operating voltage range | | 85 to 115% of rated operating voltage |
| Rated frequency | | 50/60 Hz (selectable by switch) |
| Counting range | | 0 to 99999.9 hours (TH14 series)<br>0 to 9999.9 hours (TH24 series) |
| Minimum time display | | 0.1 hours (6 min) |
| Rated power consumption | | Approx. 1.5 W |
| Insulation resistance (Initial value) | | Min. 100 MΩ; Between live and dead metal parts (At 500V DC) |
| Breakdown voltage (Initial value) | | 2,000 Vrms Between live and dead metal parts |
| Max. temperature rise | | 55°C 131°F |
| Vibration resistance | Functional | 10 to 55 Hz: 1 cycle/min double amplitude of 0.5 mm (10 min on 3 axes) |
| Shock resistance | Functional | Min 98 m/s² {10 G} (4 times on 3 axes) |
| | Destructive | Min 980 m/s² {100 G} (5 times on 3 axes) |
| Ambient temperature | | –10 to +50°C +14 to +122°F |
| Ambient humidity | | Max. 85% RH (non-condensing) |
| Weight | | 145 g 5.11 oz (TH14 series) / 150 g 5.29 oz (TH24 series) |

## Product types

| Type | Operating voltage | Part number | | Operating voltage | Part number | | Operating voltage | Part number | |
|---|---|---|---|---|---|---|---|---|---|
| | | Silver panel | Black panel | | Silver panel | Black panel | | Silver panel | Black panel |
| TH14 series (without reset button) | 100V AC | TH141S | TH141 | 24V AC | TH144S | TH144 | 115 to 120V AC | TH147S | TH147 |
| | 200V AC | TH142S | TH142 | 48V AC | TH145S | TH145 | 220V AC | TH148S | TH148 |
| | 12V AC | TH143S | TH143 | 110V AC | TH146S | TH146 | 240V AC | TH149S | TH149 |
| TH24 series (with reset button) | 100V AC | TH241S | TH241 | 24V AC | TH244S | TH244 | 115 to 120V AC | TH247S | TH247 |
| | 200V AC | TH242S | TH242 | 48V AC | TH245S | TH245 | 220V AC | TH248S | TH248 |
| | 12V AC | TH243S | TH243 | 110V AC | TH246S | TH246 | 240V AC | TH249S | TH249 |

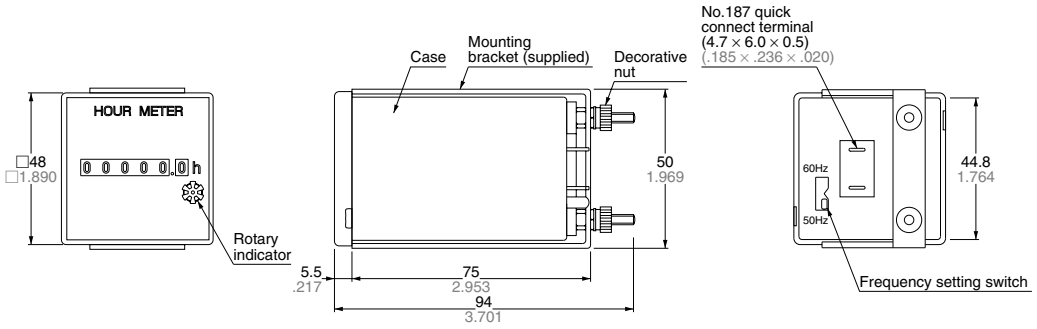
Note) Only the black-panel type is UL-recognized and CSA-certified. For this type, specify “U” at the end of the part number when ordering.

## Applicable standard

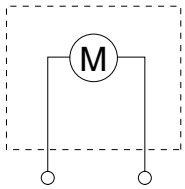
| Safety standard | EN61010-1 | Pollution Degree 2/Overvoltage Category II |
|---|---|---|
| EMC | (EMI)EN61000-6-4<br>Radiation interference electric field strength<br>Noise terminal voltage<br>(EMS)EN61000-6-2<br>Static discharge immunity<br><br>RF electromagnetic field immunity<br><br>EFT/B immunity<br>Surge immunity<br>Conductivity noise immunity<br>Power frequency magnetic field immunity<br>Voltage dip/Instantaneous stop/Voltage fluctuation immunity | <br>EN55011 Group1 ClassA<br>EN55011 Group1 ClassA<br><br>EN61000-4-2 4 kV contact<br>8 kV air<br>EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz)<br>EN61000-4-4 2 kV (power supply line)<br>EN61000-4-5 1 kV (power line)<br>EN61000-4-6 10 V/m AM modulation (0.15 MHz to 80 MHz)<br>EN61000-4-8 30 A/m (50 Hz)<br>EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

## Dimensions (TH14 and TH24 series common)

mm inch
General tolerance: ±1.0 ±.039



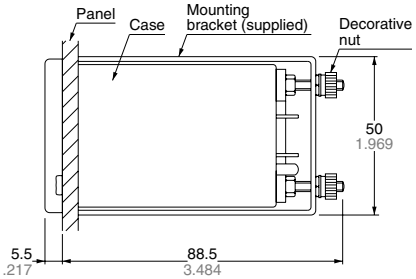

## Wiring diagram



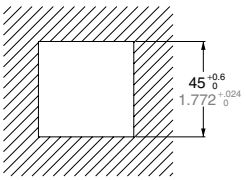

Operating power supply

## Panel mounting

mm inch




**• Panel cutout dimensions**



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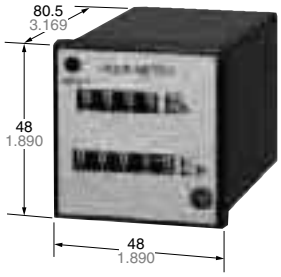
# DIN 48 DUAL INDICATOR HOUR METER

# TH40




mm inch

Silver panel

Black panel

## Features

- **Upgraded composite function**
  Specified-period measurement and total-time measurement can be monitored on a single hour meter.
- **High-performance compact syncronous motor**
  The accurately turning motor is employed to provide for longer period of measurement.
- **Common for 50/60 Hz power frequency**
  A lever is used to select 50 Hz or 60 Hz. There is no need to rearrange the control panel and other signal destinations.
- **Dimensions as per DIN 43700 standard**
  The units are in the 48x48 DIN standard size. They can be fitted in panels and give refined metallic appearance.
- **Easier wiring**
  The flat terminals (#187) are quick and easy to connect.
- **Rotary indicator**
  The rotary indicator makes one turn every 2 minutes for monitoring.
- **Compliant with CE.**

