Panasonic
ideas for life

Matsushita
Timer, Counter, Hour Meter

TABLE OF CONTENTS

TIMERS CHART

		Multiple operation	ON-delay	OFF-delay	Twin	Flicker	One-shot	Star delta	One-cycle	Integration
Digital quartz timer	DIN 48 SIZE	 LT4H LT4H-W	 LT4H QM4H	 LT4H (Signal)	 LT4H-W	 LT4H	 LT4H			 LT4H
Multi-range analog timer (CR oscillation)	Surface mountable	 PM4H-A	 S1DX PM4H-S PM4H-M	 PM4H-A (Signal) PM4H-F	 PM4H-W	 PM4H-A S1DX	 PM4H-A S1DX	 PM4H-SD/SDM	 S1DX	
	Relay terminal socket		 S1DX			 S1DX	 S1DX		 S1DX	
	PC board mount		 S1DX							
DIN rail timer		 PM5S	 PM5S	 PM5S		 PM5S	 PM5S			

TIMERS SELECTOR CHART

Operation mode	Pulse ON-delay Pulse Flicker Pulse ON-Flicker Differential ON/OFF-delay (1)(2) Signal OFF-delay Pulse One-shot Pulse One-cycle	Power ON-delay	Power ON-delay Power Flicker Power ON-flicker Power One-shot Power One-cycle (with instantaneous contact)	Star-Delta	Power OFF-delay	Power OFF-start cyclic
			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 Each model has various time ranges. See the product lists before ordering.		0.1s — 500h 16 time ranges selectable		0.2s — 100s 4 time ranges selectable	0.04s — 10s 3 time ranges selectable 0.04min — 10min 3 time ranges selectable	0.1s — 500h 16 time ranges selectable
Model/Product Name	CE PM4H-A Multi-range analog timer	CE PM4H-S Multi-range analog timer	CE PM4H-M Multi-range analog timer	CE PM4H-SD/SDM Star-Delta timer	CE PM4H-F OFF-delay timer	CE PM4H-W Analog multi-range cyclic twin timer
Features	16 time ranges are selectable. 1s to 500h (Max. range) is controlled. 8 operation modes available.	16 time ranges are selectable. 1s to 500h (Max. range) is controlled in one unit.	16 time ranges are selectable. 1s to 500h (Max. range) is controlled in one unit. 5 operation modes (with instantaneous contact) available.	4 time ranges are selectable. 2s to 100s (Max. range) is controlled in one unit. 5 time ranges selectable for the ⅄-△ switching times.	Multiple time ranges are selectable. Power-OFF delay of max. 10 min. is controlled.	16 time ranges are selectable. 1s to 500h (Max. range) is controlled in one unit.
Control output (resistive) — Current	5A	5A	5A	5A	3A	5A
Control output (resistive) — 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, 48 to 125V DC, 12 V DC, 24 V AC/DC (other models)	100 to 240 V AC, 48 to 125V DC, 12 V DC, 24 V AC/DC (other models)	100 to 240 V AC, 48 to 125V DC, 12 V DC, 24 V AC/DC (other models)	100 to 240 V AC, 24 V AC/DC (other models)	100 to 120 V AC, 200 to 240 V AC, 24 V AC, 24 V DC, 12 V DC (other models)	100 to 240 V AC, 48 to 125V DC, 12 V DC, 24 V AC/DC (other models)
Arrangement	Timed-out 2 Form C	Timed-out 2 Form C	Timed-out 1 Form C Instantaneous 1 Form C	⅄ side: Timed-out 1 Form A △ side: Timed-out 1 Form A Instantaneous: 1 Form A	Timed-out 2 Form C [F8R type] Timed-out 1 Form C	Timed-out 2 Form C
Time accuracy — Operation time fluctuation	±0.3%	±0.3%	±0.3%	±0.3%	±0.3%	±0.3%
Time accuracy — Temperature error	±2%	±2%	±2%	±2%	±2%	±2%
Time accuracy — Voltage error	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%	±0.5%
Time accuracy — 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	2×10^7	2×10^7	2×10^7	2×10^7	10^7	2×10^7
Life (Min. operation) — Electrical (resistive)	10^5	10^5	10^5	10^5	10^5	10^5
Wiring diagrams	Pin type Screw terminal type	Pin type Screw terminal type	Pin type Screw terminal type	Pin type No instantaneous contact Pin type With instantaneous contact	Pin type Screw terminal type	Pin type Screw terminal type
Available standards	UL/CSA, LLOYD	UL/CSA, LLOYD	UL/CSA, LLOYD	UL/CSA, LLOYD	UL/CSA, LLOYD	UL/CSA, LLOYD
Page	P. 12	P. 12	P. 12	P. 17	P. 19	P. 23

TIMERS SELECTOR CHART

		Power ON delay (1) Power ON delay (2) Signal ON delay Signal OFF delay Pulse One-shot Pulse ON-delay Signal Flicker Totalizing ON-delay	ON-start flicker OFF-start flicker Delay one-shot		Power ON-delay Power flicker Power One-shot Power One-cycle
Operation mode	Power ON-delay			Power ON-delay	
					Output with contact
	CR oscillation counting timer	Quartz oscillation counting timer			CR oscillation counting timer
Major uses	For time control for short or long time	Suitable for super-high accurate, digital setting			For highly accurate time setting
Time range Each model has various time ranges. See the product lists before ordering.	10m, 30m, 60m, 10h, 30h 0.1s 0.1s 0.6s 0.2s 0.1m	999.9h 8 time ranges selectable 0.05s	9999h 8 time ranges selectable 0.08s	9990h 0.01s	60min 9h 30min 10min 3min 60s 30s 10s 5s 0.1min 3s 0.5min 3s 0.3h 1s 1min 0.5s 1s 0.1s 0.1s 0.2s 0.5s 0.05s
Model/Product Name	CE **PM4S** **Multi-range analog timer**	CE **LT4H Digital timer**	CE **LT4H-W Digital timer**	CE **QM4H Timer**	CE **S1DX Timer**
Features	An affordable new series timers	Bright and easy-to-read display Simple operation Short body	Bright and easy-to-read display Simple operation Wide time setting range	Possible to set and change the time and the time range even when the power is off.	With a large transparent dial. This timer can be attached both on the DIN rails and panel.

Control output (resistive)	Current	5A	(Relay output type) 5A	(Transistor output type) 100mA	(Relay output type) 5A	(Transistor output type) 100mA	5A	7A 2 Form C type	5A 4 Form C type
	Voltage	250 V AC	250 V AC	30 V DC	250 V AC	30 V DC	250 V AC	250 V AC	

Mounting method					

Mounting parts	Terminal block, cap, mounting frame	Terminal block, cap, panel cover, rubber gasket, mounting frame	Terminal block, cap, panel cover, rubber gasket, mounting frame	Terminal block, cap, mounting frame	Terminal block, cap block, mounting frame, fitting sockets, protective cover
Rated operating voltage	100 to 120 V AC, 200 to 240 V AC, 24 V DC 12 V DC	100 to 240 V AC 24 V AC 12 to 24 V DC (other models)	100 to 240 V AC 24 V AC 12 to 24 V DC (other models)	100 to 240 V AC/DC 12 to 48 V AC/DC	24 V AC, 100 to 120 V AC, 200 to 220 V AC, 220 to 240 V AC, 12 V DC, 24 V DC (other models)
Arrangement	T.D: Timed-out 2 Form C INST: Timed-out 1 Form C, / Selected by front switch	(Relay output type) Timed-out 1 Form C	(Transistor output type) Timed-out 1 Form A	(Relay output type) Timed-out 1 Form C	(Transistor output type) Timed-out 1 Form A	T.D. mode: Time delay 2C INST. mode: Time delay 1C and instantaneous 1C (Use MODE switch on front)	Timed-out 2 Form C Timed-out 4 Form C

Time accuracy	Operation time fluctuation	±1% (power off time change at the range of 0.1s to 1h)	±(0.005% + 50 ms) in case of power on start ±(0.005% + 20 ms) in case of reset or input signal start	±(0.005% + 80 ms) in case of power on start ±(0.005% + 20 ms) in case of reset or input signal start	±(0.01%±0.05s) in case of power on start ±0.005%±0.03s) in case of input reset start*² Operating voltage: 85 to 110% V Temperature: −10 to +55°C (+14 to 131°F) (20°C 68°F) Stopped time: 0.1 sec to 1 hour	±1%
	Temperature error	±2% (at 20°C ambient temp. at the range of −10 to +50°C)				±5%
	Voltage error	±1% (at the operating voltage changes between 85 to 110%)				±1%
	Setting error	±5%				±10%
Min. power off time		100 ms	500 ms	500 ms	100 ms	100 ms
Life (Min. operation)	Mechanical	10^7	2×10^7	—	2×10^7	—	10^7	10^7
	Electrical	10^5	10^5	10^7	10^5	10^7	10^5	2×10^5

Terminal layouts and Wiring diagrams	(PM4S diagrams) T.D: Timed-out 2 Form C INST: Timed-out 1 Form C, instantaneous 1 Form C * Selected by front switch	11-Pin type Screw terminal type	11-Pin type Screw terminal type	QM4H-S type QM4H-G type	Timed-out 2 Form C type Timed-out 4 Form C type
Available standards	UL/C-UL	UL/C-UL	UL/C-UL	UL/C-UL	UL/CSA, LLOYD
Page	P. 28	P. 31	P. 37	P. 44	P. 50

4

Operation mode	Pulse ON-delay Pulse Flicker Pulse ON-Flicker Signal OFF-delay Pulse One-shot Pulse One-cycle	Power ON-delay	Pulse ON-delay Pulse Flicker Pulse ON-flicker Signal OFF-delay Pulse One-shot Pulse One-cycle (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 Each model has various time ranges. See the product lists before ordering.	1000h 100h 30h 10h 1h 30m 10m 5m 2m 1m 30s 10s 5s 1s 0.1s 0.01s	500h 16 time ranges selectable 0.1s	500h 16 time ranges selectable 0.1s
Model/Product Name	$C \in$ **PM5S-A** **Multi-range analog timer**	$C \in$ **PM5S-S** **Multi-range analog timer**	$C \in$ **PM5S-M** **Multi-range analog timer**
Features	16 time ranges are selectable. 1s to 500h (Max. range) is controlled. 6 operation modes available.	16 time ranges are selectable. 1s to 500h (Max. range) is controlled in one unit.	16 time ranges are selectable. 1s to 500h (Max. range) is controlled in one unit. 6 operation modes (with instantaneous contact) available.
Control output (resistive) — Current	7A 5A 3A 5A	5A	5A
Control output (resistive) — 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 2 Form C	Timed-out 2 Form C	Timed-out 1 Form C Instantaneous 1 Form C
Time accuracy — Operation time fluctuation	±0.3%	±0.3%	±0.3%
Time accuracy — Temperature error	±2%	±2%	±2%
Time accuracy — Voltage error	±0.5%	±0.5%	±0.5%
Time accuracy — Setting error	±10%	±10%	±10%
Min. power off time	100 ms	100 ms	100 ms
Life (Min. operation) — Mechanical	2×10^7	2×10^7	2×10^7
Life (Min. operation) — Electrical (resistive)	10^5	10^5	10^5
Wiring diagrams			
Available standards	UL/C-UL	UL/C-UL	UL/C-UL
Page	P. 59	P. 59	P. 59

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.

(In the case of timer w/instantaneous contact)
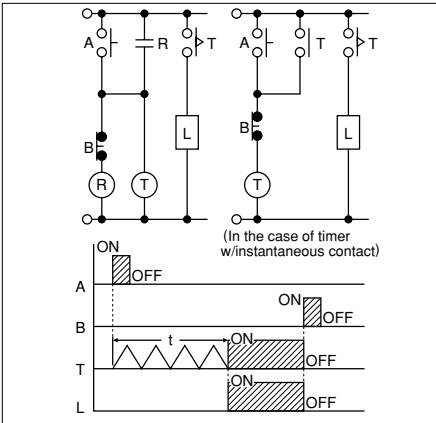
2. Delay Operation (Continuous input)

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.
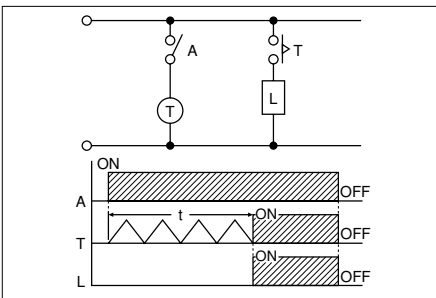
3. Fixed Time Operation (Instantaneous input)

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

(In the case of timer w/instantaneous contact)
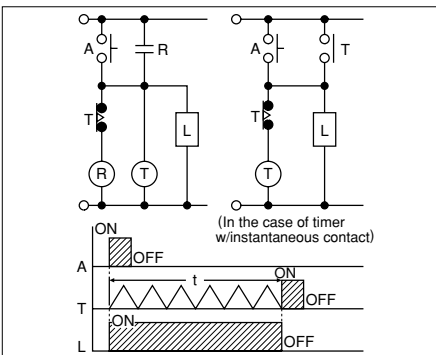
4. Fixed Time Operation (Continuous input)

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.
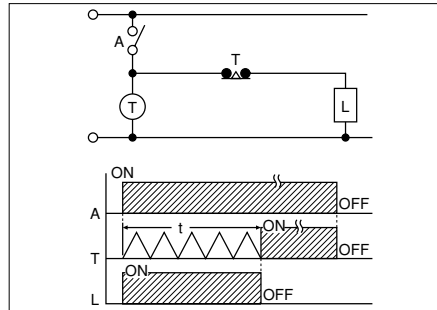
5. Delay Reset Operation

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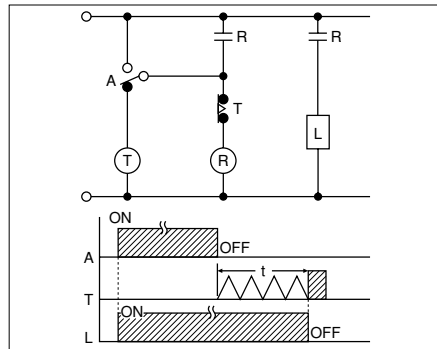
6. Fixed Time Operation after Delay Time is Set (Instantaneous input)

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).

(In the case of timer w/instantaneous contact)
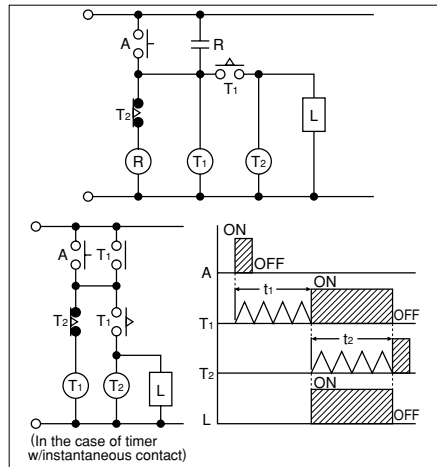
7. Fixed Time Operation after Delay Time is Set (Continuous input)

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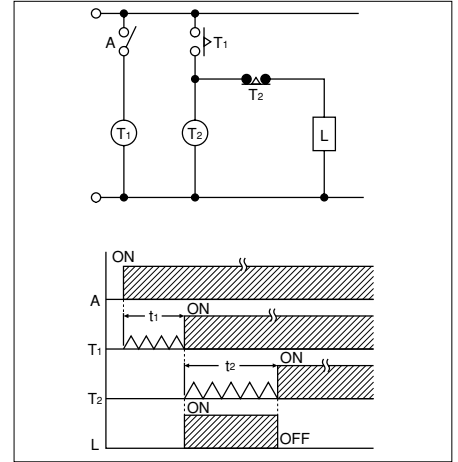
8. Repetitive Operation

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.
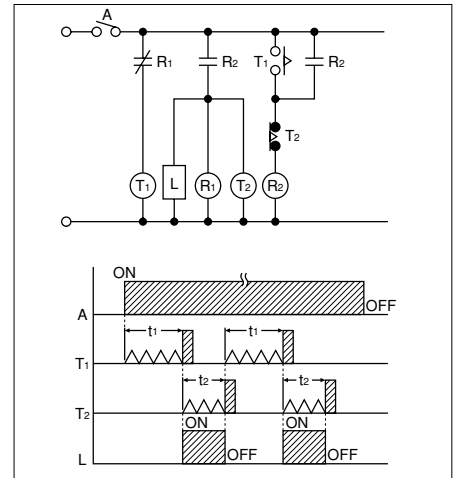
TIMER-RELATED TERMINOLOGY

• What is the 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.

Example of On-delay Operation

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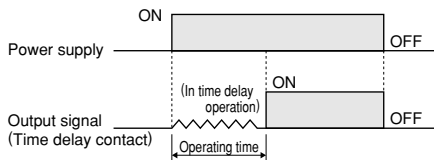
• Off-delay Operation (Time delay resetting)
The off-delay operation is an operation to turn OFF output when preset time expires after a predetermined input is given to the power supply circuit or input circuit, and at the same time output signal is given and predetermined input is turned OFF. On-delay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

Example of Off-delay Operation

ON
Power supply   OFF
(In time delay operation)
ON
Output signal   OFF
(Time delay contact)
Operating time
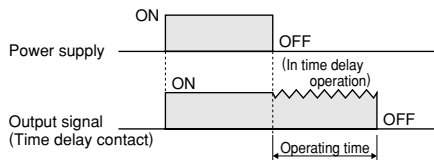
• Flicker Operation
The flicker operation is an operation to repeat output ON/OFF action according to preset ON time and OFF time while a predetermined input is given to the power supply circuit or input circuit. Flicker operation includes OFF-start flicker operation and ON-start flicker operation.

Example of Flicker Operation $t < t_1$

ON
Power supply   OFF
or signal
ON   ON
Output signal   OFF   OFF
(Time delay contact)
t_1 t_2 t_1 t_2 t

t_1 : Output OFF time
t_2 : Output ON time
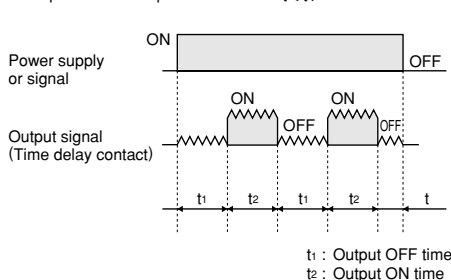
• Star (Y)/Delta (△) Operation
This operation controls the time in the star connection used for star-delta starting which is conducted for starting a cage induction motor and the time for switching the star connection over to delta connection.

ON
Power supply   OFF
ON
Y Star side contact   OFF
ON
△ Delta side contact   OFF
t_1 t_2 t_3

t_1 : Y Star operation time
t_2 : Y - △ Star/Delta switching time
t_3 : △ Delta operation time
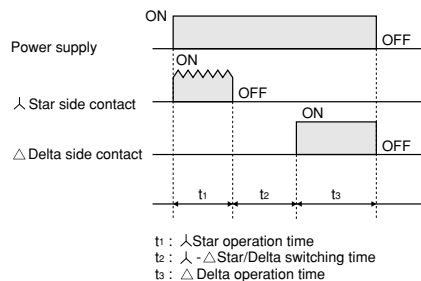
• Preset Time
The preset time is the control time set by setting time-variable timer.

• 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.

Power application time
(Input signal application time) Pause time
Power supply
(Input signal)
Time delay contact
Internal circuit
Internal mechanism
Operating time   Reset time
Hold time
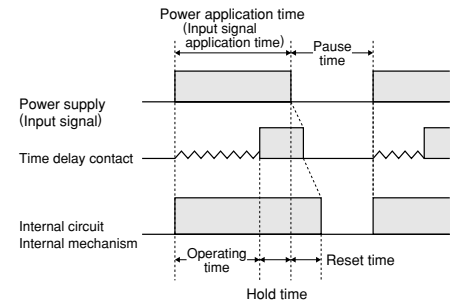
• Minimum power application time
It means the minimum time during which power must be supplied in order to operate timer normally, in the case of power supply off-delay timer.

• 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 $20\pm2°C$ 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 maximum scale value. If the set error is $\pm5\%$, 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.

• 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:

Error	Equation	Measurement conditions		
		Set value Ts - Note 1	Supply voltage	Ambient temperature
(1) Fluctuation in operation time	$\pm \dfrac{1}{2} \times \dfrac{Tmax. - Tmin.}{TMs} \times 100\ (\%)$	Maximum scale-time	Rated voltage	20±2°C 68±36°F Note 2
(2) Voltage error	$\dfrac{Tmx_1 - TM}{TMs} \times 100\ (\%)$		Fluctuation range of allowable voltage of power supply Note 3	
(3) Temperature error	$\dfrac{Tmx_2 - TM}{TMs} \times 100\ (\%)$		Rated voltage	−10 to 50°C +14 to 122°F Note 4
(4) Set error	$\dfrac{TM - Ts}{TMs} \times 100\ (\%)$	**1/3 or more of maximum scale-time**		20±2°C 68±36°F Note 2
(5) Halt time error	$\dfrac{Tmx_3 - TM}{TMs} \times 100\ (\%)$	Maximum scale-time		

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: **Maximum 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 halt time (in the range from the specified recovery time to 1 hour) as maximizes deviation from TM.

• Vibration Resistance [Functional]

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]

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.

• 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]

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 voltage × current 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 1 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 $\pm(1.2 \times 50)$ μs or $\pm(1 \times 40)$ μs.

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	Timer contact	Timer contact	Timer contact
Application	AC	△ Note:	○	×	○
	DC	○	○	○	○
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. 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.
		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, c: 0.5 to 1 *F per 1 A contact current r: 0.5 to 1 * per 1 V contact voltage 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. 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
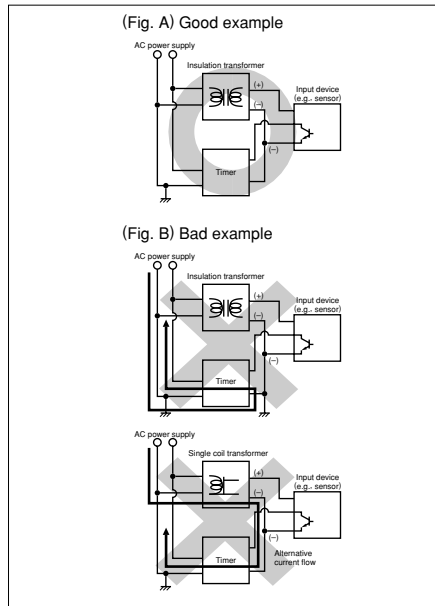
Do not use an auto-transformer (e.g., Sly-Duck). Otherwise, the internal circuit of the timer will be short-circuited as shown in Fig. B resulting in breakdown.

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
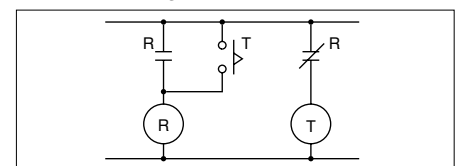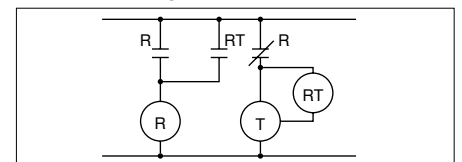
(2) When using non-contact output

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.

(Fig. A)

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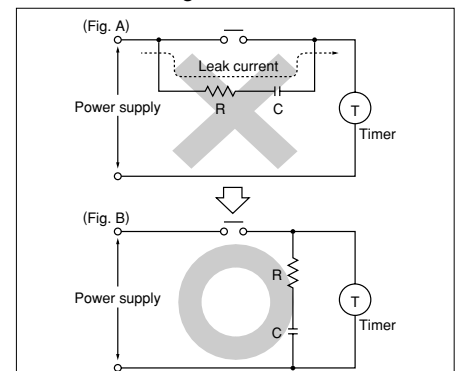
2) If the timer is directly switched with a non-contact element, leak current may flow into the timer and cause it to malfunction.

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).

(Fig. A) (Fig. B)
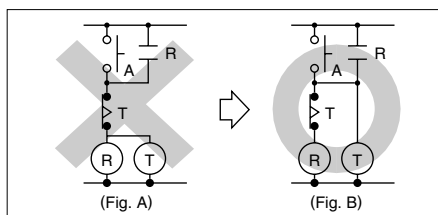
8. Electrical life

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

tion:
(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 pin layout/connection 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.

Good example Bad example
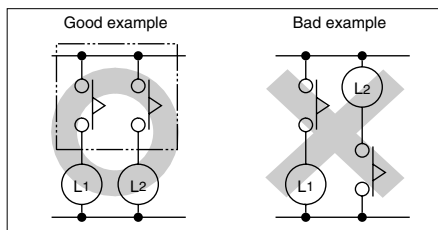
4. Installing the timer

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 (±1.2 × 50µs or ±1 × 40µs) is taken as the standard value for surge-proof voltage. (The positive and negative voltages are applied each three or five times between
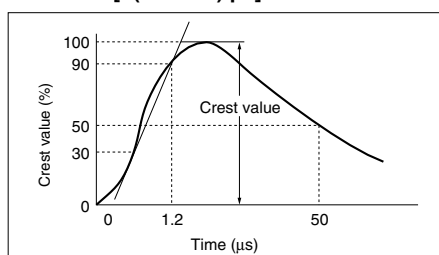
• Single-pole, full-wave voltage for surge waveform [±(1.2 × 50) µs]
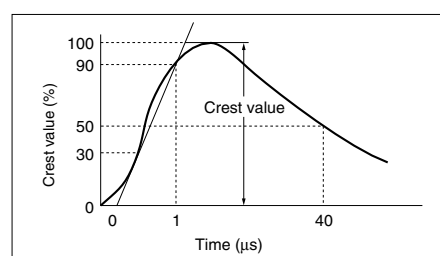
the power pins.)
For the standard values for the PM4H, LT4H and S1DX type timers, see the respective items in "Caution on usage."
If external surge occurs exceeding the specified value, the internal circuit may break down. In this case, use a surge absorption element. The typical surge absorption elements 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), see the relevant item in "Caution on use."

• Single-pole, full-wave voltage for surge waveform [±(1 × 40) µs]

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 (a) inflammable or corrosive gas is generated, (b) the timer is exposed to much dust and other foreign matter; (c) water or oil is splashed on the timer; or (d) 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.

10. Conformance to CE marking standard

1) EMC directive (89/336/EEC)
The models with CE marking conform to the EMC directive as timers alone.
Applicable standards: EN50081-2 and EN50082-2
2) Low-voltage directive (73/23/EEC)
In order to meet VDE0435/Part 2021, follow the installation conditions and instructions given below:

• PM4H, PM4S series

(1) This timer uses power supply without a transformer and its power pins are input signal pins are not insulated. If a sensor or a similar element is connected to the input circuit, provide insulation for that element. (PM4H-A type)

(2) The power supply used must be protected with an overcurrent protection device (e.g., a fuse of 1 A, 250 V) that conforms to the EN/IEC standard.

(3) When the timer is powered, do not touch it or any of its pins. Before installing or removing the timer, check that no voltage is applied to any pin.

(4) To install the pin type, be sure to use the pin bracket or socket. Do not directly connect a lead wire to any of the round pins on the timer.

(5) Requirements for installation location
For the IP65 type, only its panel surface is protected. The main unit must be placed in the panel protected with the IP54. The IP50 type is designed to install in the panel protected with the IP54.

(6) Other specifications
• Humidity class:
    Class G (DIN40040)
• Surge immunity:
    Class II (VDE0435/Part 303)
• High-frequency immunity:
    Class II (VDE0435/Part 303)

• S1DX timer

(1) To install the S1DX timer, be sure to use the terminal bracket or socket.

(2) The power supply used must be protected with an over current protection device (e.g., a fuse of 1 A, 250 V) that conforms to the EN/IEC standard.

(3) When the timer is powered, do not touch it or any of its pins. Before installing or removing the timer, check that no voltage is applied to any pin.

(4) For the limit time 4C type, the contact rating is 60 VAC in relation to the space/creeping distance.

(5) Other specifications
• Humidity class:
    Class G (DIN40040)
• Surge immunity:
    Class II (VDE0435/Part 303)
• High-frequency immunity:
    Class II (VDE0435/Part 303)
• Protective structure:
    IP40
• Withstand voltage:
    Shown in table below.

	Time limit 2C	Time limit 4C	Time limit 1a
Between heteropolar live parts	2000 VAC for 1 minute	1500 VAC for 1 minute	—
Between heteropolar contacts	2000 VAC for 1 minute	1500 VAC for 1 minute	—
Between contacts	1000 VAC for 1 minute	1000 VAC for 1 minute	—
Between input and output	—	—	2000 VAC for 1 minute

• LT4H series

(1) This timer uses power supply without a transformer and its power pins are input signal pins are not insulated.
  1) If a sensor is connected to the input circuit, provide double insulation for that sensor.
  2) For input with a contact, use a double-insulated relay or a similar part.

(2) The load connected to the output contact is subject to basic insulation. This timer provides basic insulation, thus allowing the double insulation required in VDE to be obtained when combined with the basic insulation of the load.

(3) The power supply used must be protected with an overcurrent protection device (e.g., a fuse of 1 A, 250 V) that conforms to the EN/IEC standard.

(4) To install this timer, be sure to use the pin bracket or socket. Do not directly connect a lead wire to any of the round pins on the timer.
When the timer is powered, do not touch it or any of its pins. Before installing or removing the timer, check that no voltage is applied to any pin.

(5) Do not use this timer in a safety circuit. For example, if the timer is used in a heater circuit or the like, include a protective circuit in the relevant system.

Panasonic
ideas for life

**DIN48 SIZE
MULTI-RANGE ANALOG TIMER**

PM4H-A
PM4H-S
PM4H-M

48
1.890

48
1.890

62.5
2.461

mm inch

Socket
mount

Flush mount
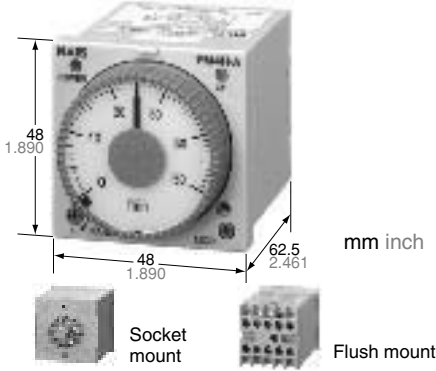
UL File No.: E122222   CSA File No.: LR39291

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

PRODUCT TYPE

Type	Operation mode	Contact arrangement	Time range	Protective construction	Rated operating voltage	Terminal type	Part No.
PM4H-A	8 operation modes • Pulse ON-delay • Pulse Flicker • Pulse ON-flicker • Differential ON/OFF-delay (1) (2) • Signal OFF-delay • Pulse One-shot • Pulse One-cycle	Relay Timed-out 2 Form C		IP65	100 to 240V AC	11 pin	PM4HA-H-AC240VW
						Screw terminal	PM4HA-H-AC240VSW
					24V AC/DC	11 pin	PM4HA-H-24VW
						Screw terminal	PM4HA-H-24VSW
					12V DC	11 pin	PM4HA-H-DC12VW
						Screw terminal	PM4HA-H-DC12VSW
				IP50	100 to 240V AC	11 pin	PM4HA-H-AC240V
						Screw terminal	PM4HA-H-AC240VS
					24V AC/DC	11 pin	PM4HA-H-24V
						Screw terminal	PM4HA-H-24VS
					12V DC	11 pin	PM4HA-H-DC12V
						Screw terminal	PM4HA-H-DC12VS
PM4H-S	Power ON-delay	Relay Timed-out 2 Form C	16 selectable ranges 1s to 500h	IP65	100 to 240V AC	8 pin	PM4HS-H-AC240VW
						Screw terminal	PM4HS-H-AC240VSW
					24V AC/DC	8 pin	PM4HS-H-24VW
						Screw terminal	PM4HS-H-24VSW
					12V DC	8 pin	PM4HS-H-DC12VW
						Screw terminal	PM4HS-H-DC12VSW
				IP50	100 to 240V AC	8 pin	PM4HS-H-AC240V
						Screw terminal	PM4HS-H-AC240VS
					24V AC/DC	8 pin	PM4HS-H-24V
						Screw terminal	PM4HS-H-24VS
					12V DC	8 pin	PM4HS-H-DC12V
						Screw terminal	PM4HS-H-DC12VS
PM4H-M	5 operation modes (With instantaneous contact) • Power ON-delay • Power Flicker • Power ON-flicker • Power One-shot • Power One-cycle	Relay Timed-out 1 Form C Instantaneous 1 Form C		IP65	100 to 240V AC	8 pin	PM4HM-H-AC240VW
						Screw terminal	PM4HM-H-AC240VSW
					24V AC/DC	8 pin	PM4HM-H-24VW
						Screw terminal	PM4HM-H-24VSW
					12V DC	8 pin	PM4HM-H-DC12VW
						Screw terminal	PM4HM-H-DC12VSW
				IP50	100 to 240V AC	8 pin	PM4HM-H-AC240V
						Screw terminal	PM4HM-H-AC240VS
					24V AC/DC	8 pin	PM4HM-H-24V
						Screw terminal	PM4HM-H-24VS
					12V DC	8 pin	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

Time unit / Scale		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.
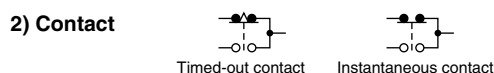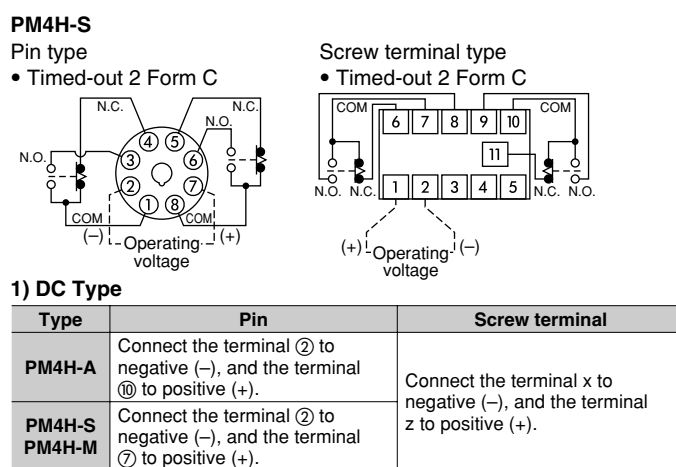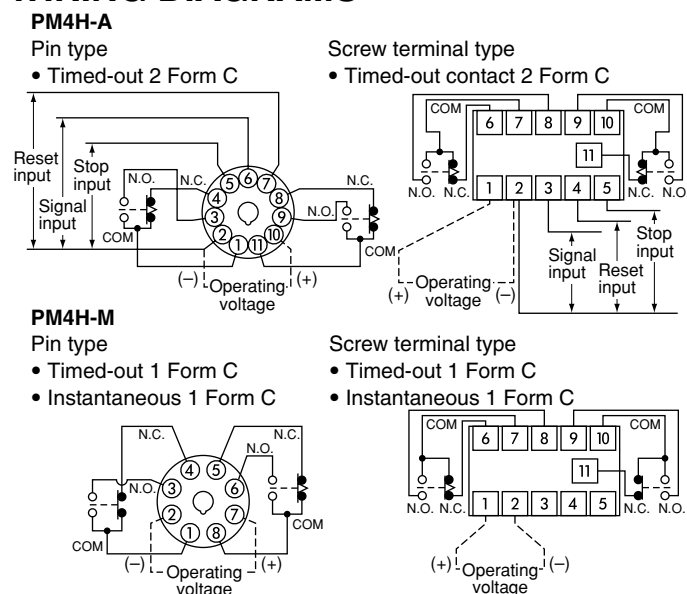16 time ranges are selectable.
1s to 500h (Max. range) is controlled.

CHARACTERISTICS

Item	Type	PM4H-A	PM4H-S	PM4H-M
Rating	Rated operating voltage	100 to 240V AC, 12V DC, 24V AC/DC, 48 to 125V DC		
	Rated frequency	50/60Hz common (AC operating type)		
	Rated power consumption	Approx. 10VA (100 to 240V AC) Approx. 2.5VA (24V AC) Approx. 2W (12V DC, 24V DC, 48 to 125V DC)		
	Output rating	5A 250V AC (resistive load)		
	Operating mode	Pulse ON-delay Pulse Flicker Pulse ON-Flicker Differential ON/OFF-delay (1) (2) Signal OFF-delay Pulse One-shot Pulse One-cycle	Power ON-delay	Power ON-delay Power Flicker Power ON-flicker Power One-shot Power One-cycle (with instantaneous contact)
	Time range	1s to 500h (Max.) 16 time ranges switchable		
Time accuracy Note:)	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 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)	2×10^7		
	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.)		
	Insulation resistance (Initial value)	Min. 100MΩ	Between live and dead metal parts Between input and output Between contacts of different poles Between contacts of same pole	(At 500V DC)
	Breakdown voltage (Initial value)	2,000Vrms for 1 min Between live and dead metal parts 2,000Vrms for 1 min Between input and output 2,000Vrms for 1 min Between contacts of different poles 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)		
	Shock resistance — Destructive	Min. 980m/s² (5 times on 3 axes)		
	Vibration resistance — Functional	10 to 55Hz: 1 cycle/min double amplitude of 0.5mm (10min on 3 axes)		
	Vibration resistance — Destructive	10 to 55Hz: 1 cycle/min double amplitude of 0.75mm (1h on 3 axes)		
Operating condition	Ambient temperature	−10 to +50°C +14 to +122°F		
	Ambient humidity	Max. 85%RH		
	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.

WIRING DIAGRAMS

PM4H-A
Pin type
• Timed-out 2 Form C

Screw terminal type
• Timed-out contact 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 x to negative (−), and the terminal z to positive (+).
PM4H-S PM4H-M	Connect the terminal ② to negative (−), and the terminal ⑦ to positive (+).	

2) Contact

Timed-out contact   Instantaneous 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.

13

PART NAMES

PM4H-S

PM4H-A

PM4H-M

PM4H-A labels:
- Power indicator LED
- Time indicator window
- Time range indicator
- Time range selector
- Operation indicator LED
- Hand
- Set dial
- Operation mode indicator
- Operation mode selector
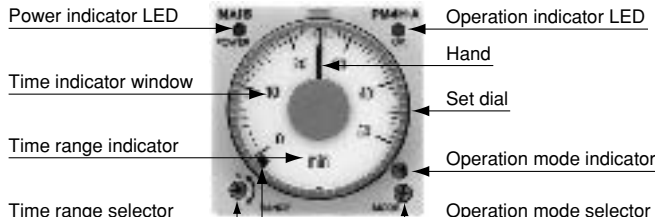
16 time settings selectable
1 s to 500 h
1s 5s 10s 50s
1min 5min 10min 50min
1h 5h 10h 50h
10h 50h 100h 500h

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

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

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

• PM4H-☐

Screw terminal type
(Flush mount)

48 (1.890)
6.0 .236
12.0 .472
62.5 2.461
Ø41 1.614
48 1.890
☐44.5 1.752
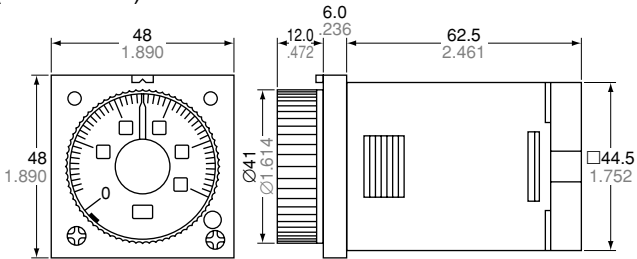
Pin type
(Flush mount/Surface mount)

48 (1.890)
6.0 .236
12.0 .472
66.5 2.618
14.5 .571
Ø41 1.614
48 1.890
☐44.5 ☐1.752
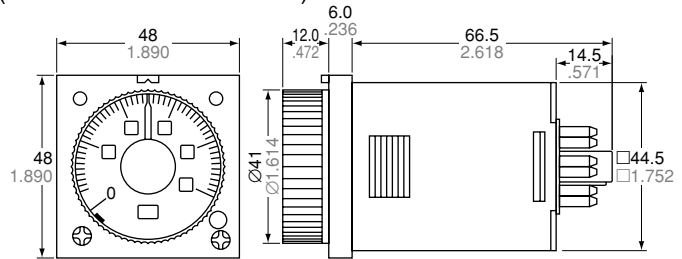
• Panel mount dimensions (with mounting frame)

Screw terminal type

Rubber gasket ATC 18002 (attached)
Panel
Mounting frame AT8-DA4 (attached)
48 1.890
50 1.969
66 2.6
☐44.5 1.752
48 1.890
1 .039
61.5 2.421

Pin type

Socket (8 pin) AT8-RR
When 11 pin timer is used, use the socket. AT8-DP11
Rubber gasket ATC 18002
Panel
Mounting frame AT8-DA4
48 1.890
50 1.969
66 2.6
48 1.890
77 3.031
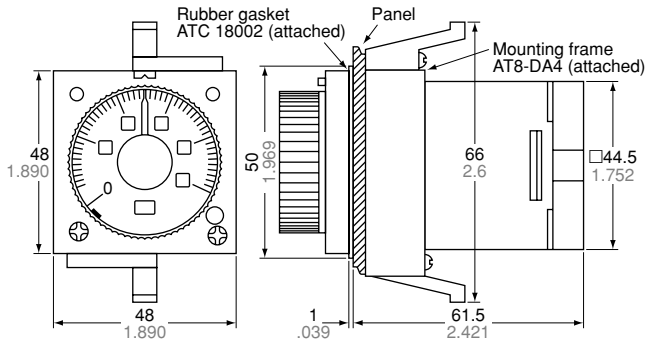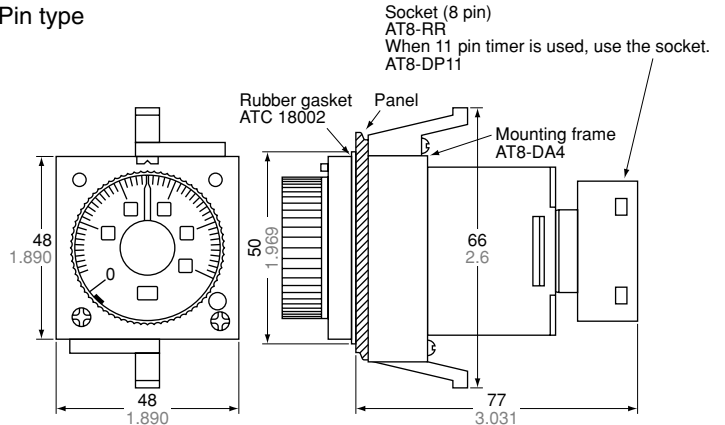
• Surface mount dimensions

Socket mount (Pin type)
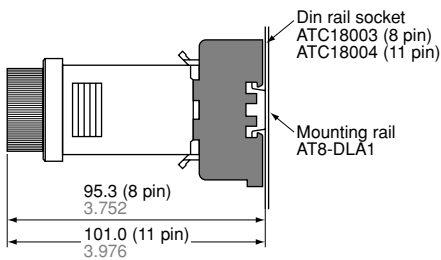
Din rail socket
ATC18003 (8 pin)
ATC18004 (11 pin)
Mounting rail AT8-DLA1
95.3 (8 pin) 3.752
101.0 (11 pin) 3.976

• Panel cut out dimensions

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

$45^{+0.6}_{0}$ $1.772^{+.024}_{0}$
Min. 80 3.150
$45^{+0.6}_{0}$ $1.772^{+.024}_{0}$
Min. 80 3.150

• Adjacent mounting

$45^{+0.6}_{0}$ $1.772^{+.024}_{0}$
A

$A = (48 \times n - 2.5)^{+0.6}_{0}$
$A = (1.890 \times n - .098)^{+.024}_{0}$
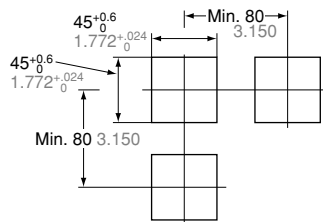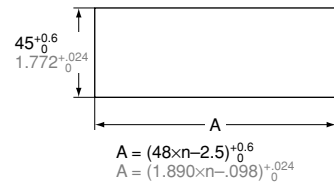
Note: 1. The proper thickness of mounting panel is between 1 to 5mm.
2. Adjacent mount is less water-resistant.