## Specifications

| | | |
|---|---|---|
| Rated operating 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 |
| Allowable operating voltage range | | 85 to 115% of rated operating voltage |
| Rated frequency | | 50/60 Hz (selectable by switch) |
| Counting range | | 0 to 9999.9 hours (upper side) ... with reset indicator<br>0 to 99999.9 hours (lower side) ... without reset indicator |
| Minimum time display | | 0.1 hours (6 min) |
| Rated power consumption | | Approx. 1.5 W |
| Insulation resistance (Initial value) | | Min. 100 MΩ; Between live and dead metal parts (At 500V DC) |
| Breakdown voltage (Initial value) | | 2,000 Vrms Between live and dead metal parts |
| Max. temperature rise | | 55°C 131°F |
| Vibration resistance | Functional | 10 to 55 Hz: 1 cycle/min double amplitude of 0.5 mm (10 min on 3 axes) |
| Shock resistance | Functional | Min 98 m/s² {10 G} (4 times on 3 axes) |
| | Destructive | Min 980 m/s² {100 G} (5 times on 3 axes) |
| Ambient temperature | | –10 to +50°C +14 to +122°F |
| Ambient humidity | | Max. 85% RH (non-condensing) |
| Weight | | 160 g 5.64 oz |

## Product types

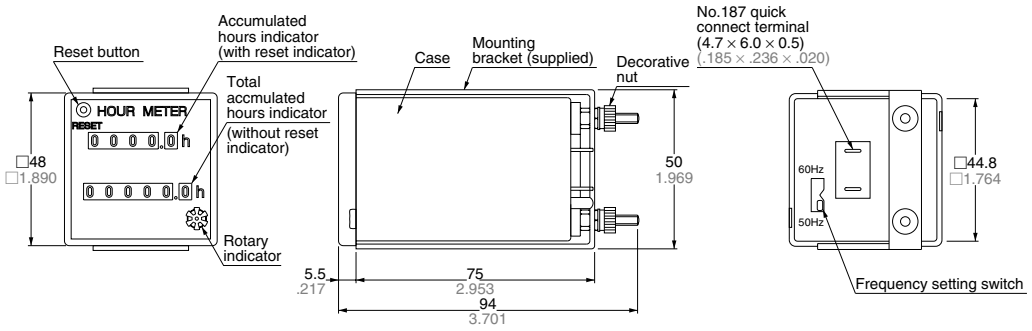
| Type | Operating voltage | Part number | | Operating voltage | Part number | | Operating voltage | Part number | |
|---|---|---|---|---|---|---|---|---|---|
| | | Silver panel | Black panel | | Silver panel | Black panel | | Silver panel | Black panel |
| TH40 series | 100V AC | TH401S | TH401 | 24V AC | TH404S | TH404 | 115 to 120V AC | TH407S | TH407 |
| | 200V AC | TH402S | TH402 | 48V AC | TH405S | TH405 | 220V AC | TH408S | TH408 |
| | 12V AC | TH403S | TH403 | 110V AC | TH406S | TH406 | 240V AC | TH409S | TH409 |

## Applicable standard

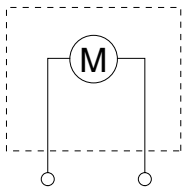
| Safety standard | EN61010-1 | Pollution Degree 2/Overvoltage Category II |
|---|---|---|
| EMC | (EMI)EN61000-6-4<br>Radiation interference electric field strength<br>Noise terminal voltage<br>(EMS)EN61000-6-2<br>Static discharge immunity<br><br>RF electromagnetic field immunity<br><br>EFT/B immunity<br>Surge immunity<br>Conductivity noise immunity<br>Power frequency magnetic field immunity<br>Voltage dip/Instantaneous stop/Voltage fluctuation immunity | <br>EN55011 Group1 ClassA<br>EN55011 Group1 ClassA<br><br>EN61000-4-2 4 kV contact<br>8 kV air<br>EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz)<br>EN61000-4-4 2 kV (power supply line)<br>EN61000-4-5 1 kV (power line)<br>EN61000-4-6 10 V/m AM modulation (0.15 MHz to 80 MHz)<br>EN61000-4-8 30 A/m (50 Hz)<br>EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

## Dimensions

mm inch
General tolerance: ±1.0 ±.039



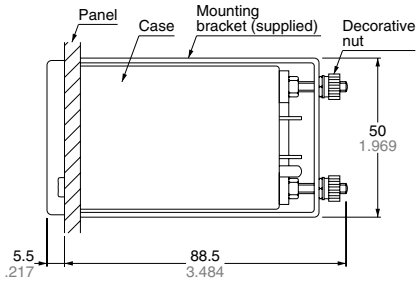

## Wiring diagram



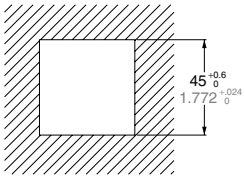

Operating power supply

## Panel mounting

mm inch




**• Panel cutout dimensions**



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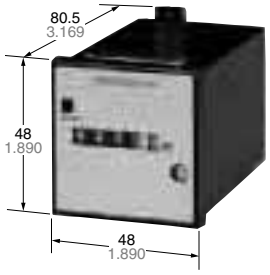
# DIN 48 MINUTES INDICATOR HOUR METER

# TH50




mm inch

Silver panel

Black panel

## Features

- **Measurement and management in units of minutes**
  Unlike conventional hour meters, the time can be measured and managed in minutes.
- **Reset button**
  The hour meters can be reset to zero for repeated measurement.
- **High-performance compact syncronous motor**
  The accurately turning motor is employed to provide for longer period of measurement.
- **Common for 50/60 Hz power frequency**
  A lever is used to select 50 Hz or 60 Hz. There is no need to rearrange the control panel and other signal destinations.
- **Dimensions as per DIN 43700 standard**
  The units are in the 48x48 DIN standard size. They can be fitted in panels and give refined metallic appearance.
- **Easier wiring**
  The flat terminals (#187) are quick and easy to connect.
- **Rotary indicator**
  The rotary indicator makes one turn every 2 seconds for monitoring.
- **Compliant with CE.**

## Specifications

| | | |
|---|---|---|
| Rated operating 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 |
| Allowable operating voltage range | | 85 to 115% of rated operating voltage |
| Rated frequency | | 50/60 Hz (selectable by switch) |
| Counting range | | 0 to 9999.9 min |
| Minimum time display | | 0.1 min (6 sec) |
| Rated power consumption | | Approx. 1.5 W |
| Insulation resistance (Initial value) | | Min. 100 MΩ, Between live and dead metal parts (At 500 V DC) |
| Breakdown voltage (Initial value) | | 2,000 Vrms, Between live and dead metal parts |
| Max. temperature rise | | 55°C 131°F |
| Vibration resistance | Functional | 10 to 55 Hz: 1 cycle/min double amplitude of 0.5 mm (10 min on 3 axes) |
| Shock resistance | Functional | Min. 98 m/s² {10 G} (4 times on 3 axes) |
| | Destructive | Min. 980 m/s² {100 G} (5 times on 3 axes) |
| Ambient temperature | | –10 to +50°C +14 to +122°F |
| Ambient humidity | | Max. 85% RH (non-condensing) |
| Weight | | 150 g 5.29 oz |

## Product types

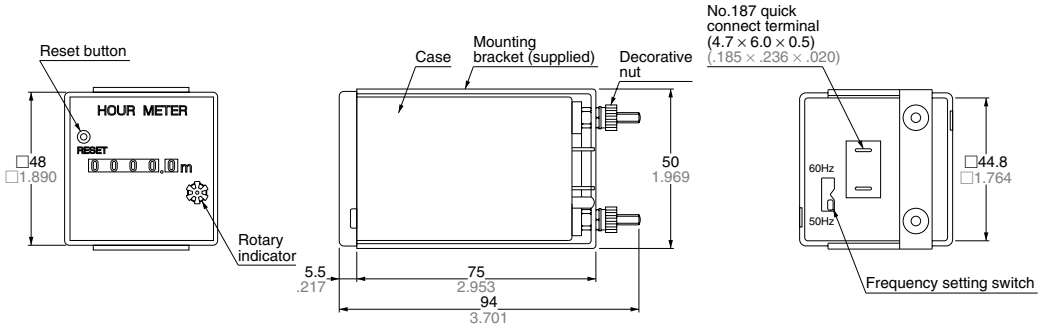
| Type | Operating voltage | Part number | | Operating voltage | Part number | | Operating voltage | Part number | |
|---|---|---|---|---|---|---|---|---|---|
| | | Silver panel | Black panel | | Silver panel | Black panel | | Silver panel | Black panel |
| TH50 series | 100V AC | TH501S | TH501 | 24V AC | TH504S | TH504 | 115 to 120V AC | TH507S | TH507 |
| | 200V AC | TH502S | TH502 | 48V AC | TH505S | TH505 | 220V AC | TH508S | TH508 |
| | 12V AC | TH503S | TH503 | 110V AC | TH506S | TH506 | 240V AC | TH509S | TH509 |

## Applicable standard

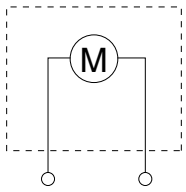
| Safety standard | EN61010-1 | Pollution Degree 2/Overvoltage Category II |
|---|---|---|
| EMC | (EMI)EN61000-6-4<br>Radiation interference electric field strength<br>Noise terminal voltage<br>(EMS)EN61000-6-2<br>Static discharge immunity<br><br>RF electromagnetic field immunity<br><br>EFT/B immunity<br>Surge immunity<br>Conductivity noise immunity<br>Power frequency magnetic field immunity<br>Voltage dip/Instantaneous stop/Voltage fluctuation immunity | <br>EN55011 Group1 ClassA<br>EN55011 Group1 ClassA<br><br>EN61000-4-2 4 kV contact<br>8 kV air<br>EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz)<br>EN61000-4-4 2 kV (power supply line)<br>EN61000-4-5 1 kV (power line)<br>EN61000-4-6 10 V/m AM modulation (0.15 MHz to 80 MHz)<br>EN61000-4-8 30 A/m (50 Hz)<br>EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

## Dimensions

mm inch
General tolerance: ±1.0 ±.039



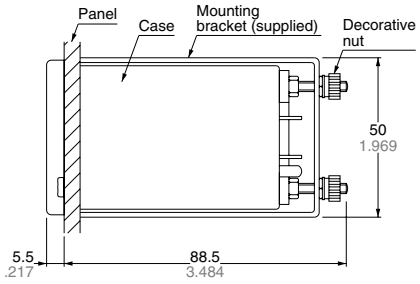

## Wiring diagram



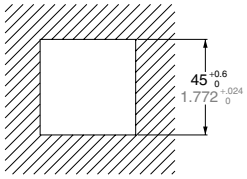

Operating power supply

## Panel mounting

mm inch




**• Panel cutout dimensions**



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# DIN HALF SIZE HOUR METER

# TH63 / TH64


mm inch

TH64 series (with reset button)

TH63 series (without reset button)

**UL File No.: E42876**
**CSA File No.: LR39291**

## Features

- **Compact to save panel space**
  The 24x48 mm hour meters are just half the DIN 48x48 standard size. They help save the panel space.
- **Reset button**
  The hour meters can be reset to zero (TH64 series).
- **Wide-ranging measurement display**
  The measurement can be displayed from 0.1 hour up to 99999.9 hours (TH63 series). The dial size is the same as that of 48x48 DIN size hour meters (TH14 and TH24 series).
- **Easy to install**
  The flat terminals (#187) are used for easier wiring. There is no need to undo the lock spring.
- **High-performance sync motor with 50/60 Hz selector**
  The noise-resistant, accurately turning motor is employed to provide for longer period of measurement. The power frequency can be selected for 50 or 60 Hz.
- **Rotary indicator**
  The rotary indicator makes one turn every 72 seconds for monitoring.
- **Compliant with UL, CSA and CE.**

## Typical applications

Management of small generators and food processing machines; hour counting for leased equipment; maintenance management of various equipment, etc.

## Specifications

| | | |
|---|---|---|
| Rated operating 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 |
| Allowable operating voltage range | | 85 to 115% of rated operating voltage |
| Rated frequency | | 50/60 Hz (selectable by switch) |
| Counting range | | 0 to 99999.9 hours (TH63 series)<br>0 to 9999.9 hours (TH64 series) |
| Minimum time display | | 0.1 hours (6 min) |
| Rated power consumption | | Approx. 1.5 W |
| Insulation resistance (Initial value) | | Min. 100 MΩ, Between live and dead metal parts (At 500 V DC) |
| Breakdown voltage (Initial value) | | 2,000 Vrms, Between live and dead metal parts |
| Max. temperature rise | | 55°C 131°F |
| Vibration resistance | Functional | 10 to 55 Hz: 1 cycle/min double amplitude of 0.5 mm (10 min on 3 axes) |
| Shock resistance | Functional | Min 98 m/s² {10 G} (4 times on 3 axes) |
| | Destructive | Min 980 m/s² {100 G} (5 times on 3 axes) |
| Ambient temperature | | –10 to +50°C +14 to +122°F |
| Ambient humidity | | Max. 85% RH (non-condensing) |
| Weight | | Approx. 80 g 2.82 oz |

## Product types

| Type | Operating voltage | Part number | Operating voltage | Part number | Operating voltage | Part number |
|---|---|---|---|---|---|---|
| TH63 series (without reset button) | 100V AC | TH631 | 24V AC | TH634 | 115 to 120V AC | TH637 |
| | 200V AC | TH632 | 48V AC | TH635 | 220V AC | TH638 |
| | 12V AC | TH633 | 110V AC | TH636 | 240V AC | TH639 |
| TH64 series (with reset button) | 100V AC | TH641 | 24V AC | TH644 | 115 to 120V AC | TH647 |
| | 200V AC | TH642 | 48V AC | TH645 | 220V AC | TH648 |
| | 12V AC | TH643 | 110V AC | TH646 | 240V AC | TH649 |

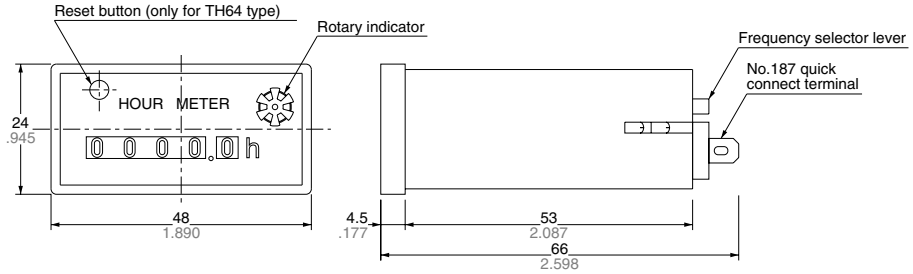
Notes) 1. Only the metallic-looking (silver) panel mounting type is available.
2. Standard products are UL-recognized as well as CSA-certified. There is no need to add "U" at the end of the part number. Just specify the standard part number when ordering.