14

OPERATION MODE
PM4H-A

The new settings are valid after power OFF → ON
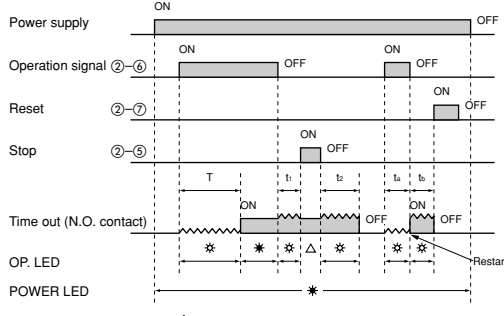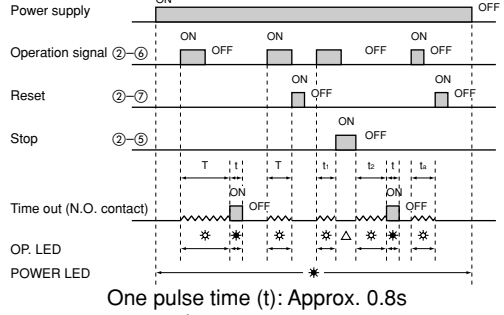
(☀ LED lighting ☼ LED flickering
T: Setting time t₁, t₂, tₐ, tᵦ<T t₁+t₂=T)

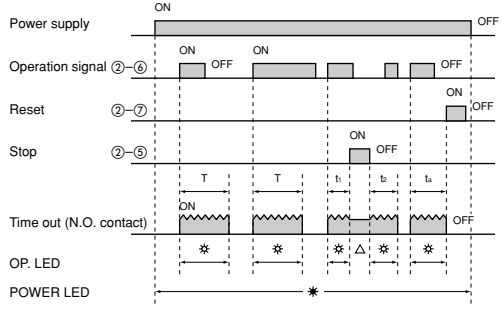| Operation mode	Operation	Time chart
Pulse ON-delay ⓄⓃ	Turn the operation selector to ⓄⓃ. Power is applied continuously. When a start signal is applied, the time cycle begins. The output contacts change state after the time delay is completed. The contacts will return to their normal state when a reset signal is applied or power is removed. (Note: When a stop signal is applied during timing operation, the time cycle stops. When a stop signal is removed, the time cycle begins.)	△Note: ☀ LED lighting or No LED lighting
Pulse Flicker ⒻⓁ	Turn the operation selector to ⒻⓁ. Power is applied continuously. When a start signal is applied, the time cycle begins but the output contacts remain in their normal state. When the time delay is completed, the output contacts change state and next time cycle begins. When this time delay is completed, the output contacts return to their normal state. This cycle will repeat until a reset signal is applied or power is removed. (Note: When a stop signal is applied during timing operation, the time cycle stops. When a stop signal is removed, the time cycle begins.)	△Note: ☀ LED lighting or No LED lighting
Pulse ON-flicker ⒻⓄ	Turn the operation selector to ⒻⓄ. Power is applied continuously. When a start signal is applied, the output contacts change state immediately and time cycle begins. When the time delay is completed, the output contacts change state and next time cycle begins. When the time delay is completed, the output contacts return to the normal state. This cycle will repeat until a reset signal is applied or power is removed. (Note: When a stop signal is applied during timing operation, the time cycle stops. When a stop signal is removed, the time cycle begins.)	
Differential ON/OFF-delay (1) ⓄⒻ1	Turn the operation selector to ⓄⒻ1. Power is applied continuously. When a start signal is applied, the output contacts change state immediately and time cycle begins. The output contacts change state after the timing cycle is completed. When the start signal is removed, the output contacts change state and time cycle starts again. If operation signal is turned ON or OFF during timing operation, time cycle restart at that point. The output contacts will return to their normal state when a reset signal is applied or power is removed. (Note: When a stop signals is applied during timing operation, the time cycle stops. When a stop signal is removed, the time cycle begins.)	△Note: ☀ LED lighting or No LED lighting
Signal OFF-delay ⓈⒻ	Turn the operation selector to ⓈⒻ. Power is applied continuously. When a start signal is applied, the output contacts change state immediately. When the start signal is removed the time cycle begins. The output contacts will return to their normal state when the time delay is completed. Reset will occur when a reset signal is applied or power is removed. (Note: When a stop signal is applied during timing operation, the time cycle stops. When a stop signal is removed, the time cycle begins.)	△Note: ☀ LED lighting or No LED lighting

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

PM4H-A/S/M

Operation mode	Operation	Time chart
Pulse One-shot (OS)	Turn the operation selector to (OS). Power is applied continuously. When a start signal is applied, the output contacts change state immediately and time cycle begins. When the time delay is completed, the output contacts return to their normal state. The contacts will return to normal state when a reset signal is applied or power is removed. (Note: When a stop signal is applied during timing operation, the time cycle stops. When a stop signal is removed, the time cycle begins.)	Power supply — ON / OFF Operation signal ②–⑥ — ON / OFF Reset ②–⑦ — ON / OFF Stop ②–⑤ — ON / OFF Time out (N.O. contact) OP. LED POWER LED △Note: ✹ LED lighting or No LED lighting
Differential ON/OFF-delay (2) (OF2)	Turn the operation selector to (OF2). Power is applied continuously. When a start signal is applied, the time cycle begins but output contacts remain in their normal state. The output contacts change state after time delay is completed. When the start signal is removed the time cycle begins. The output contacts return to their normal state after time delay is completed. The start signal is applied or start signal is removed while timing operation, the output contacts change state and time cycle begins at this point. The contacts will return to their normal state when a reset signal is applied or power is removed. (Note: When a stop signal is applied during timing operation, the time cycle stops. When a stop signal is removed, the time cycle begins.)	Power supply — ON / OFF Operation signal ②–⑥ — ON / OFF Reset ②–⑦ — ON / OFF Stop ②–⑤ — ON / OFF Time out (N.O. contact) OP. LED POWER LED — Restart △Note: ✹ LED lighting or No LED lighting
Pulse One-cycle (OC)	Turn the operation selector to (OC). Power is applied continuously. When a start signal is applied, the time cycle begins but the output contacts remain in their normal state. The output contacts change state for 0.8s after time delay is completed. Reset will occur when a reset signal is applied or power is removed. (Note: When a stop signal is applied during timing operation, the time cycle stops. When a stop signal is removed, the time cycle begins.)	Power supply — ON / OFF Operation signal ②–⑥ — ON / OFF Reset ②–⑦ — ON / OFF Stop ②–⑤ — ON / OFF Time out (N.O. contact) OP. LED POWER LED One pulse time (t): Approx. 0.8s △Note: ✹ LED lighting or No LED lighting
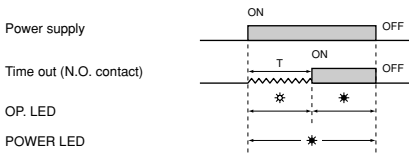
Note: Keep 0.1s or more for power off time.
Keep 0.05s or more for signal, stop, reset input time.
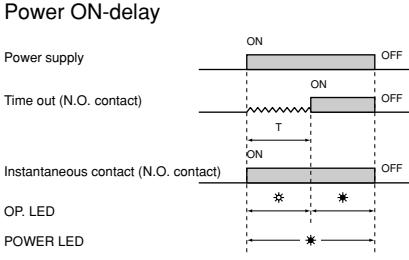
OPERATION MODE
PM4H-S

(✹ LED lighting ✹ LED flickering)
(T: Setting time)

Operation mode	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.	Power supply — ON / OFF Time out (N.O. contact) — T / ON / OFF OP. LED POWER LED

PM4H-M

Operation mode	Operation	Time chart
Power ON-delay (ON) **Power Flicker** (FL) **Power ON-flicker** (FO) **Power One-shot** (OS) **Power One-cycle** (OC)	Power ON-delay When power is applied continuously, the output contacts change state. Reset will occur when power is removed. PM4H-M timers does not have each input which is signal, reset and stop. (As for other operation mode, refer to the operation mode of PM4H-A.)	Power ON-delay Power supply — ON / OFF Time out (N.O. contact) — ON / OFF T Instantaneous contact (N.O. contact) — ON / OFF OP. LED POWER LED

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

Panasonic
ideas for life

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

PM4H-SD/SDM

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

48 1.890

48 1.890

66.5 2.618

mm inch
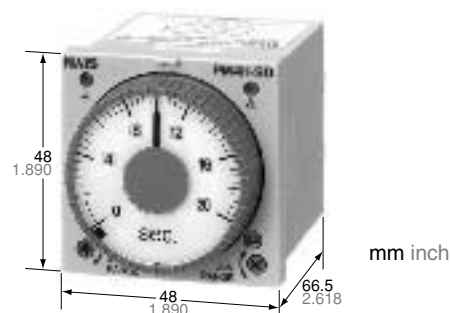
FEATURES

- 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.

CHARACTERISTICS

Item	Type	PM4H-SD/SDM
Rating	Rated operating voltage	100 to 240V AC, 24V AC
	Rated frequency	50/60Hz common
	Rated power consumption	Approx. 10VA (100 to 240V AC) Approx. 2.5VA (24V AC)
	Output rating	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:)	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 Instantaneous: 1 Form A (Instantaneous for SDM type only)
	Contact resistance (Initial value)	Max. 100mΩ (at 1A 6V DC)
	Contact material	Au flash on Silver alloy
Life	Mechanical (contact)	2×10^7
	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.)
	Insulation resistance (Initial value)	Min. 100MΩ Between live and dead metal parts Between input and output Between contacts of different poles *3 (At 500V DC) Between contacts of same pole
	Breakdown voltage (Initial value)	2,000Vrms for 1 min Between live and dead metal parts 2,000Vrms for 1 min Between input and output 2,000Vrms for 1 min Between contacts of different poles *3 1,000Vrms for 1 min Between contacts of same pole
	Min. power off time	500ms
	Max. temperature rise	65°C 131°F
Mechanical function	Shock resistance	Functional	Min. 294m/s² (4 times on 3 axes)
		Destructive	Min. 980m/s² (5 times on 3 axes)
	Vibration resistance	Functional	10 to 55Hz: 1 cycle/min double amplitude of 0.5mm (10min on 3 axes)
		Destructive	10 to 55Hz: 1 cycle/min double amplitude of 0.75mm (1h on 3 axes)
Operating condition	Ambient temperature	−10 to +50°C +14 to +122°F
	Ambient humidity	Max. 85%RH
	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 SDM type only.

PRODUCT TYPE

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 pin	PM4HSD-S-AC240VW
						screw	PM4HSD-S-AC240VSW
					24V AC	8 pin	PM4HSD-S-AC24VW
						screw	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 pin	PM4HSDM-S-AC240VW
						screw	PM4HSDM-S-AC240VSW
					24V AC	8 pin	PM4HSDM-S-AC24VW
						screw	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 pin	PM4HSD-S-AC240V
						screw	PM4HSD-S-AC240VS
					24V AC	8 pin	PM4HSD-S-AC24V
						screw	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 pin	PM4HSDM-S-AC240V
						screw	PM4HSDM-S-AC240VS
					24V AC	8 pin	PM4HSDM-S-AC24V
						screw	PM4HSDM-S-AC24VS

WIRING DIAGRAMS
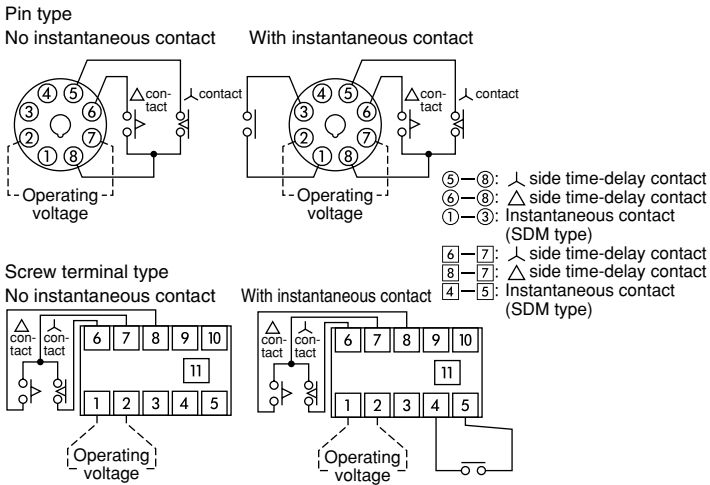
Pin type

No instantaneous contact   With instantaneous contact

⑤—⑧: ⅄ side time-delay contact
⑥—⑧: △ side time-delay contact
①—③: Instantaneous contact (SDM type)
⑥—⑦: ⅄ side time-delay contact
⑧—⑦: △ side time-delay contact
④—⑤: Instantaneous contact (SDM type)

Screw terminal type

No instantaneous contact   With instantaneous contact

DIMENSIONS

mm inch

OPERATION MODE

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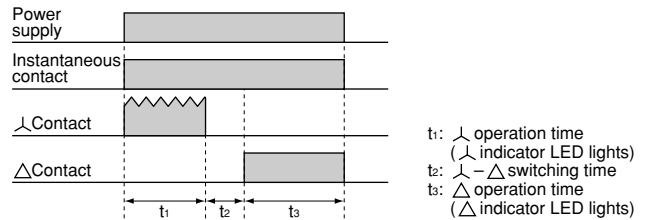
TIME RANGE

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

Panasonic
ideas for life

| DIN48 SIZE ANALOG MULTIRANGE POWER OFF-DELAY TIMERS | PM4H-F |

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

48
1.890

48
1.890

62.5
2.461

mm inch

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.
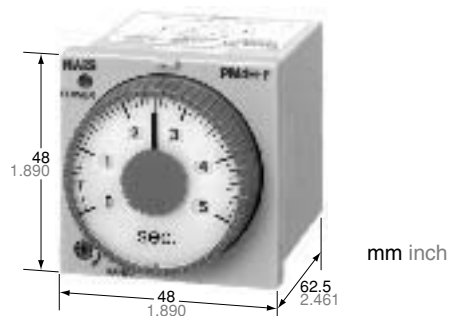
CHARACTERISTICS

Item	Type		PM4H-F8	PM4H-F8R	PM4H-F11R
Rating	Rated operating voltage		100 to 120V AC, 200 to 240V AC, 24V AC, 24V DC, 12V DC		
	Rated frequency		50/60Hz common (AC operating type)		
	Rated power consumption		Approx. 5VA (AC type) Approx. 2W (DC type)		
	Output rating		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 Between live and dead metal parts Between input and output Between contacts of different poles *3 Between contacts of same pole (At 500V DC)		
	Breakdown voltage (Initial value)		1,500Vrms for 1 min Between live and dead metal parts 1,500Vrms for 1 min Between input and output 1,000Vrms for 1 min Between contacts of different poles *3 750Vrms for 1 min Between contacts of same pole		
	Min. power supply width		s range type: 100ms min range type: 2s		
	Min. reset time		—	50ms	
	Max. temperature rise		55°C 131°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 double amplitude of 0.5mm (10min on 3 axes)		
		Destructive	10 to 55Hz: 1 cycle/min double amplitude of 0.75mm (1hr on 3 axes)		
Operating condition	Ambient temperature		−10 to +50°C +14 to +122°F		
	Ambient humidity		Max. 85%RH		
	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.
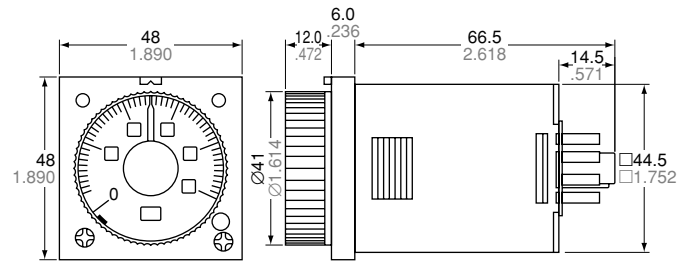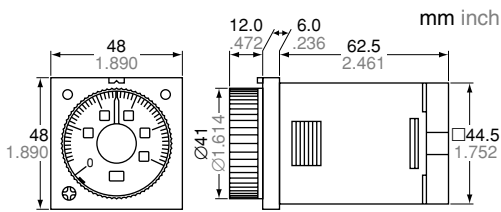3) Between contacts of different pools for F8, F11R types only.

PRODUCT TYPE

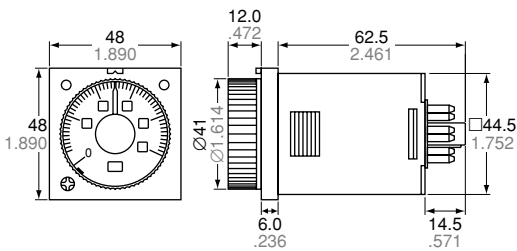| Type	Operation mode	Contact arrangement	Time range	Protective construction	Rated operating voltage	Terminal type	Part Number
PM4H-F8	Power OFF-delay (without reset)	Relay Timed-out 2 Form C	3 selectable ranges over 1s to 10s	IP65	100 to 120V AC	8 pin	PM4HF8-S-AC120VW
					200 to 240V AC	8 pin	PM4HF8-S-AC240VW
					24V AC	8 pin	PM4HF8-S-AC24VW
					12V DC	8 pin	PM4HF8-S-DC12VW
					24V DC	8 pin	PM4HF8-S-DC24VW
			3 selectable ranges over 1 min to 10 min		100 to 120V AC	8 pin	PM4HF8-M-AC120VW
					200 to 240V AC	8 pin	PM4HF8-M-AC240VW
					24V AC	8 pin	PM4HF8-M-AC24VW
					12V DC	8 pin	PM4HF8-M-DC12VW
					24V DC	8 pin	PM4HF8-M-DC24VW
			3 selectable time ranges over 1s to 10s	IP50	100 to 120V AC	8 pin	PM4HF8-S-AC120V
					200 to 240V AC	8 pin	PM4HF8-S-AC240V
					24V AC	8 pin	PM4HF8-S-AC24V
					12V DC	8 pin	PM4HF8-S-DC12V
					24V DC	8 pin	PM4HF8-S-DC24V
			3 selectable time ranges over 1 min to 10 min		100 to 120V AC	8 pin	PM4HF8-M-AC120V
					200 to 240V AC	8 pin	PM4HF8-M-AC240V
					24V AC	8 pin	PM4HF8-M-AC24V
					12V DC	8 pin	PM4HF8-M-DC12V
					24V DC	8 pin	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 pin	PM4HF8R-S-AC120VW
					200 to 240V AC	8 pin	PM4HF8R-S-AC240VW
					24V AC	8 pin	PM4HF8R-S-AC24VW
					12V DC	8 pin	PM4HF8R-S-DC12VW
					24V DC	8 pin	PM4HF8R-S-DC24VW
			3 selectable time ranges over 1 min to 10 min		100 to 120V AC	8 pin	PM4HF8R-M-AC120VW
					200 to 240V AC	8 pin	PM4HF8R-M-AC240VW
					24V AC	8 pin	PM4HF8R-M-AC24VW
					12V DC	8 pin	PM4HF8R-M-DC12VW
					24V DC	8 pin	PM4HF8R-M-DC24VW
			3 selectable time ranges over 1s to 10s	IP50	100 to 120V AC	8 pin	PM4HF8R-S-AC120V
					200 to 240V AC	8 pin	PM4HF8R-S-AC240V
					24V AC	8 pin	PM4HF8R-S-AC24V
					12V DC	8 pin	PM4HF8R-S-DC12V
					24V DC	8 pin	PM4HF8R-S-DC24V
			3 selectable time ranges over 1 min to 10 min		100 to 120V AC	8 pin	PM4HF8R-M-AC120V
					200 to 240V AC	8 pin	PM4HF8R-M-AC240V
					24V AC	8 pin	PM4HF8R-M-AC24V
					12V DC	8 pin	PM4HF8R-M-DC12V
					24V DC	8 pin	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 pin	PM4HF11R-S-AC120VW
						screw	PM4HF11R-S-AC120VSW
					200 to 240V AC	11 pin	PM4HF11R-S-AC240VW
						screw	PM4HF11R-S-AC240VSW
					24V AC	11 pin	PM4HF11R-S-AC24VW
						screw	PM4HF11R-S-AC24VSW
					12V DC	11 pin	PM4HF11R-S-DC12VW
						screw	PM4HF11R-S-DC12VSW
					24V DC	11 pin	PM4HF11R-S-DC24VW
						screw	PM4HF11R-S-DC24VSW
				IP50	100 to 120V AC	11 pin	PM4HF11R-S-AC120V
						screw	PM4HF11R-S-AC120VS
					200 to 240V AC	11 pin	PM4HF11R-S-AC240V
						screw	PM4HF11R-S-AC240VS
					24V AC	11 pin	PM4HF11R-S-AC24V
						screw	PM4HF11R-S-AC24VS
					12V DC	11 pin	PM4HF11R-S-DC12V
						screw	PM4HF11R-S-DC12VS
					24V DC	11 pin	PM4HF11R-S-DC24V
						screw	PM4HF11R-S-DC24VS
			3 selectable time ranges over 1 min to 10 min	IP65	100 to 120V AC	11 pin	PM4HF11R-M-AC120VW
						screw	PM4HF11R-M-AC120VSW
					200 to 240V AC	11 pin	PM4HF11R-M-AC240VW
						screw	PM4HF11R-M-AC240VSW
					24V AC	11 pin	PM4HF11R-M-AC24VW
						screw	PM4HF11R-M-AC24VSW
					12V DC	11 pin	PM4HF11R-M-DC12VW
						screw	PM4HF11R-M-DC12VSW
					24V DC	11 pin	PM4HF11R-M-DC24VW
						screw	PM4HF11R-M-DC24VSW
				IP50	100 to 120V AC	11 pin	PM4HF11R-M-AC120V
						screw	PM4HF11R-M-AC120VS
					200 to 240V AC	11 pin	PM4HF11R-M-AC240V
						screw	PM4HF11R-M-AC240VS
					24V AC	11 pin	PM4HF11R-M-AC24V
						screw	PM4HF11R-M-AC24VS
					12V DC	11 pin	PM4HF11R-M-DC12V
						screw	PM4HF11R-M-DC12VS
					24V DC	11 pin	PM4HF11R-M-DC24V
						screw	PM4HF11R-M-DC24VS

DIMENSIONS

• **Screw terminal type (embedded mounting)**

mm inch

48 (1.890)
48 (1.890)
12.0 (.472)
6.0 (.236)
62.5 (2.461)
Ø41 (1.614)
□44.5 (1.752)

• **Pin type (embedded mounting/surface mount)**

48 (1.890)
48 (1.890)
12.0 (.472)
62.5 (2.461)
Ø41 (1.614)
□44.5 (1.752)
6.0 (.236)
14.5 (.571)

OPERATION

• **PM4H-F8 (no reset input)**

Power supply
Time-delay contact N.O.
Time-delay contact N.C.

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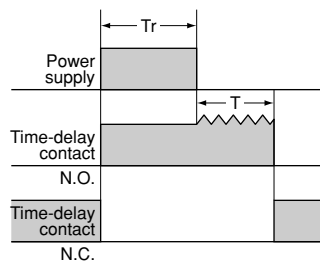
• **PM4H-F8R/F11R (with reset input)**

Power supply
Reset input
Time-delay contact N.O.
Time-delay contact N.C.

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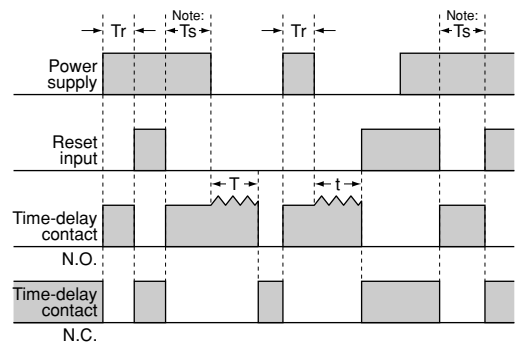
Note: t<T: Time setting
Tr: Minimum power supply application time
Ts: Min. 2s (Time to restart operation after reset input is set to OFF: both second type and minute type)

WIRING DIAGRAMS

• PM4H-F8 (no reset input)
Pin type
Time-delay 2C
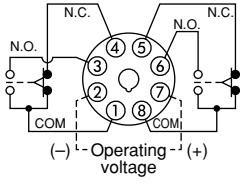
• PM4H-F8R (with reset input)
Pin type
Time-delay 1C, with reset input

• PM4H-F11R (with reset input)
Pin type
Time-delay 2C, with reset input

Screw terminal type
Time-delay 2C, with reset input
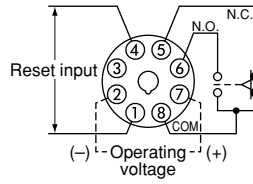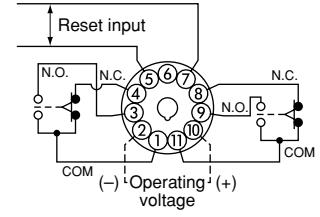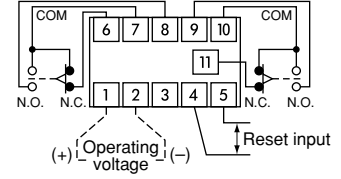
PM4H-F (WITH RESET) INPUT CONDITIONS

1. Contact operating input (pin type example)

PM4H-F8R   **PM4H-F11R**
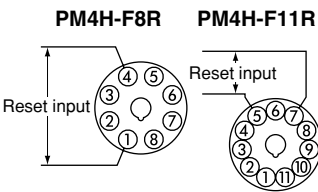
Use a contact with good contact reliability for the input. Contact bounce can lead to erroneous operation of the timer, so use a contact with short bounce time. Make the resistance between terminals for a short circuit less than 1k-ohms. Make the resistance between terminals for an open circuit greater than 100k-ohms.

2. Non-contact input (pin type example)

PM4H-F8R   **PM4H-F11R**
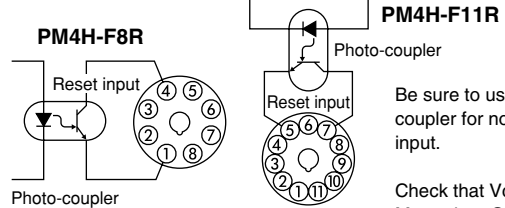
Photo-coupler

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

Check that Vce = 0.6V Max. when ON.

TIME RANGE

Time range unit / Time range	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

Panasonic ideas for life	**DIN48 SIZE** **ANALOG MULTI-RANGE** **CYCLIC TWIN TIMERS**	**PM4H-W**

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

48
1.890

48
1.890

62.5
2.461

mm inch
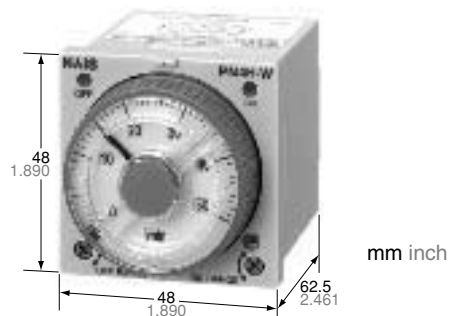
FEATURES

- 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.

CHARACTERISTICS

Item	Type	PM4H-W
Rating	Rated operating voltage	100 to 240V AC, 12V DC, 24V AC/DC, 48 to 125V DC
	Rated frequency	50/60Hz common (AC operating type)
	Rated power consumption	Approx. 10VA (100 to 240V AC) Approx. 2.5VA (24V AC) Approx. 2W (12V DC, 24V DC, 48 to 125V DC)
	Output rating	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:)	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)	$2×10^7$
	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.)
	Insulation resistance (Initial value)	Min. 100MΩ · Between live and dead metal parts / Between input and output / Between contacts of different poles / Between contacts of same pole (At 500V DC)
	Breakdown voltage (Initial value)	2,000Vrms for 1 min Between live and metal parts 2,000Vrms for 1 min Between input and output 2,000Vrms for 1 min Between contacts of different poles 1,000Vrms for 1 min Between contacts of same pole
	Min. power off time	300ms
	Max. temperature rise	55°C 131°F
Mechanical function	Shock resistance — Functional	Min. 98m/s² (4 times on 3 axes)
	Shock resistance — Destructive	Min. 980m/s² (5 times on 3 axes)
	Vibration resistance — Functional	10 to 55Hz: 1 cycle/min double amplitude of 0.5mm (10min on 3 axes)
	Vibration resistance — Destructive	10 to 55Hz: 1 cycle/min double amplitude of 0.75mm (1h on 3 axes)
Operating condition	Ambient temperature	−10 to +50°C +14 to +122°F
	Ambient humidity	Max. 85%RH
	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.
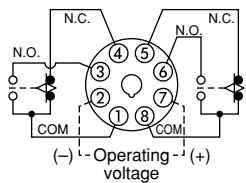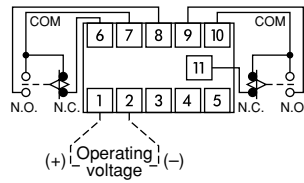
PM4H-W

PRODUCT TYPE

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 pin	PM4HW-H-AC240VW
						Screw terminal	PM4HW-H-AC240VSW
					24V AC/DC	8 pin	PM4HW-H-24VW
						Screw terminal	PM4HW-H-24VSW
					12V DC	8 pin	PM4HW-H-DC12VW
						Screw terminal	PM4HW-H-DC12VSW
				IP50	100 to 240V AC	8 pin	PM4HW-H-AC240V
						Screw terminal	PM4HW-H-AC240VS
					24V AC/DC	8 pin	PM4HW-H-24V
						Screw terminal	PM4HW-H-24VS
					12V DC	8 pin	PM4HW-H-DC12V
						Screw terminal	PM4HW-H-DC12VS

WIRING DIAGRAMS

Pin Type
Cyclic timed-out relay contact: 2C

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

DIMENSIONS

mm inch

OPERATION

Power supply

Time-delay contact (N.O. contact)

Time-delay contact (N.C. contact)
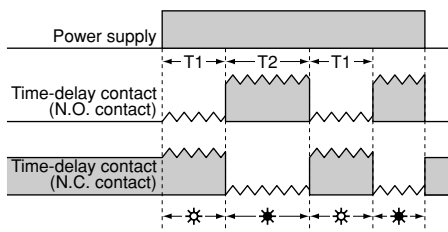
☼: Output OFF indicator (red)
☀: Output ON indicator (green)
T1: OFF set time
T2: ON set time
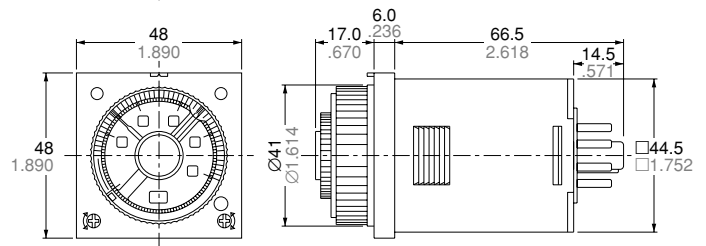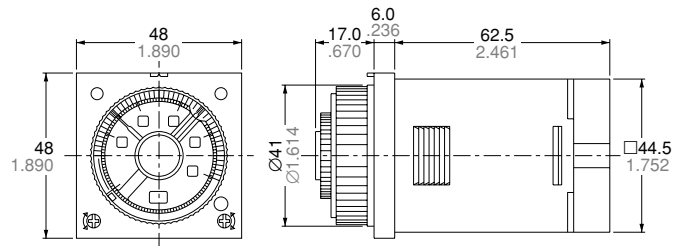
TIME RANGE

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

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

MODES & TIME SETTING

1) Operation mode setting [PM4H-A]
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 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 or a reset signal is applied to set the new operation mode.

How to use "Stop ring" [PM4H series]

1) Fixed time setting
Set the desired time and put 2 stop rings together.
Insert the rings into stopper to fix the time.

Stop ring (2 pcs)

Stopper

Set dial
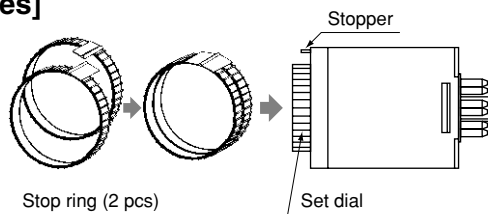
2) Fixed time range setting
Example: Time range 20s to 30s.

① Shorter time value setting
Set the dial to 20s.
Place the stop ring at the right side of stopper.
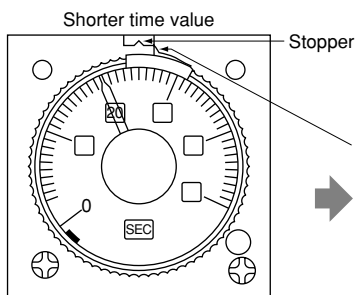
② Longer time value setting
Set the dial to 30s.
Place the stop ring at the left side of stopper.

Shorter time value — Stopper

Longer time value

Stop ring

Set range
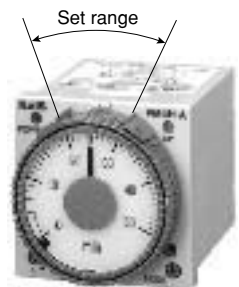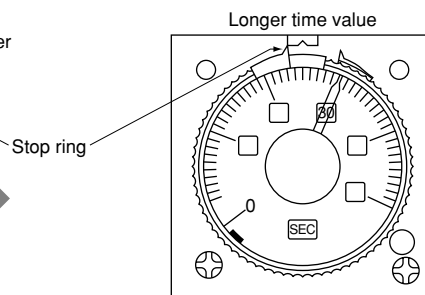
DATA
■ Load control life

• Load life curve (PM4H-A, PM4H-S, PM4H-W)
• Load life curve (PM4H-M)

250V AC Resistive load (cosφ=1)
250V AC Resistive load (cosφ=0.4)
265V•130V AC cosφ=1
265V•130V AC cosφ=0.4

Operations (×10⁴) / Switching capacity (A)
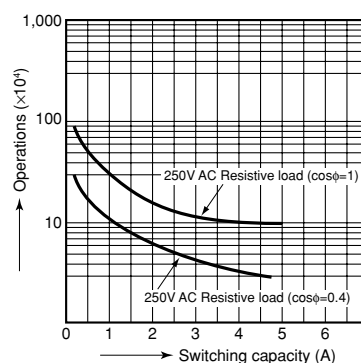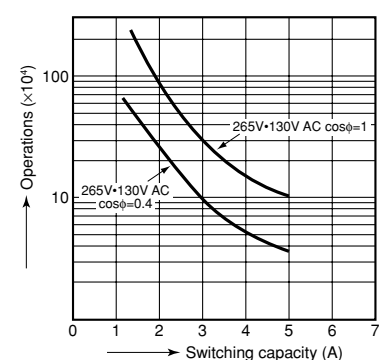
CAUTIONS

1. Terminal connections

1) Refer to wiring diagram before terminal connections.

2) Use the screw terminal type for flush mounting.

For using 8 pin type, use the timer with screw terminal socket (AT8-RR) or 8 pin cap (AD8-RC).

For using 11 pin type, use the timer with 11 pin cap (AT8-DP11).

Do not solder directly the pin of the timer for connection.

3) The connection to power supply

100 to 240V AC, 24V AC type

Type	Pin	Screw terminal
PM4H-A PM4H-F11R	Connect the terminal ②-⑩ to the power source.	Connect the terminal z-x to the power source.
PM4H-S PM4H-M PM4H-W PM4H-SD PM4H-F8 PM4H-F8R	Connect the terminal ②-⑦ to the power source.	

DC type

Type	Pin	Screw terminal
PM4H-A PM4H-F11R	Connect the terminal ② to negative (−), the terminal ⑩ to positive (+).	Connect the terminal x to negative (−), the terminal z to positive (+).
PM4H-S PM4H-M PM4H-W PM4H-F8 PM4H-F8R	Connect the terminal ② to negative (−), the terminal ⑦ to positive (+).	

Prevent inductive or residual voltages generating between the power supply terminals after the power is off.

(If the power supply cables are routed parallel to the high voltage or power cables, an inductive voltage will be generated between the power supply terminals.)

On the DC type, keep the voltage within the allowable operating voltage range with ripple rate of 20% or less.

Apply the power supply voltage at once through the switch or relay contacts. If the voltage is gradually applied, the timer may time up or power supply reset may not operate regardless of setting time.

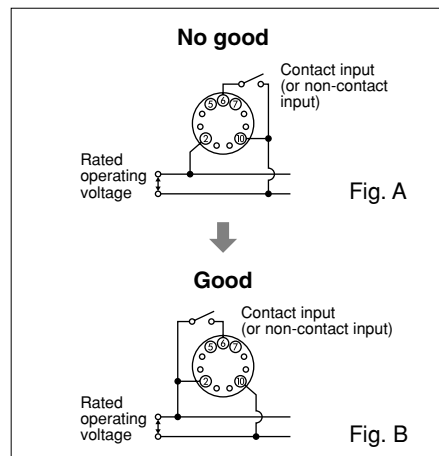4) The control output load must be less than the rated load capacity of the relay contacts.

2. Input connections

1) If the circuits is connected as in Fig. A, the internal circuits must be broken. Be sure to connect the circuit as in Fig. B. Especially, for customer who has been used PM48A (Conventional type), be sure to check if the new circuit for PM4H timer is corrected as in Fig. B.
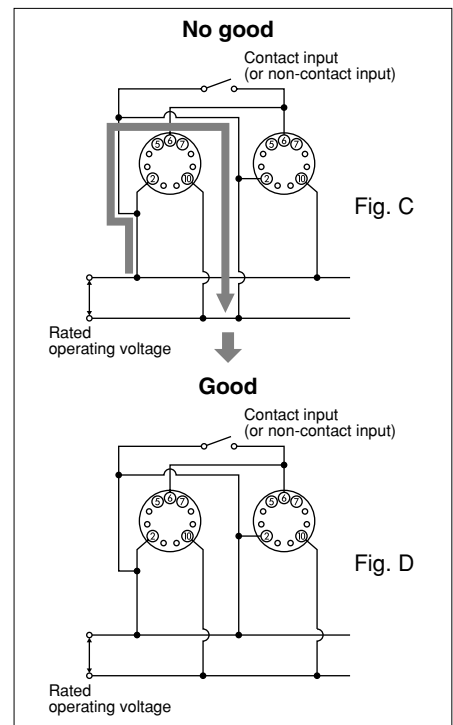

Fig. A   Fig. B
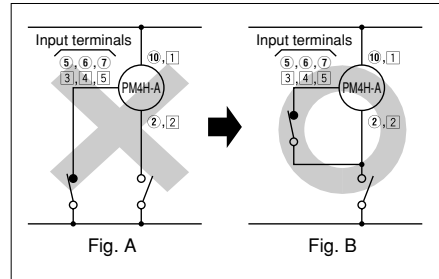
2) Since the PM4H timers use a transformerless power supply system, the input equipment must use the power supply transformer in which the secondary side is not grounded with the primary and secondary sides insulated, in order to prevent interference of the power supply circuit when connecting the external input circuit.

Be sure not to use an autotransformer.

3) Be sure not to use terminal ⑩ as the common terminal of the operation 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.

No good

Contact input (or non-contact input)

Rated operating voltage

Fig. A

Good

Contact input (or non-contact input)

Rated operating voltage

Fig. B

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

No good

Contact input (or non-contact input)

Fig. C

Rated operating voltage

Good

Contact input (or non-contact input)

Fig. D

Rated operating voltage

5) Terminal ②-⑥ (screw terminal ②-③) should be connected as the operation signal 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.

6) 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 sealed-wire or metal wiring tube.

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

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

3. Input signal conditions

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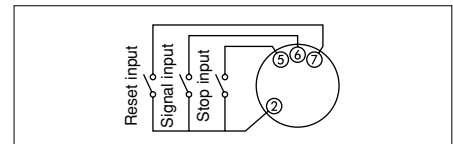
Use gold-plated contacts with high-reliability. The bounce time at the contacts causes errors in the timer operation time. Accordingly, use signal input contact whose bounce time is short. The resistance when shorted should be less than 1kΩ, and when open resistance should be more than 100kΩ.

2) Connections of non-contact input (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.

3) 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 signal input is turned on when the signal is turned from H to L.
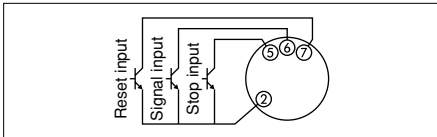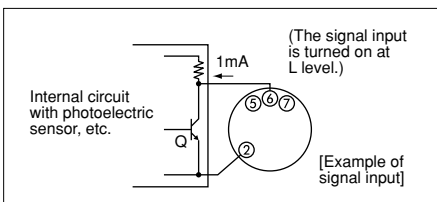The residual voltage must be 0.6V or less when Q is on. On the AC type, an insulated transformer is required as the power supply for the photoelectric sensor, etc. (power supply for the input devices).
Note: Keep the minimum input signal time of each signal to 0.05s or more.

4. Power off time

Keep 0.1s (-A, -S, -M type), 0.5s (-SD/SDM type), 0.3s (-W type) or more for the power off time after time cycle is completed.

5. Cautions [Common]

1. Prevent using the timer in such places where flammable or corrosive gas is generated, a lot of dust exists, oil is splashed or considerable shock and vibration occur.
2. Since the main body cover is 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. External surge protection may be required if the following values are exceeded. Otherwise, the internal circuit will be damaged.