## Applicable standard

| Safety standard | EN61010-1 | Pollution Degree 2/Overvoltage Category II |
|---|---|---|
| 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<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz)<br>10 V/m pulse modulation (895 MHz to 905 MHz) |
| | EFT/B immunity | EN61000-4-4 2 kV (power supply line) |
| | Surge immunity | EN61000-4-5 1 kV (power 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) |
| | Voltage dip/Instantaneous stop/Voltage fluctuation immunity | EN61000-4-11 10 ms, 30% (rated voltage)<br>100 ms, 60% (rated voltage)<br>1,000 ms, 60% (rated voltage)<br>5,000 ms, 95% (rated voltage) |

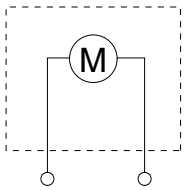
## Dimensions

mm inch
General tolerance: ±0.5 ±.020



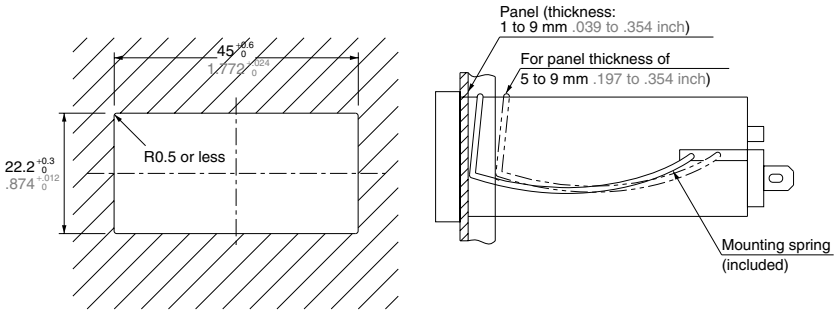

## Wiring diagram

mm inch



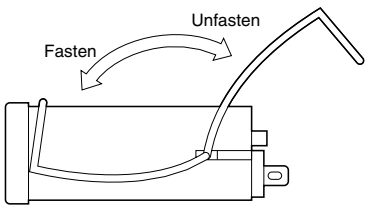

Operating power supply

**• Panel cutout dimensions**




## Mounting

1. Cut a $22.2^{+0.3}_{0} \times 45^{+0.6}_{0}$ mm ($.874^{+.012}_{0} \times 1.772^{+.024}_{0}$ inch) opening in the panel.
2. Swing the mounting spring to the rear of the hour meter and fit the hour meter into the panel opening. (There is no need to detach the mounting spring from the hour meter.) If the panel is 5 to 9 mm .197 to .354 inch thick, move the mounting spring to the other hole toward the rear of the hour meter.
3. Swing the mounting spring to the front of the hour meter to secure the hour meter to the panel.
4. Wire the supplied quick connectors and connect to the hour meter. Be sure to use the supplied insulating sleeves to cover the connectors.



Panasonic
ideas for life

# DIN HALF SIZE HOUR METER

# TH8

## Features

- **IP66 waterproof construction**

The front panel surface keeps water and dust out. Perfect for use in rough conditions.

- **Includes operation light (LED)**

The operation LED illuminates so you can quickly verify operation status.

- **Compliant with UL, c-UL and CE.**

## Product type

| Installation | Measurement time | Operation light | Rated voltage | Part No. |
|---|---|---|---|---|
| Panel installation | 0 to 9999.9 hours | LED illuminates while operating. | 12 V DC | TH833C |
| | | | 24 V DC | TH834C |

Note: Products are UL and c-UL certified as standard. (Suffix "U" is not required ON part numbers when ordering.)

## Specifications

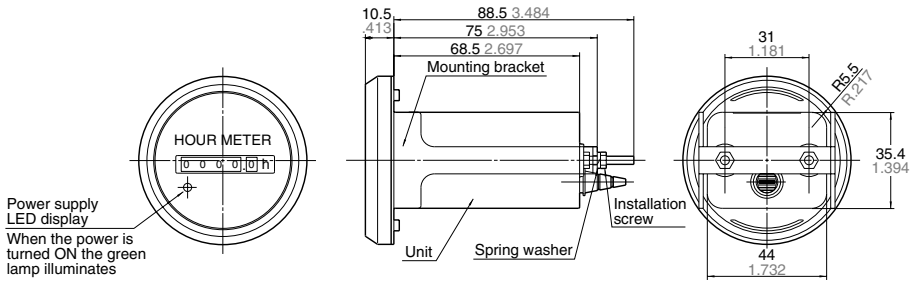
| Item \ Type | | TH833C | TH834C |
|---|---|---|---|
| Rating | Rated voltage | 12 V DC | 24 V DC |
| | Usage voltage range | 10.2 to 15.6 V DC | 20.4 to 31.2 V DC |
| | Measurement time | 0 to 9999.9 hours | |
| | Min. measurement time | 0.1 hour (6 min.) | |
| | Power consumption | Approx. 1.5 W (With rated voltage applied at 25°C 77°F) | |
| Electrical characteristics | Insulation resistance (initial) | Min. 100 MΩ between charged and uncharged parts (measured at 500 V DC) | |
| | Breakdown voltage (initial) | Between charged and uncharged parts: 2,000 V AC for 1 minute. | |
| | Temperature rise | Max. 55°C 131°F (measured at rated voltage and resistance law) | |
| Mechanical characteristics | Functional vibration resistance | 10 to 55 Hz (1 cycle/min.)<br>Single amplitude: 0.35 mm (10 min. ON 3 axes) | |
| | Functional shock resistance | Min. 98 m/s² (4 times ON 3 axes) | |
| | Destructive vibration resistance | Min. 980 m/s² (5 times ON 3 axes) | |
| Usage conditions | Operation temperature | –20°C to +60°C –4°F to +140°F (Without due and frost) | |
| | Ambient humidity | 35 to 85% RH (relative humidity) (non-condensing) | |
| | Power supply ripple | Approx. 48% or less (single phase, all-wave rectification) | |
| Protective construction | | IP66 (front panel with a rubber gasket) | |