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

Surge wave form [±(1.2×50)μs single polarity full wave voltage]
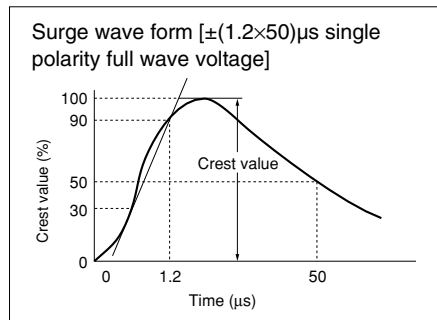
4. For connecting and disconnecting operating voltage to the timer, a circuit should be used to prevent the flow of leakage current. For example, a circuit for contact protection as shown in Fig. A will permit leakage current to flow through R and C, causing erroneous operation of the timer. Instead, the circuit shown in Fig. B should be used.
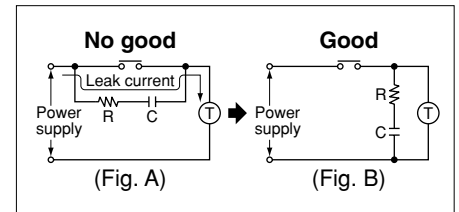
5. In order to maintain the characteristics of the timer, long continuous current flow through the timer, causing generation of heat internally should be avoided because of the degradation it can cause. For such long continuous operation, the circuit shown below should be used.
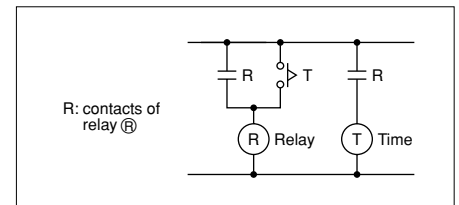
PM4S

MULTI-RANGE ANALOG TIMER

PM4S

Panasonic
ideas for life

Features

1. **An affordable new series of timers.**
2. **20 types with a variety of voltage ratings, contact arrangements and time settings are available to cover a wide range of applications, and allow you to stock efficiently.**
3. **Compliant with UL, C-UL and CE.**

Typical Applications

- **Control panels**
- **Molding machines**
- **Packaging machines**
- **Wire winding machines**
- **Machine tools**

SPECIFICATIONS

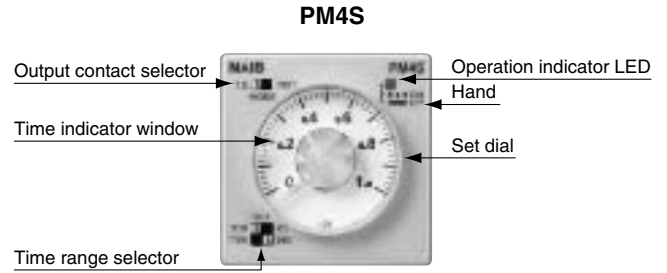| Item	Type		PM4S			
			100 to 120V AC	200 to 240V AC	24V DC	12V DC
Rating	Rated operating voltage		100 to 120V AC	200 to 240V AC	24V DC	12V DC
	Rated power consumption		Approx. 2.5VA/3.0VA (at 100V AC) Approx. 3.5VA/4.5VA (at 120V AC)	Approx. 3.8VA/4.5VA (at 200V AC) Approx. 5.5VA/6.5VA (at 240V AC)	Approx. 1.0W (at 24V DC)	Approx. 0.8W (at 12V DC)
	Rated frequency		50/60 Hz			
	Output rating		5A 250V AC			
	Operating mode		Power ON-delay			
	Time range		Each 4 time settings switchable in 5 types			
Time accuracy	Operating time fluctuation		±1% (power off time change at the range of 0.1s to 1h)			
	Setting error		±5% (full-scale value)			
	Voltage error		±1% (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		T.D.: Timed-out 2 Form C INST.: Timed-out 1 Form C, instantaneous 1 Form C } Selected by front switch			
	Contact resistance (Initial value)		Max. 100mΩ (at 1A 6V DC)			
	Contact material		Silver alloy			
Life	Mechanical (contact)		10^7			
	Electrical (contact)		10^5			
Electrical function	Allowable operating voltage range		85 to 110% of rated operating voltage			
	Insulation resistance (Initial value)		Min. 100MΩ	Between live and dead metal parts Between input and output Between contacts of different poles Between contacts of same pole		
	Breakdown voltage (Initial value)		2,000Vrms for 1 min Between live and dead metal parts 2,000Vrms for 1 min Between input and output 2,000Vrms for 1 min Between contacts of different poles 1,000Vrms for 1 min Between contacts of same pole			
	Min. power off time		100 ms			
	Max. temperature rise		55°C 131°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 double amplitude of 0.5mm (10min on 3 axes)			
		Destructive	10 to 55Hz: 1 cycle/min double amplitude of 0.75mm (1h on 3 axes)			
Operating condition	Ambient temperature		−10 to +50°C +14 to +122°F			
	Ambient humidity		Max. 85%RH			
	Atmospheric pressure		860 to 1,060hPa			
	Ripple factor (DC type)		20%			
Others	Weight		Approximately 110 g 3.880 oz			
	Operation display		Red LED	During count down: blinking At time up: lit		

Ordering information

Ex. PM4S-A2C [   ] – [   ]

Max. time range	Max. rated operating voltage
10M 30M 60M 10H 30H	12V DC 24V DC 120V AC 240V AC

Part names

PM4S

Output contact selector
Operation indicator LED
Hand
Time indicator window
Set dial
Time range selector

PRODUCT TYPE

Type	Contact arrangement	Time range	Operating voltage	Part No.
A		1sec	200 to 240V AC	PM4S-A2C10M-AC240V
		10sec	100 to 120V AC	PM4S-A2C10M-AC120V
		1min	24V DC	PM4S-A2C10M-DC24V
		10min	12V DC	PM4S-A2C10M-DC12V
B		3sec	200 to 240V AC	PM4S-A2C30M-AC240V
		30sec	100 to 120V AC	PM4S-A2C30M-AC120V
		3min	24V DC	PM4S-A2C30M-DC24V
		30min	12V DC	PM4S-A2C30M-DC12V
C	Selected by front switch T.D.: Timed-out 2C INST.: Timed-out 1C Instantaneous 1C	6sec	200 to 240V AC	PM4S-A2C60M-AC240V
		60sec	100 to 120V AC	PM4S-A2C60M-AC120V
		6min	24V DC	PM4S-A2C60M-DC24V
		60min	12V DC	PM4S-A2C60M-DC12V
D		1min	200 to 240V AC	PM4S-A2C10H-AC240V
		10min	100 to 120V AC	PM4S-A2C10H-AC120V
		1h	24V DC	PM4S-A2C10H-DC24V
		10h	12V DC	PM4S-A2C10H-DC12V
E		3min	200 to 240V AC	PM4S-A2C30H-AC240V
		30min	100 to 120V AC	PM4S-A2C30H-AC120V
		3h	24V DC	PM4S-A2C30H-DC24V
		30h	12V DC	PM4S-A2C30H-DC12V

Dimensions

mm inch
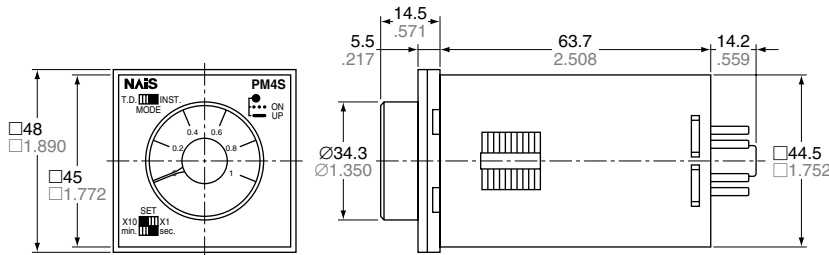
Wiring diagram
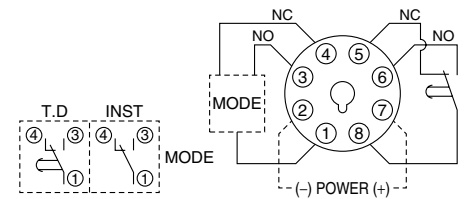
T.D.: Timed-out 2 Form C
INST: Timed-out 1 Form C,
instantaneous 1 Form C
* Selected by front switch

• Surface mount dimensions
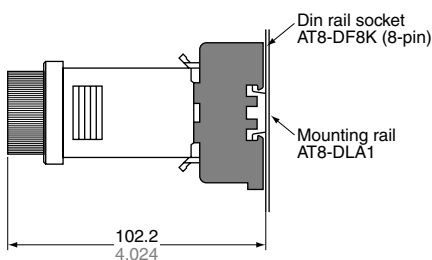
Din rail socket
AT8-DF8K (8-pin)

Mounting rail
AT8-DLA1

102.2
4.024

• Panel cut out dimensions

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

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

Min. 80 3.150

Min. 80 3.150

• Adjacent mounting

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

A

A = $(48 \times n - 2.5)^{+0.6}_{0}$
A = $(1.890 \times n - .098)^{+.024}_{0}$
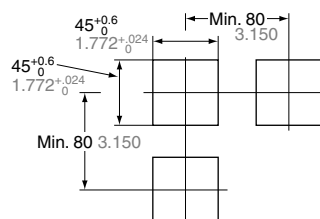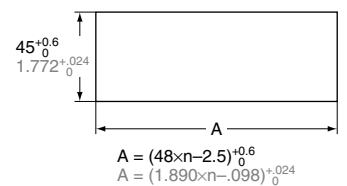
Note) The proper thickness of mounting panel is between 1 to 5 mm .039 to .197 inch.

OUTPUT CONTACT & TIME SETTING AND PRECAUTIONS

Operation method

1. Setting the output contact

There are two output contact modes, and the mode is set using the Output contact selector. Use a pair of tweezers or similar to set the Output contact selector to one of the following settings.

T.D.: Two time delay outputs

INST.: One time delay output and one instantaneous output

Be sure to set the switch so that it is securely in the desired setting position. If you leave the switch in the halfway position between the settings, unreliable operation will result.

2. Setting the time range

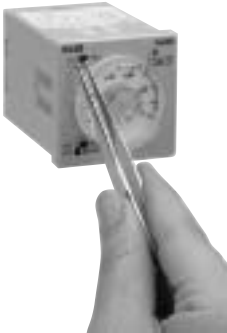You can set the unit to one of four time ranges using the Time range selector. Use a pair of tweezers or similar to set the top (scale digit) and bottom (time range) of the Time range selector and set the time range that you desire.

Be sure to set the switches so that they are securely in the desired setting positions. If you leave the switches in halfway positions between settings, unreliable operation will result.
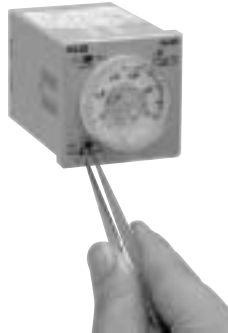
3. Setting the time

The time setting that you use must be within the setting range given on the ratings plate.

Do not make settings that are outside the scale range, as this will result in unreliable operation.

Note: Changing the time range or time setting when the unit is in operation can result in unreliable operation. Be certain to switch off the power before changing any of the settings.

Precautions

1. Timer contact protection circuit

The back e.m.f. and surge current that occurs with circuits used to interrupt inductive loads can damage the relay contacts. In cases such as this, we recommend that you insert a protection circuit to protect the contacts (e.g. CR circuit, diode circuit, or varistor).

2. Continuous conduction

If the timer conducts for long periods (i.e., more than one month) in the timed up state, the heat generated will cause the electronic components to deteriorate. In cases such as this, use the timer in combination with a relay to prevent long periods of continuous conduction.

(1) When using contact output
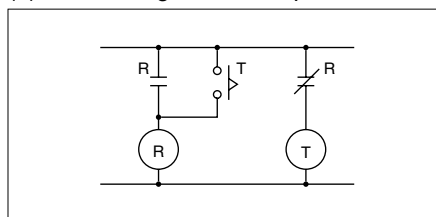
(2) When using non-contact output

Panasonic
ideas for life

**DIN 48 SIZE
DIGITAL TIMER**

LT4H

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

48
1.890

48
1.890

64.5
2.539

mm inch

Pin type   Screw terminal type

FEATURES

1. 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.

2. Simple Operation
Seesaw buttons make operating the unit even easier than before.

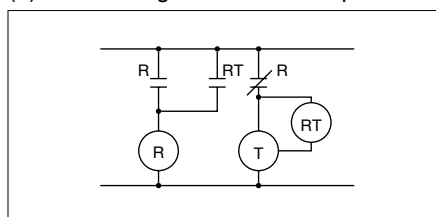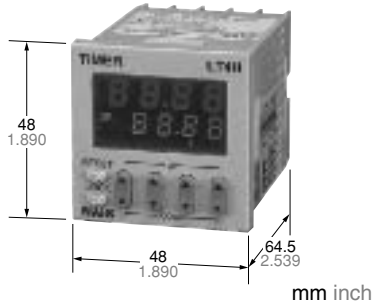**3. Short Body of only 64.5 mm 2.539 inch (screw terminal type) or 70.1 mm 2.760 inch (pin type)**
With a short body, it is easy to install in even narrow control panels.

4. Conforms to IP66's Weather Resistant Standards
The water-proof panel keeps out water and dirt for reliable operation even in poor environments.

5. 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.

6. Changeable Panel Cover
Also offers a black panel cover to meet your design considerations.

7. Conforms With EMC and Low Voltage Directives
Conforms with EMC directives (EN50081-2/EN50082-2) and low -voltage directives (VDE0435/Part 2021) for CE certification vital for use in Europe.
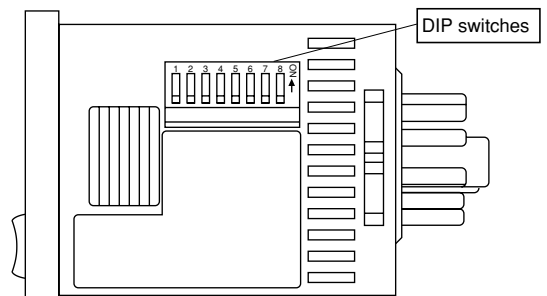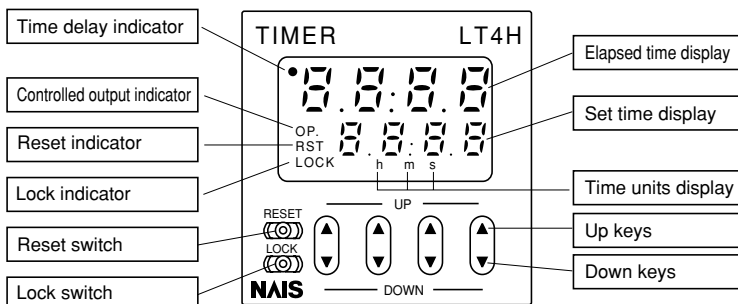
8. Good performance
All this at an affordable price to provide you with unmatched cost performance.

PRODUCT TYPES

Time range	Operation mode	Output	Operation voltage	Power down insurance	Terminal	Part No.
9.999 s (0.001 s~) 99.99 s (0.01 s~) 999.9 s (0.1 s~) 9999 s (1 s~) 99 min 59 s (1 s~) 999.9 min (0.1 min~) 99 h 59 min (1 min~) 999.9 h (0.1 h~)	Power ON delay (1) Power ON delay (2) Signal ON delay Signal OFF delay Pulse One-shot Pulse ON-delay Signal Flicker Totalizing ON-delay (8 modes)	Relay (1 c)	100-240 V AC	Available	8 pin	LT4H8-AC240V
					11 pin	LT4H-AC240V
					Screw	LT4H-AC240VS
			24 V AC / 24 V DC		8 pin	LT4H8-AC24V
					11 pin	LT4H-AC24V
					Screw	LT4H-AC24VS
			12-24 V DC		8 pin	LT4H8-DC24V
					11 pin	LT4H-DC24V
					Screw	LT4H-DC24VS
		Transistor (1 a)	100-240 V AC		8 pin	LT4HT8-AC240V
					11 pin	LT4HT-AC240V
					Screw	LT4HT-AC240VS
			24 V AC / 24 V DC		8 pin	LT4HT8-AC24V
					11 pin	LT4HT-AC24V
					Screw	LT4HT-AC24VS
			12-24 V DC		8 pin	LT4HT8-DC24V
					11 pin	LT4HT-DC24V
					Screw	LT4HT-DC24VS

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

PART NAMES

Time delay indicator

Controlled output indicator

Reset indicator

Lock indicator

Reset switch

Lock switch

TIMER   LT4H

OP.
RST
LOCK
h   m   s
UP
RESET
LOCK
NAIS   DOWN

Elapsed time display

Set time display

Time units display

Up keys

Down keys

DIP switches

1 2 3 4 5 6 7 8 9 0

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

LT4H

SPECIFICATIONS

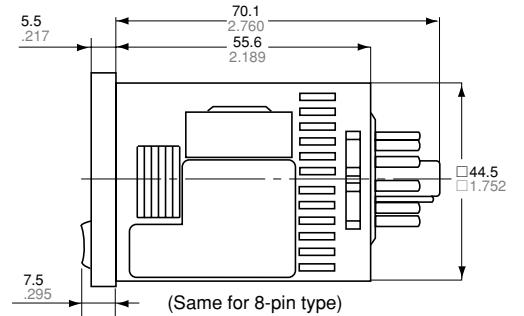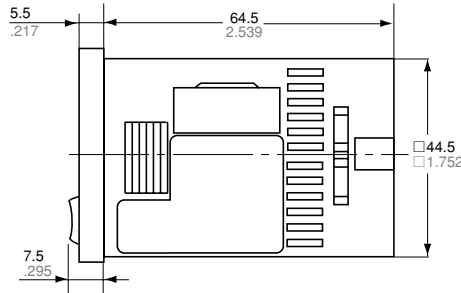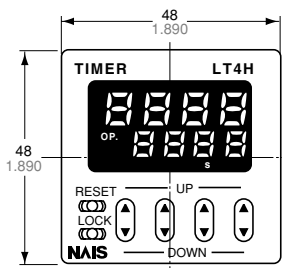| Item		Relay output type		Transistor output type	
		AC type	DC type	AC type	DC type
Rating	Operating voltage	100 to 240 V AC, 24 V AC [1]	12 to 24 V DC	100 to 240 V AC, 24 V AC [1]	12 to 24 V DC
	Frequency	50/60 Hz common	—	50/60 Hz common	—
	Power consumption	Max. 10 V A	Max. 3 W	Max. 10 V A	Max. 3 W
	Control capacity (resistive)	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)			
	Signal/Reset/Stop input	Min. input signal width: 1 ms, 20 ms (2 directions by selected by DIP switch)			
	Lock input	Min. input signal width: 20 ms			
	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, 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 ± (0.005 % + 20 ms) in case of reset or input signal start		⎡ Operating voltage: 85 to 110% Temperature: −10 to +55°C +14 to +131°F 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)	
	Initial contact resistance	100 mΩ (at 1 A 6 V DC)		—	
	Contact material	Ag alloy/Au flash		—	
Life	Mechanical	2.0×10^7 ope. (Except for switch operation parts)		—	
	Electrical	1.0×10^5 ope. (At rated control voltage)		1.0×10^7 ope. (At rated control voltage)	
Electrical	Operating voltage range	85 to 110 % of rated operating voltage			
	Initial breakdown voltage	2,000 Vrms for 1 min: Between live and dead metal parts (11-pin) 2,000 Vrms for 1 min: Between input and output 1,000 Vrms for 1 min: Between contacts		2,000 Vrms for 1 min: Between live and dead metal parts (Pin type) 2,000 Vrms for 1 min: Between input and output	
	Initial insulation resistance (At 500 V DC)	Min. 100 MΩ: Between live and dead metal parts / Between input and output / Between contacts		Min. 100 MΩ: Between live and dead metal parts / Between input and output	
	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)			
	Vibration resistance — 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./s² (4 times on 3 axes)			
	Shock resistance — Destructive	Min. 294 m 964.567 ft./s² (5 times on 3 axes)			
Operating conditions	Ambient temperature	−10° C to 55° C +14° F to +131° F			
	Ambient humidity	Max. 85 % RH			
	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)			

Note: 1) the 24 V AC type can be operated also with 24 V DC.

DIMENSIONS (units: mm inch)

• LT4H digital timer

Screw-down terminal type
(embedded installation)

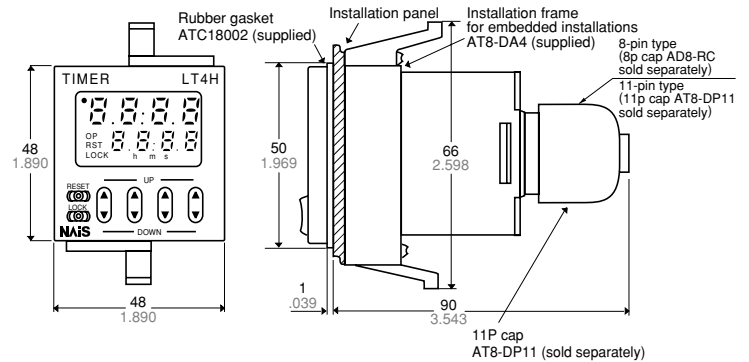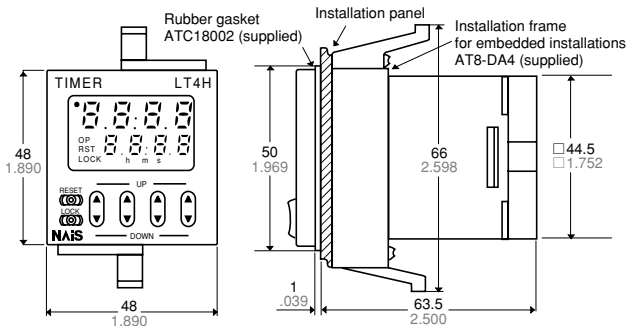Pin type (embedded installation/
front panel installation)

(Same for 8-pin type)

• Dimensions for embedded installation (with adapter installed)
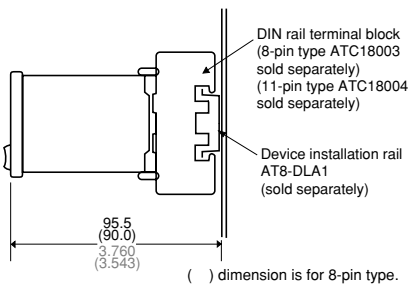
Screw-down terminal type

Pin type

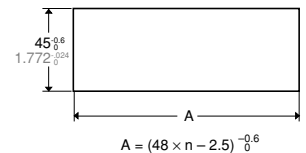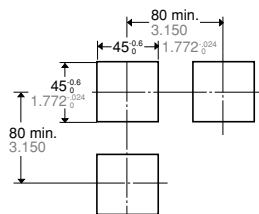**• Dimensions for front panel installations**

DIN rail terminal block
(8-pin type ATC18003
sold separately)
(11-pin type ATC18004
sold separately)

Device installation rail
AT8-DLA1
(sold separately)

( ) dimension is for 8-pin type.

• Installation panel cut-out dimensions

The standard panel cut-out dimensions are shown below. Use the installation 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 LAYOUT AND WIRING

• 8-pin type

Relay output type

Transistor output type

(−) − Operation voltage − (+)

(−) − Operation voltage − (+)

• Screw-down terminal type

Relay output type

Transistor output type

(+) − Operation voltage − (−)

(+) − Operation voltage − (−)

TERMINAL LAYOUT AND WIRING

• 11-pin type

Relay output type
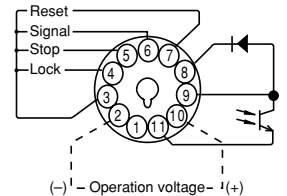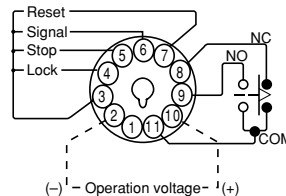
Transistor output type

(−) − Operation voltage − (+)

(−) − Operation voltage − (+)
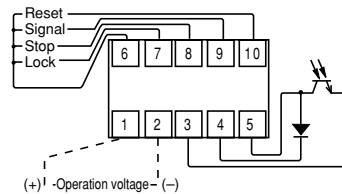
Note: For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 43.

SETTING THE OPERATION MODE, TIMER RANGE, AND TIME

The new settings are valid after power OFF → ON

Setting procedure 1) Setting the operation mode and timer range

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

DIP switches

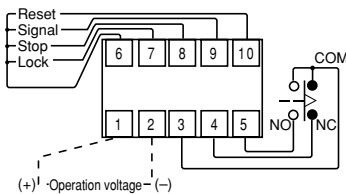|	Item	DIP switch	
		OFF	ON
1			
2	Operation mode	Refer to table 1	
3			
*4	Minimum input reset, signal, and stop signal width	20 ms	1 ms
5	Time delay direction	Addition	Subtraction
6			
7	Timer range	Refer to table 2	
8			

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

DIP switches

(Same for screw-down terminal type)

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 timer range

| DIP switch No.			Timer 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
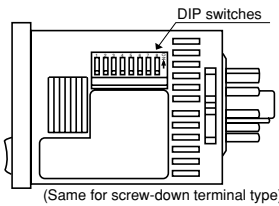
Note: Set the DIP switches before installing the unit.

Setting procedure 2) Setting the time

Set the set time with the keys on the front of the unit.

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
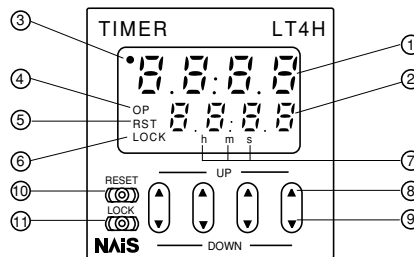
TIMER   LT4H

OP
RST
LOCK
h m s

UP

RESET
LOCK
NAiS   DOWN

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

OPERATION MODE

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. <table><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>ON</td><td>ON</td><td>ON</td></tr></table> • Clears elapsed time value and starts time delay at power ON. • After timer completion, stops at the display of the set value (addition), or stops at "0" (subtraction). • Ignores signal input. • 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. <table><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>OFF</td><td>OFF</td><td>OFF</td></tr></table> • Elapsed time value does not clear at power ON. (power outage countermeasure function) • The output remains ON even after the power is cut and restarted. • After timer completion, stops at the display of the set value (addition), or stops at "0" (subtraction). • Ignores signal input. • 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. <table><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>ON</td><td>OFF</td><td>OFF</td></tr></table> • Clears elapsed time value at power ON. • Time delay starts at signal ON and elapsed time value or output resets at signal OFF. • Instantaneous time delay start at reset OFF and power ON while signal is ON. • Stops delay time operation at stop ON. Restarts delay time operation at stop OFF. • In order to have the time delay start at power ON or reset at power OFF, short out the signal 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. <table><tr><td>1</td><td>2</td><td>3</td></tr><tr><td>OFF</td><td>ON</td><td>OFF</td></tr></table> • Clears elapsed time value at power ON. • Output control ON at signal ON and time delay start at signal OFF. • Elapsed time value clears when signal goes ON again during time delay. • Stops delay time operation at stop ON. Restarts delay time operation at stop OFF.	

Notes: 1) Each signal input (signal, 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 ⑥ for the screw-down terminal type).
2) The 8-pin type does not have a stop input or lock input.

LT4H

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

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

Notes: 1) Each signal input (signal, 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 ⑥ for the screw-down terminal type).
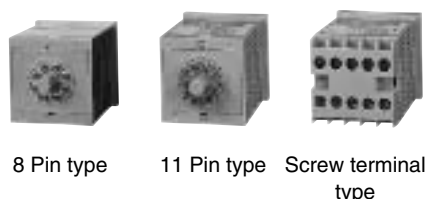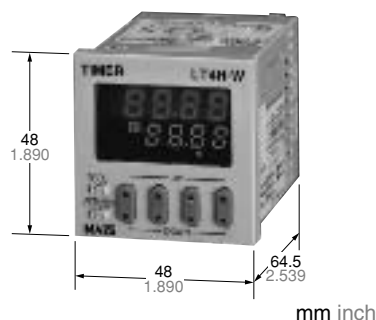2) The 8-pin type does not have a stop input or lock input.

Panasonic
ideas for life

**DIN 48 SIZE
DIGITAL TIMER**

LT4H-W

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

48
(1.890)

48
(1.890)

64.5
(2.539)

mm inch

8 Pin type   11 Pin type   Screw terminal type

FEATURES

1. 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	999min	999.9h
9999s		9999h

2. 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.

3. Simple Operation
Seesaw buttons make operating the unit even easier than before.

4. 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.

5. Conforms to IP66's Weather Resistant Standards
The water-proof panel keeps out water and dirt for reliable operation even in poor environments.

6. 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.

7. Changeable Panel Cover
Also offers a black panel cover to meet your design considerations.

8. Conforms With EMC and Low Voltage Directives
Conforms with EMC directives (EN50081-2/EN50082-2) and low -voltage directives (VDE0435/Part 2021) for CE certification vital for use in Europe.

9. Good performance
All this at an affordable price to provide you with unmatched cost performance.

PRODUCT TYPES

Time range	Operation mode	Output	Operation voltage	Power down insurance	Terminal	Part No.
99.99s 999.9s 9999s 99min59s 999.9min 99h59min 999.9h 9999h	Pulse input: • Delayed one shot • OFF-start flicker • ON-start flicker Integrating input: • Delayed one shot • OFF-start flicker • ON-start flicker	Relay (1 c)	100-240 V AC	Available	8 pin	LT4HW8-AC240V
					11 pin	LT4HW-AC240V
					Screw	LT4HW-AC240VS
			24 V AC / 24 V DC		8 pin	LT4HW8-AC24V
					11 pin	LT4HW-AC24V
					Screw	LT4HW-AC24VS
			12-24 V DC		8 pin	LT4HW8-DC24V
					11 pin	LT4HW-DC24V
					Screw	LT4HW-DC24VS
		Transistor (1 a)	100-240 V AC		8 pin	LT4HWT8-AC240V
					11 pin	LT4HWT-AC240V
					Screw	LT4HWT-AC240VS
			24 V AC / 24 V DC		8 pin	LT4HWT8-AC24V
					11 pin	LT4HWT-AC24V
					Screw	LT4HWT-AC24VS
			12-24 V DC		8 pin	LT4HWT8-DC24V
					11 pin	LT4HWT-DC24V
					Screw	LT4HWT-DC24VS

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

PART NAMES

T1/T2 Operation display
Display for change-over between T1/T2 settings
Controlled output indicator
Lock indicator
Reset switch
Set/Lock switch

TIMER   LT4H-W

(Subtraction elapsed time display)
Elapsed time display
Set time display
Time units display
Up keys
Down keys

Fourth digit   First digit

DIP switches

(Same for 8-pin and screw terminal type)

SPECIFICATIONS

Item		Ralay output type		Transistor output type	
		AC type	DC type	AC type	DC type
Rating	Operating voltage	100 to 240 V AC, 24 V AC [1]	12 to 24 V DC	100 to 240V AC, 24V AC [1]	12 to 24 V DC
	Frequency	50/60 Hz common	—	50/60 Hz common	—
	Power consumption	Max. 10 V A	Max. 3 W	Max. 10 V A	Max. 3 W
	Control capacity (resistive)	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) (2 directions selectable by DIP switch)			
	Operation mode	Pulse input: Delayed one shot, OFF-start flicker or ON-start flicker Integrating input: Delayed one shot, OFF-start flicker or ON-start flicker			
	Signal, Reset, Stop input	Min. input signal width: 1 ms, 20 ms (2 directions by selected by DIP switch)			
	Lock input	Min. input signal width: 20 ms			
	Input signal	Open collector input Input impedance: Max. 1 kΩ; Residual voltage: Max. 2V 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. 10⁵ overwriting)			
Time accuracy (max.)	Operating time fluctuation	± (0.005% + 50 ms) in case of power on start ± (0.005% + 20 ms) in case of reset or input signal start		Operating voltage: 85% to 110% Temperature: −10°C to +55°C +14°F to +131°F 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)	
	Initial contact resistance	100 mΩ (at 1 A 6 V DC)		—	
	Contact material	Ag alloy/Au flash		—	
Life	Mechanical	2.0 × 10⁷ ope. (Except for switch operation parts)		—	
	Electrical	1.0 × 10⁵ ope. (At rated control voltage)		1.0 × 10⁷ ope. (At rated control voltage)	
Electrical	Operating voltage range	85 to 110 % of rated operating voltage			
	Initial breakdown voltage	2,000 Vrms for 1 min: Between live and dead metal parts (11-pin type only) 2,000 Vrms for 1 min: Between input and output 1,000 Vrms for 1 min: Between contacts		2,000 Vrms for 1 min: Between live and dead metal parts (Pin type only) 2,000 Vrms for 1 min: Between input and output	
	Initial insulation resistance (At 500 V DC)	Min. 100 MΩ: Between live and dead metal parts Between input and output Between contacts		Min. 100 MΩ: Between live and dead metal parts Between input and output	
	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./s² (4 times on 3 axes)		
		Destructive	Min. 294 m 964.567 ft./s² (5 times on 3 axes)		
Operating conditions	Ambient temperature	−10° C to 55° C +14° F to +131° F			
	Ambient humidity	Max. 85 % RH			
	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)			

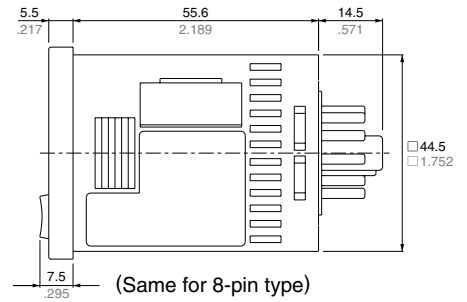Note: 1) the 24 V AC type can be operated also with 24 V DC.

DIMENSIONS (units: mm inch)

• LT4H-W digital timer
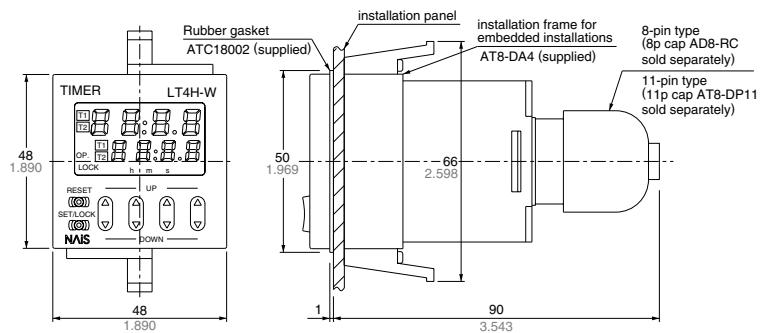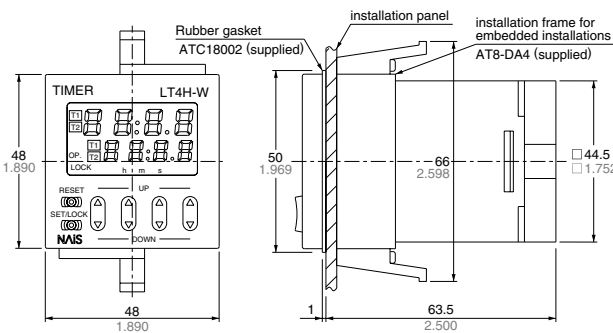
Screw-down terminal type
(embedded installation)
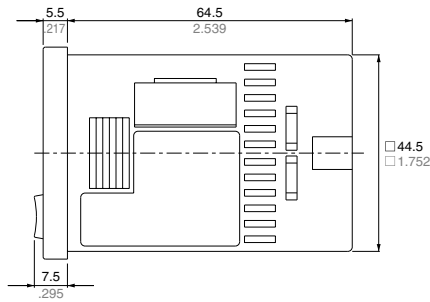
Pin type (embedded installation/
front panel installation)

(Same for 8-pin type)

• Dimensions for embedded installation (with adapter installed)

Screw-down terminal type

Pin type

• Dimensions for front panel installations

DIN rail terminal block
(8-pin type ATC18003
sold separately)
(11-pin type ATC18004
sold separately)

Device installation rail
AT8-DLA1
(sold separately)

( ) dimension is for 8-pin type.
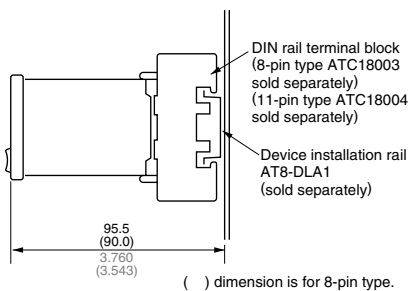
• Installation panel cut-out dimensions

The standard panel cut-out dimensions are shown below. Use the installation frame (AT8-DA4) and rubber gasket (ATC18002).
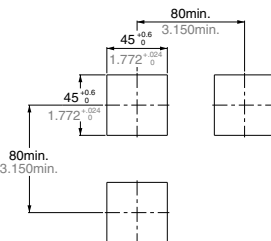
• For connected installations
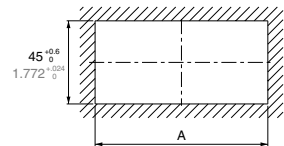
When n timers are continuously installed, the dimension (A) is calculated according to the following formula (n: the number of the timers to be installed):
$$A=(48 \times n - 2.5)^{+0.6}_{0} \quad A=(1.890 \times n - .098)^{+.024}_{0}$$

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

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

TERMINAL LAYOUT AND WIRING

• 8-Pin type
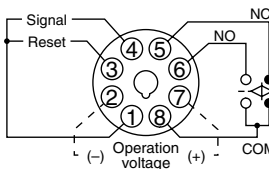
Relay output type

Transistor output type
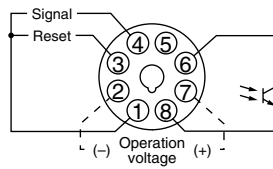
• 11-Pin type
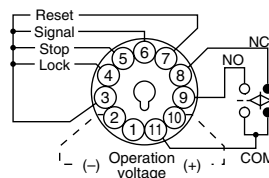
Relay output type

Transistor output type
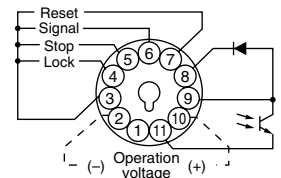
• Screw terminal type

Relay output type
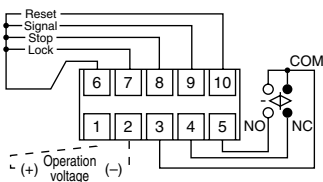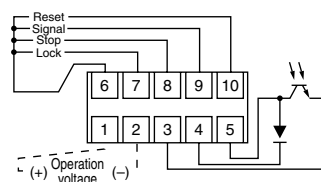
Transistor output type

Note) For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 43.

SETTING THE OPERATION MODE, TIMER RANGE, AND TIME

The new settings are valid after power OFF → ON

Setting procedure 1) Setting the operation mode and timer range (Timer T_1/Timer T_2)

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

DIP switches

	Item	DIP switch	
		OFF	ON
1	Time range (Timer T_1)	Refer to table 1	
2			
3			
*4	Minimum input reset, signal, 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 signal inputs. The signal range of the lock input is fixed (minimum 20 ms).

DIP switches

Table 1: Setting the timer range (Timer T_1)

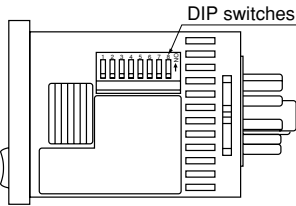| DIP switch No.			Timer range
1	2	3	
ON	ON	ON	0.01 s to 99.99 s
OFF	OFF	OFF	0.1 s to 999.9 s
ON	OFF	OFF	1 s to 9999 s
OFF	ON	OFF	0 min 01 s to 99 min 59 s
ON	ON	OFF	0.1 min to 999.9 min
OFF	OFF	ON	0 h 01 min to 99 h 59 min
ON	OFF	ON	0.1 h to 999.9 h
OFF	ON	ON	1 h to 9999 h

Table 2: Setting the timer range (Timer T_2)

| DIP switch No.			Timer 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

Note: Set the DIP switches before installing the unit.

Setting procedure 2) Setting the time

Set the set time with the keys on the front of the unit.

Front display section

① Elapsed time display
② Set time display
③ T_1/T_2 operation indicator
④ T_1/T_2 setting value selectable indicator
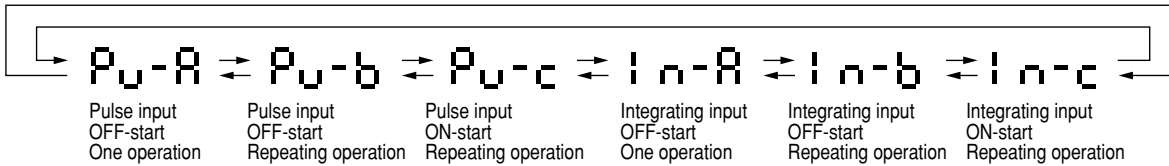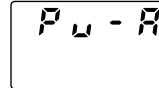⑤ Controlled output indicator
⑥ Lock indicator
⑦ Time units display
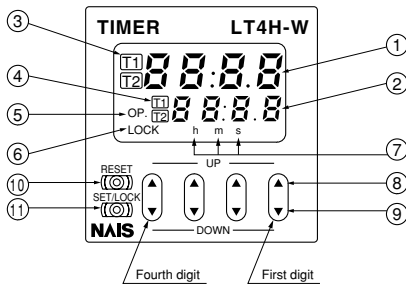
⑧ UP keys
Changes the corresponding digit of the set time in the addition direction (upwards)
⑨ DOWN keys
Changes the corresponding digit of the set time in the subtraction direction (downwards)
⑩ RESET switch
Resets the elapsed time and the output
⑪ Set/lock switch
Changes over the display between T_1/T_2 settings, sets the operational mode, checks the operational mode and locks the operation of each key (such as up, down or reset key).

Ex: Setting mode display

1) Setting or changing the operational 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 key.
(3) The operational 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.

Pu-A ⇄ Pu-b ⇄ Pu-c ⇄ In-A ⇄ In-b ⇄ In-c

Pulse input OFF-start One operation	Pulse input OFF-start Repeating operation	Pulse input ON-start Repeating operation	Integrating input OFF-start One operation	Integrating input OFF-start Repeating operation	Integrating input ON-start Repeating operation

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

2) Checking the operational 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.)

3) 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.

4) 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 signal input is carried out. However, while the reset input is carried out, the output becomes OFF.

	PULSE : Pulse input	INTEGRATION : Integrating input
A Delayed one shot	PULSE A OFF-start/1 operation t₁<T₁, t₂<T₂	INTEGRATION A OFF-start/1 operation t₁<T₁, t₂<T₂
B OFF-start flicker	PULSE B OFF-start/repeating operation t₁<T₁, t₂<T₂	INTEGRATION B OFF-start/repeating operation t₁<T₁, t₂<T₂
C ON-start flicker	PULSE C ON-start/repeating operation t₁<T₁, t₂<T₂	INTEGRATION C ON-start/repeating operation t₁<T₁, t₂<T₂
Remarks and notes	• The pulse input mode starts the operation by starting the signal input. • When using the unit by starting it with the power on, short-circuit the signal terminal (8-pin: ① to ④, 11-pin: ③ to ⑥ and screw: ⑥ to ⑨).	• The integrating input mode is operated by the integrated time of the signal input. In other word, the timer operates only when the signal input is performed. • When the elapsed value is cleared by the reset input, the output is reset. • When using the unit by starting it with the power on, short-circuit the signal terminal (8-pin: ① to ④, 11-pin: ③ to ⑥ and screw: ⑥ to ⑨).

• Each signal input such as signal, 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.
• The 8-pin type does not have a stop input or lock input.

LT4H series CAUTIONS FOR USE

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.
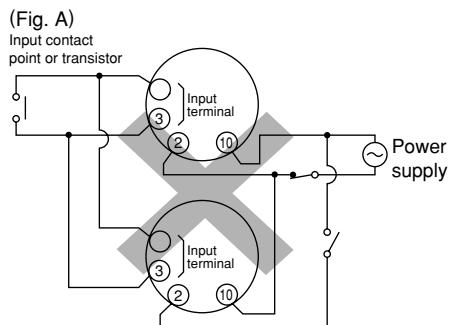
2) When using the instrument with an embedded installation, the screw-down terminal type is recommended. For the pin type, use either the rear terminal block (AT8-RR) or the 8P cap (AD8-RC) for the 8-pin type, and the 11P cap (AT8-DP11) for the 11-pin type. Avoid soldering directly to the round pins on the unit.

When using the instrument with a front panel installation, use the DIN rail terminal block (ATC18003) for the 8-pin type and the DIN rail terminal block (ATC18004) 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-down 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. 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)

Input contact point or transistor

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

(Fig. B)

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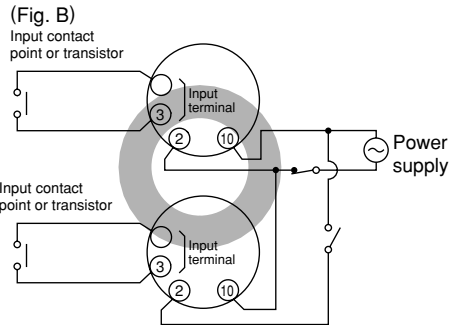
When power circuitry is not independent, one input signal can be fed to two or more counters at once, as shown in Fig. C.

(Fig. C)

Input contact point or transistor
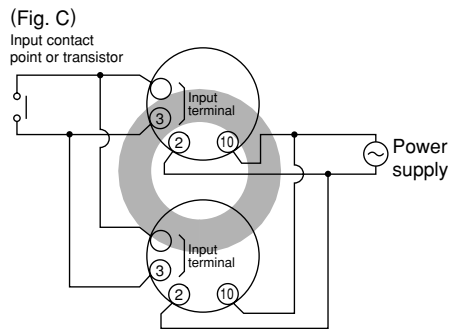
3. Input and output

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
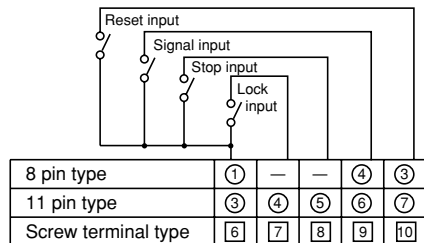
(2) Non-contact point input

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 W, 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	—	—	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) 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.
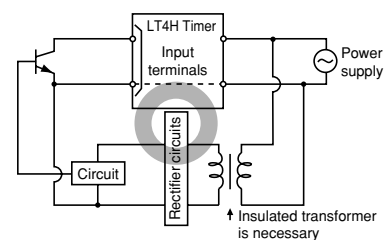
4) The input signal is applied by the shorting of each input terminal with the common terminal (terminal ① for 8-pin types, terminal ③ for 11-pin types and terminal ⑥ for screw-down terminal types). Never connect other terminals or voltages higher than DC 40 V, because it may destroy the internal circuitry.

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)

As NPN output

LT4H timer

⑪ ⑨ ⑧

Load

Load's power supply

As PNP output

LT4H timer

⑪ ⑨ ⑧

Load

Load's power supply

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

LT4H timer

Inductive load

Diode rating:
I_F (forward current): 1 A
V_R (reverse voltage): 600 V
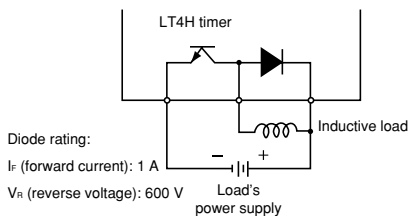
Load's power supply

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.

8) Turning on and off the power supply while operating in A2* (Power on delay) 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 signal input or stop input.
* Not related to the signal input.

9) 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 signal input or stop input.

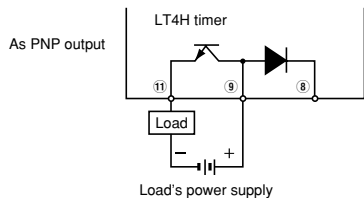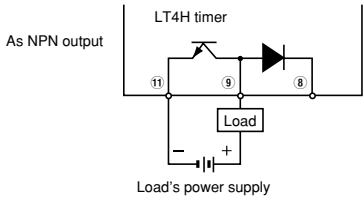10) The operation mode and time range can be set with the DIP switches on the side of the timer. Make the DIP switch settings before installing the timer on the panel.

4. 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.

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

• **Surge wave form**
[± (1.2 × 50) 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 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.

Ⓡ Relay Ⓣ Timer Receive output from contact at relay R

5. 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 reset, RESET key, or restart unit.	The values at start-up before the CPU malfunction occurred.
Err-01	Malfunctioning memory. See note.			0

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

| DIN 48 SIZE DIGITAL TIMER | QM4H Timers |

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!!

S Type
(with MODE switch)

G Type

FEATURES

1. Possible to set and change the time and the time range even when the power is off.
2. Selectable 8 different time ranges with front digit switches.
3. **[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.

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

TIMER   QM4H-S

MODE switch
(QM4H-S type only)

Set time display

Time setting switch
(3 digits)

NAIS

Elapsed time display

Time delay indicator
(OP.LED)

MODE
T.D. [ ] INST.
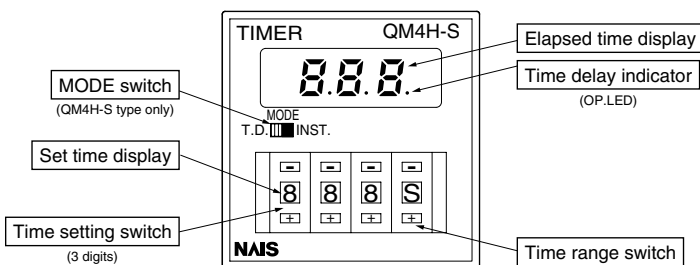
Time range switch

Protective construction:
QM4H: IP40
with cover AQM4801: IP50
with cover AQM4803: IP64

TIME RANGE SETTINGS

Time range switch								
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

.01 S → 0.1 S → .01 S → 0.1 S ← S → 0.1 M → M → 0.1 H → H → 10 H

Note that there are two settings with the same range.

SPECIFICATIONS

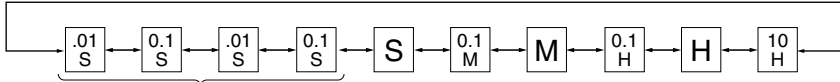| Item		Type	QM4H-S		QM4H-G	
Rating	Rated operating voltage		12 to 48 V AC/DC and 100 to 240 V AC/DC			
	Rated power consumption	12 to 48 V AC/DC	During time delay	12 V DC, 48 V DC: Max. 1.5W 12 V AC, 48 V AC: Max. 3.0 VA	During time delay	12 V DC, 48 V DC: Max. 1.0W 12 V AC, 48 V AC: Max. 2.0 VA
			After time delay	12 V DC, 48 V DC: Max. 2.5W 12 V AC, 48 V AC: Max. 5.0 VA	After time delay	12 V DC, 48 V DC: Max. 1.5W 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 100 V AC, 240 V AC: Max. 3.0 VA	During time delay	100 V DC, 240 V DC: Max. 1.0W 100 V AC, 240 V AC: Max. 2.5 VA
			After time delay	100 V DC, 240 V DC: Max. 2.0W 100 V AC, 240 V AC: Max. 4.0 VA	After time delay	100 V DC, 240 V DC: Max. 1.8W 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 ±(0.005%+0.03s) in case of input reset start[2] Operating voltage: 85 to 110% V Temperature: −10 to +55°C +14 to 131°F (20°C 68°F) Stopped time: 0.1 sec to 1 hour			
	Temperature error					
	Setting error					
	Voltage error					
Contact	Contact arrangement		T.D. mode: Time delay 2C 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 Min. 100 MΩ (at 500 V DC megger)			
	Insulation resistance (Initial value)		Between live and dead metal parts: 2, 000 Vrms for 1 min Between input and output: 2, 000 Vrms for 1 min Between contact sets: 2, 000 Vrms for 1 min 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/s² (4 times on 3 axes)			
		Destructive	980 m/s² (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 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.
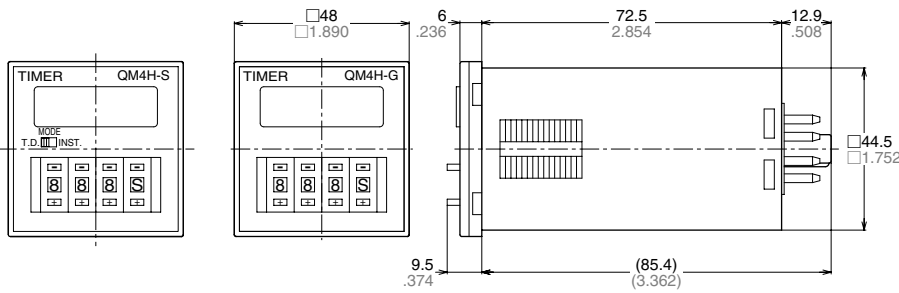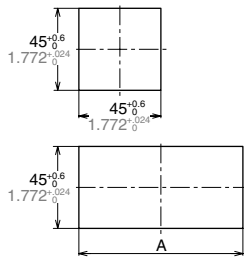
QM4H

DIMENSIONS

• S Type   • G Type

□48
□1.890   6 .236   72.5 2.854   12.9 .508

TIMER   QM4H-S

TIMER   QM4H-G

44.5
1.752

9.5 .374   (85.4) (3.362)

Panel cut-out dimensions

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

A

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

Mounting frame (AQM4812: supplied)
(AT8-DA4 can also be used for
mounting frame. Sold separately)
Mounting screw
(supplied with mounting frame)

Panel (Thickness: 1 to 5 mm .039 to .197 inch)
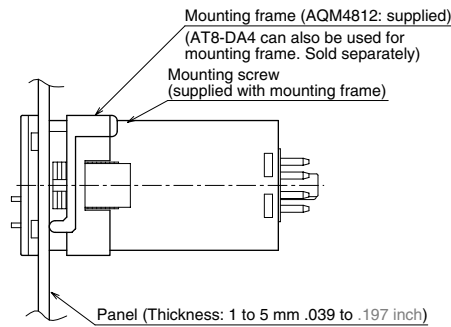
Terminal layouts and Wiring diagrams
• QM4H-S Type

NC   NC
NO   NO
4 5
3   6
MODE
2   7
1 8
COM   COM
(−) Operating (+)
voltage
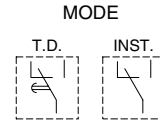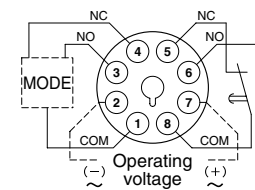
MODE

T.D.   INST.

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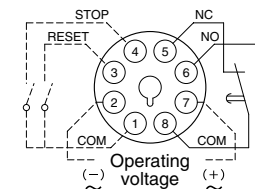Instantaneous 1C
*Use MODE switch on front

Notes:
1. Operating voltage signs in parentheses ( ) indicate the polarity
of the DC type.

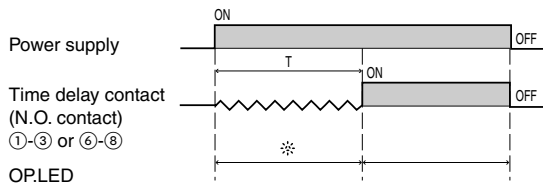2. ⌇ is a time delay contact.

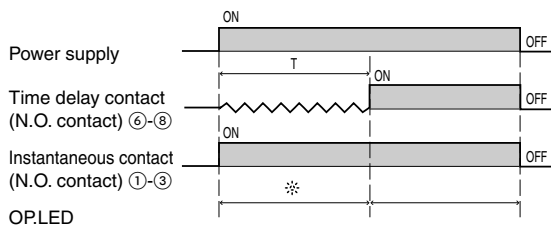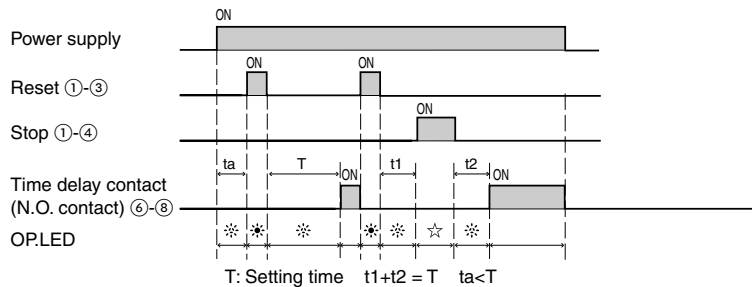⌇ is an instantaneous contact.

• QM4H-G Type

STOP   NC
RESET   NO
4 5
3   6
2   7
1 8
COM   COM
(−) Operating (+)
voltage

OPERATION MODE

• QM4H-S Type

1) T.D. mode

Power supply   ON   OFF

Time delay contact
(N.O. contact)
①-③ or ⑥-⑧   T   ON   OFF

OP.LED   ※

2) INST. mode

Power supply   ON   OFF

Time delay contact
(N.O. contact) ⑥-⑧   T   ON   OFF

Instantaneous contact
(N.O. contact) ①-③   ON   OFF

OP.LED   ※

• QM4H-G Type

Power supply   ON

Reset ①-③   ON   ON

Stop ①-④   ON

Time delay contact
(N.O. contact) ⑥-⑧   ta   T   ON   t1   t2   ON

OP.LED   ※ ※   ※   ※   ※   ☆   ※

T: Setting time   t1+t2 = T   ta<T

※ Lit   ※ Blinking   ☆ Blinking slowly

* 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 AT8-DA4
is also available for sale separately.**
**6. If you change the operating voltage,
be sure not to allow leak current into
the timer.**
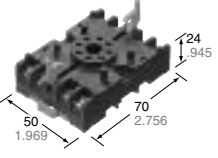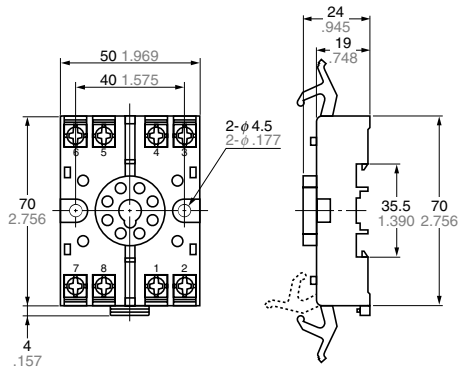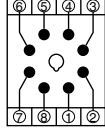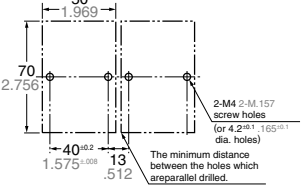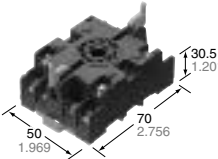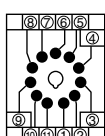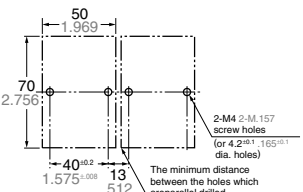
**7. Avoid leaving the unit powered
continuously. Leaving the unit
powered up with output set to ON
continuously for a long period of time
(about 1 month or more) will wear out
the electronic components. If you will
be keeping it powered continuously,
combine with a relay to create the
circuit shown below:**

R   T   R
Ⓡ   Ⓣ
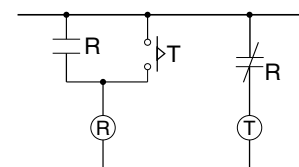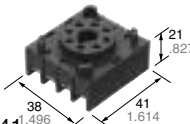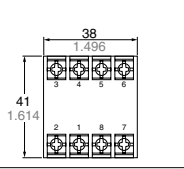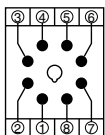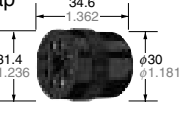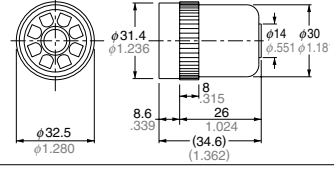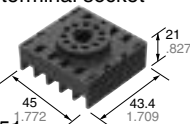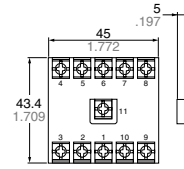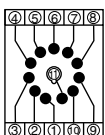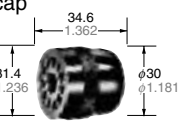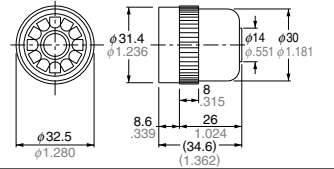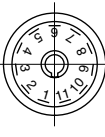
DIN SIZE TIMERS COMMON OPTIONS

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

Type	Appearance	Dimensions	Terminal wiring (Top view)	Mounting hole dimensions
PM4H-S PM4H-M PM4H-SD PM4H-F8 PM4H-F8R PM4H-W LT4H LT4H-W (8-pin type) QM4H	• DIN rail socket (8-pin) ATC180031	24 .945 / 19 .748 / 50 1.969 / 40 1.575 / 70 2.756 / 50 1.969 / 2-φ4.5 2-φ.177 / 35.5 1.390 / 70 2.756 / 4 .157	Note: Terminal No. on the main body are identical to those on the terminal socket.	50 1.969 / 70 2.756 / 40±0.2 1.575±.008 / 13 .512 / 2-M4 2-M.157 screw holes (or 4.2±0.1 .165±0.1 dia. holes) The minimum distance between the holes which are parallel drilled.
PM4H-A PM4H-F11R LT4H LT4H-W (11-pin type)	• DIN rail socket (11-pin) ATC180041	30.5 1.201 / 29.5 1.161 / 50 1.969 / 40 1.575 / 70 2.756 / 70 2.756 / 2-φ4.5 2-φ.177 / 35.7 1.406 / 70 2.756 / 4 .157	Note: Terminal No. on the main body are identical to those on the terminal socket.	50 1.969 / 70 2.756 / 40±0.2 1.575±.008 / 13 .512 / 2-M4 2-M.157 screw holes (or 4.2±0.1 .165±0.1 dia. holes) The minimum distance between the holes which are parallel drilled.

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

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

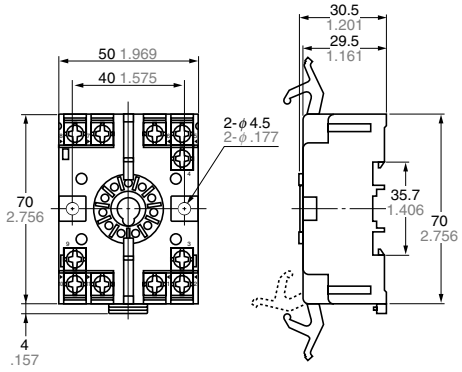| Type	Appearance	Dimensions	Terminal wiring (Top view)	Mounting hole dimensions
PM4H-S PM4H-M PM4H-SD PM4H-F8 PM4H-F8R PM4H-W LT4H LT4H-W (8-pin type) QM4H	• Rear terminal socket AT78041	21 .827 / 16 .630 / 38 1.496 / 41 1.614 / 41 1.614 / 38 1.496		—
	• 8P cap AD8-RC	34.6 1.362 / φ31.4 φ1.236 / φ30 φ1.181 / φ14 φ.551 / φ30 φ1.18 / 8 .315 / 8.6 .339 / 26 1.024 / (34.6) (1.362) / φ32.5 φ1.280		—
PM4H-A PM4H-F11R LT4H LT4H-W (11-pin type)	• Rear terminal socket AT78051	5 .197 / 21 .827 / 16 .630 / 45 1.772 / 43.4 1.709 / 43.4 1.709 / 45 1.772		—
	• 11P cap AT8-DP11	34.6 1.362 / φ31.4 φ1.236 / φ30 φ1.181 / φ31.4 φ1.236 / φ14 φ.551 / φ30 φ1.181 / 8 .315 / 8.6 .339 / 26 1.024 / (34.6) (1.362) / φ32.5 φ1.280		—

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

MOUNTING PARTS

• Rubber gasket

ATC18002

50.0 1.969
50.0 1.969
1.0 .039

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

48 1.890
48 1.890
68 2.677
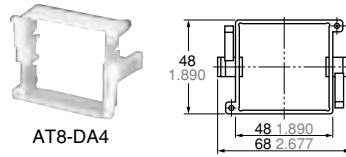
Applicable for PM4H series LT4H series and QM4H series

• Mounting rails (Applicable for DIN and IEC standards)
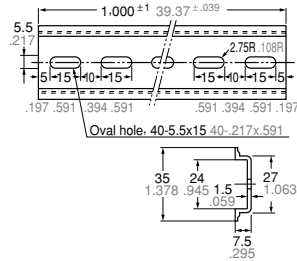
AT8-DLA1
Length: 1 m
aluminum

1.000 ±1 39.37 ±.039
5.5 .217
2.75R .108R
5 15 40 15 15 40 15 5
.197 .591 .394 .591 .591 .394 .591 .197
Oval hole: 40-5.5x15 40-.217x.591
35 1.378 24 .945 1.5 .059 27 1.063
7.5 .295

• Fastening plate

ATA4806

50 1.969
12 .472 M4 M.157
10 .394

ATA4806

10 .394

For holding DIN rails

• Protective cover for DIN 48 size

Hard type

17.2 .677 50.6 1.992
50.6 1.992

AQM4801

Flexible type

11 .433 50 1.969
50 1.969
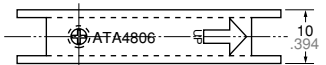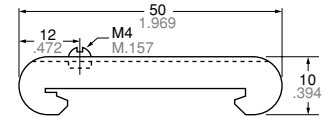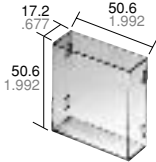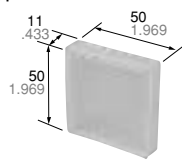
AQM4803

ACCESSORIES

PM4H series
• Panel cover (Black)
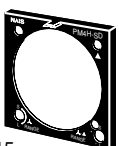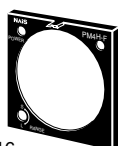
PM4H-A	PM4H-S	PM4H-M
ATC18011	ATC18012	ATC18013
PM4H-W	PM4H-SD	PM4H-F
ATC18014	ATC18015	ATC18016

• Set ring
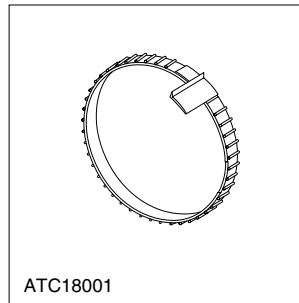
ATC18001

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)
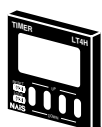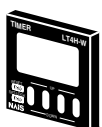
LT4H	LT4H-W
ATL58011	ATL68011

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.

INSTALLING DIN SIZE TIMER

Installations

1. Surface mount

1) For the timers of PM4H and LT4H series, use the pin type timer.
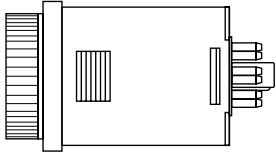
2) Put the terminal socket on the board directly or put it on the DIN rail (Fig. 1).

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. 1)   (Fig. 2)

Terminal socket

(Fig. 3)
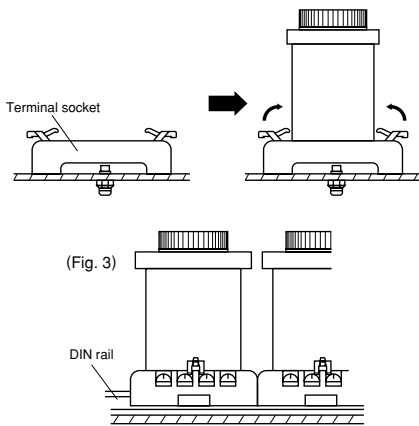
DIN rail

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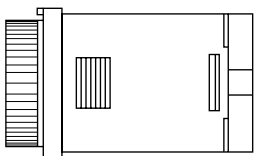
If the pin type is used, the mounting frame (AT8-DA4) and rubber gasket (ATC18002 for surface waterproofing) that are available at extra costs are necessary. If the pin connection socket is the 8-pin type, use the 8P cap (AD8-RC); or if it is the 11-pin type, use the 11P cap (AT8-DP11).

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

Panel cover

Mounting frame

Push in

Rubber gasket   Screw

• Pin type

Panel   Push in
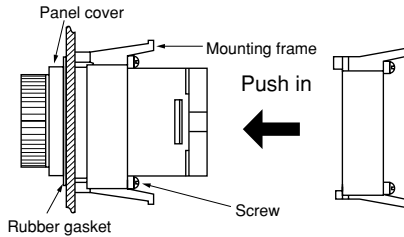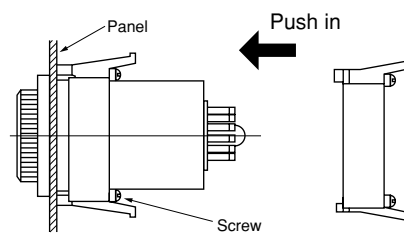
Screw

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.
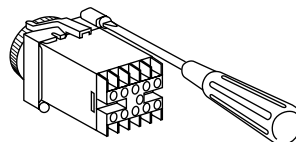
Pull the mounting frame backward while spreading out its hooks with your thumbs and index fingers.
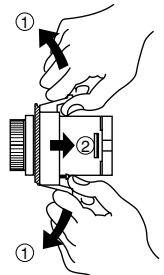
5) Correctly connect the pins while seeing the pin connection diagram.

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
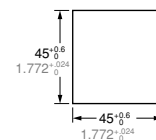
$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

The standard panel cutout dimensions are shown in the left figure. (Panel thickness: 1 to 5 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.

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$
80 mm
3.150 inch or more

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$
80 mm
3.150 inch or more

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

A
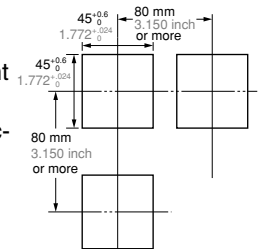
9) Adjacent mounting

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.
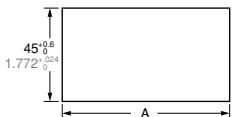
Formed spring

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

Formed spring

	COMPACT SIZE HIGH PRECISION TIMERS VARIOUS OUTPUT & OPERATION MODE TYPES	**S1DX**

Panasonic
ideas for life

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

FEATURES

3 operation modes added for fuller lineup
Now, operation modes include not only On Delay, but Flicker, One Shot, and One Cycle modes as well.

Operation can be checked easily
Power supply: Red
Operation: Green LED display

CE markings accommodated
EMC directive
(EN50081 - 2/EN50082 - 2)
Low-voltage directive
(VDE0435/Part 2021)

Easier than ever to read and use
Large-sized transparent dial makes setting time easy!

High precision
Repeatability error: 1%

Output contact relay construction
Available contact relay output types: 2C and 4C

Panels can be installed
In addition to conventional DIN rail installation, panels can be installed using an installation frame.
The compact timer size means that larger panels can be used.

Output terminal
A plug-in terminal and printed circuit terminal are provided.

PRODUCT TYPES

• Plug-in terminal
Power ON-delay
AC operating type

	Time range	24V AC	100 to 120V AC	200 to 220V AC	220 to 240V AC
		Part number	Part number	Part number	Part number
Time-out 2 Form C type	0.05 to 0.5 s	S1DX-A2C0.5S-AC24V	S1DX-A2C0.5S-AC120V	S1DX-A2C0.5S-AC220V	S1DX-A2C0.5S-AC240V
	0.1 to 1 s	S1DX-A2C1S-AC24V	S1DX-A2C1S-AC120V	S1DX-A2C1S-AC220V	S1DX-A2C1S-AC240V
	0.1 to 3 s	S1DX-A2C3S-AC24V	S1DX-A2C3S-AC120V	S1DX-A2C3S-AC220V	S1DX-A2C3S-AC240V
	0.2 to 5 s	S1DX-A2C5S-AC24V	S1DX-A2C5S-AC120V	S1DX-A2C5S-AC220V	S1DX-A2C5S-AC240V
	0.5 to 10 s	S1DX-A2C10S-AC24V	S1DX-A2C10S-AC120V	S1DX-A2C10S-AC220V	S1DX-A2C10S-AC240V
	1 to 30 s	S1DX-A2C30S-AC24V	S1DX-A2C30S-AC120V	S1DX-A2C30S-AC220V	S1DX-A2C30S-AC240V
	3 to 60 s	S1DX-A2C60S-AC24V	S1DX-A2C60S-AC120V	S1DX-A2C60S-AC220V	S1DX-A2C60S-AC240V
	0.1 to 3 min	S1DX-A2C3M-AC24V	S1DX-A2C3M-AC120V	S1DX-A2C3M-AC220V	S1DX-A2C3M-AC240V
	0.5 to 10 min	S1DX-A2C10M-AC24V	S1DX-A2C10M-AC120V	S1DX-A2C10M-AC220V	S1DX-A2C10M-AC240V
	1 to 30 min	S1DX-A2C30M-AC24V	S1DX-A2C30M-AC120V	S1DX-A2C30M-AC220V	S1DX-A2C30M-AC240V
	3 to 60 min	S1DX-A2C60M-AC24V	S1DX-A2C60M-AC120V	S1DX-A2C60M-AC220V	S1DX-A2C60M-AC240V
	0.1 to 3 h	S1DX-A2C3H-AC24V	S1DX-A2C3H-AC120V	S1DX-A2C3H-AC220V	S1DX-A2C3H-AC240V
Time-out 4 Form C type	0.05 to 0.5 s	S1DX-A4C0.5S-AC24V	S1DX-A4C0.5S-AC120V	S1DX-A4C0.5S-AC220V	S1DX-A4C0.5S-AC240V
	0.1 to 1 s	S1DX-A4C1S-AC24V	S1DX-A4C1S-AC120V	S1DX-A4C1S-AC220V	S1DX-A4C1S-AC240V
	0.1 to 3 s	S1DX-A4C3S-AC24V	S1DX-A4C3S-AC120V	S1DX-A4C3S-AC220V	S1DX-A4C3S-AC240V
	0.2 to 5 s	S1DX-A4C5S-AC24V	S1DX-A4C5S-AC120V	S1DX-A4C5S-AC220V	S1DX-A4C5S-AC240V
	0.5 to 10 s	S1DX-A4C10S-AC24V	S1DX-A4C10S-AC120V	S1DX-A4C10S-AC220V	S1DX-A4C10S-AC240V
	1 to 30 s	S1DX-A4C30S-AC24V	S1DX-A4C30S-AC120V	S1DX-A4C30S-AC220V	S1DX-A4C30S-AC240V
	3 to 60 s	S1DX-A4C60S-AC24V	S1DX-A4C60S-AC120V	S1DX-A4C60S-AC220V	S1DX-A4C60S-AC240V
	0.1 to 3 min	S1DX-A4C3M-AC24V	S1DX-A4C3M-AC120V	S1DX-A4C3M-AC220V	S1DX-A4C3M-AC240V
	0.5 to 10 min	S1DX-A4C10M-AC24V	S1DX-A4C10M-AC120V	S1DX-A4C10M-AC220V	S1DX-A4C10M-AC240V
	1 to 30 min	S1DX-A4C30M-AC24V	S1DX-A4C30M-AC120V	S1DX-A4C30M-AC220V	S1DX-A4C30M-AC240V
	3 to 60 min	S1DX-A4C60M-AC24V	S1DX-A4C60M-AC120V	S1DX-A4C60M-AC220V	S1DX-A4C60M-AC240V
	0.1 to 3 h	S1DX-A4C3H-AC24V	S1DX-A4C3H-AC120V	S1DX-A4C3H-AC220V	S1DX-A4C3H-AC240V

* Wire springs (ADX18005) are included.

DC operating type

	Time range	12V DC	24V DC
		Part number	Part number
Time-out 2 Form C type	0.05 to 0.5 s	S1DX-A2C0.5S-DC12V	S1DX-A2C0.5S-DC24V
	0.1 to 1 s	S1DX-A2C1S-DC12V	S1DX-A2C1S-DC24V
	0.1 to 3 s	S1DX-A2C3S-DC12V	S1DX-A2C3S-DC24V
	0.2 to 5 s	S1DX-A2C5S-DC12V	S1DX-A2C5S-DC24V
	0.5 to 10 s	S1DX-A2C10S-DC12V	S1DX-A2C10S-DC24V
	1 to 30 s	S1DX-A2C30S-DC12V	S1DX-A2C30S-DC24V
	3 to 60 s	S1DX-A2C60S-DC12V	S1DX-A2C60S-DC24V
	0.1 to 3 min	S1DX-A2C3M-DC12V	S1DX-A2C3M-DC24V
	0.5 to 10 min	S1DX-A2C10M-DC12V	S1DX-A2C10M-DC24V
	1 to 30 min	S1DX-A2C30M-DC12V	S1DX-A2C30M-DC24V
	3 to 60 min	S1DX-A2C60M-DC12V	S1DX-A2C60M-DC24V
	0.1 to 3 h	S1DX-A2C3H-DC12V	S1DX-A2C3H-DC24V
Time-out 4 Form C type	0.05 to 0.5 s	S1DX-A4C0.5S-DC12V	S1DX-A4C0.5S-DC24V
	0.1 to 1 s	S1DX-A4C1S-DC12V	S1DX-A4C1S-DC24V
	0.1 to 3 s	S1DX-A4C3S-DC12V	S1DX-A4C3S-DC24V
	0.2 to 5 s	S1DX-A4C5S-DC12V	S1DX-A4C5S-DC24V
	0.5 to 10 s	S1DX-A4C10S-DC12V	S1DX-A4C10S-DC24V
	1 to 30 s	S1DX-A4C30S-DC12V	S1DX-A4C30S-DC24V
	3 to 60 s	S1DX-A4C60S-DC12V	S1DX-A4C60S-DC24V
	0.1 to 3 min	S1DX-A4C3M-DC12V	S1DX-A4C3M-DC24V
	0.5 to 10 min	S1DX-A4C10M-DC12V	S1DX-A4C10M-DC24V
	1 to 30 min	S1DX-A4C30M-DC12V	S1DX-A4C30M-DC24V
	3 to 60 min	S1DX-A4C60M-DC12V	S1DX-A4C60M-DC24V
	0.1 to 3 h	S1DX-A4C3H-DC12V	S1DX-A4C3H-DC24V

* Wire springs (ADX18005) are included.

Please select power flicker, power one-shot or power one-cycle specifications based on the ordering information listed below.

ORDERING INFORMATION

Ex. S1DX- [C] [2C] [5S] — [AC120V]

Operation mode	Control output arrangement	Time range *		Operating voltage *
F: Power Flicker S: Power One-shot C: Power One-cycle	2C: Timed-out 2 Form C 4C: Timed-out 4 Form C	0.5S: 0.05 to 0.5 s 1S: 0.1 to 1 s 3S: 0.1 to 3 s 5S: 0.2 to 5 s 10S: 0.5 to 10 s 30S: 1 to 30 s	60S: 3 to 60 s 3M: 0.1 to 3 min 10M: 0.5 to 10 min 30M: 1 to 30 min 60M: 3 to 60 min 3H: 0.1 to 3 h	AC24V: 24V AC AC120V: 100 to 120V AC AC220V: 200 to 220V AC AC240V: 220 to 240V AC DC12V: 12V DC DC24V: 24V DC

*For other time range types and operating voltage types, please consult us.

• PC board terminal

Power ON-delay

	Time range	100 to 120V AC	200 to 220V AC	24V DC
		Part number	Part number	Part number
Time-out 2 Form C type	0.05 to 0.5 s	S1DX-A2C0.5S-AC120VP	S1DX-A2C0.5S-AC220VP	S1DX-A2C0.5S-DC24VP
	0.1 to 1 s	S1DX-A2C1S-AC120VP	S1DX-A2C1S-AC220VP	S1DX-A2C1S-DC24VP
	0.1 to 3 s	S1DX-A2C3S-AC120VP	S1DX-A2C3S-AC220VP	S1DX-A2C3S-DC24VP
	0.2 to 5 s	S1DX-A2C5S-AC120VP	S1DX-A2C5S-AC220VP	S1DX-A2C5S-DC24VP
	0.5 to 10 s	S1DX-A2C10S-AC120VP	S1DX-A2C10S-AC220VP	S1DX-A2C10S-DC24VP
	1 to 30 s	S1DX-A2C30S-AC120VP	S1DX-A2C30S-AC220VP	S1DX-A2C30S-DC24VP
	3 to 60 s	S1DX-A2C60S-AC120VP	S1DX-A2C60S-AC220VP	S1DX-A2C60S-DC24VP
Time-out 4 Form C type	0.05 to 0.5 s	S1DX-A4C0.5S-AC120VP	S1DX-A4C0.5S-AC220VP	S1DX-A4C0.5S-DC24VP
	0.1 to 1 s	S1DX-A4C1S-AC120VP	S1DX-A4C1S-AC220VP	S1DX-A4C1S-DC24VP
	0.1 to 3 s	S1DX-A4C3S-AC120VP	S1DX-A4C3S-AC220VP	S1DX-A4C3S-DC24VP
	0.2 to 5 s	S1DX-A4C5S-AC120VP	S1DX-A4C5S-AC220VP	S1DX-A4C5S-DC24VP
	0.5 to 10 s	S1DX-A4C10S-AC120VP	S1DX-A4C10S-AC220VP	S1DX-A4C10S-DC24VP
	1 to 30 s	S1DX-A4C30S-AC120VP	S1DX-A4C30S-AC220VP	S1DX-A4C30S-DC24VP
	60 s	S1DX-A4C60S-AC120VP	S1DX-A4C60S-AC220VP	S1DX-A4C60S-DC24VP

* Wire springs (ADX18005) are included.

S1DX

SPECIFICATIONS

Type		AC operating type	DC operating type
Rated operating voltage		24V, 100 to 120V, 200 to 220V, 220 to 240V	12V, 24V
Allowable operating voltage range		80 to 110% of rated operating voltage	
Rated frequency		50/60Hz common	—
Power supply ripple		—	Full-wave rectified (Approx. 48%)
Rated power consumption		Max. 3VA	Max. 2W
Rated control capacity		[Timed -out 2 Form C]: 7A 250V AC [Timed -out 4 Form C]: 5A 250V AC (resistive load)	
UL/CSA rating		[Timed -out 2 Form C]: 7A 125 AC, 6A 250V AC, 1/6HP 125, 250V AC, PILOT DUTY C300 [Timed -out 4 Form C]: 5A 250V AC, 1/10HP 125, 250V AC, PILOT DUTY C300	
Output arrangement		Timed-out 2 Form C, Timed-out 4 Form C	
Time accuracy (max.)	Operating time fluctuation & Power off time change error	[Except 0.5s & 1s types] ±1% [0.5s type]: ±(2%+10ms) [1s type]: ±(1%+10ms) (power off time change at the range of 0.1 s to 1 h)	
	Temperature error	±5% (at 20°C ambient temp. at the range of −10 to +50°C +14 to +122°F)	
	Voltage error	[Except 0.5s & 1s types] ±1% [0.5s type]: ±(2%+10ms) [1s type]: ±(1%+10ms) (at the operating voltage changes between −20 to +10%)	
	Setting error	±10% (Full-scale value)	
Min. power off time		100ms	
Contact resistance (Initial value)		Max. 100mΩ (at 1A, 6V DC)	
Life	Mechanical (constant)	10^7	
	Electrical (constant)	2×10^5 (at rated control capacity)	
Insulation resistance (Initial value)		Min. 100MΩ Between live and dead metal parts/input and output Between contact sets (At 500V DC) Between contacts	
Breakdown voltage (Initial value)		1500Vrms for 1min Between live and dead metal parts/input and output 1500Vrms for 1min Between contact sets 1000Vrms for 1min Between contacts	
Vibration resistance	Functional	10 to 55Hz: 1 cycle/min double amplitude of 0.5mm (10min on 3 axes)	
	Destructive	10 to 55Hz: 1 cycle/min double amplitude of 0.75mm (1h on 3 axes)	
Shock resistance	Functional	Min. 98m/s² (4 times on 3 axes)	
	Destructive	Min. 980m/s² (5 times on 3 axes)	
Max. temperature rise		70°C 158°F	
Ambient temperature		−10 to 50°C + 14 to 122°F	
Ambient humidity		Max. 85% RH	

*Power one-shot type of 1 s type: +(2% + 10 ms)

Dimensions

mm inch

• Plug-in terminal

Timed-out 2 Form C type   Timed-out 4 Form C type
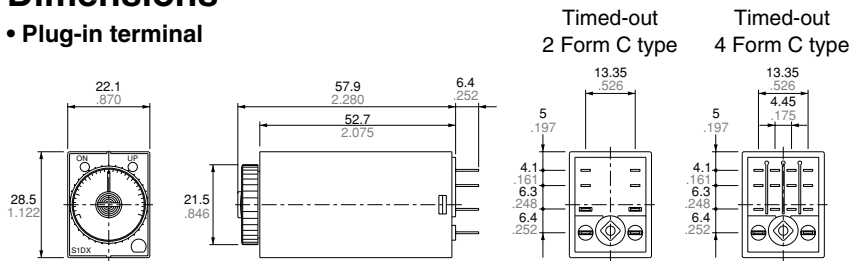
• Printed circuit board terminal

Timed-out 2 Form C type   Timed-out 4 Form C type

Terminal layouts and Wiring diagram

Timed-out 2 Form C type   Timed-out 4 Form C type
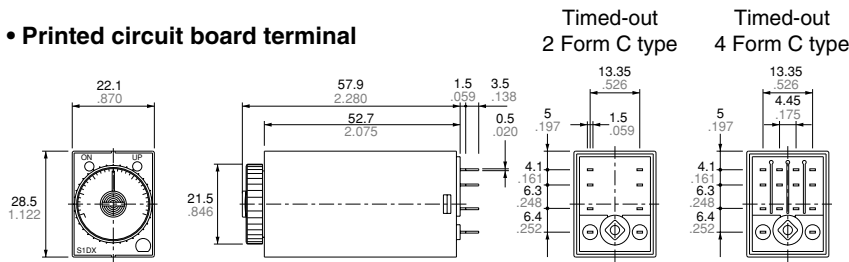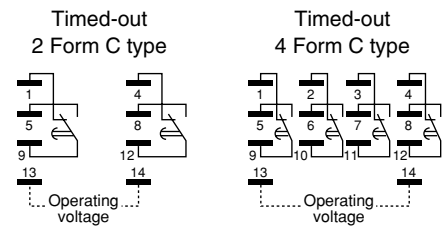
(For the DC operating type, terminal 14 is +, and terminal 13 is −.)

PC board pattern

Timed-out 2 Form C type   Timed-out 4 Form C type
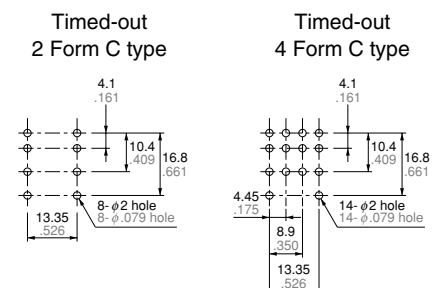
Data

1. Load control capacity and life

• Switching capacity
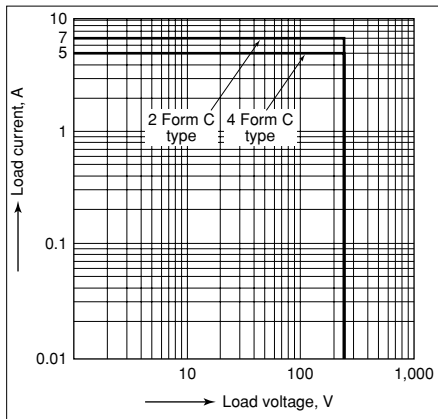
• Life curve
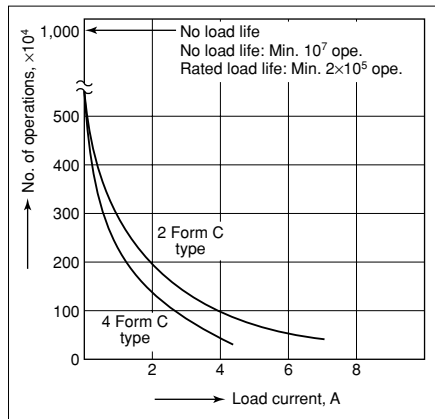
2. Time accuracy

• Voltage error test I
  3 s range, 120V AC operating type 6 pcs.
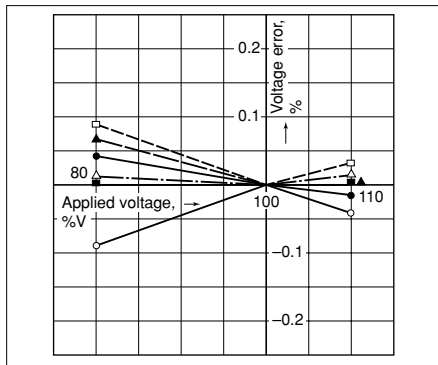
• Voltage error test II
  3 s range, 220V AC operating type 3 pcs.
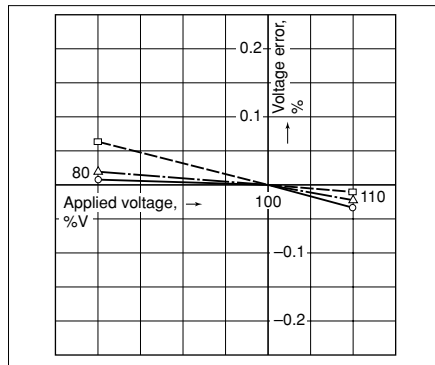
• Voltage error test III
  3 s range, 24V DC operating type 3 pcs.
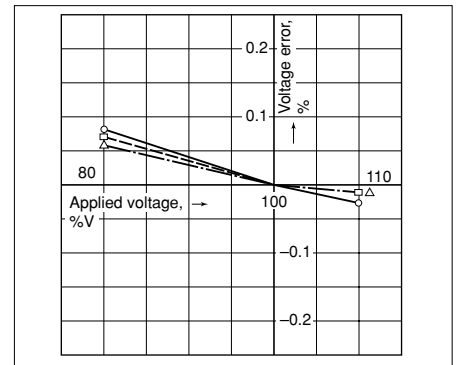
• Temperature error test I
  3 s range, 120V AC operating type 4 pcs.
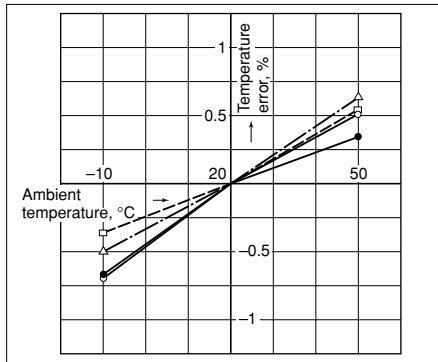
• Temperature error test II
  3 s range, 220V AC operating type 4 pcs.
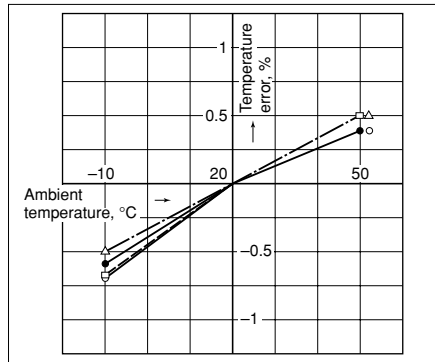
• Temperature error test III
  3 s range, 24V DC operating type 3 pcs.
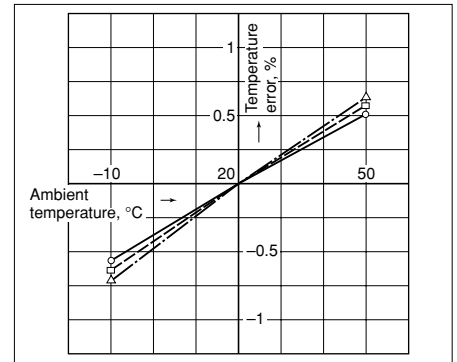
3. Environmental durability

• Surge testing

Model	100 to 120V AC	200 to 220V AC	12V DC	24V DC	48V DC	100 to 120V DC
Surge voltage	4,000V	4,000V	1,000V	1,000V	4,000V	4,000V

Applied voltage: Unipolar full-wave voltage of ± (1.2 x 50) μs
No. of times applied: 5 times, continuously
Locations at which voltage is applied:
Between power supply terminals (between 13 and 14)
Results: No differences from withstand surge voltages listed above.