## Applicable standard

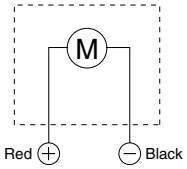
| | | |
|---|---|---|
| EMC | (EMI)EN61000-6-4 | |
| | Radiation interference electric field strength | EN55011 Group1 ClassA |
| | Noise terminal voltage | EN55011 Group1 ClassA |
| | (EMS)EN61000-6-2 | |
| | Static discharge immunity | EN61000-4-2 4 kV contact<br>8 kV air |
| | RF electromagnetic field immunity | EN61000-4-3 10 V/m AM modulation (80 MHz to 1 GHz) |
| | 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) |

## Dimensions and part names (unit: mm inch)

Tolerance: ±1.0 ±.039

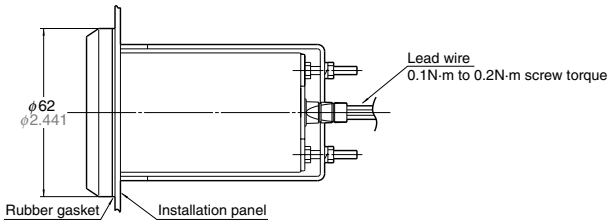



## Wiring diagram

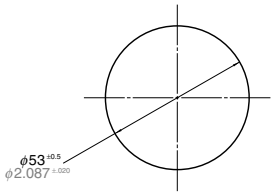



Operation voltage

## Panel installation diagram




**Panel cutout dimensions**




(Unit: mm inch)

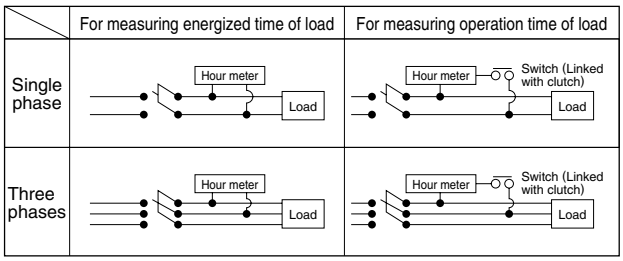
# PRECAUTIONS IN USING THE HOUR METERS

**1. Frequency setting**

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

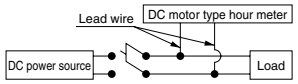
**2. Connections**

**• 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°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°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°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°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)

## Options

**1. Accessories (for LC2H total counter)**
Panel cover (black)

Part No.: AEL3801
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 accessory (black) is available for the LC2H preset counter.

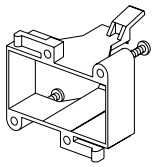
**2. Lithium battery (3 V)**


Part No.: ATH3802
Packaged with the LC2H (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 LC2H total counter and LC2H preset counter)



Part No.: ATH3803
Packaged with the mounting bracket type LC2H total counter

**Rubber gasket**
(Suitable for installation bracket type LC2H total counter and LC2H preset counter)

Part No.: ATH3804
Packaged with the mounting bracket type LC2H total counter

## 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.

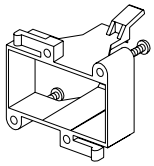
**2. Lithium battery (3 V)**


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

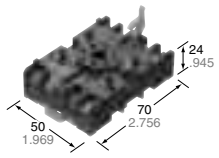
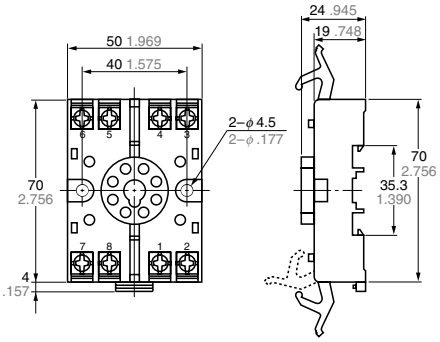
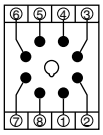
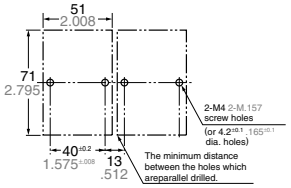
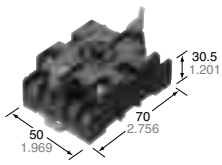
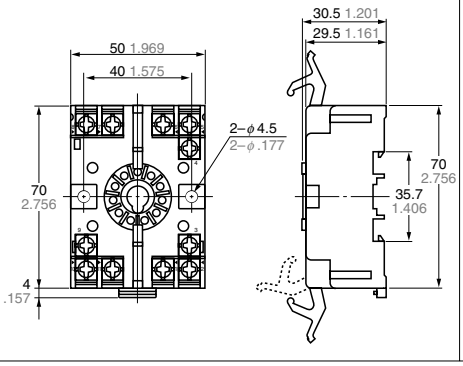
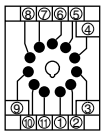
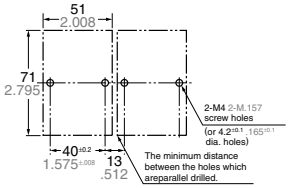


Part No.: ATH3803
Packaged with the mounting bracket type LH2H hour meter

**Rubber gasket**
Suitable for installation frame type LH2H hour meter and LH2H preset hour meter

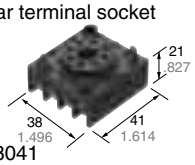
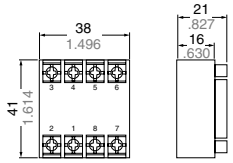
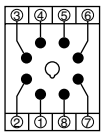
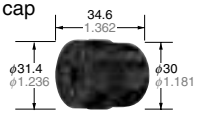
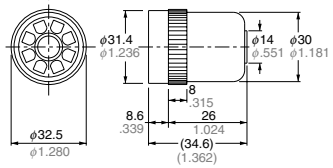
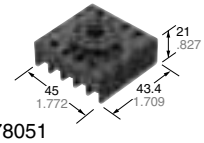
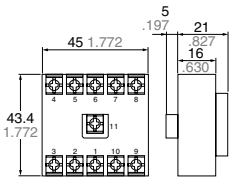
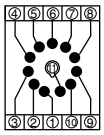
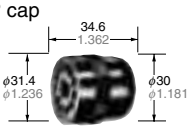
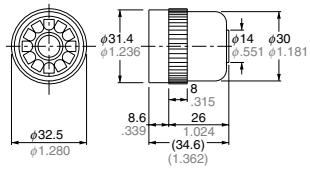
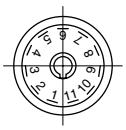
Part No.: ATH3804
Packaged with the mounting bracket type LH2H hour meter

## Terminal sockets (Unit: mm inch, Tolerance: ±1 ±.039)

| Type | Appearance | Dimensions | Terminal wiring (Top view) | Mounting hole dimensions |
|---|---|---|---|---|
| LC4H (8-pin type) | • DIN rail socket (8-pin)<br>  <br>ATC180031 |  |  <br>Note: Terminal No. on the main body are identical to those on the terminal socket. |  |
| LC4H<br>LC4H-S<br>LC4H-W<br>(11-pin type) | • DIN rail socket (11-pin)<br>  <br>ATC180041 |  |  <br>Note: Terminal No. on the main body are identical to those on the terminal socket. |  |

Note: The terminal numbers on the counter are identical to those on the terminal socket.