• Noise testing

Item	Noise generation	Results
Power supply weight Noise	Noise simulator 1,000 V Rise: 1 ns Pulse width: 1 (s, 50 ns Repetition cycle: 10 ms Pulse polarity: Positive, negative Applied modes: Normal mode and Common mode	Not affected

• Cold and heat testing

Conditions	Results
Left for 1 hour at high temperature of 80°C 176°F and low temperature of −25°C −13°F (25 times)	Appearance Operation Insulation performance —No irregularities

• Humidity testing

Conditions	Results
Left for 500 hours at ambient temperature of 40 (C, at relative humidity of 90 to 95%.	Appearance Operation Insulation performance —No irregularities

S1DX

OPERATION MODE AND COLOR

Operation type	Description	Time chart	Operation mode indicator color
Power ON-delay	Timing operation will start when the power is supplied, and the control output turns on after the setting time.	Power supply — ON / OFF; Timed-out contact (NO) — ON / OFF; Timed-out contact (NC) — OFF / ON; T	Yellow
Power Flicker	When the power is supplied, the control output turns on after the setting time and then turns off after the setting time. This operation is repeated sequentially.	Power supply — ON / OFF; Timed-out contact (NO) — ON OFF ON OFF ON OFF; Timed-out contact (NC) — OFF OFF OFF; t < T	Blue
Power One-shot	When the power is supplied, control output turns on for the setting time.	Power supply — ON / OFF; Timed-out contact (NO) — ON T OFF; Timed-out contact (NC) — OFF ON	Green
Power One-cycle	When the power is supplied, the control output turns on for one pulse after the setting time.	Power supply — ON / OFF; Timed-out contact (NO) — T ON OFF; Timed-out contact (NC) — OFF ON; One pulse time: Approx. 1 s	Red

SCALE INTERVALS

Time type	Scale intervals
0.5	0.05 (0.02 in a range of 0.1 to 0.5)
1	0.05
3	0.1
5	0.2
10	0.5
30	1
60	2

Accessory

mm inch

• Mounting frame

Appearance

Panel cutout dimensions

25.1 / .988
30 / 1.181
31.5 / 1.240
3 / .118
33.5 / 1.319
27.1 / 1.067

25.2 $^{+0.2}_{0}$ / .992 $^{+.008}_{0}$ 5 / .197
31.6 $^{+0.2}_{0}$ / 1.244 $^{+.008}_{0}$
3 / .118
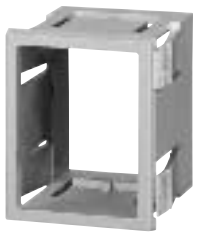
ADX18002 Titan Gray
ADX18006 Gray
ADX18007 Black

• Protective cover

10.5 / .413
28.2 / 1.110
34.6 / 1.362

ADX18008

• Socket

36 / 1.417
30.0 / 1.181
21.2 / .835
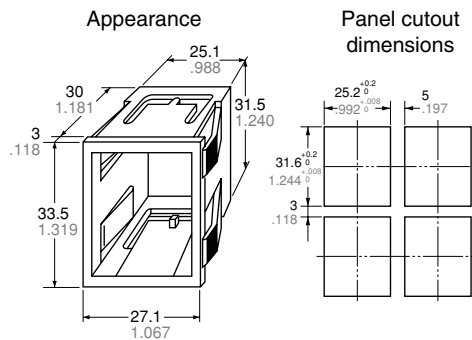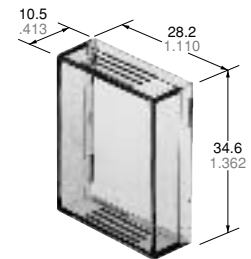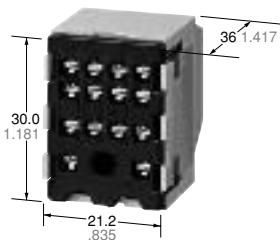
ADX18011

• Cap

ADX18004

• Socket

29.4 / 1.157
2 / .079
18.85 / .742
7.65 / .301
21.2 / .835
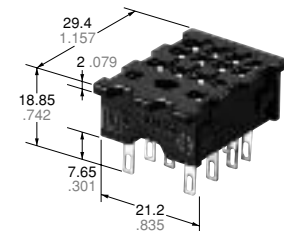
ADX18003

• APPLICABLE SOCKET LEAF HOLDING CLIP FOR S1DX

ADX18001			Applicable terminal socket
Part number	Dimensions	Installation overall height	
(2 pcs. per set)	4.5 / .177; 63.1 / 2.484	About 88 mm 3.465 inch	HC2-SFD-K HC4-SFD-K

Terminal socket

• HC2 slim DIN terminal socket • HC2 DIN high terminal socket • HC4 DIN high terminal socket • HC4 socket
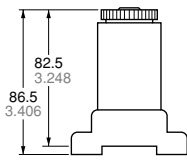
| HC2-SFD-S | HC2-SFD-K | HC4-SFD-K | HC4-SS-K |
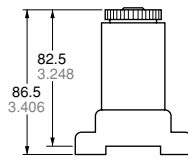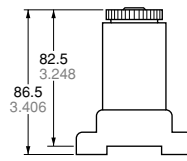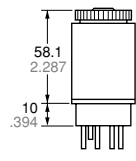
Precautions during usage

1. Terminal wiring
Make sure that terminals are wired carefully and correctly, referring to the terminal layout and wiring diagrams.

2. Assembly
1) A dedicated terminal base or socket should be used for attachment.
2) To assure that characteristics are maintained, do not remove the case.

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

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

Operation voltage	Surge voltage
100 to 120V AC 200 to 220V AC 220 to 240V AC	4,000V
24V AC 12V DC 24V DC	1,000V

• **Single-pole, full-wave voltage for surge waveform [$\pm(1.2 \times 50)$ µs]**
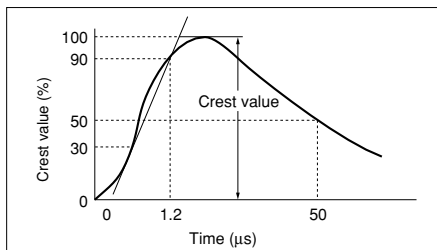
The typical surge absorption elements include a varistor, a capacitor, and a diode. If a surge absorption element is used, use an oscilloscope to see whether or not the foreign surge exceeding the specified value appears.

5. 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.

6. Soldering and cleaning
1) A flux-tight construction is not used with this timer, so be careful that flux does not get inside the case.
2) Terminals should be soldered by hand (at a soldering iron temperature of 300°C 572°F, for less than 3 seconds, using a 30 to 60 W soldering iron). Automatic soldering should be avoided.
3) Cleaning should be avoided as much as possible. If the timer has to be cleaned, make sure no cleaning fluid gets inside the main unit case.

7. Others
1) 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.
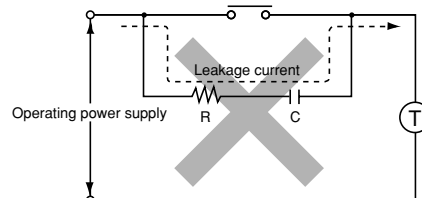
(Fig. A)
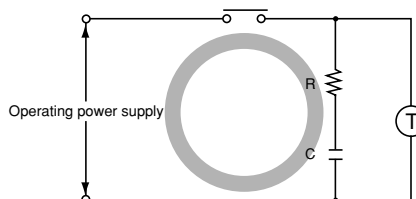
(Fig. B)

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
220 to 240V AC operating type:
 Min. 82kΩ
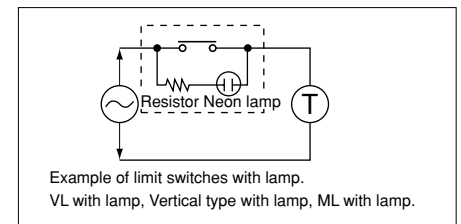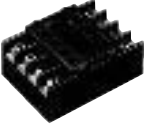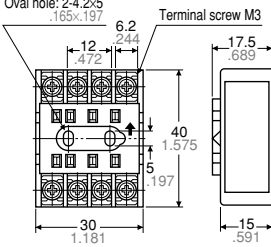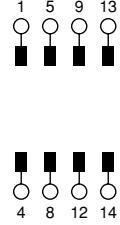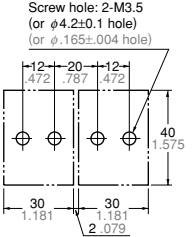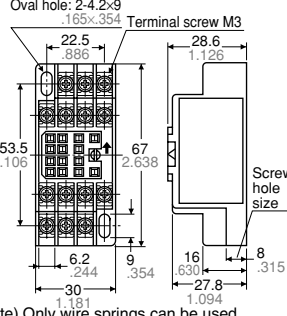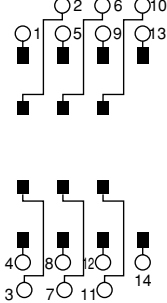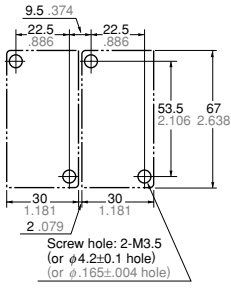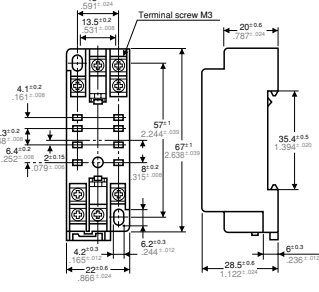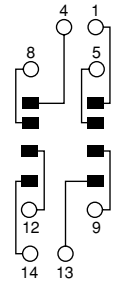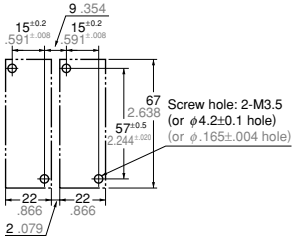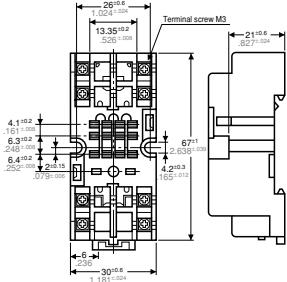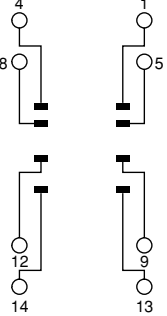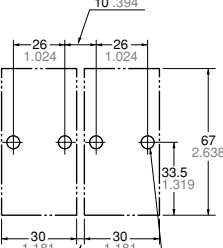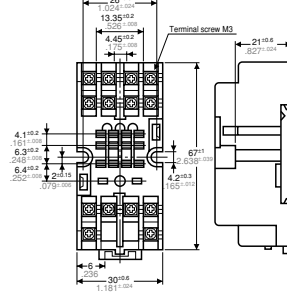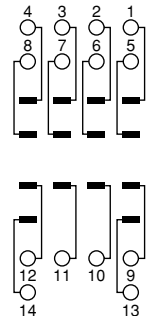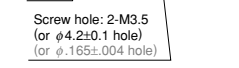
Example of limit switches with lamp.
VL with lamp, Vertical type with lamp, ML with lamp.

2) When setting the time, the dial should be kept within the range indicated on the dial face. The "0" marking on the dial indicatesf the minimum time during which the control time can be varied (it does not indicate 0 seconds).
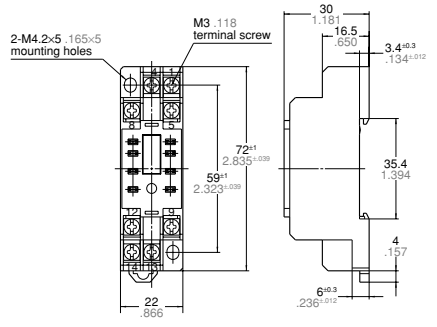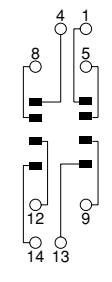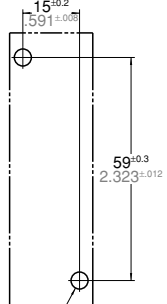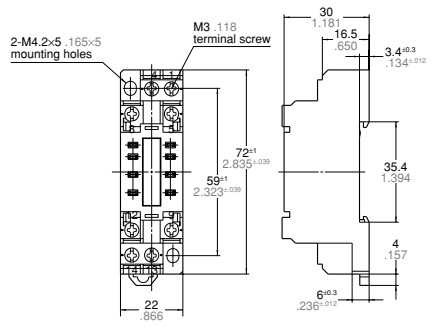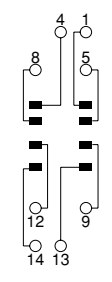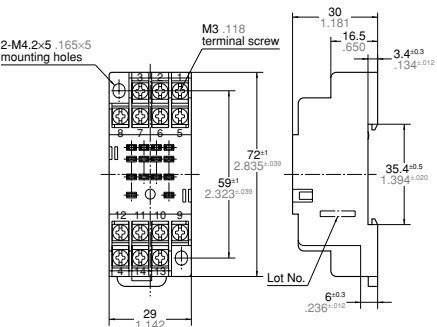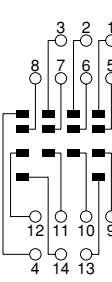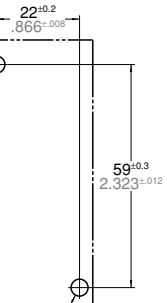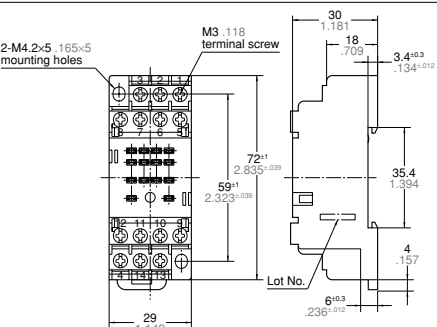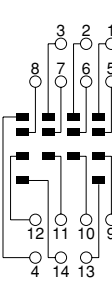
S1DX TIMER OPTIONS

TERMINAL SOCKETS
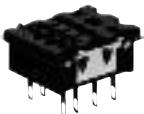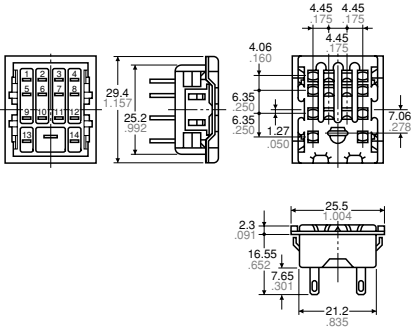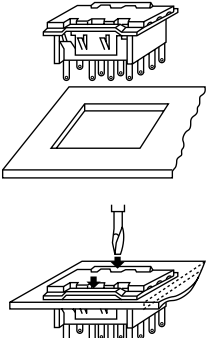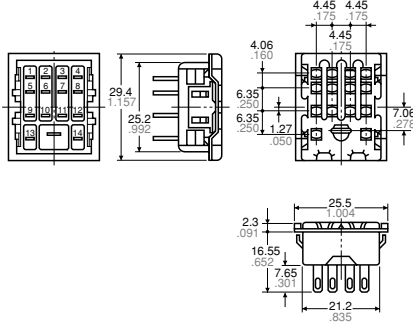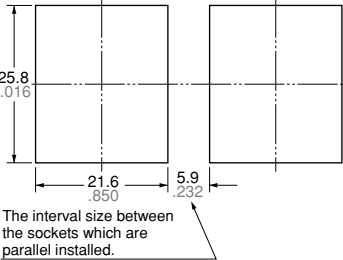
Name/Order No.	Dimensions	Terminal layout	Mounting hole dimensions	Applicable timers S1DX 2 Form C	S1DX4 4 Form C

	Name/Order No.	Dimensions	Terminal layout	Mounting hole dimensions	S1DX 2 Form C	S1DX4 4 Form C
For general rails	• Terminal socket, HC 2-pin HC2-SF-K	Oval hole: 2-4.2×5 .165×.197, Terminal screw M3, 6.2 .244, 12 .472, 17.5 .689, 40 1.575, 5 .197, 30 1.181, 15 .591 Note) Only wire springs can be used. (Plate springs cannot be used.)	1 5 9 13 / 4 8 12 14	Screw hole: 2-M3.5 (or φ4.2±0.1 hole) (or φ.165±.004 hole), 12 .472, 20 .787, 12 .472, 40 1.575, 30 1.181, 30 1.181, 2 .079 Drilling size of panel holes for installing the terminal sockets parallel	Available	Not available
	• High terminal socket, HC 1-, 2- and 4-pin HC4-HSF-K	Oval hole: 2-4.2×9 .165×.354, Terminal screw M3, 22.5 .886, 28.6 1.126, 53.5 2.106, 67 2.638, Screw hole size, 6.2 .244, 9 .354, 16 .630, 8 .315, 30 1.181, 27.8 1.094 Note) Only wire springs can be used. (Plate springs cannot be used.)	1 2 6 10 / 5 9 13 / 4 8 12 14 / 3 7 11	9.5 .374, 22.5 .886, 22.5 .886, 53.5 2.106, 67 2.638, 30 1.181, 30 1.181, 2 .079, Screw hole: 2-M3.5 (or φ4.2±0.1 hole) (or φ.165±.004 hole) Drilling size of panel holes for installing the terminal sockets parallel	Available	Available
For DIN rails	• Slim DIN terminal socket, HC2 HC2-SFD-S	15±0.6 .591, 13.5±0.2 .531, Terminal screw M3, 20±0.6 .787, 4.1±0.2 .161, 6.3±0.2 .248, 6.4±0.2 .252, 2±0.15 .079, 57±1 2.244, 67±1 2.638, 8±0.2 .315, 35.4±0.5 1.394, 4.2±0.3 .155, 6.2±0.3 .244, 22±0.6 .866, 28.5±0.6 1.122, 6±0.3 .236	4 1 / 8 5 / 12 9 / 14 13	9 .354, 15±0.2 .591, 15±0.2 .591, 67 2.638, 57±0.5 2.244, Screw hole: 2-M3.5 (or φ4.2±0.1 hole) (or φ.165±.004 hole), 22 .866, 22 .866, 2 .079	Available	Not available
	• DIN high terminal socket, HC2 HC2-SFD-K	26±0.6 1.024, 13.35±0.2 .526, Terminal screw M3, 21±0.6 .827, 4.1±0.2 .161, 6.3±0.2 .248, 6.4±0.2 .252, 2±0.15 .079, 67±1 2.638, 4.2±0.3 .165, 6±0.3 .236, 30±0.6 1.181	4 1 / 8 5 / 12 9 / 14 13	10 .394, 26 1.024, 26 1.024, 67 2.638, 33.5 1.319	Available	Not available
	• DIN high terminal socket, HC4 HC4-SFD-K	26±0.6 1.024, 13.35±0.2 .526, Terminal screw M3, 4.45±0.2 .175, 21±0.6 .827, 4.1±0.2 .161, 6.3±0.2 .248, 6.4±0.2 .252, 2±0.15 .079, 67±1 2.638, 4.2±0.3 .165, 6±0.3 .236, 30±0.6 1.181	4 3 2 1 / 8 7 6 5 / 12 11 10 9 / 14 13	30 1.181, 30 1.181, 4 .157, Screw hole: 2-M3.5 (or φ4.2±0.1 hole) (or φ.165±.004 hole) Drilling size of panel holes for installing the terminal sockets parallel	Available	Available

HJ RELAY TERMINAL SOCKETS

Name/Part No.	Dimensions	Terminal layout	Mounting hole dimensions	Applicable timers S1DX2 2 Form C	S1DX4 4 Form C
• HJ2 terminal socket HJ2-SFD				Available	Not available
• HJ2 terminal socket (Finger protect type) HJ2-SFD-S			2-M3 .118 or M4 .157 or 4.5 .177 dia. hole	Available	Not available
• HJ4 terminal socket HJ4-SFD				Available	Available
• HJ4 terminal socket (Finger protect type) HJ4-SFD-S			2-M3 .118 or M4 .157 or 4.5 .177 dia. hole	Available	Available

Sockets

Name/Order No.	Dimensions	Mounting hole dimensions	Applicable timers	
			S1DX 2 Form C	S1DX 4 Form C
• Socket, HC 2-pin 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. 4.45 .175 4.45 .175 4.45 .175 4.06 .160 29.4 1.157 25.2 .992 6.35 .250 6.35 .250 1.27 .050 7.06 .278 25.5 1.004 2.3 .091 16.55 .652 7.65 .301 21.2 .835	• The thickness of applicable chassis plates ranges from 1.0 to 2.0 mm. • 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.	Available	Not available
• Socket, HC 4-pin HC4-SS-K	General tolerance: ±0.5 4.45 .175 4.45 .175 4.45 .175 4.06 .160 29.4 1.157 25.2 .992 6.35 .250 6.35 .250 1.27 .050 7.06 .278 25.5 1.004 2.3 .091 16.55 .652 7.65 .301 21.2 .835	25.8 1.016 21.6 .850 5.9 .232 The interval size between the sockets which are parallel installed. 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

Applicable socket mounting tracks for S1DX

• **Item**

Mounting track for HC socket
AP3804
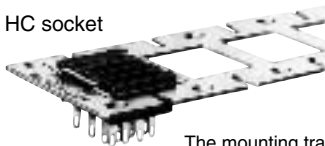
The mounting track is for ten sockets. When you install less than ten sockets on the track, cut away the section of the track where the socket are not installed.
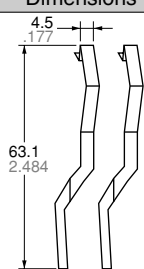
Features:
1. It is necessary to drill square holes in each socket.
2. Ten sockets with 1P, 2P, 3P or 4P can be installed on one mounting track.
3. The sockets can be installed by one person if they are installed on the big control panel.

• **Dimensions**

Oval hole: 22-4.2×6 .165×.236

Panel
Nut
Mounting track
Socket

Fastening plate
Spring washer
Screw M4

9 .354
1.5 .059
9 .354
1.6 .063 3 .118 9 .354 290 11.417
(10 sockets can be installed)

27.5 1.083 52 2.047 42 1.654
21.5 27.5 7.5 .295 55

(Unit: mm inch)

Applicable socket leaf holding clip for S1DX

ADX18001			Applicable terminal socket
Part number	Dimensions	Installation overall height	
(2 pcs. per set)	4.5 .177 63.1 2.484	About 88 mm 3.465 inch	HC2-SFD-K HC4-SFD-K

Panasonic
ideas for life

**DIN24 SIZE
MULTI-RANGE ANALOG TIMER**

**PM5S-A
PM5S-S
PM5S-M**

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

75.0
2.953

98.5
3.878

22.5
.886

mm inch
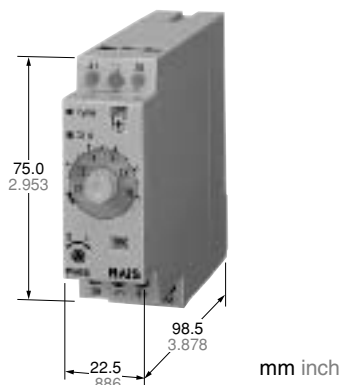
Features

- 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 • Pulse ON-delay • Pulse Flicker • Pulse ON-flicker • Signal OFF-delay • Pulse One-shot • Pulse One-cycle	Relay Timed-out 2 Form C				PM5S-A-24-240V
PM5S-S	Power ON-delay	Relay Timed-out 2 Form C	16 selectable ranges 1s to 500h	IP40	24 to 240V AC/DC	PM5S-S-24-240V
PM5S-M	6 operation modes (With instantaneous contact) • Pulse ON-delay • Pulse Flicker • Pulse ON-flicker • Signal OFF-delay • Pulse One-shot • Pulse One-cycle	Relay Timed-out 1 Form C Instantaneous 1 Form C				PM5S-M-24-240V

TIME RANGE

Scale	Time unit	sec	min	hrs	10h
1		0.1s to 1s	0.1 min to 1 min	0.1h to 1h	1.0h to 10h
5	Control time range	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.

CHARACTERISTICS

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)		
	Output rating		5A 250V AC (resistive load)		
	Operating mode		Pulse ON-delay Pulse Flicker Pulse ON-Flicker Signal OFF-delay Pulse One-shot Pulse One-cycle	Power ON-delay	Pulse ON-delay Pulse Flicker Pulse ON-flicker Signal OFF-delay Pulse One-shot Pulse One-cycle (with instantaneous contact)
	Time range		1s to 500h (Max.) 16 time ranges switchable		
Time accuracy Note:)	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 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)		$2×10^7$		$1×10^7$
	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.)		
	Insulation resistance (Initial value)		Min. 100MΩ	Between live and dead metal parts Between input and output Between contacts of different poles Between contacts of same pole	(At 500V DC)
	Breakdown voltage (Initial value)		2,000Vrms for 1 min Between live and dead metal parts 2,000Vrms for 1 min Between input and output 2,000Vrms for 1 min Between contacts of different poles 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		
	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.

WIRING DIAGRAMS

PM5S-A
• Timed-out 2 Form C
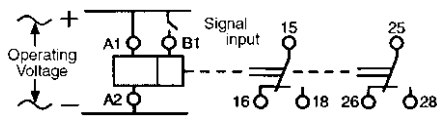
PM5S-S
• Timed-out 2 Form C

PM5S-M
• Timed-out 1 Form C
• Instantaneous 1 Form C
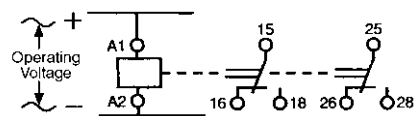
Contact
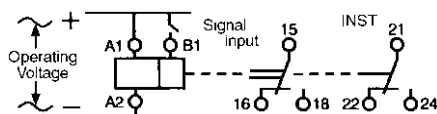
Timed-out contact   Instantaneous contact
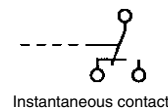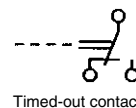
MODE SELECTION
PM5S-A/M type
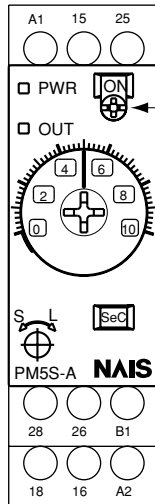
Operation mode indicator
Selectable from 8 operation modes
ON: ON-delay
FL: Flicker
FO: ON-flicker
SF: Signal OFF-delay
OS: Pulse One-shot
OC: Pulse One-cycle

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
PM5S-□

mm inch

NAIS
ATD1217
PM5S MULTIRANGE TIMER
PM5S-A-24-240V

75.0 / 2.953
22.5 / .886
9.0 / .354
48.0 / 1.890
9.0 / .354
5.0 / .197
14.2 / .559
41.3 / 1.626
98.5 / 3.878
3.5 / .138
20 / .787
37.5 / 1.476
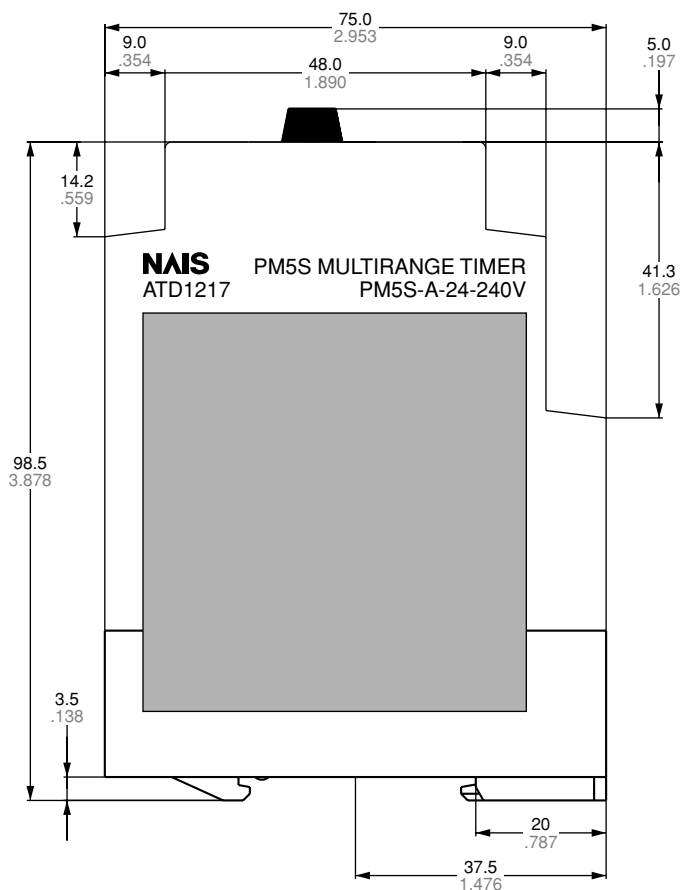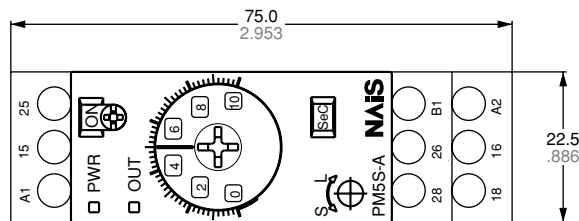
OPERATION MODE
PM5S-A/M

(✴ LED lighting ❄ LED flickering)
(T: Setting time t_1, $t_2 < T$)

Operation mode	Operation	Time chart
ON-delay ON	Turn the operation selector to ON. 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	Power supply / Signal A1-B1 / Relay output (NO contact) / OUT. LED / POWER LED
Flicker FL	Turn the operation selector to FL. 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.	Power supply / Signal A1-B1 / Relay output (NO contact) / OUT. LED / POWER LED
ON-flicker FO	Turn the operation selector to FO. 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.	Power supply / Signal A1-B1 / Relay output (NO contact) / OUT. LED / POWER LED
Signal OFF-delay SF	Turn the operation selector to SF. Timing operation starts when terminals A1 – B1 are opened while power is on. Control output is turned off after the set time. If the signal input turns OFF during timing operation, the timing operation starts at that point again.	Power supply / Signal A1-B1 / Relay output (NO contact) / OUT. LED / POWER LED
One-shot OS	Turn the operation selector to OS. Timing operation starts when terminals A1 – B1 are connected while power is ON. Control output continues ON state while timing operation.	Power supply / Signal A1-B1 / Relay output (NO contact) / OUT. LED / POWER LED

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

Operation mode	Operation	Time chart
One-cycle OC	Turn the operation selector to OC. Timing operation starts when terminals A1 – B1 are connected while power is ON. Control output is turned on after the set time, the pulse is 0.5 to 1.0 s.	Power supply Signal A1-B1 0.5-1.0S Relay output (NO contact) OUT. LED POWER LED

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

OPERATION MODE
PM5S-S

$\left(\begin{array}{l}\text{✹ LED lighting ☼ LED flickering}\\ \text{T: Setting time}\end{array}\right)$

Operation mode	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.	Power supply Time-out relay output (NO contact) OUT. LED POWER LED

MODES & TIME SETTING

1) Operation mode setting [PM4H-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 operation 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.)

Contact input

Operates with transistor ON

Operates with relay ON
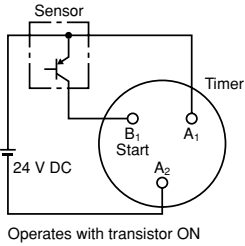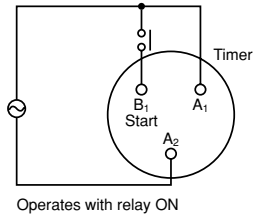
Voltage Input Signal Levels

No-contact input	1. Transistor ON Residual voltage: 1 V max. (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 Leakage current: 0.01 mA max. (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: When contacts are ON: 20.4 to 264 V AC/DC 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).
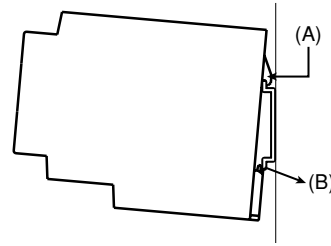
When dismounting the PM5S pull out portion (C) with a flat-blade screwdriver and remove the Timer from the mounting track.
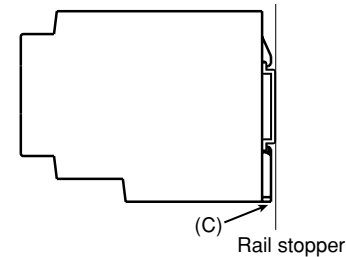
CAUTIONS FOR USE

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.

↑ Isolation tranformer is required.
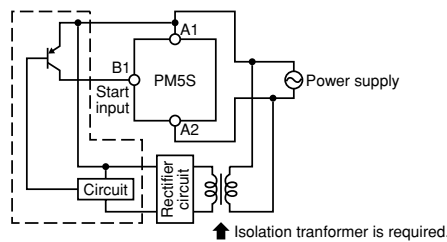
• Input and Power supply circuit (PM5-A/M)
• Since input circuit and power supply cir-

cuit 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.

Incorrect

Fig. A

Correct

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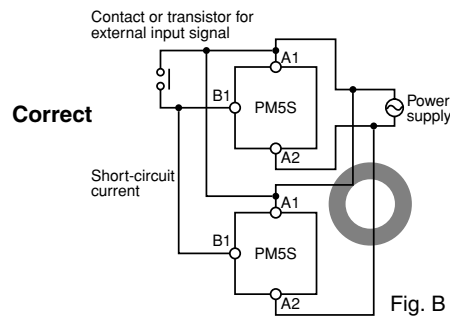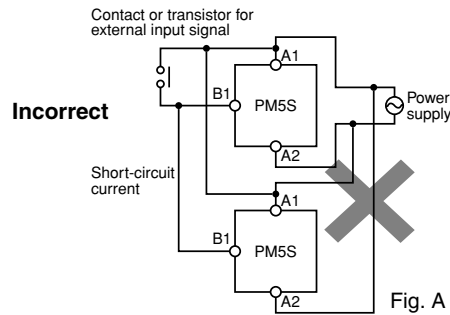
The PM5S series is provided with a transformer less power supply system.

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]
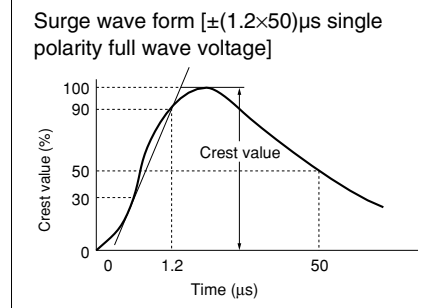
3. For connecting and disconnecting operating voltage to the timer, a circuit should be used to prevent the flow of leakage current. For example, a circuit for contact protection as shown in Fig. C will permit leakage current to flow through R and C, causing erroneous operation of the timer. Instead, the circuit shown in Fig. D should be used.
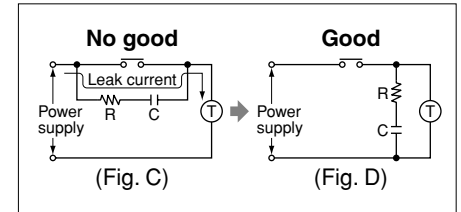
4. In order to maintain the characteristics of the timer, long continuous current flow through the timer, causing generation of heat internally should be avoided because of the degradation it can cause. For such long continuous operation, the circuit shown below should be used.

COUNTERS SELECTOR CHART
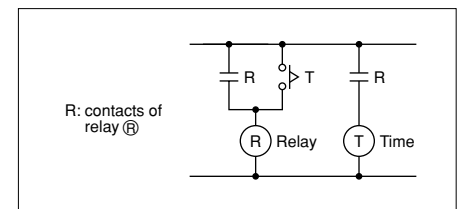
Contact output (1 Form C) — Contact output (1 Form A) — Open collector output

Classification	Electronic counters				
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
Appearance	CE Flush mounting type / PC board mounting type AEL3	CE AEL3	CE 4-digit display / 6-digit display	CE 4-digit display / 6-digit display	CE
Features	8.7 mm tall 8-digit display Bright 2-color back light	8.7 mm tall 8-digit display Preset function equipped in half size Display has backlight for instant recognition	Bright and easy-to-read display Simple operation Short body Conforms to IP66's weather resistant standards	Bright and easy-to-read display Simple operation Pre-scale function Built-in power supply for high-capacity sensor (100 to 240 V AC type) Conforms to IP66's weather resistant standards	Bright and easy-to-read display Simple operation Upper and lower limit settings are available. Conforms to IP66's weather resistant standards
Rated operating voltage	Flush mounting type: Unnecessary (Built-in battery) PC board mounting type: 3 V DC (Battery in externally installed)	24 V DC	100 to 240 V AC 24 V AC, 12 to 24 V DC	100 to 240 V AC	100 to 240 V AC 24 V AC 12 to 24 V DC
Number of digits (counter capacity)	8-digit [_____0] ~ [99999999]	8-digit [_____0] ~ [99999999]	4-digit [___0] ~ [9999] / 6-digit [_____0] ~ [999999]	4-digit [___0] ~ [9999] / 6-digit [_____0] ~ [99999]	6-digit [_____0] ~ [999999]
Counter/Indication	Zero-suppress function (LCD)	Zero-suppress function (LCD)	7-segment LCD Counter value (backlight red LED)	7-segment LCD Counter value (backlight red LED) Setting value (backlight yellow LED)	7-segment LCD Counter value (backlight red LED) Setting value (backlight yellow LED)
Counting speed	Flush mounting type: 2kHz/30Hz (Changeable by a switch) PC board mounting type: 2kHz/30Hz (Different type)	30Hz/5kHz switchable	30Hz/5kHz	30Hz/5kHz	30Hz/5kHz
Input	Counting (signal) input and reset input • Input by short-circuiting or opening contacts • Open collector input • Voltage input	Counting (signal) input and reset input • Input by short-circuiting or opening contacts • Open collector input	2-input (multi-mode) and reset input • Input by short-circuiting or opening contacts. • Open collector input	2-input (multi-mode) and reset input • Input by short-circuiting or opening contacts. • Open collector input	2-input (multi-mode) and reset input • Input by short-circuiting or opening contacts. • Open collector input
Reset (Reset input specifications conform to those of counting input)	• Front reset button and external reset input terminal • External reset dip terminal	• Manual reset with and external terminal and front reset key • Manual reset types inside one-short output models	• Manual reset with and external terminal and front reset key • Manual reset types inside one-short output models	• Manual reset with and external terminal and front reset key • Manual reset types inside one-short output models	• Manual reset with and external terminal and front reset key • Manual reset types inside one-short output models
Preset	—	• Counter number setting with key switches	• Operation mode setting with dip switches • Counter number setting with key switches	• Operation mode setting with dip switches • Counter number setting with key switches	• Output mode setting with dip switches • Counter number setting with key switches
Control output	—	(1 Form A / Open collector)	(1 Form A or Open collector)	(1 Form A or Open collector)	(1 Form A or Open collector)
Power supply output	—	—	—	External power supply 12 V DC	—
Options	Flush mounting type (No need for easy installation type) Mounting frame, rubber gasket	Mounting frame, rubber gasket	11 P plug-in (terminal block, socket) 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
Page	P. 72	P. 79	P. 86	P. 92	P. 100

TYPICAL COUNTER APPLICATIONS

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
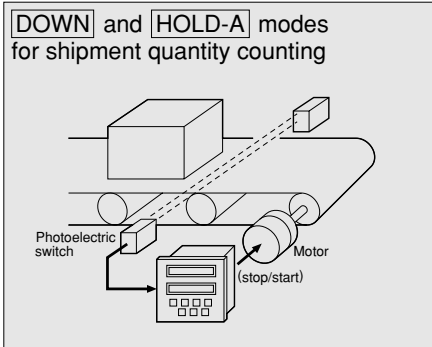
Shipment quantities are counted to control the conveyor line flow.

IND and HOLD-C modes
for parking lots
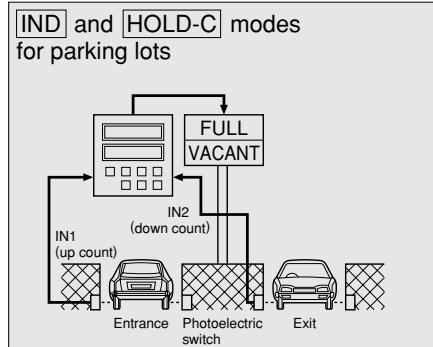
Incoming and outgoing cars are counted to switch the FULL and VACANT signs.

PHASE and HOLD-A modes
for valve control
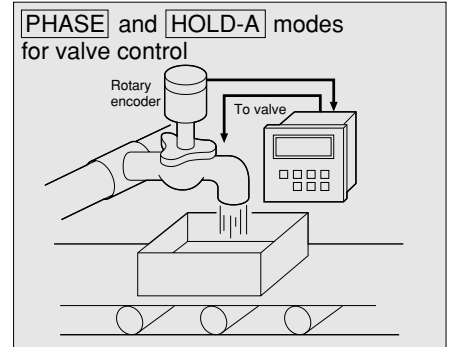
Rotary encoder signals are counted to control a valve aperture.

UP and SHOT-A modes
for packing a specified number of copies
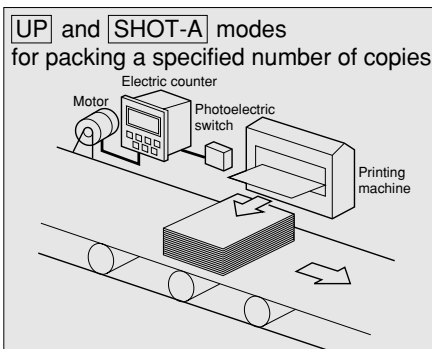
Printed matter is counted to package a specified number of copies.

UP and SHOT-B modes
for packing medicine tablets
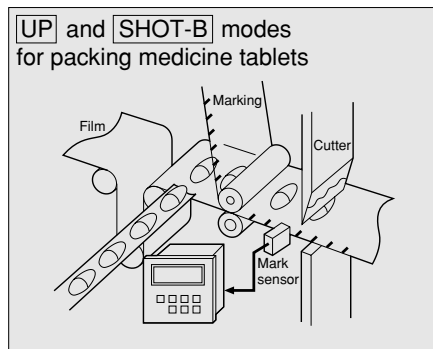
Medicine tablets are packed in specified quantities.

UP and SHOT-C modes
for counting acceptables
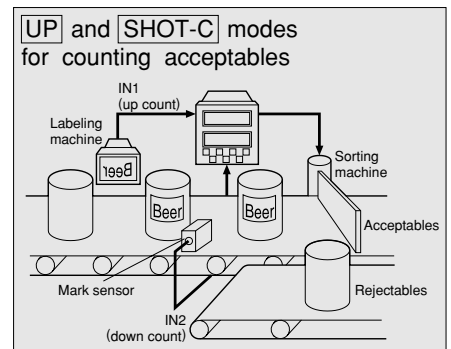
Labeled cans alone are counted up. Rejected cans are not counted.

UP and SHOT-D modes
for winding leader sheet
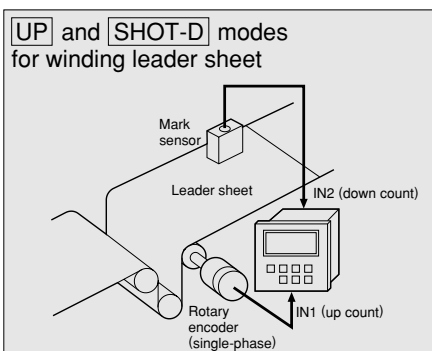
Extra leader sheet that is now wound is counted by a rotary encoder and a color detecting sensor.

DIR input mode
for controlling part stocks
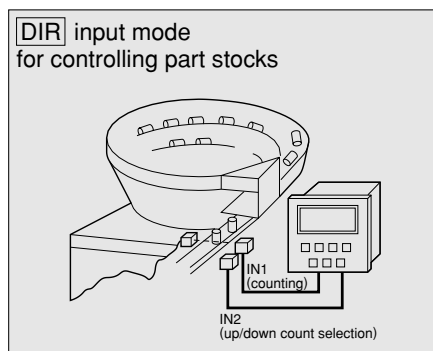
Incoming and outgoing parts are counted to keep parts feeders well-stocked.

PHASE input mode for sizing
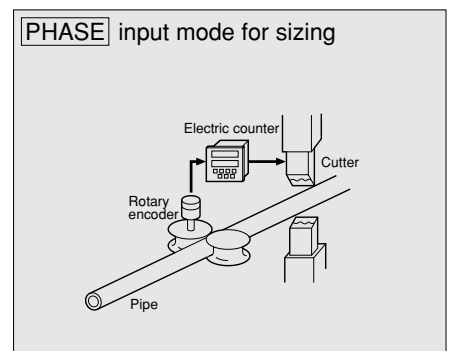
Teamed up with a rotary encoder, the counter is used to control the cutting length of pipes.

TECHNICAL COUNTER TERMS

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 Operational 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. Mis-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 second.

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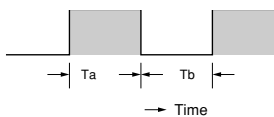
6. Maximum Counting Speed
Suppose that the counter is operated with an input pulse of a make ratio of 1. The highest counting speed is the peak of a range in which the output circuit can send signals without mis-counting. The speed is expressed in units of Hz (cps: counts per second).

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 power 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 power 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 $\pm(1.2 \times 50)$ μs) acrosss the control power terminals.
Surge waveform
[Single-pole full-wave voltage for $\pm(1.2 \times 50)$ μs]
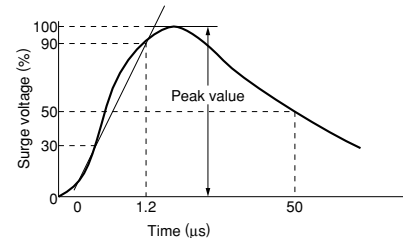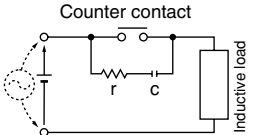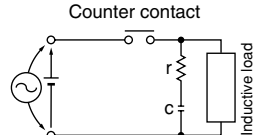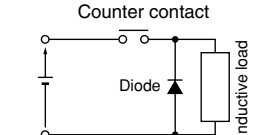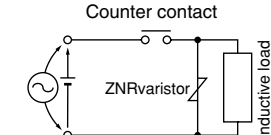
3. Noise Immunity
This is the strength against external noise. Relay noise tests, noise simulator tests, etc. are conducted.

GENERAL APPLICATION GUIDELINES

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 r c Inductive load	Counter contact r c Inductive load	Counter contact Diode Inductive load	Counter contact ZNRvaristor Inductive load
Application	AC	△ Note:	○	×	○
	DC	○	○	○	○
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. 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.
		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,
		    c: 0.5 to 1 *F per 1 A contact current
		    r: 0.5 to 1 * per 1 V contact voltage
		Values vary depending on the properties of the load and variations in counter 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 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

The LC4H series use power supply without a transformer. 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
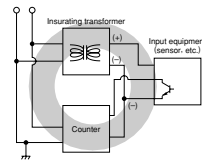
(Fig. B) No good
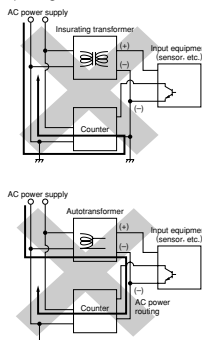
Do not use an auto-transformer (e.g., Sly-Duck). Otherwise, the internal circuit of the counter will be short-circuited as shown in Fig. B resulting in breakdown.

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.