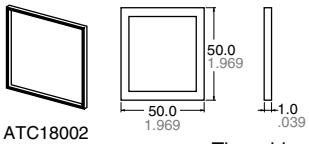
## Sockets (Unit: mm inch, Tolerance: ±1 ±.039)

| Type | Appearance | Dimensions | Terminal wiring (Top view) | Mounting hole dimensions |
|---|---|---|---|---|
| LC4H (8-pin type) | • Rear terminal socket<br>  <br>AT78041 |  |  | — |
| | • 8P cap<br>  <br>AD8-RC |  |  | — |
| LC4H<br>LC4H-S<br>LC4H-W<br>(11-pin type) | • Rear terminal socket<br>  <br>AT78051 |  |  | — |
| | • 11P cap<br>  <br>AT8-DP11 |  |  | — |

Note: The terminal numbers on the counter are identical to those on the socket.

# DIN SIZE COUNTERS COMMON OPTIONS

**• Rubber gasket**

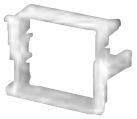



ATC18002

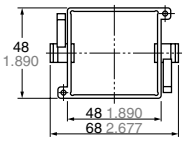
Applicable for LC4H series

The rubber gasket is enclosed in the LC4H series.

**• Mounting frame**



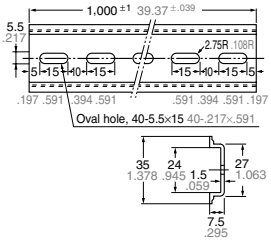
AT8-DA4



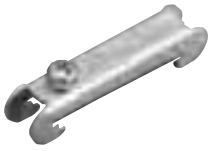

Applicable for LC4H series

**• Mounting rails (Applicable for DIN and IEC standards)**

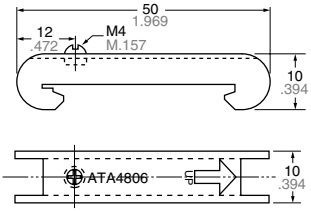
AT8-DLA1
Length: 1 m
aluminum




**• Fastening plate**



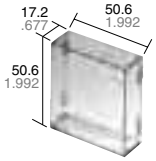
ATA4806




For holding DIN rails

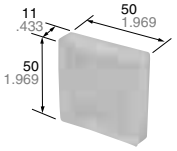
**• Protective cover for DIN 48 size**

Hard type



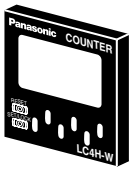

AQM4801

Flexible type




AQM4803

**• Panel cover (Black)**

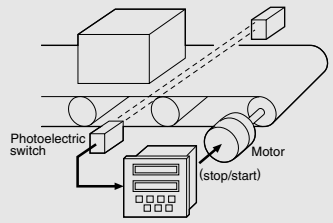
| LC4H Panel cover (4 digits) | LC4H Panel cover (6 digits) | LC4H-S Panel cover (4 digits) | LC4H-S Panel cover (6 digits) | LC4H-W Panel cover (6 digits) |
|---|---|---|---|---|
|  |  |  |  |  |
| AEL58011 | AEL58012 | AEL58013 | AEL58014 | AEL68011 |

The black panel cover is also available so that you can change the appearance of the panel by changing the panel cover.
The color of the standard panel cover is ash gray.

## *The highly accurate, reliable counters can be controlled from the front panel and are suitable for a wide range of applications.*

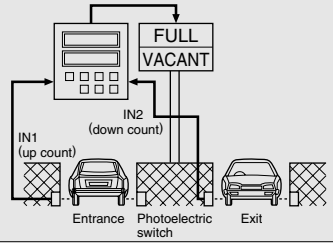
### Typical Counter Applications

DOWN and HOLD-A modes
for shipment quantity counting



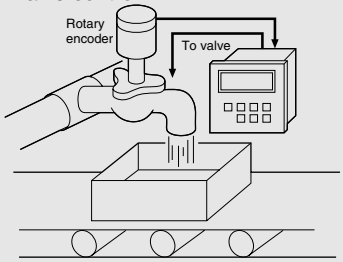

Shipment quantities are counted to control the conveyor line flow.

IND and HOLD-C modes
for parking lots



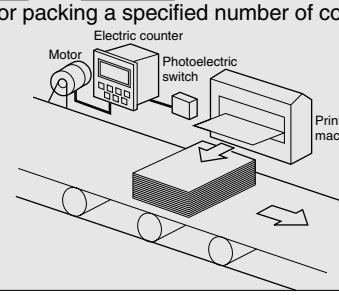

Incoming and outgoing cars are counted to switch the FULL and VACANT signs.

PHASE and HOLD-A modes
for valve control



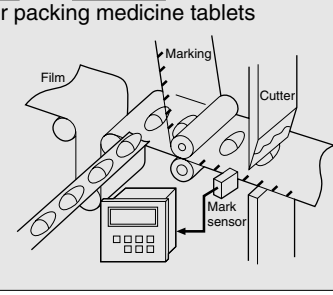

Rotary encoder signals are counted to control a valve aperture.

UP and SHOT-A modes
for packing a specified number of copies



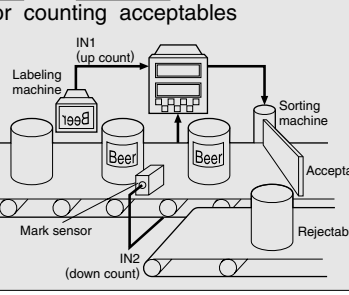

Printed matter is counted to package a specified number of copies.

UP and SHOT-B modes
for packing medicine tablets



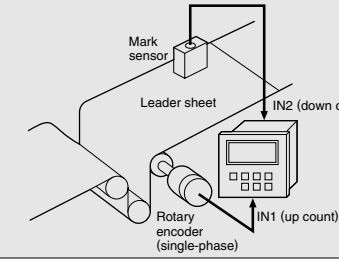

Medicine tablets are packed in specified quantities.

UP and SHOT-C modes
for counting acceptables



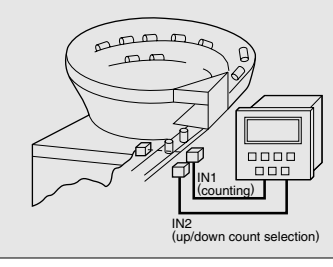

Labeled cans alone are counted up. Rejected cans are not counted.