R   C   R   R

Ⓡ Relay   Ⓒ Counter   Receive output from contact at relay R
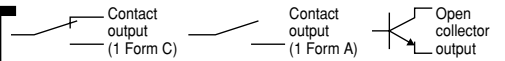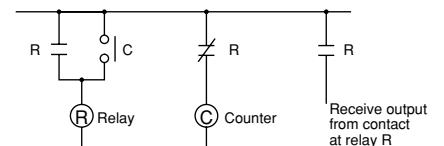
5. Leakage current

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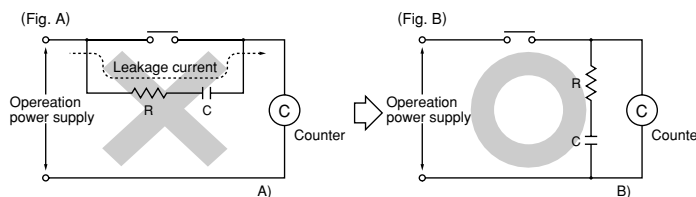
2) If the counter is directly switched with a non-contact element, leak current may flow into the counter and cause it to malfunction.

CAUTIONS FOR USE (common for all models)

1. Pin connections
Correctly connect the pins while seeing the pin layout/connection 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) Apply the entire supply voltage through a switch, relay or other contact.
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%

3) Make sure that no induced voltage and residual voltage are applied between the power pins 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 (±1.2 × 50μs or ±1 × 40μs) 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 [±(1.2 × 50) μs]**
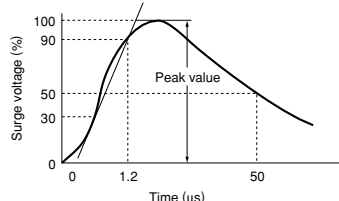
If external surge occurs exceeding the specified value, the internal circuit may break down. In this case, use a surge absorption element. The typical surge absorption elements include a varistor, a capacitor, and a diode. If a surge absorption element is used, use an oscilloscope to see whether or not 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 (a) inflammable or corrosive gas is generated, (b) the counter is exposed to much dust and other foreign matter; (c) water or oil is splashed on the counter; or (d) 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.
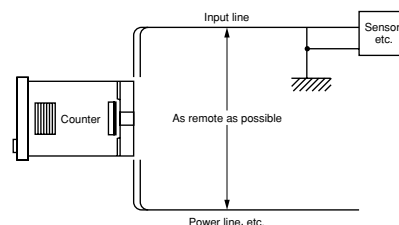
8. Checking the actual load
In order to increase the reliability in the actual use, check the quality of the counter in the actual usage.

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.

10. Conformance to CE marking standard

1) EMC directive (89/336/EEC)
The models with CE marking conform to the EMC directive as counters alone.
Applicable standards: EN50081-2 and EN50082-2

2) Low-voltage directive (73/23/EEC)
• LC2H series
To satisfy EN61010-1 requirements, use the counters under the following conditions.
Ambient conditions: Overvoltage category III, contamination factor 2, indoor use.
Ambient temperature and humidity –10 and +55°C and 35-85%RH respectively.
• LC4H series
To satisfy VDE0435/Part2021 requirements, follow the setup conditions and precautions below.

1) The counter does not have a power transformer. This means that there is no insulation between the power terminal and the input signal terminal.
(1) When connecting to a sensor input circuit, provide double insulation on the sensor side.
(2) For a contact input, use a double-insulated relay or the like.

2) This counter is single-insulated. Accordingly, select a single-insulated load that is to be connected to the output contact. This combination meets the VDE-specified double-insulation requirement.

3) Make sure the power supply is equipped with an overcurrent protector (250V, 1A fuse, for example) that conforms to EN/IEC standards.

4) Be sure to employ a terminal block or socket. While power is on, do not touch the counter's terminals or any other parts. Before connecting and disconnecting, make sure no voltage is applied to any of the terminals.

5) Do not hook up the counter directly to a safety circuit. When the counter is connected to a heater circuit, for example, provide a protective circuit on the machine side.

Panasonic
ideas for life

| DIN HALF SIZE LCD COUNTER | LC2H |

$_c$ **Ru** $_{us}$ $C\,\epsilon$

Features

1. 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.

8.7mm
.343inch

2. Plenty of Digits

←— 8 digits —→

3. Counting Speed Switchable between 2 kHz and 30 Hz
4. Panel Mounting Type Features 2 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.

5. Battery Replacement Easy on Environment
To replace battery simply remove body for the one-touch installation type, and remove battery lid for the installation frame type.
6. Screw Terminals Designed for Safety
Built in finger protection.
7. Panel Covers Replacable (Standard color is ash gray.)
Change the panel design by replacing with a black panel cover.
8. Conforms to IP66 Protective Construction (Only installation frame type.) (Front panel surface)
9. Input Methods
1) Non-voltage input method
2) Voltage input method
3) Free voltage input method
10. Backlight Type Added to Series and Now 2-color Switchable (green/red)
Easy viewing even in dark places and switchable between green and red (Voltage input type).
11. Conforms to Safety Regulations

Panel mounting type
One-touch installation type

Panel mounting type
Installation frame type

PC board mounting type

PRODUCT CHART

Type / Installation 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	○	○	○	○
Panel mounting 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

Type / Item		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 Low level: 0 to 2 V DC	High level: 24 to 240 V AC/DC Low level: 0 to 2.4 V AC/DC
	Input impedance	When shorted: Max. 10 kΩ When open: 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 Low level: 0 to 2 V DC	Non-voltage input using contacts or open collector connection
	Input impedance	When shorted: Max. 10 kΩ When open: Max. 750 kΩ	Appox. 4.7 kΩ	When shorted: Max. 10 kΩ When open: Max. 750 kΩ
	Residual voltage	Max 0.5 V	—	Max. 0.5 V
Display method		7-segment LCD	7-segment LCD With green/red backlight	7-segment LCD
Breakdown voltage (initial)		Between charged and uncharged parts: 1,000 V AC for 1 minute.		Between charged and uncharged parts: 2,000 V AC for 1 minute.
Insulation resistance (initial)		Min. 100 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
Count input — Input method	Non-voltage input using contacts or open collector connection	
Count input — Input impedance	When shorted: Max. 10 kΩ / When open: Max. 750 kΩ	
Count input — Residual voltage	Max. 0.5 V	
Reset input — Min. input signal width	10 ms	
Reset input — Input method	Non-voltage input using contacts or open collector connection	
Reset input — Input impedance	When shorted: Max. 10 kΩ / When open: Max. 750 kΩ	
Reset input — 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

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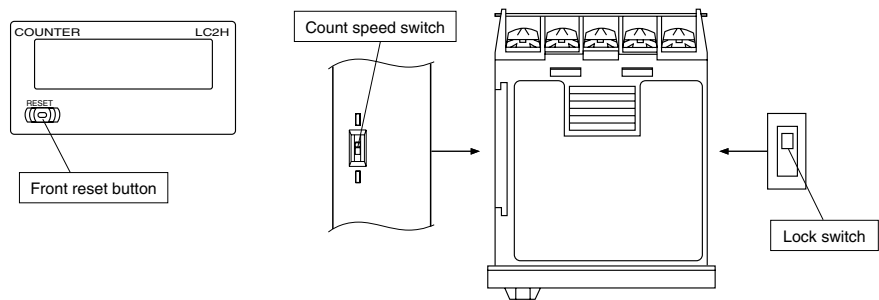
	Non-voltage input/voltage input	Free voltage input
Lock switch (Unit display 1)	(Terminal block side) ↕ (LCD side)	OFF✽ ↕ ON
Count speed switch (Unit display 2)	(Terminal block side) ↕ (LCD side) — 2k Hz ↕ 30Hz✽	— (Fixed at 30 Hz)

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

44.8
1.764

54.4
2.142

10.4 .409 (44) (1.732) 5 .197

48 1.890

22 .866

COUNTER　　　　LC2H

24 .945

RESET

7 .276

Reset button

2) Installation frame type

44.8
1.764

54.4
2.142

10.4 .409　44 1.732　5 .197

48 1.890

22 .866

COUNTER　　　　LC2H

24 .945

RESET

7 .276

Reset button

• Panel installation diagram

Panel (1 to 4.5mm
.039 to .177inch
thickness)
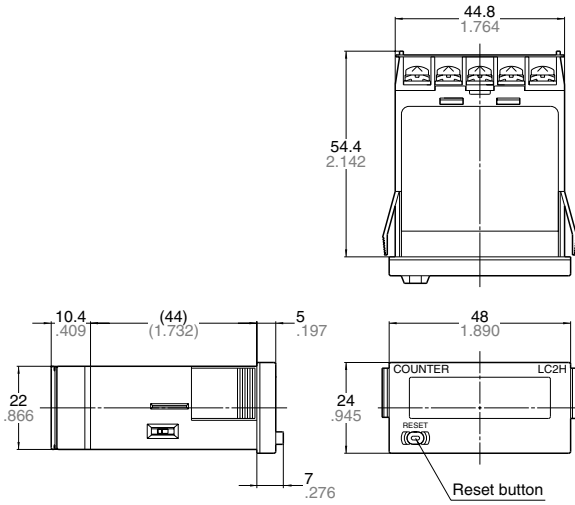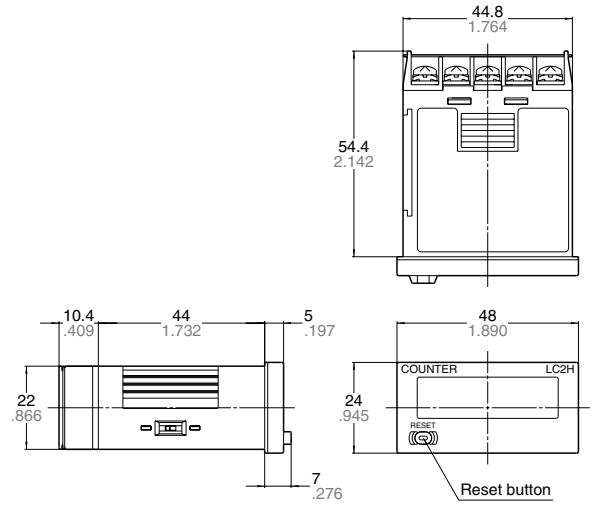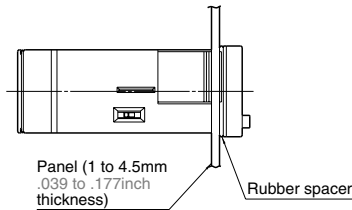
Rubber spacer

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

• Panel installation diagram

Installation screws
(found on mounting bracket)

Mounting bracket
ATH3803 (included)

37
1.457

Panel
(1 to 4.5mm .039 to .177inch thickness)

Rubber gasket
ATH3804 (included)

• Panel cut-out dimensions

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

60 min.
2.362 min.

$45^{+0.5}_{0}$
$1.772^{+.020}_{0}$

$22.2^{+0.5}_{0}$
$.874^{+.020}_{0}$

• When installing repeatedly (sealed installation)
(Only mounting bracket installation type.)

$22.2^{+0.5}_{0}$
$.874^{+.020}_{0}$

A

$A=(48×n-2.5)^{+1.0}_{0}$
$A=(1.890×n-.098)^{+.039}_{0}$

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).
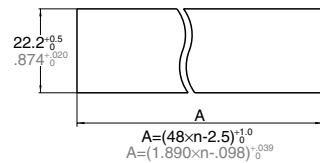
• Terminal layout and wiring diagrams
1) Standard type

Non voltage input type	Voltage input type	Free voltage input type
Count input　　　　Reset input	Count input　　　　Reset input +V　　　　+V	Count input　　　　Reset input
① ② 　③ ④	① ② 　③ ④ 0V　　　　0V	~ or 　① ② 　③ ④
①-④ are connected internally.		

LC2H

2) Backlight type

Voltage input type

2. PC board mounting type

General tolerance: ±1.0 ±.039 mm inch

• External dimensions
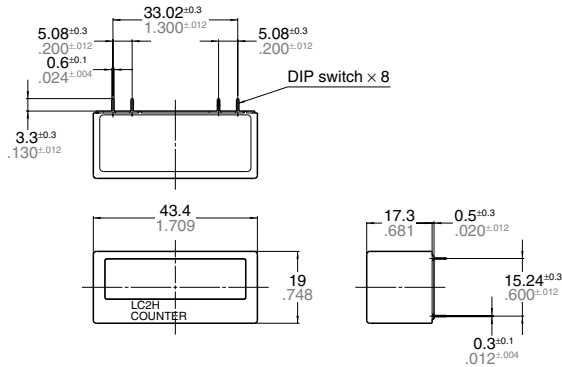
PC board pattern (BOTTOM VIEW)

• Terminal layout and wiring diagrams

①-③, ⑫-⑭, ⑮-⑰ and ㉖-㉘ are connected internally.

INPUT METHOD

1. Standard type

Non-voltage input type					
Panel mounting type			PC board mounting type		
Contact input	Transistor input		Contact input	Transistor input	
	NPN transistor			NPN transistor	
(② and ④ are connected internally.)	(② and ④ are connected internally.)				

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.
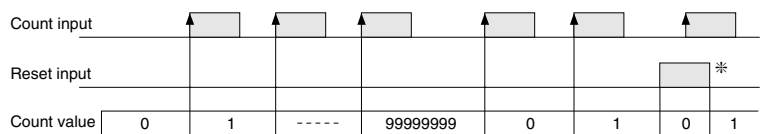
Note) ＊Count becomes "1" when the reset input is turned OFF while the count signal is being input.

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. 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.

Panasonic
ideas for life

**PRESET
COUNTER**

LC2H
Counters

c(UL)us   CE

FEATURES

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

Counting		Counting up
		Red or (Green)
(backlight)

Green or (Red)
(backlight)

(Lit or Flashing)

Green or Red can
be selected at setup.

Red or (Green)
(backlight)

(Lit or Flashing)

Lit or Flashing can
be selected at setup.

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

12345678 8.7mm
.343inch
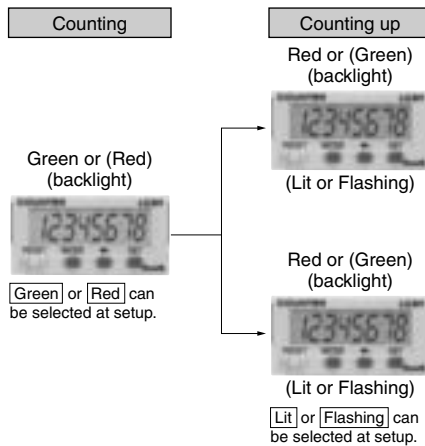
4. Plenty of Digits

12345678
|← 8 digits →|

**5. Counting Speed Switchable between
30 Hz and 5 kHz**
**6. Conforms to IP66 Protective
Construction (Front panel surface)**
Weatherproofing supported by using
optional mounting frame and rubber
gasket
**7. Includes reassuring lock mode and
lock switch to prevent erroneous
operation.**
**8. Screw terminals are constructed to
protect fingers to ensure safety.**
9. Complies with CE marking.

PRODUCT TYPES

No. digits	Counting speed	Output mode	Output	Operating voltage	Part No.
8 digits	30 Hz/5 kHz switchable	• Maintain output/hold count • Maintain output/over count • One shot/over count • 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, 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 • Input impedance; when shorted: Max. 1 kΩ, when open: Min. 100 kΩ • Residual voltage: Max. 2 V
	Output mode	• Maintain output/hold count • Maintain output/over count • One shot/over count • One shot/recount (Selectable by front switch)
	Display method	7-segment LCD (Switch between red and green for backlight, and between lit and flashing for count up.)
	Digit	−9999999 to 99999999 (−7 digits to +8 digits) (0 to 99999999 for preset value)
	Memory	EEP-ROM (Overwriting times: 1.0×10^5 operations or more)
Contact arrangement		1 Form A (Open collector)
Electrical life (contact)		1.0×10^7 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 0.006 inch (10 min. on 3 axes)
	Destructive vibration resistance	10 to 55 Hz (1 cycle/min), Single amplitude: 0.375 mm 0.015 inch (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)

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.
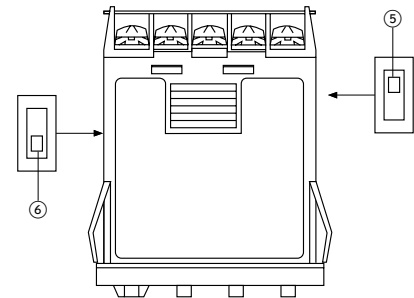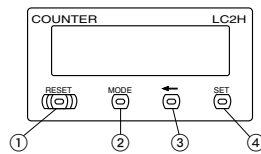
�: Default setting when shipped.

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

• **External dimensions**

44.8
1.764

54.4
2.142

10.4
.409

44
1.732

5
.197

48
1.890

22
.866

24
.945

7
.276

COUNTER   LC2H

RESET   MODE   SET

• **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)

60 min.
2.362 min.

$45^{+0.5}_{0}$
$1.772^{+.020}_{0}$

$22.2^{+0.5}_{0}$
$.874^{+.020}_{0}$

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

$22.2^{+0.5}_{0}$
$.874^{+.020}_{0}$

A

$A=(48 \times n-2.5)^{+1.0}_{0}$
$A=(1.890 \times n-.098)^{+.039}_{0}$

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.

MODE
Press the MODE key.

←
Set the digit.

SET
Set the value.

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

`0000 1000`
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.

MODE + SET ·········► ←
Press the SET key while pressing the MODE key.   Un-Lock ←→ Lock

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).

`Un-Lock`
Display after entering lock mode
(Example showing "Un-Lock".)

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

`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.
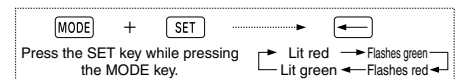
MODE + SET ·········► ←
Press the SET key while pressing the MODE key.   ┌─ Lit red ──► Flashes green ─┐
└─ Lit green ◄── Flashes red ◄─┘

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"

`LEd`
Display after entering the backlight setting mode.

3) The LED backlight will be red (initial setting).
23/
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.

MODE + SET ┈┈┈┈→ ←
Press the SET key while pressing   Addition ←→ Subtraction
the MODE key.

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).

| UP | 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".

| dn | (Example showing "dn") |
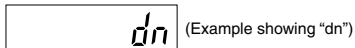
4) Pressing the front panel reset key sets the content displayed and returns you to regular operation mode.
Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

5. Output setting mode
This sets the operation mode.

MODE + SET ┈┈┈┈→ ←
Press the SET key while pressing   → HOLD-A → HOLD-B ┐
the MODE key.   └ SHOT-B ← SHOT-A ◄
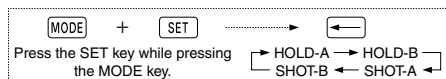
1) Pressing the SET key four times while holding down the MODE key takes you to the output setting mode.
2) The display reads "HoLd-A" (initial setting) after entering the output setting mode.
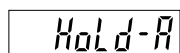
| HoLd-A |

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

| HoLd-b |
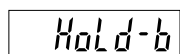
SHOT-A (One shot/over count)

| Shot-A |

SHOT-B (One shot/recount I)

| Shot-b |
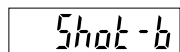
HOLD-A (Output maintain/hold count)
4) Pressing the front panel reset key sets the display content and returns you to regular operation mode.
Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

2) Lock mode
MODE + SET ┈┈┈┈→ ←
Press the SET key while pressing   Un-Lock ←→ Lock
the MODE key.
When the lock is set, you cannot enter modes other than backlight setting mode.

3) Backlight setting mode
MODE + SET ┈┈┈┈→ ←
Press the SET key while pressing   → Lit red → Flashes green ┐
the MODE key.   └ Lit green ← Flashes red ◄

4) Input setting mode
MODE + SET ┈┈┈┈→ ←
Press the SET key while pressing   Addition ←→ Subtraction
the MODE key.

5) Output setting mode
MODE + SET ┈┈┈┈→ ←
Press the SET key while pressing   → HOLD-A → HOLD-B ┐
the MODE key.   └ SHOT-B ← SHOT-A ◄

Front panel reset key

Regular operation mode

Mode changes as follows by pressing the SET key while holding down the MODE key.
→ Lock mode → Backlight setting mode ┐
└ Output setting mode ← Input setting mode ◄

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 " ▫ ▫ ▫ ▫ ▫ ▫ ▫ ".

OPERATION MODE

Output mode	Operation	Example when input mode is either addition or Subject:ubtraction
Output maintain/ 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.	Output: OFF / ON Counting able/unable: Able / Unable Addition: 0, 1, 2, 3, 4, ·· , n–1, n Subtraction: n, n–1, n–2, n–3, n–4, ·· , 1, 0 n: Preset value
Output maintain/ 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.	Output: OFF / ON Counting able/unable: Able Addition: 0, 1, 2, 3, ·· , n–2, n–1, n, n+1, n+2, n+3 Subtraction: n, n–1, n–2, n–3, ·· , 2, 1, 0, –1, –2, –3 n: Preset 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.	One shot pulse width: approx. 1 sec. Output: OFF / ON Counting able/unable: Able Addition: 0, 1, 2, 3, ·· , n–2, n–1, n, n+1, n+2, n+3 Subtraction: n, n–1, n–2, n–3, ·· , 2, 1, 0, –1, –2, –3 n: Preset 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.	One shot pulse width: approx. 1 sec. Output: OFF / ON Counting able/unable: Able Addition: 0, 1, 2, 3, ·· , n–1, 0, 1, 2, 3, 4 Subtraction: n, n–1, n–2, n–3, ·· , 1, n, n–1, n–2, n–3, n–4 n: Preset value

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.
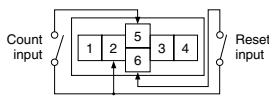
(2) Non-contact input (Transistor input)

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

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 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.
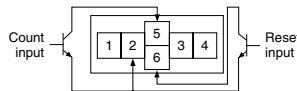
(3) Input wiring

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
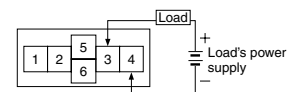
As PNP output
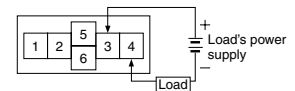
2. Self-diagnosis function

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.

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.

PRECAUTIONS IN USING THE LC2H SERIES

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)

Insulation sheet / Reset button

• LC2H total counter (installation frame type)

Insulation sheet / Reset button
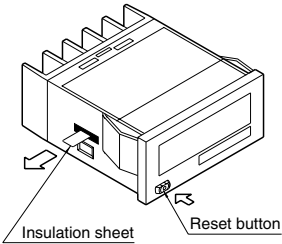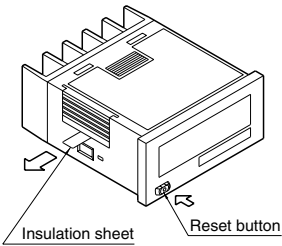
2. Waterproof construction
• LC2H total counter (installation frame type)

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.

Mounting frame (ATH3803)
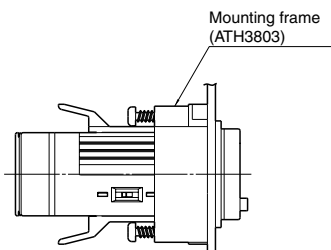
• LC2H preset counter

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.

Mounting frame (ATH3803)

Rubber gasket (ATH3804)
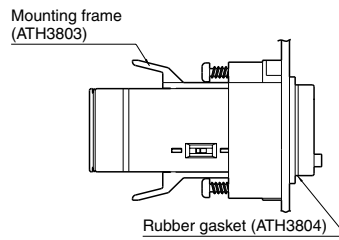
When installing the mounting frame and rubber gasket please remove the pre-attached o-ring.

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.

Tool

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.

"+" side
"–" side

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)
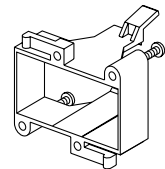
Part No.: ATH3803
Packaged with the mounting bracket type LC2H total counter

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

Panasonic
ideas for life

**DIN 48 SIZE
LCD ELECTRONIC COUNTER**

LC4H

R4/T4 systems (4-digit display)

R6/T6 systems (6-digit display)

Pin type

Screw terminal type

FEATURES

1. 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.

2. Simple Operation
Seesaw buttons make operating the unit even easier than before.

3. 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.

4. Conforms to IP66's Weather Resistant Standards
The water-proof panel keeps out water and dirt for reliable operation even in poor environments.

5. 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.

6. Changeable Panel Cover
Also offers a black panel cover to meet your design considerations.

7. 4-digit or 6-digit display
Two sizes of displays are offered for you to choose the one that suits your needs.

8. Conforms With EMC and Low Voltage Directives
Conforms with EMC directives (EN50081-2/EN50082-2) and low-voltage directives (VDE0435/Part 2021) for CE certification vital for use in Europe.

PRODUCT TYPES

Digit	Count speed	Output mode	Output	Operation voltage	Power down insurance	Terminal	Part No.
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)	100-240 V AC	Available	8 pin	LC4H8-R4-AC240V
						11 pin	LC4H-R4-AC240V
						Screw	LC4H-R4-AC240VS
				24 V AC / 24 V DC		8 pin	LC4H8-R4-AC24V
						11 pin	LC4H-R4-AC24V
						Screw	LC4H-R4-AC24VS
				12-24 V DC		8 pin	LC4H8-R4-DC24V
						11 pin	LC4H-R4-DC24V
						Screw	LC4H-R4-DC24VS
			Transistor (1a)	100-240 V AC		8 pin	LC4H8-T4-AC240V
						11 pin	LC4H-T4-AC240V
						Screw	LC4H-T4-AC240VS
				24 V AC / 24 V DC		8 pin	LC4H8-T4-AC24V
						11 pin	LC4H-T4-AC24V
						Screw	LC4H-T4-AC24VS
				12-24 V DC		8 pin	LC4H8-T4-DC24V
						11 pin	LC4H-T4-DC24V
						Screw	LC4H-T4-DC24VS
6			Relay (1c)	100-240 V AC		8 pin	LC4H8-R6-AC240V
						11 pin	LC4H-R6-AC240V
						Screw	LC4H-R6-AC240VS
				24 V AC / 24 V DC		8 pin	LC4H8-R6-AC24V
						11 pin	LC4H-R6-AC24V
						Screw	LC4H-R6-AC24VS
				12-24 V DC		8 pin	LC4H8-R6-DC24V
						11 pin	LC4H-R6-DC24V
						Screw	LC4H-R6-DC24VS
			Transistor (1a)	100-240 V AC		8 pin	LC4H8-T6-AC240V
						11 pin	LC4H-T6-AC240V
						Screw	LC4H-T6-AC240VS
				24 V AC / 24 V DC		8 pin	LC4H8-T6-AC24V
						11 pin	LC4H-T6-AC24V
						Screw	LC4H-T6-AC24VS
				12-24 V DC		8 pin	LC4H8-T6-DC24V
						11 pin	LC4H-T6-DC24V
						Screw	LC4H-T6-DC24VS

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

PART NAMES

Controlled output indicator
Reset indicator
Lock indicator
Reset switch
Lock switch

Counter display
Set value display
Up keys
Down keys

COUNTER LC4H
OP.
RST
LOCK
RESET
LOCK
UP
DOWN
NAIS

DIP switches

(Same for screw-down terminal type)

Controlled output indicator
Reset indicator
Lock indicator
Reset switch
Lock switch

Counter display
Set value display
Up keys

COUNTER LC4H
OP.
RST
LOCK
RESET
LOCK
NAIS

DIP switches

(Same for screw-down 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[1]	12 to 24 V DC	100 to 240 V AC, 24 V AC[1]	12 to 24 V DC
	Rated frequency	50/60 Hz common	—	50/60 Hz common	—
	Power consumption	Max. 10 V A	Max. 3 W	Max. 10 V A	Max. 3 W
	Control output	1 Form C: 5 A, 250 V AC (resistive)		1 Form A: 100 mA, 30 V DC Open collector output (Max.)	
	Input mode	Addition (UP)/Subtraction (DOWN)/Direction (DIR)/Individuality (IND)/Phase (PHASE) 5 modes selectable by DIP switch			
	Counting speed	30 Hz/5 kHz (selectable by DIP switch)			
	Min. counting input time	16.7 ms at 30 Hz/0.1 ms at 5 kHz ON time: OFF time = 1:1			
	Reset input method	Signal reset/Push-key switch, Min. input time 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, 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) 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	2.0×10^7 ope. (Except for switch operation parts)		—	
	Electrical	1.0×10^5 ope. (At rated control voltage)		1.0×10^7 ope. (At rated control voltage)	
Electrical	Operating voltage range	85 to 110 % of rated operating voltage			
	Initial withstand voltage	Between live and dead metal parts: 2,000 Vrms for 1 min (11-pin type) Between input and output: 2,000 Vrms for 1 min Between open contacts: 1,000 Vrms for 1 min		Between live and dead metal parts: 2,000 Vrms for 1 min (11-pin type) Between input and output: 2,000 V AC for 1 min	
	Initial insulation resistance (At 500 V DC)	Between live and dead metal parts: Min. 100 MΩ (11-pin type) Between input and output: Min. 100 MΩ Between open contact: Min. 100 MΩ		Between live and dead metal parts: Min. 100 MΩ (11-pin type) 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 .014 inch (10 min on 3 axes)			
	Vibration resistance Destructive	10 to 55 Hz (1 cycle/min), single amplitude: 0.75 mm .030 inch (1 h on 3 axes)			
	Shock resistance Functional	Min. 98 m 321.522 ft./s² (4 times on 3 axes)			
	Shock resistance Destructive	Min. 294 m 964.567 ft./s² (5 times on 3 axes)			
Operating conditions	Ambient temperature	–10° C to 55° C +14° F to +131° F			
	Ambient humidity	Max. 85 % RH			
	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)			

Note: 1) the 24 V AC type can be operated also with 24 V DC.

DIMENSIONS (units: mm inch)

• LC4H electrical counter

Screw-down terminal type
(embedded installation)

Pin type (embedded installation/
front panel installation)

Screw-down terminal type
(embedded installation)

Pin type (embedded installation/
front panel installation)

• Dimensions for embedded installation (with adapter installed)

Screw-down terminal type

Pin type

• Dimensions for front panel installations

DIN rail terminal block
ATC18004 or ATC18003
(sold separately)

Device installation rail
AT8-DLA1
(sold separately)

95.5
(90.0)
3.760
(3.543)
( ) Dimensions for 8-pin type.

• Installation panel cut-out dimensions

The standard panel cut-out dimensions are shown below. Use the installation 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 LAYOUT AND WIRING

• 8 pin type

Relay output type

Transistor output type

• 11 pin type

Relay output type

Transistor output type

• Screw-down terminal type

Relay output type

Transistor output type

Note: For connecting the output leads of the transistor output type, refer to 6) Transistor output on page 109.

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 unit.

DIP switches

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

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	—
ON	OFF	ON	—
OFF	ON	ON	—

See note 1
See note 1
See note 1
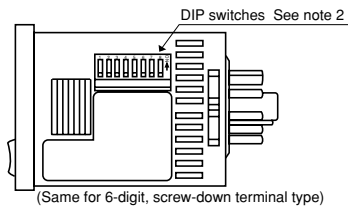
Note 1: The counter and set value displays will display DIP Err.
Note 2: Set the DIP switches before installing the unit.

DIP switches See note 2

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

Setting procedure 2) Setting the set value

Set the set value with the keys on the front of the unit.

Front display section

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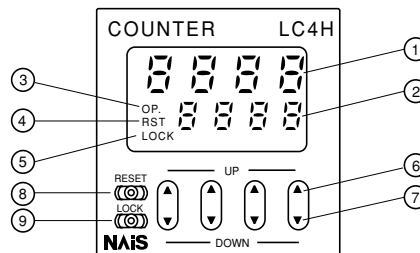
⑦ DOWN keys
Changes the corresponding digit of the set value in the subtraction direction (downwards)
⑧ RESET switch
Resets the set value and the output
⑨ LOCK switch
Locks the operation of all keys on the unit

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 set value and the output
⑧ LOCK switch
Locks the operation of all keys on the unit

• 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) If counting is set to the subtraction direction, counting will continue until full scale (-999 with the 4-digit type and -99999 with the 6-digit type) regardless of the new set value, and then the display will change to ◦ ◦ ◦ ◦ with the 4-digit type and ◦ ◦ ◦ ◦ ◦ ◦ with the 6-digit type.

2. If the set value is changed to "0," the unit will not complete count-up. However, be aware of the following points.

1) 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) 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.

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

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 count input and IN2 is the input block (gate). IN1 / IN2 / Counting (addition) / Counting (subtraction) / Reset / Count-up completed
Subtraction DOWN		• Example where IN2 is the count input and IN1 is the input block (gate). IN1 / IN2 / Counting (addition) / Counting (subtraction) / Reset / Count-up completed * "A" must be more than the minimum input signal width.
Directive DIR	IN1 is the count input and IN2 is the addition or subtraction directive input. IN2 adds at L level and subtracts at H level.	IN1 / IN2 / Counting / Addition / Subtraction / Addition / Reset * "A" must be more than the minimum input signal width.
Independent IND	IN1 is addition input and IN2 is subtraction input.	IN1 / IN2 / Counting / Reset * 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.	IN1 / IN2 / Counting / Phase advance / Phase retard / Reset * "B" must be more than the minimum input signal width.

2. Output mode

For the operation 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.	Counting (addition): – – – – – , n-3, n-2, n-1, n. Counting (subtraction): – – – – – , 3, 2, 1, 0. Counting able/unable: Able → Unable. Output control: OFF → ON. * 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.	Counting (addition): – – – – – , n-2, n-1, n, n+1, n+2, – – – – – . Counting (subtraction): – – – – – , 2, 1, 0, -1, -2, – – – – – . Counting able/unable: Able. Output control: OFF → ON. * 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.	Counting (addition): – – – – – , n-2, n-1, n, n+1, n+2, – – – – – . Counting (subtraction): – – – – – , 2, 1, 0, -1, -2, – – – – – . Counting able/unable: Able. Output control: OFF → ON → OFF. * 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.	Counting (addition): – – – – – , n-2, n-1, n, n+1, n+2, – – – – – . Counting (subtraction): – – – – – , 2, 1, 0, -1, -2, – – – – – . Counting able/unable: Able. Output control: OFF → ON → OFF, Approx. 1 s. * 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.	Counting (addition): – – – – – , n-2, n-1, 0, 1, 2, – – – – – . Counting (subtraction): – – – – – , 2, 1, n, n-1, n-2, – – – – – . △ Reset (automatic). Counting able/unable: Able. Output control: OFF → ON → OFF, Approx. 1 s. * 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.	Counting (addition): – – – – – , n-1, n, n+1, 0, 1, – – – – – . Counting (subtraction): – – – – – , 1, 0, -1, n, n-1, – – – – – . △ Reset (automatic). Counting able/unable: Able. Output control: OFF → ON → OFF, Approx. 1 s. * 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.	Counting (addition): – – – – – , n-1, n, 0, 1, – – – – – . Counting (subtraction): – – – – – , 1, 0, n, n-1, – – – – – . △ Reset (automatic). Counting able/unable: Able → Unable → Able. Output control: OFF → ON → OFF, Approx. 1 s. * n: Set value

new:
DIN 48 SIZE
LCD ELECTRONIC COUNTER
Scale factor, power supply

LC4H-S

Panasonic
ideas for life

48
1.890

48
1.890

64.5
2.539
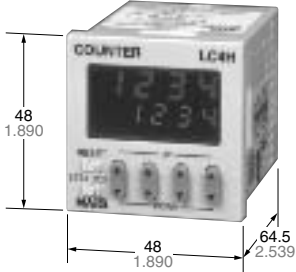
mm inch

R4/T4 systems (4-digit display)

R6/T6 systems (6-digit display)

Pin type   Screw terminal type

NEW FEATURES:

1. Scale Factor:
A scale factor can be entered into LC4H-SV series. After that one count shows the real unit/value of the machine/application.

2. 12 V DC Power Supply:
The 100 – 240 V AC types are equipped

with a 12 V DC power supply 100 mA. It is possible to connect photo-sensors, proximity switches or encoders without additional devices.

3. Voltage Signal Input:
PNP input types are available.

FEATURES

1. 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.

2. Simple Operation
Seesaw buttons make operating the unit even easier than before.

3. Conforms to IP66's Weather Resistant Standards
The water-proof panel keeps out water and dirt for reliable operation even in poor environments.

4. 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.

5. 4-digit or 6-digit display
Two sizes of displays are offered for you to choose the one that suits your needs.

6. Conforms With EMC and Low Voltage Directives
Conforms with EMC directives (EN50081-2/EN50082-2) and low-voltage directives (VDE0435/Part 2021) for CE certification vital for use in Europe.

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

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

PART NAMES

• 4-digit display type

Controlled output indicator
Reset indicator
Lock indicator
Reset switch
Set/lock switch

COUNTER   LC4H
OP.
RST
LOCK
RESET
SET/LOCK
NAIS
UP
DOWN

Counter display
Set value display

Up keys
Down keys

DIP switches

(Same for screw terminal type)

• 6-digit display type

Controlled output indicator
Reset indicator
Lock indicator
Reset switch
Set/lock switch

COUNTER   LC4H
OP.
RST
LOCK
RESET
SET/LOCK
NAIS

Counter display
Set value display

Up keys

DIP switches

(Same for screw terminal type)

SPECIFICATIONS

Item		Ralay 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) 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) 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)	2.0×10^7 ope. (Except for switch operation parts)		—
	Electrical (contact)	1.0×10^5 ope. (At rated control voltage)		1.0×10^7 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) 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) 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 .014 inch (10 min on 3 axes)		
	Vibration resistance Destructive	10 to 55 Hz (1 cycle/min), single amplitude: 0.75 mm .030 inch (1 h on 3 axes)		
	Shock resistance Functional	Min. 98 m/s² (4 times on 3 axes)		
	Shock resistance Destructive	Min. 294 m/s² (5 times on 3 axes)		
Operating conditions	Ambient temperature	−10° C to 55° C +14° F to +131° F		
	Ambient humidity	Max. 85 % RH		
	Air pressure	860 to 1,060 h Pa		
Connection		11-pin/screw terminal		
Protective construction		IP66 (front panel with a rubber gasket)		

Dimensions

(units: mm inch)

Pin type

Screw-down terminal type

COUNTER LC4H
OP.
S
RESET
SET/LOCK
UP
DOWN
NAIS

□48 1.890
□48 1.890

5.5 .217
70.1 2.760
55.6 2.189
14.5 .571
(□44.5) (□1.752)
7.5 .295
73* 2.874*
87.5* 2.445*
* With power supply for sensor

5.5 .217
64.5 2.539
(□44.5) (□1.752)
81.9* 3.224*
* With power supply for sensor

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

• Dimensions for embedded installation (with adapter installed)

Screw terminal type

Pin type

Rubber gasket ATC18002 (supplied)
Installation panel
Installation frame for embedded installations ATA4811 (supplied)

COUNTER LC4H
OP.
RST.
LOCK
RESET
SET/LOCK
UP
DOWN
NAIS

48 1.890
48 1.890
50 1.969
66 2.598
44.5 1.752
1 .039
63.5 2.500
80.9 3.185 * With power supply for sensor

Rubber gasket ATC18002 (supplied)
Installation panel
Installation frame for embedded installations ATA4811 (supplied)
11 pin type: 11 pins cap: ATA4861 (sold separately)

COUNTER LC4H
OP.
RST.
LOCK
RESET
SET/LOCK
UP
DOWN
NAIS

48 1.890
48 1.890
50 1.969
66 2.598
1
90 3.543
104.5 4.114 * With power supply for sensor

• Dimensions for front panel installations

DIN rail terminal block 11-pin type: AT8-DF11K (sold separately)

Device installation rail ATA48011 (sold separately)

95.5 (112.9) 3.760 (4.445)
* With power supply for sensor

• Installation panel cut-out dimensions

The standard panel cut-out dimensions are shown below. Use the installation frame (ATA4811) and rubber gasket (ATC18002).

Min. 80 3.150
$45^{+0.6}_{-0}$ 1.772 $^{+.024}_{-0}$
$45^{+0.6}_{-0}$ 1.772 $^{+.024}_{-0}$
Min. 80 3.150

• For connected installations

$45^{+0.6}_{-0}$ 1.772 $^{+.024}_{-0}$
A
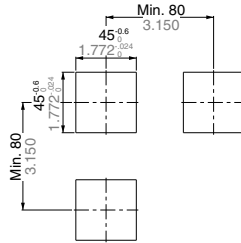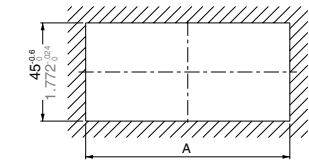
When n units are attached in a continuous series, the dimension of (A) is:

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

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

* With power supply for sensor

Relay output type

Transistor output type

Relay output type

Transistor output type

Reset
Input 1
Input 2
Lock
NC
NO
Operating voltage

Reset
Input 1
Input 2
Lock
Operating voltage

Reset
Input 1
Input 2
Lock
NC
NO
DC 12V 100mA Max.
0 V
Operating voltage

Reset
Input 1
Input 2
Lock
DC 12V 100mA Max.
0 V
Operating voltage
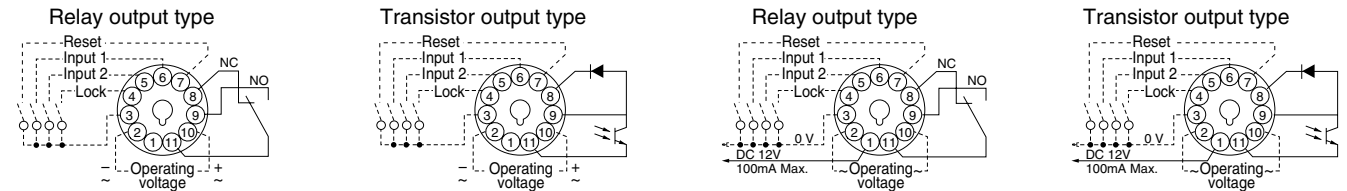
• Screw terminal type

* With power supply for sensor
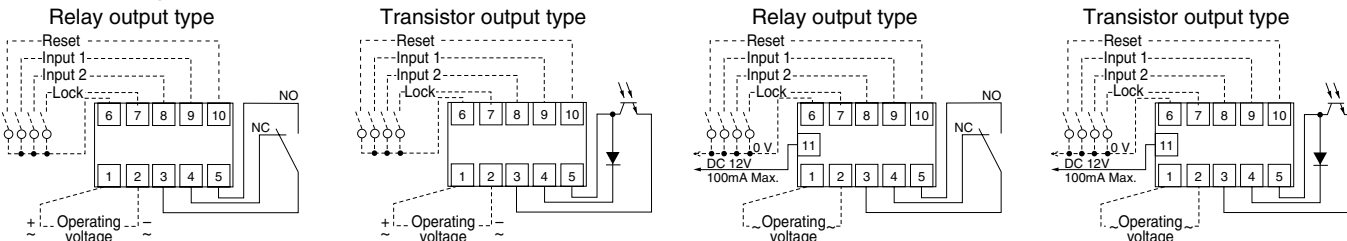
Relay output type

Transistor output type

Relay output type

Transistor output type

Reset
Input 1
Input 2
Lock
NO
NC
Operating voltage

Reset
Input 1
Input 2
Lock
Operating voltage

Reset
Input 1
Input 2
Lock
NO
NC
DC 12V 100mA Max.
0 V
Operating voltage

Reset
Input 1
Input 2
Lock
DC 12V 100mA Max.
0 V
Operating voltage

Note) For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 109.

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

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)

DIP switches (See note 2)

(Same for 6-digit, screw-down terminal type)
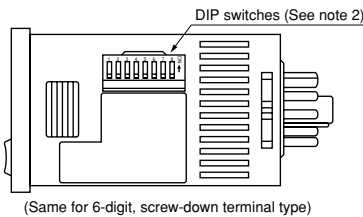
Notes:1) The counter and set value displays will display DIP Err.
2) Set the DIP switches before installing the counter on the panel.
3) When the DIP SW setting is changed, turn off the power once.
4) The DIP switches are set as ON before shipping.

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)

COUNTER   LC4H

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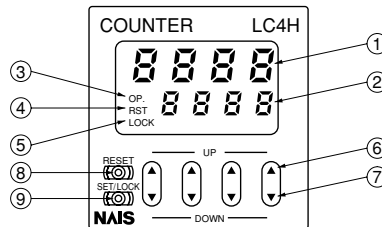
⑦ DOWN keys
 Changes the corresponding digit of the set value in the subtraction direction (downwards)
⑧ RESET switch
 Resets the counting value and the output
⑨ SET/LOCK switch
 This is used to handle pre-scaling values, one-shot times, decimal point position settings, and key lock operations (to disable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

COUNTER   LC4H

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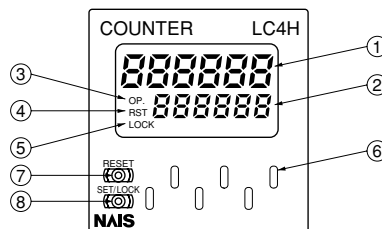
⑥ UP keys
 Changes the corresponding digit of the set value in the addition direction (upwards)
⑦ RESET switch
 Resets the counting value and the output
⑧ SET/LOCK switch
 This is used to handle pre-scaling values, one-shot times, decimal point position settings, and key lock operations (to disable Up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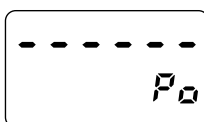
Example) 6-digit type
Decimal point position setting mode display
(Example shows default value displayed)

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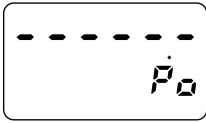
Example) 6-digit type
Example shows 2nd digit displayed using [UP] key

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:

$$\rightarrow 1\ s \rightarrow 0.5\ s \rightarrow 0.2\ s \rightarrow 0.1\ s \rightarrow 0.05\ s \rightarrow 0.01\ s \rightarrow$$

(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 108 "LC4H series CAUTIONS FOR USE".

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).
Subtraction DOWN		• Example where IN2 is the counting input and IN1 is the input block (gate). * "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.	 * "A" must be more than the minimum input signal width.
Independent IND	IN1 is addition input and IN2 is subtraction input.	 * 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.	 * "B" must be more than the minimum input signal width.

LC4H-S

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.	Counting (addition): ----- n-3, n-2, n-1, n / Counting (subtraction): ----- 3, 2, 1, 0 / Counting able/unable: Able → Unable / Output control: OFF, ON / * 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.	Counting (addition): ----- n-2, n-1, n, n+1, n+2 ----- / Counting (subtraction): ----- 2, 1, 0, -1, -2 ----- / Counting able/unable: Able / Output control: OFF, ON / * 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.	Counting (addition): ----- n-2, n-1, n, n+1, n+2 ----- / Counting (subtraction): ----- 2, 1, 0, -1, -2 ----- / Counting able/unable: Able / Output control: OFF, ON, OFF / * 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.	Counting (addition): ----- n-2, n-1, n, n+1, n+2 ----- / Counting (subtraction): ----- 2, 1, 0, -1, -2 ----- / Counting able/unable: Able / Output control: OFF, ON, OFF, Approx. 1s / * 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	Counting (addition): ----- n-2, n-1, 0, 1, 2 ----- / Counting (subtraction): ----- 2, 1, n, n-1, n-2 ----- / Reset (automatic) / Counting able/unable: Able / Output control: OFF, ON, OFF, Approx. 1s / * 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.	Counting (addition): ----- n-1, n, n+1, 0, 1 ----- / Counting (subtraction): ----- 1, 0, -1, n, n-1 ----- / Reset (automatic) / Counting able/unable: Able / Output control: OFF, ON, OFF, Approx. 1s / * 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.	Counting (addition): ----- n-1, n, 0, 1 ----- / Counting (subtraction): ----- 1, 0, n, n-1 ----- / Reset (automatic) / Counting able/unable: Able → Unable → Able / Output control: OFF, ON, OFF, Approx. 1s / * n: Set value

Input connections
• Signal input type
•) Open collector

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

0V · Lock input · Input 2 · Input 1 · Reset input · 12 V DC output

•) For voltage output

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

0V · Lock input · Input 2 · Input 1 · Reset input · 12 V DC output

•) Contact input

11-pin type	③	④	⑤	⑥	⑦
Screw-down terminal type	6	7	8	9	10
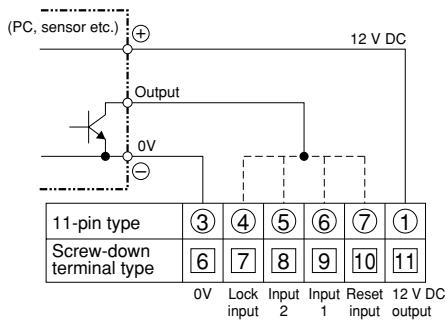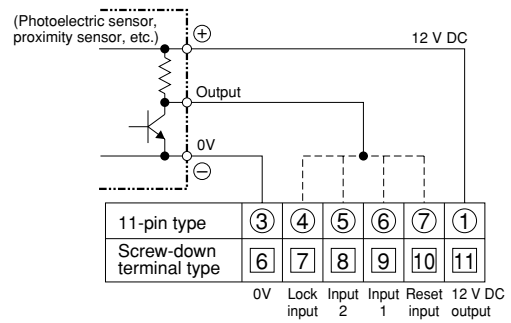
0V · Lock input · Input 2 · Input 1 · Reset input

•) For a rotary encoder

11-pin type	③	⑤	⑥	①
Screw-down terminal type	6	8	9	11

0V · Input 2 · Input 1 · 12 V DC output

•) PNP transistor type

11 Pin type	③	⑤	⑥	⑦	①
Screw terminal type	6	8	9	10	11

0 V · Input 2 · Input 1 · Reset input · DC12V output
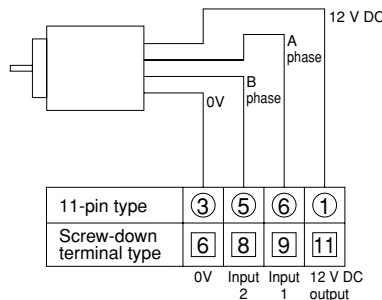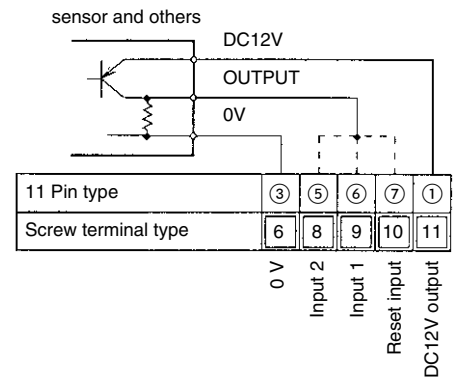
Input 1, input 2, and reset input specifications
- Impedance during short-circuit: 1 kΩ max.
  (At 0 Ω, the outflow current is approximately 12 mA.)
- Residual voltage during short-circuit: 2 V max.
- Impedance when released: 100 kΩ min.
- Max. applied voltage: 40 VDC max.

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.

•) For a dual-line sensor

11-pin type	③	⑤	⑥	⑦
Screw-down terminal type	6	8	9	10

0V · Input 2 · Input 1 · Reset input
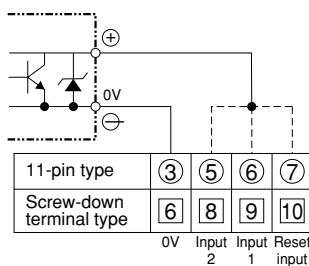
Dual-line sensor specifications
- Leakage current: 1.5 mA max.
- Breaker capacitance: 5 mA min.
- Residual voltage: 2.0 V max.
- Usable voltage: Runs on 10 VDC

---

* 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).

Prescale value: 0.002

Can be set to easy-to-understand unit.

Panasonic
ideas for life

**DIN 48 SIZE
LCD ELECTRONIC COUNTER**

LC4H-W

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

48
1.890

48
1.890

64.5
2.539

mm inch

11-pin type

Screw terminal type
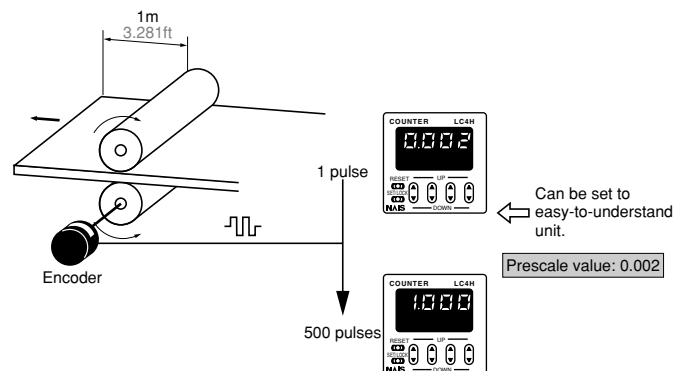
FEATURES

1. Two-stage presetting (upper and lower limits)

SET2

Count

SET1

Output 1

Output 2

2. 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.

3. Simple Operation
Seesaw buttons make operating the unit even easier than before.

4. 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.

5. Conforms to IP66's Weather Resistant Standards
The water-proof panel keeps out water and dirt for reliable operation even in poor environments.

6. 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.

7. Changeable Panel Cover
Also offers a black panel cover to meet your design considerations.

8. Conforms With EMC and Low Voltage Directives
Conforms with EMC directives (EN50081-2/EN50082-2) and low-voltage directives (VDE0435/Part 2021) for CE certification vital for use in Europe.

9. Low Price
All this at an affordable price to provide you with unmatched cost performance.

PRODUCT TYPES

Digit	Count speed	Output mode		Output	Operation voltage	Power down insurance	Terminal	Part No.
		Output 1	Output 2					
6	30 Hz (cps)/ 5 KHz (Kcps) switchable	• Maintain output/over count I • Maintain output/over count II • Maintain output/over count III • One shot/over count (4 modes)	• Maintain output/hold count • Maintain output/over count I • Maintain output/over count II • Maintain output/over count III • One shot/over count • One shot/recount I • One shot/recount II • One shot/hold count (8 modes)	Relay (1a+1a)	100 to 240 V AC	Available	11 pin	LC4HW-R6-AC240V
							Screw	LC4HW-R6-AC240VS
					24V AC / 24V DC		11 pin	LC4HW-R6-AC24V
							Screw	LC4HW-R6-AC24VS
					12-24 V DC		11 pin	LC4HW-R6-DC24V
							Screw	LC4HW-R6-DC24VS
				Transistor (1a+1a)	100 to 240 V AC		11 pin	LC4HW-T6-AC240V
							Screw	LC4HW-T6-AC240VS
					24V AC / 24V DC		11 pin	LC4HW-T6-AC24V
							Screw	LC4HW-T6-AC24VS
					12-24 V DC		11 pin	LC4HW-T6-DC24V
							Screw	LC4HW-T6-DC24VS

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

PART NAMES

Setting value 1/2 selector
Controlled output indicator
Lock indicator
Reset switch
Set/lock switch

COUNTER LC4H-W

Counter display
Set value display
Up key

Sixth digit   First digit

UP keys	: Used to set the corresponding digits for the count-up mode.
RESET key	: 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		Ralay 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[1]	12 to 24 V DC	100 to 240 V AC 24 V AC[1]	12 to 24 V DC
	Rated frequency	50/60 Hz common	—	50/60 Hz common	—
	Power consumption	Max. 10 V A	Max. 3 W	Max. 10 V A	Max. 3 W
	Control output	1 Form C: 3 A, 250 V AC (resistive)		1 Form A: 100 mA, 30 V DC Open collector output (Max.)	
	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)			
	Min. counting input time	16.7 ms at 30 Hz(cps)/0.1 ms at 5 KHz(cps) ON time: OFF time = 1:1			
	Reset input method	Signal reset/Push-key switch, Min. input time 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, Open impedance: 100 kΩ or more, Max. energized voltage: 40 V DC			
	Output mode	Output 1. HOLD-B, C, D SHOT-A (4 modes) Output 2. HOLD-A, B, C SHOT-A, B, C, D (8 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	−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	1a+1a		1a+1a (Open collector)	
	Initial contact resistance	100 mΩ (at 1 A 6 V DC)		—	
	Contact material	Ag alloy/Au flush		—	
Life	Mechanical	Min. 2.0×10^7 ope.		—	
	Electrical	Min. 1.0×10^5 ope. (At rated control voltage)		Min. 1.0×10^7 ope. (At rated control voltage)	
Electrical	Operating voltage range	85 to 110 % of rated operating voltage			
	Initial withstand voltage	Between live and dead metal parts: 2,000 Vrms for 1 min (pin type) Between input and output: 2,000 Vrms for 1 min Between open contacts: 1,000 Vrms for 1 min		Between live and dead metal parts: 2,000 Vrms for 1 min Between input and output: 2,000 V AC for 1 min	
	Initial insulation resistance (At 500 V DC)	Between live and dead metal parts: Min. 100 MΩ (pin type) Between input and output: Min. 100 MΩ Between open contact: Min. 100 MΩ		Between live and dead metal parts: Min. 100 MΩ (pin type) 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 .014 inch (10 min on 3 axes)			
	Vibration resistance Destructive	10 to 55 Hz (1 cycle/min), single amplitude: 0.75 mm .030 inch (1 h on 3 axes)			
	Shock resistance Functional	Min. 98 m 321.522 ft./s² (4 times on 3 axes)			
	Shock resistance Destructive	Min. 294 m 964.567 ft./s² (5 times on 3 axes)			
Operating conditions	Ambient temperature	−10°C to 55°C +14°F to +131°F			
	Ambient humidity	Max. 85 % RH			
	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)			

Note: 1) the 24V AC type can be operated also with 24V DC.

101

DIMENSIONS (units: mm inch) General tolerance: ±1.0 ±.039

• LC4H-W electrical counter
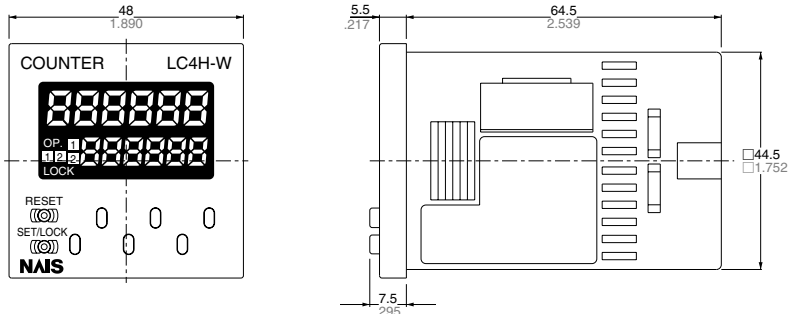
Screw-down terminal type
(embedded installation)

Pin type (embedded installation/
front panel installation)

COUNTER   LC4H-W

888888
OP.
1 2 2
LOCK

RESET

SET/LOCK

NAIS

48
1.890

5.5
.217

64.5
2.539

□44.5
□1.752

7.5
.295

70.1
2.760

5.5
.217

55.6
2.180

□44.5
□1.752

7.5
.295

• Dimensions for embedded installation (with adapter installed)

Screw-down terminal type

Pin type

Rubber gasket
ATC18002 (supplied)

Installation panel

Installation frame
for embedded installations
AT8-DA4 (supplied)

11P cap
AT8-DP11
sold separately

COUNTER   LC4H-W

48
1.890

48
1.890

50
1.969

66
2.598

□44.5
□1.752

1
.039

63.5
2.500

50
1.969

66
2.598

1
.039

90
3.543

• Dimensions for front panel installations

DIN rail terminal block
ATC18004 (sold separately)

Device installation rail
AT8-DLA1 (sold separately)

95.5
3.760

• Installation panel cut-out dimensions

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

80 min.
3.150

45 +0.6 0
1.772 +.024 0

45 +0.6 0
1.772 +.024 0

80 min.
3.150

• For connected installations

45 +0.6 0
1.772 +.024 0

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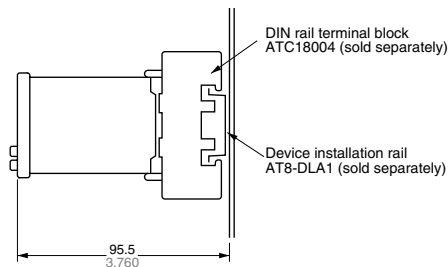
Note 1: The installation panel thickness should be between 1
and 5 mm .039 and .197 inch.
Note 2: For connected installations, the waterproofing ability
between the unit and installation panel is lost.

TERMINAL LAYOUT AND WIRING

• Pin type

Relay output type
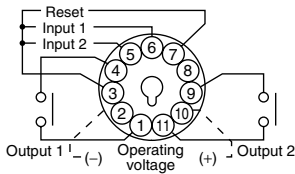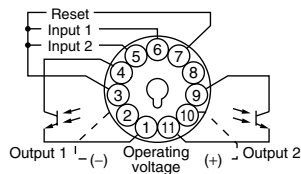
Transistor output type

Reset
Input 1
Input 2

5 6 7
4 8
3 9
2 10
1 11

Output 1   (−) Operating (+) Output 2
voltage

Reset
Input 1
Input 2

5 6 7
4 8
3 9
2 10
1 11

Output 1   (−) Operating (+) Output 2
voltage

• Screw-down terminal type

Relay output type

Transistor output type

Reset
Input 1
Input 2

6 7 8 9 10
1 2 3 4 5

Output 1   (+) Operating (−)   Output 2
voltage

Reset
Input 1
Input 2

6 7 8 9 10
1 2 3 4 5

Output 1   (+) Operating (−)   Output 2
voltage
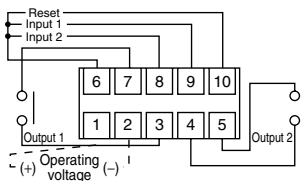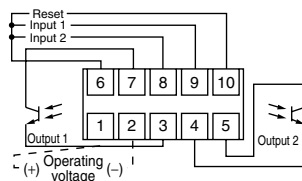
Note: For connecting the output leads of the transistor output type, refer to 6) Transistor output on page 109.

SETTING THE OPERATION MODE AND COUNTER

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

Set the input 1, 2 modes with the DIP switches on the side of the unit.

The new settings are valid after power OFF → ON

DIP switches

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

Table 1

DIP swith No.			Output mode	
1	2	3	(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.			Output mode
6	7	8	(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

DIP switches (Note 2)

(Same for screw terminal type)
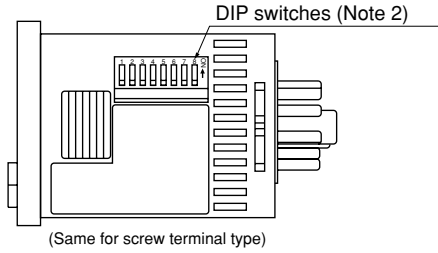
Note: 1) The elapsed time and set time displays both display "DIP Err."
2) Set the DIP switches before installing the operation panel.

Setting procedure 2) Setting the set value

Set the set value with the keys on the front of the unit.

Front display section

① Counter display
② Set value display
③ Controlled output indicator
④ Setting 1/2 selection display
⑤ Lock indicator
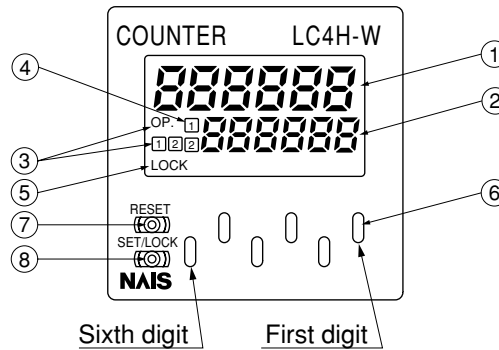
COUNTER   LC4H-W

Sixth digit   First digit

⑥ UP keys
[Changes the corresponding digit of the set value in the addition direction (upwards)]
⑦ RESET switch
Resets the set 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 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)
Setting mode displayed
(UP mode)

```
A        b        c        d        E
UP  →   dn  →   dir →   Ind →   Ph
```
Addition   subtraction   Directive   Independent   Phase difference
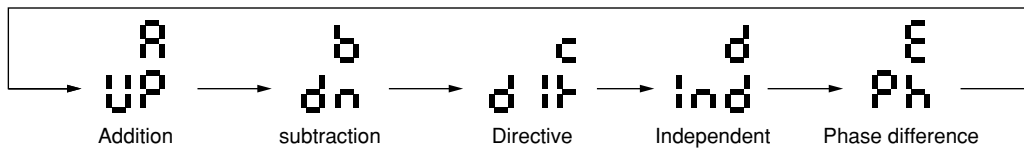
(4) Press the RESET key and the input mode being displayed is set. The display then goes back to normal.

• 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 MODE

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 count input and IN2 is the input block (gate).
Subtraction DOWN		• Example where IN2 is the count input and IN1 is the input block (gate). * "A" must be more than the minimum input signal width.
Directive DIR	IN1 is the count input and IN2 is the addition or subtraction directive input. IN2 adds at L level and subtracts at H level.	 * "A" must be more than the minimum input signal width.
Independent IND	IN1 is addition input and IN2 is subtraction input.	 * 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.	 * "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.	Counting (addition): ... n-2, n-1, n, n+1, n+2, ... Counting (subtraction): ... n+2, n+1, n, n-1, n-2, ... Counting able/unable: Able Output control 1: OFF → ON * 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.	Counting (addition): ... n-2, n-1, n, n+1, n+2, ... Counting (subtraction): ... n+2, n+1, n, n-1, n-2, ... Counting able/unable: Able Output control 1: OFF → ON → OFF * 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.	Counting (addition): ... n-2, n-1, n, n+1, n+2, ... Counting (subtraction): ... n+2, n+1, n, n-1, n-2, ... Counting able/unable: Able Output control 1 (addition): OFF → ON Output control 2 (subtraction): ON → OFF * 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.	Counting (addition): ... n-2, n-1, n, n+1, n+2, ... Counting (subtraction): ... n+2, n+1, n, n-1, n-2, ... Counting able/unable: Able Output control 1: OFF → ON → OFF (Approx. 1s) * n: Set value 1

LC4H-W

• 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.	Counting (addition): ------ | n-3 | n-2 | n-1 | n Counting (subtraction): ------ | 3 | 2 | 1 | 0 Counting able/unable: Able / Unable Output control 2: OFF / ON * 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.	Counting (addition): ------ | n-2 | n-1 | n | n+1 | n+2 | ------ Counting (subtraction): ------ | 2 | 1 | 0 | -1 | -2 | ------ Counting able/unable: Able Output control 2: OFF / ON * 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.	Counting (addition): ------ | n-2 | n-1 | n | n+1 | n+2 | ------ Counting (subtraction): ------ | 2 | 1 | 0 | -1 | -2 | ------ Counting able/unable: Able Output control 2: OFF / ON / OFF * 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.	Counting (addition): ------ | n-2 | n-1 | n | n+1 | n+2 | ------ Counting (subtraction): ------ | 2 | 1 | 0 | -1 | -2 | ------ Counting able/unable: Able Output control 2 (addition): OFF / ON Output control 2 (subtraction): OFF / ON * 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.	Counting (addition): ------ | n-2 | n-1 | n | n+1 | n+2 | ------ Counting (subtraction): ------ | 2 | 1 | 0 | -1 | -2 | ------ Counting able/unable: Able Output control 2: OFF / ON / OFF (Approx. 1s) * 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.	Counting (addition): ------ | n-2 | n-1 | 0 | 1 | 2 | ------ Counting (subtraction): ------ | 2 | 1 | n | n-1 | n-2 | ------ Reset (automatic) Counting able/unable: Able Output control 2: OFF / ON / OFF (Approx. 1s) * n: Set value 2

Output mode	Operation	(Example when input mode is either addition or subtraction)
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.	Counting (addition): ------ | n-1 | n | n+1 | 0 | 1 | ------ Counting (subtraction): ------ | 1 | 0 | -1 | n | n-1 | ------ Reset (automatic) Counting able/unable: Able Output control 2: OFF ─── ON ─── OFF, Approx. 1s * n: Set value 2
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.	Counting (addition): ------ | n-1 | n | 0 | 1 | ------ Counting (subtraction): ------ | 1 | 0 | n | n-1 | ------ Reset (automatic) Counting able/unable: Able | Unable | Able Output control 2: OFF ─── ON ─── OFF, Approx. 1s * 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 (this combination unchanged)	As usual (this combination unchanged)	
	SHOT-B	Output 1 ⎍ / Output 2 ⎍ Approx. 1s	Approx. 1s / Output 1 ⎍ / Output 2 ⎍	Output 1 ⎍ / Output 2 ⎍ Approx. 1s
	SHOT-C 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.

LC4H SERIES CAUTIONS FOR USE

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) For embedded installation applications, the screw-down terminal type is recommended.

Use either the rear terminal block (AT8-RR) or the 8P cap (AD8-RC) for the 8-pin type, and the 11P cap (AT8-DP11) for the 11-pin type. Avoid soldering directly to the round pins on the unit. For front panel installation applications, use the 11-pin type DIN rail terminal block (ATC18004).

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 ⒈ and ⒉ (screw-down 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. 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.)
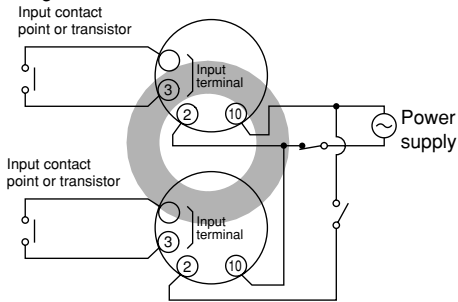
(Fig. A)
Input contact
point or transistor
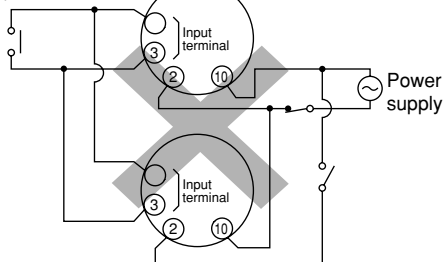
If independent power circuitry must be used, keep the input contacts or transistors separate from each other, as shown in Fig. B. When power circuitry is not independent,
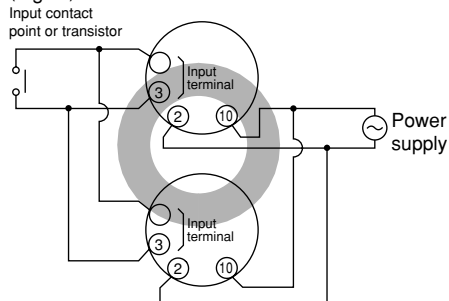
(Fig. B)
Input contact
point or transistor

one input signal can be fed to two or more counters at once, as shown in Fig. C.

### 3. Input and output

(Fig. C)
Input contact
point or transistor

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.
(2) Non-contact point input

8-pin type	①	—	⑤	④	③
11-pin type	③	④	⑤	⑥	⑦
Screw terminal type	6	7	8	9	10
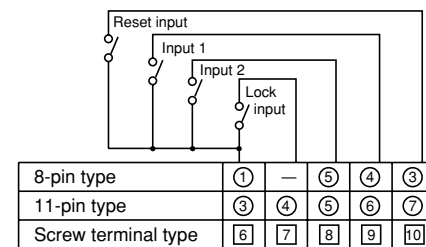
Note: The LC4H-W does not have the lock input ④⑦.

Connect with an open collector. Use transistors whose characteristics satisfy the criteria given below.
V_{CEO} = 20 V min.
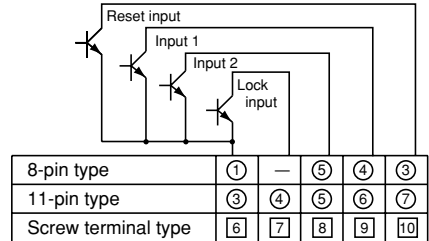I_C = 20 mA min.
I_{CBO} = 6μA max.
Also, use transistors with a residual volt-

age of less than 2 V when the transistor is on.

* The short-circuit impedance should be

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 ④⑦.

less than 1 kΩ.

[When the impedance is 0 W, 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.

2) The input mode and output mode

|					
8-pin type	①	—	⑤	④	③
11-pin type	③	④	⑤	⑥	⑦
Screw terminal type	6	7	8	9	10
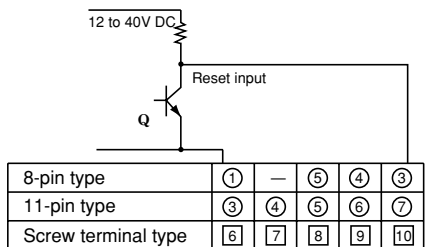
(The above example is for reset input)

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) 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.

4) Since the power supply circuitry does


Insulated transformer is necessary
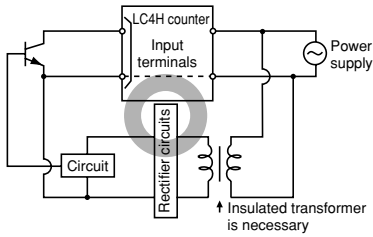
not contain a transformer, be aware that it is not possible for simultaneous input from an input contact point or transistor to a LC4H counter with independent power supply operation.

5) 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-down terminal types). Never connect other terminals or voltages higher than DC 40 V, because it may destroy the internal circuitry.

6) 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)
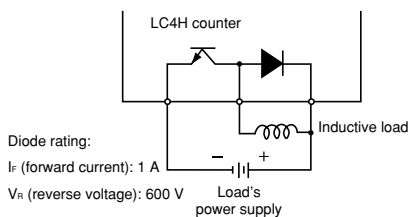
(2) Use the diode connected to the out

As NPN output

As PNP output
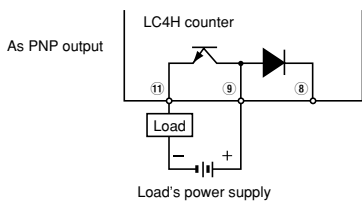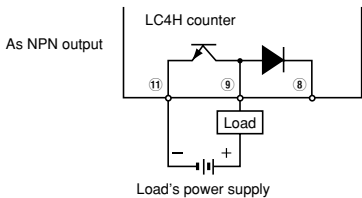
Note: With the LC4H 8-pin type and the LC4H-W, there is no diode between points ⑧ and ⑨.

put transistor's collector for absorbing the reverse voltage from induced loads. (LC4H only)

7) When wiring, use shielded wires or

Diode rating:
IF (forward current): 1 A
VR (reverse voltage): 600 V

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.

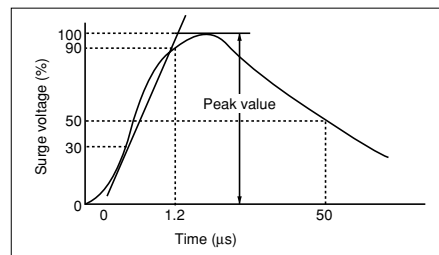## 5. Conditions of usage

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.

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

• **Surge wave form**
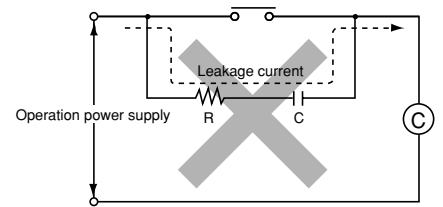[± (1.2 × 50) ms uni-polar full wave voltage]

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.

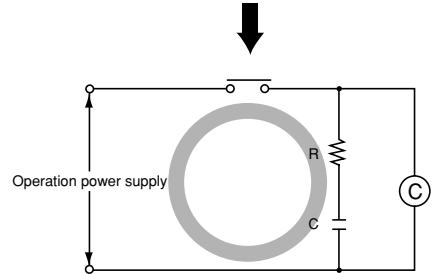|	Power supply terminals		Input terminals
	AC type	DC type 24V AC type	
Noise voltage	1,500V	1,000V	600V

Noise wave form (noise simulator)
Rise time: 1 ns
Pulse width: 1 μs, 50 ns
Polarity: ±
Cycle: 100 cycles/second

5) When connecting the 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.

Ⓡ Relay   Ⓒ Counter   Receive output from contact at relay R

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
⊙ ⊙ ⊙ ⊙ or ⊙ ⊙ ⊙ ⊙ ⊙	Minimum value went below –999 or –99999. See note 1.	No change	Enter reset or RESET key.	No change
dIPErr	Incorrect DIP switch setting.		Restart unit (correct DIP switch settings)	
Err-00	Malfunctioning CPU.	OFF	Enter reset, RESET key, or restart unit.	The values at start-up before the CPU malfunction occurred.
Err-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. CE Marking Certification

1) EMC directive (89/336/EEC)
As a counter unit, the LC4H series conforms to EMC directives. Applicable standards are EN50081-2 and EN50082-2.

2) Low voltage directive (73/23/EEC)
In order to satisfy VDE0435/Part 2021, be sure to adhere to the following installation conditions and precautions.

(1) The counter uses a non-transformer power supply and the power supply and input signal terminals are not insulated.
• When a sensor is connected to the input circuit, install double insulation on the sensor side.
• With contact-point inputting, use double-insulated relays, etc.

(2) Always connect loads insulated with basic insulation specifications to the output contact points. The counter unit is also insulated with basic insulation specifications. The combination of the two satisfies VDE, which calls for double insulation.

(3) For the applied power supply, use one protected by an over-current protection device that conforms with EN/IEC standards (e.g. 250 V, 1 A fuse).
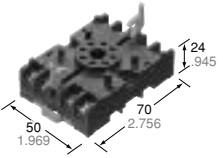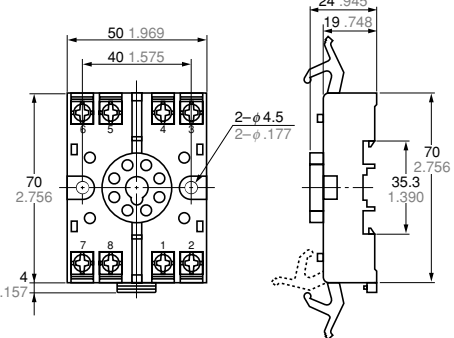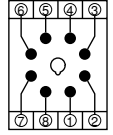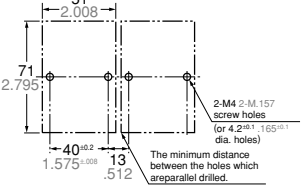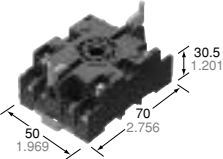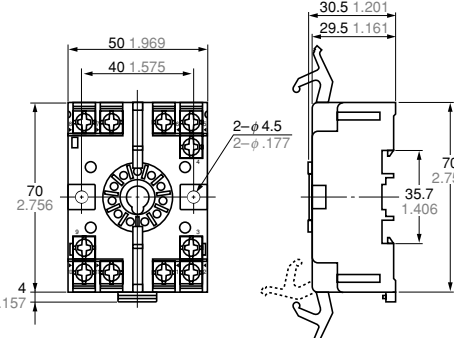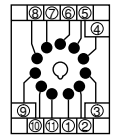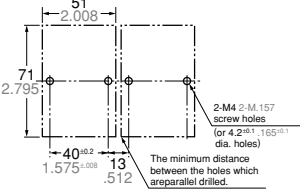
(4) During installation, always use a terminal block or the appropriate sockets. Do not touch the terminals, or other part of the counter unit while it is on. Before installation or removal of the unit, first verify that no voltage is being applied to any of the terminals.

(5) Do not use the counter in a safety circuit. When the unit is being used in a circuit such as a heater circuit, install a protection circuit on the machine side.
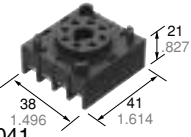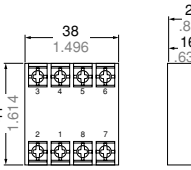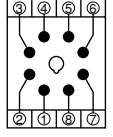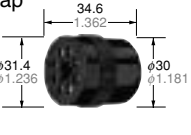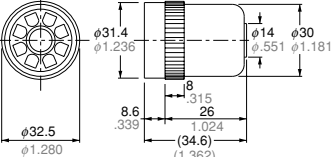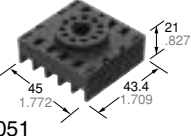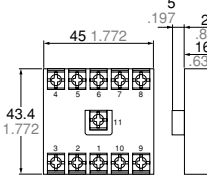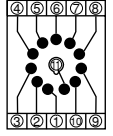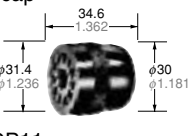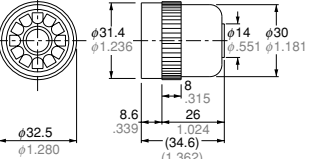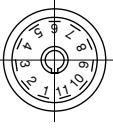
DIN SIZE COUNTERS COMMON OPTIONS

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) ATC180031		Note: Terminal No. on the main body are identical to those on the terminal socket.	2-M4 2-M.157 screw holes (or 4.2±0.1 .165±0.1 dia. holes) The minimum distance between the holes which are parallel drilled.
LC4H LC4H-S LC4H-W (11-pin type)	• DIN rail socket (11-pin) ATC180041		Note: Terminal No. on the main body are identical to those on the terminal socket.	2-M4 2-M.157 screw holes (or 4.2±0.1 .165±0.1 dia. holes) The minimum distance between the holes which are parallel drilled.

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 AT78041			—
	• 8P cap AD8-RC			—
LC4H LC4H-S LC4H-W (11-pin type)	• Rear terminal socket AT78051			—
	• 11P cap AT8-DP11			—

Note: The terminal numbers on the counter are identical to those on the socket.

DIN SIZE COUNTERS COMMON OPTIONS

Mounting parts
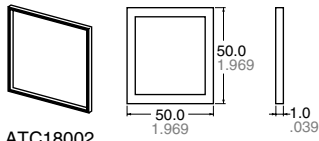
• Rubber gasket	**• Mounting frame**
50.0 / 1.969 (×2), 1.0 / .039 — Applicable for LC4H series ATC18002 The rubber gasket is enclosed in the LC4H series.	48 / 1.890, 48 / 1.890, 68 / 2.677 — Applicable for LC4H series AT8-DA4
• Mounting rails (Applicable for DIN and IEC standards) AT8-DLA1 Length: 1 m aluminum 1,000 ±1 / 39.37 ±.039 5.5 / .217 2.75R / .108R 5 / .197, 15 / .591, 40 / .394, 15 / .591, 15 / .591, 40 / .394, 15 / .591, 5 / .197 Oval hole, 40-5.5×15 / 40-.217×.591 35 / 1.378, 24 / .945, 1.5 / .059, 27 / 1.063 7.5 / .295	**• Fastening plate** ATA4806 50 / 1.969 12 / .472, M4 / M.157 10 / .394 ATA4806 10 / .394 For holding DIN rails
• Protective cover for DIN 48 size Hard type 17.2 / .677, 50.6 / 1.992 50.6 / 1.992 AQM4801 Flexible type 11 / .433, 50 / 1.969 50 / 1.969 AQM4803	
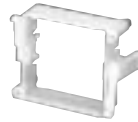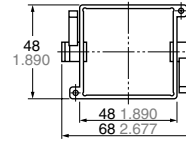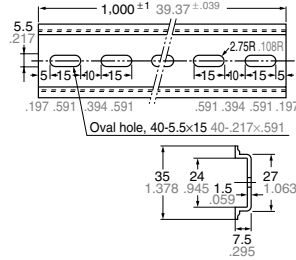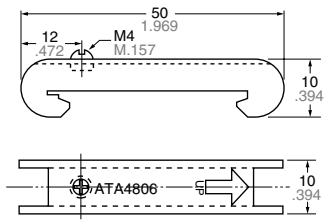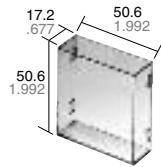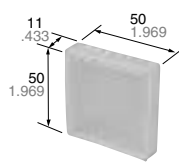
Accessories

• 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
AEL58011	AEL58012	AEL58013	AEL58014	AEL68011
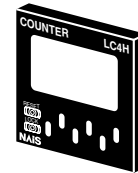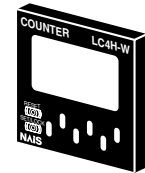
The black panel cover is also available so that you can change the appearance of the panel by changing the panel cover.
The color of the standard panel cover is ash gray.

INSTALLING DIN SIZE COUNTER (COMMON)

INSTALLATIONS

1. Surface mount

1) For the counters of LC4H series, use the pin type counter.
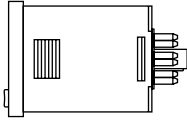
2) Put the terminal socket on the board directly or put it on the DIN rail (Fig. 1).
3) Insert the counter into the terminal socket and fix it with clip (Fig. 2)
4) On DIN rail mounting, mount the counter on the DIN rail tightly to get the proper dimension.

(Fig. 1)   (Fig. 2)

Terminal socket
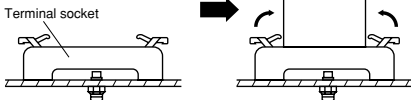
(Fig. 3)
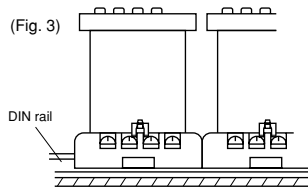
DIN rail

5) 8-pin type should be connected with terminal socket ATC180031. 11-pin type should be connected with terminal socket ATC180041.
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.)
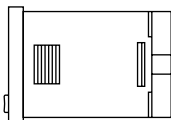
2) How to mount the counter
From the panel front, pass the counter through the square hole. Fit the mounting frame from the rear, and then push it in so that the clearance between the mounting frame and the panel surface is minimized. In addition, lock the mounting frame with a screw.

• LC4H series

Panel cover
Mounting flame
PUSH
Screw
Rubber gasket
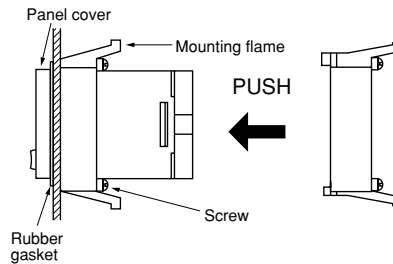
3) Caution in mounting the counter
• LC4H series
ⓐ If the LC4H series are used as the waterproof types (IEC IP66), tighten the reinforcing screws on the mounting frames so that the counters, the rubber gaskets, and the panel surfaces are tightly contacted with each other. (Tighten the two screws with 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) 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.

①
②
①
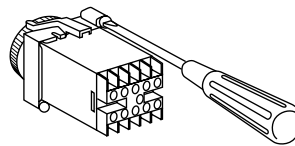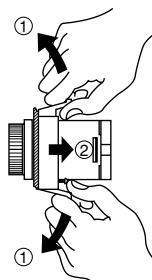
5) Correctly connect the pins while seeing the pin connection diagram.
6) If the pin type is used, the rear pin-bracket (AT8-RR) or the 8P cap (AD8-RC) is necessary to connect the pins. For the 11-pin type, use the 11P cap (AT8-DP11) and avoid directly soldering the round pins on the counter.
7) Panel cutout dimensions
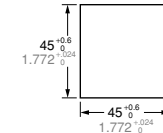
$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$
$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

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.

Min. 80
3.150
$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$
$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$
Min. 80
3.150
$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$
A
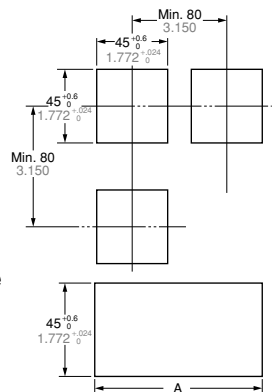
9) Adjacent mounting
Although the counters can be mounted adjacent to each other, remember that the panel surface of LC4H series counter will lose its water-resistant effect. (Panel thickness: 1 to 5 mm .039 to .197 inch)
$A = (48 \times n - 2.5)^{+0.6}_{0}$
When lining up the counters horizontally, 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.