UP and SHOT-D modes
for winding leader sheet



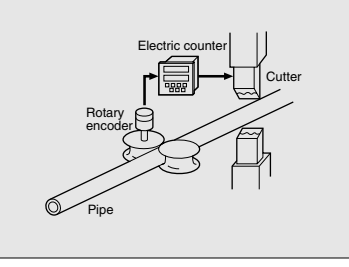

Extra leader sheet that is now wound is counted by a rotary encoder and a color detecting sensor.

DIR input mode
for controlling part stocks




Incoming and outgoing parts are counted to keep parts feeders well-stocked.

PHASE input mode for sizing




Teamed up with a rotary encoder, the counter is used to control the cutting length of pipes.

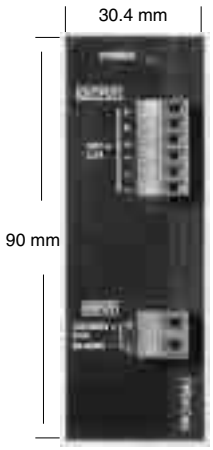
Panasonic
ideas for life

# POWER SUPPLIES

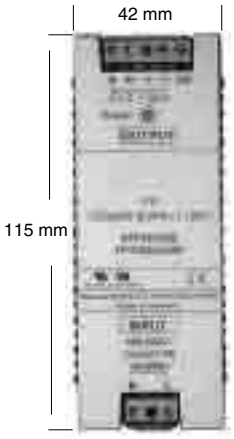
# FP 24VDC

## Features

- **Incredibly small size:**
  - FP0 power supply: 90 x 60 x 30.4mm
  - FP power supply: 115 x 75 x 42mm
- **Maximum output current:**
  - FP0 power supply: 0.7A (24VDC)
  - FP power supply: 2.1A (24VDC)
- **Multiple voltage input:**
  85 to 265VAC
- **Optimal protection:**
  overvoltage, overcurrent, overheating, etc.
- **Global approvals**
  (UL/cUL, EN, CE-marking)
- **DIN-rail mounting**
  (FP0 power supply also side mounting)




**FP0 Power supply**
**FP0-PSA2**




**FP Power supply**
**FP-PS24-050 E**

NOTE:
1) Mounting distance between the FP0 power supply and the FP0 CPU is needed to permit heat radiation for the FP0-CPU
2) For side mounting, 2 additional blue clips are needed: order part-no. 677-021-17101 (1pce.) for FP0-PSA2
3) Mounting distance between the power supply FP-PS24-050E and other devices is needed for cooling/heat radiation.

## Performance Specifications

| Order No: | FP0-PSA2 | FP-PS24-050E |
|---|---|---|
| Primary side: | | |
| Rated operating voltage | 115/230VAC | |
| Operating voltage range | 85 to 265VAC | |
| Rated operating frequency | 50/60Hz | |
| Operating frequency range | 40 to 70Hz | |
| Inrush current | < 50A at 55°C | < 50A at 25°C/< 70A at 55°C |
| Current consumption | 145mA (at 230VAC and 0.7A output current) | 400mA (at 230VAC and 2.1A output current) |
| Over voltage protection | PROTECTED | |
| Secondary side: | | |
| Rated output voltage | 24VDC | |
| Output voltage range | 23.5V to 24.5VDC | |
| Nominal output current | 0.7A | 2.1A |
| Output current range | 0 to 0.7A | 0 to 2.1A |
| Output ripple | < 60mV$_{pp}$ | < 240mV$_{pp}$ |
| Short circuit protected | Electronic, automatic restart mode | Continuous |
| Over voltage protected | Yes | |
| Over load protected | Yes (switch off at approx. 0.8A and more) | Yes (switch off at approx. 3.5A and more) |
| Holding time | Min. 20ms at 230VAC | Min. 110ms at 230VAC |
| Power OK signal | – | Yes |

## General Specifications

| | | |
|---|---|---|
| Ambient temperature | 0°C to +55°C | |
| Storage temperature | -20 °C to +70 °C | |
| Ambient humidity | 5 to 95% non-condensing | |
| Storage humidity | 5 to 95% non-condensing | |
| Vibration resistance | 10 to 55Hz, 1 cycle/min.: double amplitude of 0.75mm, 10 min. on 3 axes | |
| Shock resistance | 10g min., 4 times on 3 axes | |
| Life time min. | 7 years at nom. load, 25°C ambient temperature, 20000 h at 55°C with full load/continuous operation | |
| Mounting | DIN rail or FP0 flat attachement plate | DIN rail |
| Size | 90 x 60 x 30.4mm | 115 x 75 x 42mm |
| Input connection AC side | MC connector, 2 pin | 2 pin |
| Output connection DC side | MC connector, 6 pin, 3 pin for „+“ and 3 pin for „-“ | 5 pin, 2 pin for „+” and 2 pin for „-”; 1 pin Power OK |
| Status display | LED (green) at the front side for the secondary voltage indication | |

## Standards

| | | |
|---|---|---|
| EMC | EN 50082-2, EN50082-1, EN 50081-2, EN 50081-1 | EN 55011/B, EN 55022/B, EN 61000-4-2, -4-3, -4-4, -4-5, -4-6, -4-11 |
| LVD | EN 60950, EN 50178 (overvoltage category 3) | EN 60950, EN 50178 (overvoltage category 2) |
| Others | UL Recognized according to UL 508, UL 1950, cUL Recognized according to CAN/CSA-C22.2 No. 950.95 | |
| Protection | IP30 | IP20 outside/IP67 inside |

# INTERNATIONAL STANDARDS

## 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 (Underwiters 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

**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.

Certification

Fig. 3

Component Acceptance

Fig. 4

Fig. 5

Fig. 6

## 3. Europe

**EN standard**

**European Standards/Norme Europeennee (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 |

# INTERNATIONAL STANDARDS

## Timers

| Product 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 | |
| PM4H-A<br>PM4H-S<br>PM4H-M<br>PM4H-SD<br>PM4H-W | | E122222 | 5A250VAC<br>PILOT DUTY C300 | LR39291 | 5A250VAC<br>PILOT DUTY C300 | 98/10004 | 5A 250V AC<br>(resistive) | |
| PM4H-F | | E122222 | 3A250VAC<br>PILOT DUTY C300 | LR39291 | 3A250VAC<br>PILOT DUTY C300 | 98/10004 | 3A 250V AC<br>(resistive) | |
| LT4H<br>LT4H-W | | E122222 | 5A250VAC<br>PILOT DUTY C300<br>100mA30VDC | E122222<br>(C-UL) | 5A250VAC<br>PILOT DUTY C300<br>100mA30VDC | — | — | |
| QM4H | | E43149 | 5A250VAC<br>PILOT DUTY C300 | E43149<br>(C-UL) | 5A250VAC<br>PILOT DUTY C300 | — | — | |
| S1DXM-A/M<br>(Relay output) | 2C | E122222 | 7A125VAC<br>6A250VAC<br>1/6HP125, 250VAC<br>PILOT DUTY C300 | LR39291 | 7A125VAC<br>6A250VAC<br>1/6HP125, 250VAC<br>PILOT DUTY C300 | 98/10004 | 7A 250V AC<br>(resistive) | |
| | 4C | E122222 | 5A250VAC<br>1/10HP125, 250VAC<br>PILOT DUTY C300 | LR39291 | 5A250VAC<br>1/10HP125, 250VAC<br>PILOT DUTY C300 | 98/10004 | 5A 250V AC<br>(resistive) | |
| S1DX<br>(Relay output) | 2C | E122222 | 7A125VAC<br>6A250VAC<br>1/6HP125, 250VAC<br>PILOT DUTY C300 | LR39291 | 7A125VAC<br>6A250VAC<br>1/6HP125, 250VAC<br>PILOT DUTY C300 | 98/10004 | 7A 250V AC<br>(resistive) | |
| | 4C | E122222 | 5A250VAC<br>1/10HP125, 250VAC<br>PILOT DUTY C300 | LR39291 | 5A250VAC<br>1/10HP125, 250VAC<br>PILOT DUTY C300 | 98/10004 | 5A 250V AC<br>(resistive) | |
| PM5S-A<br>PM5S-S<br>PM5S-M | | E59504<br>(C-UL) | 5A250VAC<br>PILOT DUTY C300 | E59504<br>(C-UL) | 5A250VAC<br>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<br>AT8-RFD (AT78039)<br>7A250VAC<br>AT8-DF8L (ATA48211)<br>8P cap was an approved as an option.<br>AD8-RC (AD8013) | LR39291 | 10A250VAC<br>AT8-RFD (AT78039)<br>7A250VAC<br>AT8-DF8L (ATA48211)<br>8P cap was an approved as an option.<br>AD8-RC (AD8013) | — | — | |
| | E148103 | AT8-DF8K (ATC180031)<br>AT8-DF11K (ATC180041)<br>AT8-R8K (AT78041)<br>AT8- R11K (AT78051) | E148103<br>(C-UL) | AT8-DF8K (ATC180031)<br>AT8-DF11K (ATC180041)<br>AT8-R8K (AT78041)<br>AT8- R11K (AT78051) | — | — | |

# INTERNATIONAL STANDARDS

## Counters

| Product name | UL recognized | | CSA certified | | Remarks |
|---|---|---|---|---|---|
| | File No. | Approved ratings | File No. | Approved ratings | |
| LC4H<br>LC4H-S | E122222 | 5A250V AC<br>PILOT DUTY C300<br>100mA 30V DC | E122222<br>(C-UL) | 5A250V AC<br>PILOT DUTY C300<br>100mA 30V DC | "The standard models conform to the UL/C-UL standard. (To place an order, you do not need to specify the tailing character "9" of each item number.)" |
| LC4H-W | E122222 | 3A250V AC<br>PILOT DUTY C300<br>100mA 30V DC | E122222<br>(C-UL) | 3A250V AC<br>PILOT DUTY C300<br>100mA 30V DC | |
| LC2H | E122222 | 24-240 V AC/DC<br>4.5-30 V DC<br>3 V DC | E122222<br>(C-UL) | 24-240 V AC/DC<br>4.5-30 V DC<br>3 V DC | |

Notes) For UL-listed products, specify „9" at the end of the part No. when ordering.
Standard products of LC4H series are UL-recognized as well as CSA-certified. There is no need to add „9" at the end of the part No.

## Hour Meters

| Product name | UL recognized | | CSA certified | | Remarks |
|---|---|---|---|---|---|
| | File No. | Approved ratings | File No. | Approved ratings | |
| TH13 · TH23 series | E42876 | 115-120, 220,<br>240V AC | LR39291 | 115-120, 220,<br>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,<br>110, 115-120, 200,<br>220, 240V AC | LR39291 | 12, 24, 48, 100,<br>110, 115-120, 200,<br>220, 240V AC | • Only black panel-mounting type UL-recognized and CSA-certified.<br>• For UL-recognized and CSA-certified products, specify "U" at the end of the product code.<br>• Panel-mounting silver type not UL-recognized nor CSA-certified. |
| TH63 · 64 series | E42876 | 12, 24, 48, 100,<br>110, 115-120, 200,<br>220, 240V AC | LR39291 | 12, 24, 48, 100,<br>110, 115-120, 200,<br>220, 240V AC | • Standard products are UL-recognized and CSA-certified. |
| LH2H | E122222 | 24-240 V AC/DC<br>4.5-30 V DC<br>3 V DC | E122222<br>(C-UL) | 24-240 V AC/DC<br>4.5-30 V DC<br>3 V DC | Standard products are UL and C-UL-recognized. To place an order, you do not need to specify the tailly character "9" of each item number. |
| TH8 series | E42876 | 12 V DC<br>24 V DC | E42876<br>(C-UL) | 12 V DC<br>24 V DC | Standard products are UL and C-UL-recognized. To place an order, you do not need to specify the tailly character "U" of each item number. |

Notes) For UL-recognized and CSA-certified products, specify "U" at the end of the part No. when ordering.
① UL-recognized as well as CSA-certified TH13 and TH23 series products have operating voltages of 115-120V, 220V and 240V AC.
② Standard products of TH63 and 64 series are UL-recognized as well as CSA-certified. There is no need to add "U" at the end of the part No.
③ Standard products of LH2H and TH8 series are UL/C-UL recognized. There is no need to add "9" or "U" at the end of the part No.

## Accessories

| Product name | UL-recognized | | CSA certified | | Remarks |
|---|---|---|---|---|---|
| | File No. | Rating | File No. | Rating | |
| Common counter fixtures | E59504 | 10A250V AC<br>AT8-RFV (AT78029)<br>AT8-RFD (AT78039)<br>7A250V AC<br>AT8-DF8L (ATA48211)<br>AT8-RR (AT78049)<br>8P cap CSA-certified as option.<br>AD8-RC (AD8013) | LR26550<br>LR39291 | 10A250V AC<br>AT8-RFV (AT78029)<br>AT8-RFD (AT78039)<br>7A250V AC<br>AT8-DF8L (ATA48211)<br>AT8-RR (AT78049)<br>8P cap UL-listed as option.<br>AD8-RC(AD8013) | |
| | E148103 | AT8-DF8K (ATC180031)<br>AT8-DF11K (ATC180041)<br>AT8-R8K (AT78041)<br>AT8- R11K (AT78051)<br>Relay Socket | E148103<br>(C-UL) | AT8-DF8K (ATC180031)<br>AT8-DF11K (ATC180041)<br>AT8-R8K (AT78041)<br>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-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 |
| | PM5S | EN 61000-6-4/EN 61000-6-2 | EN 61812-1 |
| | CM4H | EN 61000-6-4/EN 61000-6-2 | EN 61010-1 |
| Counters | LC4H | 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.)


North America | Europe | Asia Pacific | China | Japan

# Panasonic Electric Works

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