Formed spring

Formed spring
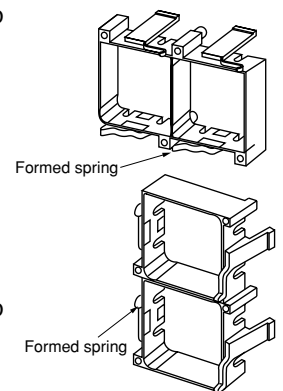
HOUR METERS SELECTOR CHART

Types	DIN 48 × 48 size Hour Meters			
Name of product	TH14 Hour Meters	TH24 Hour Meters	TH40 Hour Meters	TH50 Hour Meters
Appearance	TH14 series	TH24 series	TH40 series	TH50 series
Counting range	0 to 99999.9 hours	0 to 9999.9 hours	Reset side 0 to 9999.9 hours Without reset side 0 to 99999.9 hours	0 to 9999.9 min
Features	For controlling total integrated hours	With zero reset function For controlling measured integrated hours	Composite function for total accumulated hours monitoring and measuring each zero reset	Zero reset for minute unit time monitoring
Driving method	AC motor	AC motor	AC motor	AC motor
Counting direction	Addition (UP)	Addition (UP)	Addition (UP)	Addition (UP)
Power — Voltage	12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC	12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC	12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC	12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC
Power — 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
Min. counting unit	0.1 h	0.1 h	0.1 h	0.1 min
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
Weight	145 g 5.115 oz	150 g 5.291 oz	160 g 5.644 oz	150 g 5.291 oz
Remarks	—	The TH50 series displays time in minute.	—	—
	The TH14, 24, 40, 50, 63, and 64 series have numbers at the end of the part number that indicate the voltage required as follows: 1:100 V, 2:200 V, 3:12 V, 4:24 V, 5:48 V, 6:110 V, 7:115 to 120 V, 8:220 V, 9:240 V, Ex.) The part number of the TH24 series with 220 V is TH248. When "S" is specified at the end of the part number, a silver panel is equipped at the front.			
Page	P. 133	P. 133	P. 135	P. 137

Types	DIN 24 × 48 size Hour Meters		DIN 24 × 48 size Hour Meters	
Name of product	TH63 Hour Meters	TH64 Hour Meters	LH2H Hour Meters	LH2H Preset Hour Meters
Appearance / Front section of part number	TH63 series	TH64 series	Panel mounting type PC board mounting type	ATH3
Counting range	0 to 99999.9 hours	0 to 9999.9 hours	Flush mounting type: 0 to 999999.9 hours/0 to 3999 days 23.9 hours (selectable) 0 to 999 hours 59 min 59 sec/0 to 9999 hours 59.9 min (selectable) PC board mounting type: 0 to 999999.9 hours/9999 hours 59.9 min (different type)	0 to 999999.9 hours/ 0 to 3999 days 23.9 hours (selectable) 0 to 999 hours 59 min 59 sec/ 0 to 9999 hours 59.9 min (selectable)
Features	For controlling total integrated hours	With zero reset function For controlling measured integrated hours	Big 7-digit display, 8.7 mm tall display Bright, 2-color back light (voltage input type) Plenty of input methods • Non-voltage input, Voltage input, free voltage input	Preset function equipped in half size
Driving method	AC motor	AC motor	Quartz oscillation type	Quartz oscillation type
Counting direction	Addition (UP)	Addition (UP)	Addition (UP)	Addition or subtraction
Power — Voltage	12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC	12 V AC, 24 V AC, 48 V AC, 100 V AC, 110 V AC, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC	Flush mounting type: Unnecessary (Built-in battery) PC board mounting type: 3 V DC (Battery is externally installed.)	24 V DC
Power — Frequency	50/60Hz (common)	50/60Hz (common)	—	—
Counting integral/ Counting max. speed	Synchronizing with power supply frequency	Synchronizing with power supply frequency	±100 ppm (25°C)	±0.01% ±50 ms in case of power on start ±0.01% ±30 ms in case of input signal start
Min. counting unit	0.1 h	0.1 h	0.1 h, 0.1 min, 1 s	0.1 h, 0.1 min, 1 s
Reset input	—	Manual reset	Push button and external reset input terminal	Push button and external reset input terminal
Max. power consumption	Approx. 1.5 W	Approx. 1.5 W	—	Max. 1.5 W
Weight	80 g 2.822 oz	90 g 3.174 oz	Flush mounting type: 55 g 1.940 oz PC board mounting type: 15 g .529 oz	50 g 1.764 oz
Remarks	The numbers at the end of the part number indicate voltage. (See the remarks above.)		—	—
Page	P. 139	P. 139	P. 116	P. 123

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	C E TH13 series	C E TH23 series	C E TH8 series
Counting range	0 to 99999.9 hours	0 to 9999.9 hours	0 to 9999.9 hours
Features	For controlling total integrated hours	With zero reset function For controlling measured integrated hours	Driven on DC power
Driving method	AC motor	AC motor	Ceramic oscillation + AC motor
Counting direction	Addition (UP)	Addition (UP)	Addition (UP)
Power — Voltage	100 V AC, 200 V AC, 110 V AC, 115 to 120 V AC, 220 V AC, 240 V AC	100 V AC, 200 V AC, 110 V AC, 115 to 120 V AC, 220 V AC, 240 V AC	12 V DC, 24 V DC
Power — Frequency	50 Hz or 60 Hz	50 Hz or 60 Hz	—
Counting integral/ Counting max. speed	Synchronizing with power supply frequency	Synchronizing with power supply frequency	±0.2% (25°C)
Min. counting unit	0.1 h	0.1 h	0.1 h
Reset input	—	Manual reset	—
Max. power consumption	Approx. 1.5 W	Approx. 1.5 W	Approx. 1.5 W
Weight	130 g 4.586 oz	135 g 4.762 oz	170 g 5.997 oz
Remarks	Both the TH13 and 23 series have numbers at the end of the part number that indicate the voltage and frequency required. The third number from the front of the part number indicates the required voltage as follows: 4:100 V, 5:200 V, 6:110 V, 7:115 V (for 50 Hz only) or 115 V to 120 V (for 60 Hz only), 8:220 V, 9:240 V The fourth number from the front of the part number indicates the required frequency as follows: 5:50 Hz, 6:60 Hz Ex.) The part number for the TH13 series of 220 V & 50 Hz specification is TH1385.		—
Page	P. 131	P. 131	P. 130

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

	For measuring energized time of load	For measuring operation time of load
Single phase	Hour meter — Load	Hour meter — Switch (Linked with clutch) — Load
Three phases	Hour meter — Load	Hour meter — Switch (Linked with clutch) — Load
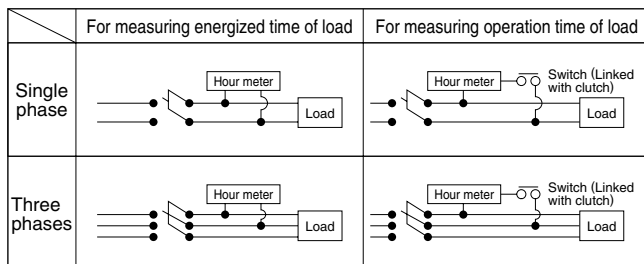
Note) Make the connection with the accompanying flat connector first and then with the hour meter's terminal (#187). In such case, be sure to cover the connection with the accompanying insulating sleeve.

• TH70, TH8

Lead wire — DC motor type hour meter — DC power source — Load
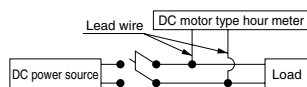
Note) Solder the lead wires in position.

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. CE marking
1) EMC directives (89/336/EEC)
CE-marked hour meters conform to the following EMC directives: EN50081-2:1993, EN50082-2:1995
2) Low-voltage directives (73/23/EEC)
To satisfy EN61010-1 requirements, use the hour meters under the following conditions.
• 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.

Panasonic
ideas for life

DIN HALF SIZE HOUR METER

LH2H

$_c$**U**$_{us}$ **CE**

Panel mounting type
One-touch installation type

Panel mounting type
Installation frame type

PC board mounting type

Features

1. 8.7 mm Character Height (previously 7 mm .343 inch)
Easy-to-read character height increased from 7 mm to 8.7 mm .276 inch to .343 inch.

999999.9 8.7mm .343inch

2. Plenty of Digits

9999999
←7 digits→

3. Select by switch between two time ranges in a single meter.
0 to 999999.9h/0 to 3999d23.9h switchable
0 to 999h59m59s/0 to 9999h59.9m switchable

4. Panel Mounting Type Features 2 Installation Methods
Comes with very easy one-touch installation type and also installation frame type that uses the bracket on the timer/counter. Choose a method that suits the application.

5. Battery Replacement Easy on Environment
To replace battery simply remove body for the one-touch installation type, and remove battery lid for the installation frame type.

6. Screw Terminals Designed for Safety
Built in finger protection.

7. Panel Covers Replacable (Standard color is ash gray.)
Change the panel design by replacing with a black panel cover.

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

9. Input Methods
1) Non-voltage input method
2) Voltage input method
3) Free voltage input method

10. Backlight Type Added to Series and Now 2-color Switchable (green/red)
Easy viewing even in dark places and switchable between green and red (Voltage input type).

11. Conforms to Safety Regulations

PRODUCT CHART

Type	Standard type			Backlight type
Installation 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	○	○	○	○
Panel mounting 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

Type / Item		Standard type	Standard type	Backlight type	Standard type
		Non-voltage input	Voltage input		Free voltage type
No. digits		7 digits			
External power supply		Not required (built-in battery)			
Measurement time range		0 to 999999.9h/0 to 3999d23.9h (Switchable by switch) 0 to 999h59m59s/0 to 9999h59.9m (Switchable by switch) Separate product type			
Start input	Min. input signal width	200 ms			
	Input method (signal)	Non-voltage input using contacts or open collector connection	High level: 4.5 to 30 V DC Low level: 0 to 2 V DC		High level: 24 to 240 V AC/DC Low level: 0 to 2.4 V AC/DC
	Input impedance	When shorted: Max. 10 kΩ When open: 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 Low level: 0 to 2 V DC		Non-voltage input using contacts or open collector connection
	Input impedance	When shorted: Max. 10 kΩ When open: Max. 750 kΩ	Appox. 4.7 kΩ		When shorted: Max. 10 kΩ When open: Max. 750 kΩ
	Residual voltage	Max 0.5 V	—		Max. 0.5 V
Display method		7-segment LCD		7-segment LCD With green/red backlight	7-segment LCD
Breakdown voltage (initial)		Between charged and uncharged parts: 1,000 V AC for 1 minute.			Between charged and uncharged parts: 2,000 V AC for 1 minute.
Insulation resistance (initial)		Min. 100 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 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 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 .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/s^2 (4 times on 3 axes)
	Destructive	Min. 294 m/s^2 (5 times on 3 axes)
Operation temperature		−10 to +55°C +14 to +131°F (without frost or dew)
Storage temperature		−25 to +65°C −13 to +149°F (without frost or dew)
Ambient humidity		35 to 85% RH

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.
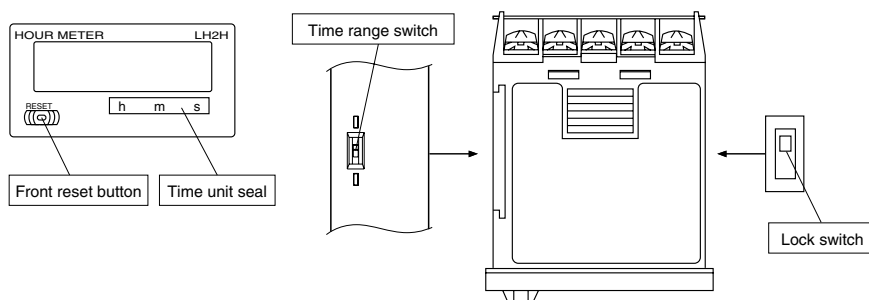
	Non-voltage input/voltage input	Free voltage input
Lock switch (Unit display 1)	(Terminal block side) ⇕ (LCD side) — OFF✳ ⇕ ON	
Time range switch (Unit display 2)	(Terminal block side) 0 to 999999.9h✳ ⇕ (LCD side) 0 to 399d23.9h	(Terminal block side) 0 to 999h59.9m✳ ⇕ (LCD side) 0 to 999h59m59s

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

DIMENSIONS

1. Panel mounting type
• External dimensions

1) One-touch installation type

44.8
1.764

54.4
2.142

10.4 .409 (44) (1.732) 5 .197

22 .866

7 .276

48 1.890

24 .945

HOUR METER   LH2H

RESET

Reset button

• Panel installation diagram

Panel (1 to 4.5mm .039 to .177inch thickness)

Rubber spacer

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

2) Installation frame type

44.8
1.764

54.4
2.142

10.4 .409 44 1.732 5 .197

22 .866

7 .276

48 1.890

24 .945

HOUR METER   LH2H

RESET

Reset button

• Panel installation diagram

Installation screws (found on mounting bracket)

Mounting bracket ATH3803 (included)

37 1.457

Panel (1 to 4.5mm .039 to .177inch thickness)

Rubber gasket ATH3804 (included)

• Panel cut-out dimensions

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

60 min.
2.362 min.

$45^{+0.5}_{0}$
$1.772^{+.020}_{0}$

$22.2^{+0.5}_{0}$
$.874^{+.020}_{0}$

• When installing repeatedly (sealed installation)
(Only mounting bracket installation type.)

$22.2^{+0.5}_{0}$
$.874^{+.020}_{0}$

A

$A=(48×n-2.5)^{+1.0}_{0}$
$A=(1.890×n-.098)^{+.039}_{0}$

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
Start input Reset input	Start input Reset input	Start input Reset input
① ② ③ ④	+V +V ① ② ③ ④ 0V 0V	~ or ① ② ③ ④
①-④ are connected internally.		

LH2H

2) Backlight type

Voltage input type

Backlight

<When green>

<When red>

Start input +V, Reset input +V, 0V, 0V

0V +V

0V +V

2. PC board mounting type

• External dimensions

General tolerance: ±1.0 ±.039 mm inch

DIP switch × 8

33.02±0.3 / 1.300±.012

5.08±0.3 / .200±.012

5.08±0.3 / .200±.012

0.6±0.1 / .024±.004

3.3±0.3 / .130±.012

43.4 / 1.709

19 / .748

LH2H HOUR METER

17.3 / .681

0.5±0.3 / .020±.012

15.24±0.3 / .600±.012

0.3±0.1 / .012±.004

PC board pattern (BOTTOM VIEW)

Mounting area

2.54 / .100

2.54 / .100

8-0.8 dia. / 8-.031 dia.

1.9 / .075

15.24 / .600 — Connection sockets 28 pin DIP terminal

1.9 / .075

5.08 / .200

5.19 / .204

5.19 / .204

5.08 / .200

33.02 / 1.300

• Terminal layout and wiring diagrams

Start input — ⑮-⑰ ㉖-㉘ — Reset input

⑭-⑫ ③-①

①-③, ⑫-⑭, ⑮-⑰ and ㉖-㉘ are connected internally.

INPUT METHOD

1. Standard type

Non-voltage input type			
Panel mounting type		PC board mounting type	
Contact input	Transistor input / NPN transistor	Contact input	Transistor input / NPN transistor
Start input, 1 2 3 4, Reset input (② and ④ are connected internally.)	Start input, 0V, 1 2 3 4, 0V, Reset input (② and ④ are connected internally.)	Start input, ⑮-⑰ ㉖-㉘ ⑭-⑫ ③-①, Reset input, 3V DC	Start input, ⑮-⑰ ㉖-㉘ ⑭-⑫ ③-①, Reset input, 3V DC

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	
Start input, 1 2 3 4, Reset input	+V, Start input, 1 2 3 4, Reset input, +V	+V, Start input, 1 2 3 4, Reset input, +V	Start input, 1 2 3 4, Reset input, or

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.
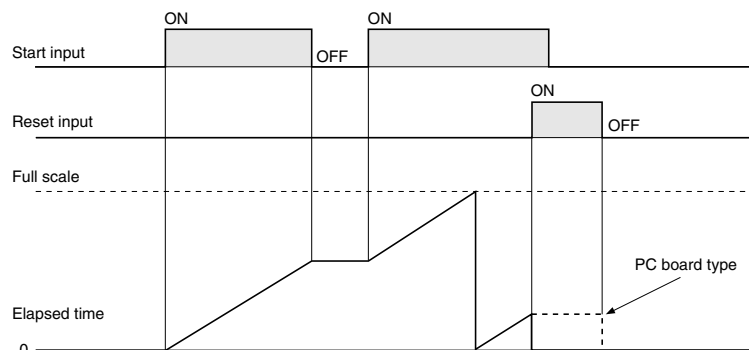3) Since the current flow is very small from reset input terminal ③, please use relays and switches with high contact reliability.
4) When inputting a reset with an open collector of a transistor, use a transistor for small signals in which ICBO is 1 µA or less and always input with no voltage.

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. 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.

LH2H Hour Meter

Panasonic
ideas for life

PRESET HOUR METER

FEATURES

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

Time counting

Green or (Red)
(backlight)

9995959

Green or Red can be selected at setup.

Timing up

Red or (Green)
(backlight)

9995959

(Lit or Flashing)

Red or (Green)
(backlight)

9995959

(Lit or Flashing)

Lit or Flashing can be selected at setup.

3. 8.7 mm 0.343 inch Character Height (previously 7 mm 0.276 inch)
Easy-to-read character height increased from 7 mm to 8.7 mm 0.276 inch to 0.343 inch.
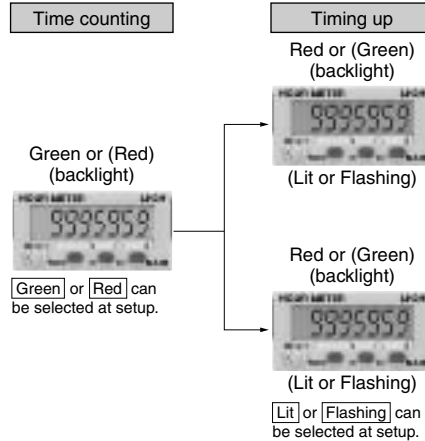
999999.9 8.7mm .343inch

4. Plenty of Digits

9999999
←7 digits→

5. Select by switch between two time ranges in a single meter.
0 to 999999.9h/0 to 3999d23.9h Selectable
0 to 999h59m59s/0 to 9999h59.9m Selectable
6. Conforms to IP66 Protective Construction (Front panel surface)
Weatherproofing supported by using optional mounting bracket and rubber gasket
7. Includes reassuring lock mode and lock switch to prevent erroneous operation.
8. Screw terminals are constructed to protect fingers to ensure safety.
9. Complies with 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) B (Signal ON delay) F (Signal flicker) E (Pulse ON delay)	Transistor (1a)	24 V DC	LH2HP-FEW-DHK-B-DC24V	
	0 to 999h59m59s/ 0 to 9999h59.9m selectable				LH2HP-FEW-HMK-B-DC24V	
Options		Mounting frame	Use for waterproofing (front panel surface)			ATH3803
		Rubber gasket				ATH3804

Note: Mounting frame and rubber gasket are not included.

SPECIFICATIONS

	Item	Descriptions
Rating	Rated operating voltage	24 V DC
	Rated power consumption	Max. 1.5 W
	Rated control output	100 mA 30 V DC
	Time counting direction	Addition or Subtraction (selectable by front switch)
	Measurement time range	0 to 999999.9h/0 to 3999d23.9h (selectable by slide switch on side) 0 to 999h59m59s/0 to 9999h59.9m (selectable by slide switch on side)
	Start input	Min. input signal width: Min. 30 ms
	Reset input	Min. input signal width: Min. 30 ms
	Input signal	• Non-voltage input using contacts or open-collector connection • Input impedance; when shorted: Max. 1 kΩ, when open: Min. 100 kΩ • Residual voltage: Max. 2 V
	Operation mode	Totalizing ON delay, Signal ON delay, Signal flicker, Pulse ON delay (selectable by front switch)
	Display method	7-segment LCD (Switch between red and green for backlight, and between lit and flashing for time up.)
	Power failure emory	EEP-ROM (Overwriting times: 1.0×10^5 operations or more)
Time accuracy	Operating time fluctuation	±0.01% ±50 ms in case of power on start / ±0.01% ±30 ms in case of input signal start	Rated operating voltage: 85 to 110% 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)		1.0×10^7 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 0.006 inch (10 min. on 3 axes)
	Destructive vibration resistance	10 to 55 Hz (1 cycle/min), Single amplitude: 0.375 mm 0.015 inch (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)

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.
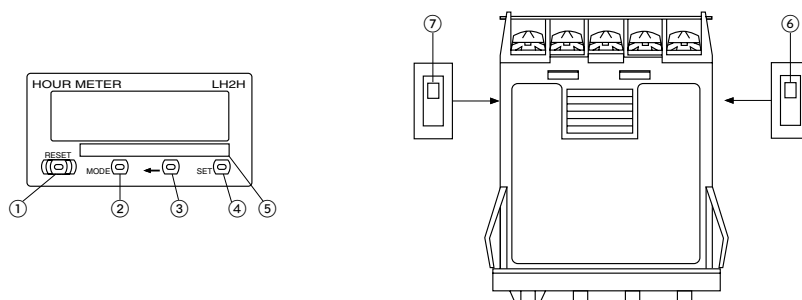
※: Default setting when shipped.

		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**
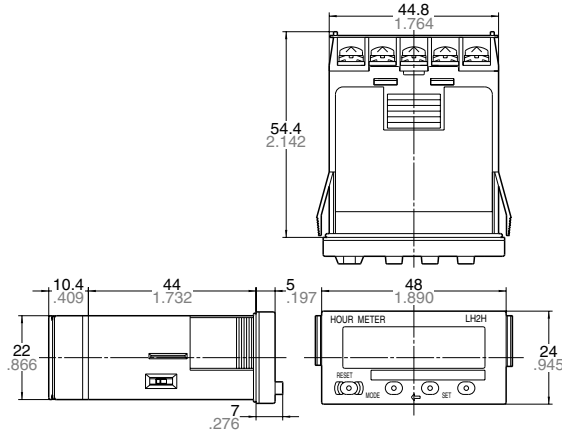
• **Panel cut out dimensions**

The standard panel cut out is shown below.
Use the mounting frame (ATH3803) and the rubber gasket (ATH3804).
(Only installation frame type)
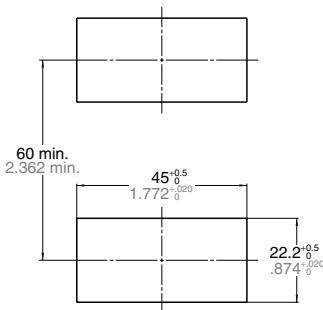
• **For connected installation (sealed installation)**
(Only installation frame type)
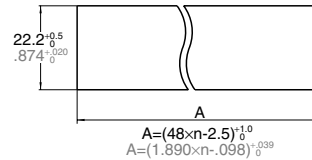
$A=(48×n-2.5)^{+1.0}_{0}$
$A=(1.890×n-.098)^{+.039}_{0}$

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.

Press the MODE key. Set the digit. Set the value.

1) Pressing the MODE key takes you to the preset value setting mode.
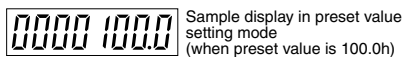
Sample display in preset value setting mode (when preset value is 100.0h)

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.

Press the SET key while pressing the MODE key. Un-Lock ◄► Lock

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".
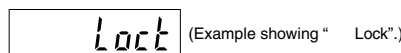
(Example showing "   Lock".)

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.
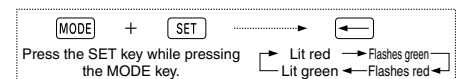
Press the SET key while pressing the MODE key. ► Lit red → Flashes green Lit green ← Flashes red ◄

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.

| MODE | + | SET | ·········· ▶ | ← |
| Press the SET key while pressing the MODE key. | | | | Addition ◄─► 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).

| | UP | 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".

| | dn | (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.

MODE	+	SET	·········· ▶	←	
Press the SET key while pressing the MODE key.				┌ OP-G ──► OP-B ┐	
				└ OP-E ◄── OP-F ◄┘	
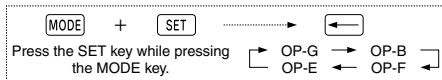
1) Pressing the SET key four times while holding down the MODE key takes you to the operation setting mode.
2) The display reads "OP-G" (Totalizing ON delay) after entering the operation setting mode.

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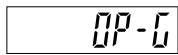
3) Pressing the setting key causes the display to change as follows:
OP-B (Signal ON delay)

| OP-b |
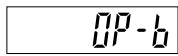
OP-F (Signal flicker)

| OP-F |

OP-E (Pulse ON delay)

| OP-E |
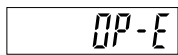
OP-G (Totalizing ON delay)

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

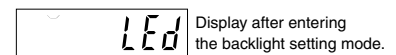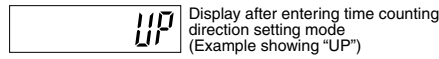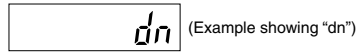Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

2) Lock mode

| MODE | + | SET | ·········· ▶ | ← |
| Press the SET key while pressing the MODE key. | | | | Un-Lock ◄─► Lock |

When the lock is set, you cannot enter modes other than backlight setting mode.

3) Backlight setting mode

MODE	+	SET	·········· ▶	←	
Press the SET key while pressing the MODE key.				┌ Lit red ──Flashes green ┐	
				└ Lit green ◄─Flashes red ◄┘	

4) Time counting direction setting mode

| MODE | + | SET | ·········· ▶ | ← |
| Press the SET key while pressing the MODE key. | | | | Addition ◄─► Subtraction |

5) Operation setting mode

MODE	+	SET	·········· ▶	←	
Press the SET key while pressing the MODE key.				┌ OP-G ──► OP-B ┐	
				└ OP-E ◄── OP-F ◄┘	

| Front panel reset key |

| Regular operation mode |

Mode changes as follows by pressing the SET key while holding down the MODE key.
┌► Lock mode ─────────► Backlight setting mode ─┐
└ Operation setting mode ◄── Time counting direction setting mode ◄┘

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) • The output remains ON even after the power is OFF and restarted.	
Signal ON delay ⓑ	• Clears elapsed value at power ON. • Time delay starts at start ON and output resets at start OFF. • Time delay starts at reset OFF and power ON while start is ON.	
Signal Flicker ⓕ	• Clears elapsed value at power ON. • Time delay starts at start ON. • After timer completion, control output reverses, elapsed value clears, and time delay starts. • Ignores start input during time delay.	
Pulse ON delay ⓔ	• Clears elapsed value at power ON. • Time delay starts at start ON. • After timer completion, control output is ON. • Ignores start input during time delay.	

Cautions for use

1. Input and output connection

1) Input connection

(1) Contact input

Use highly reliable metal plated contacts. Since the contact's bounce time leads directly to error in the timer operating time, use contacts with as short a bounce time as possible.
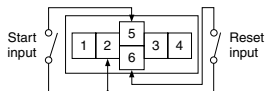
(2) Non-contact input (Transistor input)
Connect with an open collector. Use transistors whose characteristics satisfy the criteria given below.

V_{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.
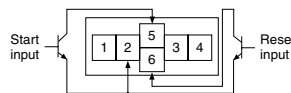
(3) Input wiring
When wiring, use shielded wires or metallic wire tubes, and keep the wire lengths as short as possible.

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
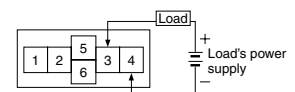
As PNP output
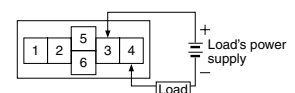
2. Self-diagnosis function

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.

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.

PRECAUTIONS IN USING THE LH2H SERIES

CAUTIONS FOR USE

1. Insulation sheet

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

• **LH2H hour meter (one-touch installation type)**

Insulation sheet   Reset button

• **LH2H hour meter (installation frame type)**

Insulation sheet   Reset button
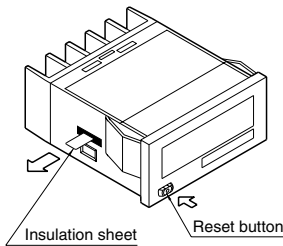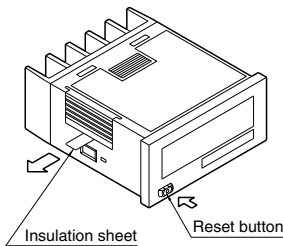
2. Waterproof construction

• **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.

Mounting frame (ATH3803)
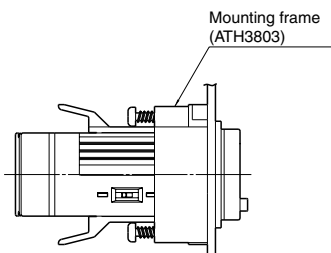
• LH2H preset hour meter

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.

Mounting frame (ATH3803)

Rubber gasket (ATH3804)
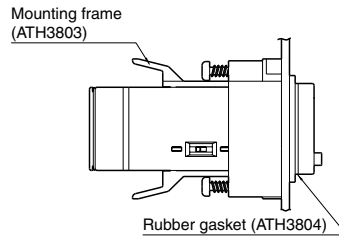
When installing the mounting frame and rubber gasket please remove the pre-attached o-ring.

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.

Tool
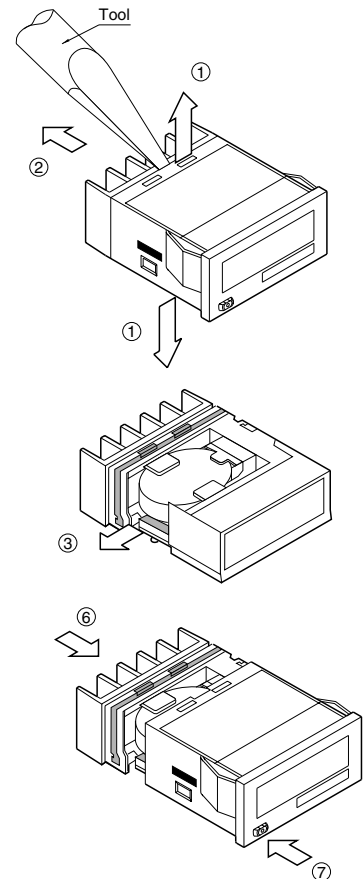
For LH2H hour meter
(installation frame type)
(1) Remove the battery cover from the case.
(2) Remove the battery from the side of the case. The battery will come loose if you put the battery side face down and lightly shake the unit.
(3) Before inserting wipe clean the surface of the new battery.
(4) 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.

"+" side

"–" side

Options

1. Accessories (for LH2H hour meter)
Panel cover (black)

HOUR METER   LH2H
RESET
NAiS
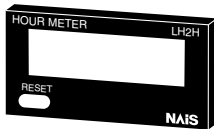
Part No.: ATH3801
You can change the design of the front panel by replacing it with this black panel cover. The counter comes with an ash gray panel cover as standard.
Note: No panel cover option (black) is available for the LH2H preset hour meter.

2. Lithium battery (3 V)

Panasonic
CR2477
3V
JAPAN

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
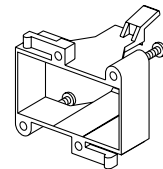
Part No.: ATH3803
Packaged with the mounting bracket type LH2H hour meter

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

	DC HOUR METER	**TH8**
Panasonic ideas for life		

c**UL**us CE

FEATURES

1. IP66 waterproof construction
The front panel surface keeps water and dust out. Perfect for use in rough conditions.

2. Includes operation light (LED)
The operation LED illuminates so you can quickly verify operation status.

3. Certified with CE marking
EMC directive (EN50081-2/EN50082-2)
Low voltage directive (EN61010-1)

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.) 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	45 to 85% RH (relative humidity)	
	Power supply ripple	Approx. 48% or less (single phase, all-wave rectification)	
Protective construction		IP66 (front panel with a rubber gasket)	

Dimensions and part names (unit: mm inch)

Tolerance ±1.0 ±.039

10.5 .413
88.5 3.484
75 2.953
68.5 2.697
Mounting bracket
31 1.181
R5.5 R.217
35.4 1.394
44 1.732
HOUR METER
0 0 0 0 0 h
Power supply LED display
When the power is turned ON the green lamp illuminates
Unit
Spring washer
Installation screw

Panel installation diagram

φ62 φ2.441
Lead wire 0.1N·m to 0.2N·m screw torque
Rubber gasket
Installation panel
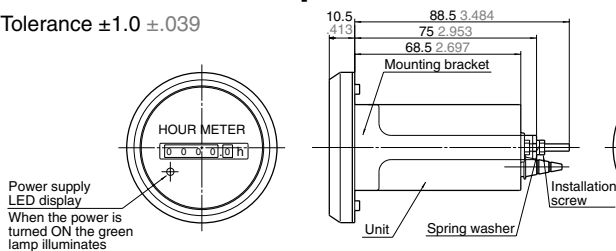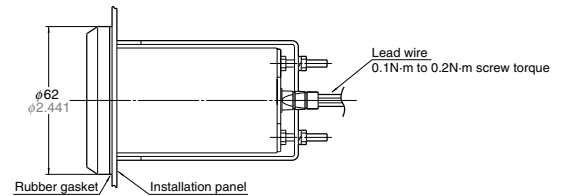
APPLICATIONS

• **Compact vessels**
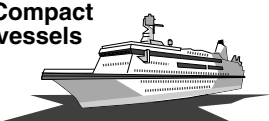
• **Construction machines**

• **Busses**
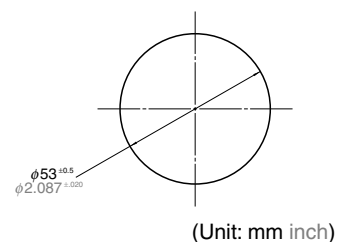
• **Generators**
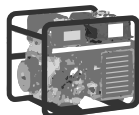
• **Agricultural machines**

Panel cutout dimensions

φ53 ±0.5 φ2.087 ±.020

(Unit: mm inch)

Panasonic
ideas for life

HOUR METER

TH13·TH23

52
2.047

52
2.047

54
2.126

mm inch

TH23 (with reset function)

TH13 (without reset function)

FEATURES

1. High-performance compact sync motor
The accurately turning motor is employed to provide for longer period of measurement.
2. Compact and stylish
3. Easier wiring
The flat terminals (#187) are quick and easy to connect.
4. Rotary indicator
The rotary indicator makes one turn every 2 minutes for quick monitoring.

5. CE marking
The hour meters satisfy EMC directives (EN50081-2/EN50082-2) and low-voltage directives (EN61010-1).

TYPICAL APPLICATIONS

Maintenance management of machine tools, automated machines, control panels, forming machines, medical equipment, generators, compressors, water treatment facilities, presses, motors, etc.

Replacing the TH13/23 series unit with the TH14/24 series unit

The TH13/TH23 series units are interchangeable with the TH14/24 series units. Use the specified mounting frame because of a different setup method. It is advisable to introduce the TH14/23 series units for the first time.
DIN48 size and mounting frame setup

Mounting frame
(sold separately):
TH1400020

Panel

□52 □48 □47 □45

Mounting flame

SPECIFICATIONS

Rated operating voltage	100V, 200V, 110V, 115 to 120V, 220V, 240V
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) 0 to 9999.9 hours (TH23 series)
Minimum time display	0.1 hours (6 min)
Rated power consumption	Approx. 1.5 W
Initial insulation resistance (At 500 V DC)	Min. 100 MΩ Between live and dead metal parts
Initial breakdown voltage	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
Weight	135 g 4.76 oz	130 g 4.59 oz

PRODUCT TYPE

Type	Rated operating voltage	Part No.		Rated operating voltage	Part No.	
		50Hz	60Hz		50Hz	60Hz
TH13 types (without reset)	100V AC	TH1345	TH1346	24V AC	TH1325	TH1326
				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)	100V AC	TH2345	TH2346	24V AC	TH2325	TH2326
				115V AC (115 to 120V AC)	TH2375	TH2376
	200V AC	TH2355	TH2356	220V AC	TH2385	TH2386
	110V AC	TH2365	TH2366	240V AC	TH2395	TH2396

Notes: 1. The AC 115-120V, AC 220V and AC 240V types are UL-recognized and CSA-certified. For those products, specify "U" at the end of the part No. when ordering.
2. If you want the CE marking on your products, specify "CE" at the end of the part No. when ordering.
3. When ordering a UL-listed/CSA-certified, CE-marked product, specify "TH2376UCE" for example (in the case of TH13 series AC 115-120V, 60Hz type).

DIMENSIONS

General tolerance: ±1.0 ±.039 mm inch

• **TH13**

• **TH23**

Reset button
(TH23 only)

RESET

52
2.047

HOUR METER

0 0 0 0 0.0 H

Rotary
indicator

52
2.047

HOUR METER

0 0 0 0 0.0 H

Rotary
indicator

Case

Mounting
bracket (supplied)

Decorative nut

46.8
1.843

6
.236

5
.197

4.75
.187

No.187 quick
connect terminal
(4.75 × 6.0 × 0.5)
(.187 × .236 × .020)

54
2.126

72
2.835

WIRING DIAGRAM

M

Operating power supply

PANEL MOUNTING

Panel

Case

Mounting
bracket (supplied)

Decorative
nut

5
.197

67
2.638

• **Panel cutout**

47 +0.5 −0.1
1.850 +.020 −.004

132
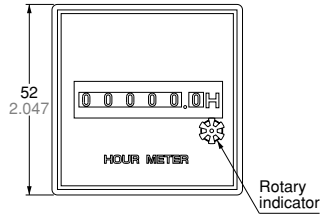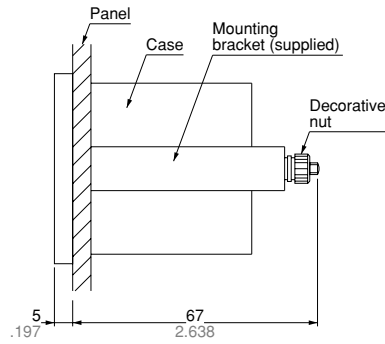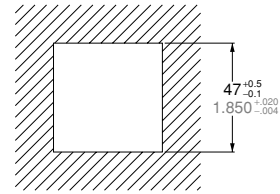
Panasonic
ideas for life

DIN48 SIZE HOUR METER

TH14·TH24
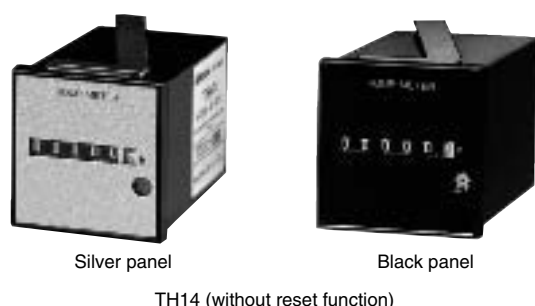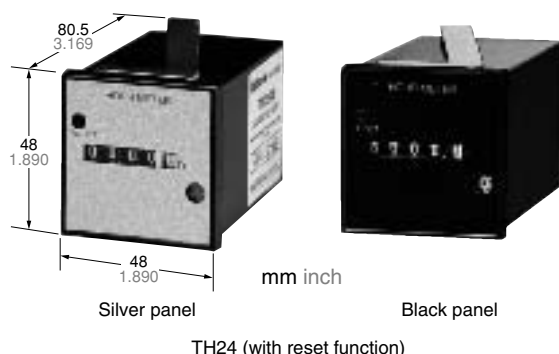
80.5 / 3.169
48 / 1.890
48 / 1.890
mm inch

Silver panel   Black panel

TH24 (with reset function)

Silver panel   Black panel

TH14 (without reset function)

FEATURES

1. High-performance compact sync motor
The accurately turning motor is employed to provide for longer period of measurement.

2. 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.

3. Dimensions as per DIN 43700 standard
The units are in the 48 × 48 DIN standard size. They can be fitted in panels and give refined metallic appearance.

4. Easier wiring
The flat terminals (#187) are quick and easy to connect.

5. Rotary indicator
The rotary indicator makes one turn every 2 minutes for quick monitoring.

6. CE marking
The hour meters satisfy EMC directives (EN50081-2/EN50082-2) and low-voltage directives (EN61010-1).

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
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) 0 to 9999.9 hours (TH24 series)
Minimum time display	0.1 hours (6 min)
Rated power consumption	Approx. 1.5 W
Initial insulation resistance (At 500 V DC)	Min. 100 MΩ; Between live and dead metal parts
Initial breakdown voltage	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
Weight	145 g 5.11 oz (TH14 series) · 150 g 5.29 oz (TH24 series)

PRODUCT TYPE

Type	Rated operating voltage	Part No. Silver panel	Part No. Black panel	Rated operating voltage	Part No. Silver panel	Part No. Black panel	Rated operating voltage	Part No. Silver panel	Part No. Black panel
TH14 types (without reset)	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 types (with reset)	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

Notes: 1. Only the black-panel type is UL-recognized and CSA-certified. For this type, specify "U" at the end of the part No. when ordering.
2. If you want the CE marking on your products, specify "CE" at the end of the part No. when ordering.
3. When ordering a UL-listed/CSA-certified, CE-marked product, specify "TH147UCE" for example (in the case of TH14 series, AC 115-120V type).
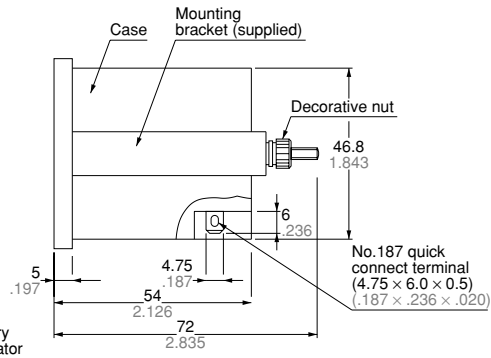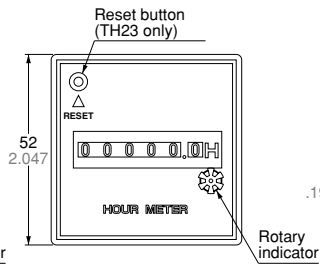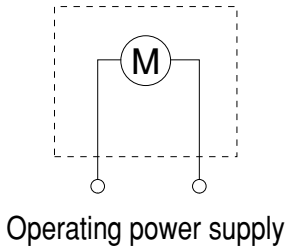
DIMENSIONS

General tolerance: ±1.0 ±.039 mm inch

HOUR METER

0 0 0 0 0.0 h

48
1.890

Rotary indicator

Case
Mounting bracket (supplied)
Decorative nut

No.187 quick connect terminal (4.7 × 6.0 × 0.5) (.185 × .236 × .020)

5.5
.217

75
2.953

94
3.701

50
1.969

60Hz
50Hz

Hz setting switch

44.8
1.764

WIRING DIAGRAM

M

Operating power supply

PANEL MOUNTING

mm inch

Panel
Case
Mounting bracket (supplied)
Decorative nut

5.5
.217

88.5
3.484

50
1.969

• **Panel cutout**

$45 ^{+0.6}_{0}$
$1.772 ^{+.024}_{0}$
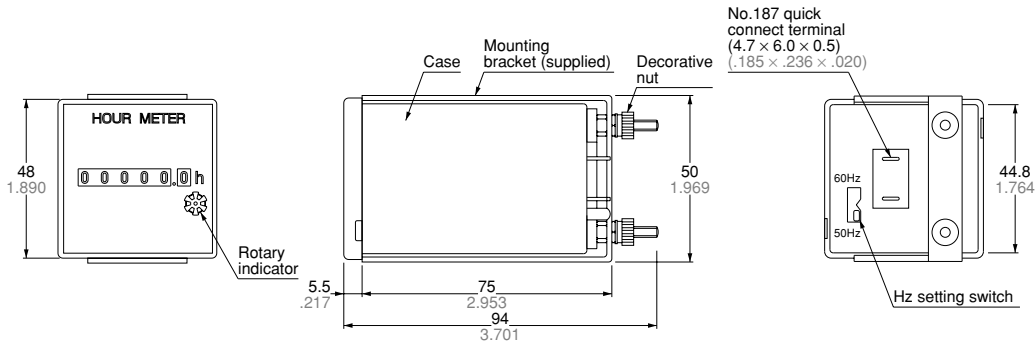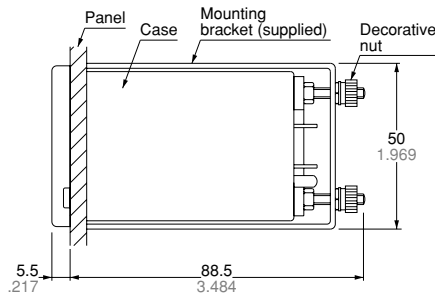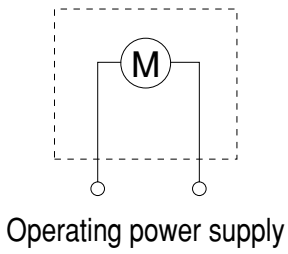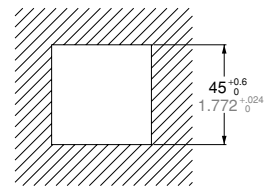
Panasonic
ideas for life

DIN48 DUAL INDICATOR HOUR METER

TH40

Silver panel

Black panel

80.5
3.169

48
1.890

48
1.890

mm inch
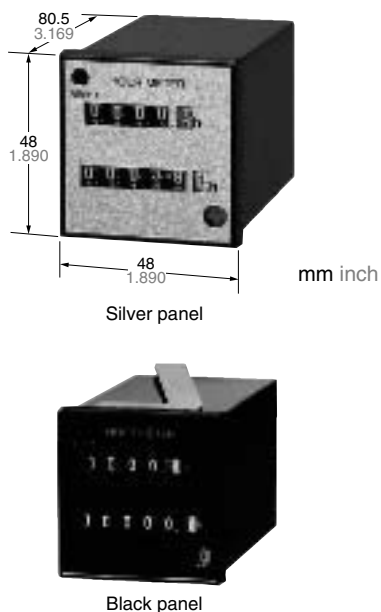
FEATURES

1. Upgraded composite function
Specified-period measurement and total-time measurement can be monitored on a single unit.

2. High-performance compact sync motor
The accurately turning motor is employed to provide for longer period of measurement.

3. 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.

4. Dimensions as per DIN 43700 standard
The units are in the 48 × 48 DIN standard size. They can be fitted in panels and give refined metallic appearance.

5. Easier wiring
The flat terminals (#187) are quick and easy to connect.

6. Rotary indicator
The rotary indicator makes one turn every 2 minutes for quick monitoring.

7. CE marking
The hour meters satisfy EMC directives (EN50081-2/EN50082-2) and low-voltage directives (EN61010-1).

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
Operating voltage range	85 to 115% of rated operating voltage
Rated frequency	50/60 Hz (selectable by switch)
Counting range	[without reset indicator]0 to 99999.9 hours [with reset indicator]0 to 9999.9 hours
Minimum time display	0.1 hours (6 min)
Rated power consumption	Approx. 1.5 W
Initial insulation resistance (At 500 V DC)	Min. 100 MΩ; Between live and dead metal parts
Initial breakdown voltage	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
Weight	160 g 5.64 oz

PRODUCT TYPE

Type	Rated operating voltage	Part No.		Rated operating voltage	Part No.		Rated operating voltage	Part No.	
		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

Note: If you want the CE marking on your products, specify "CE" at the end of the part No. when ordering.

TH40

DIMENSIONS

General tolerance: ±1.0 ±.039 mm inch

Reset button

Accumulated hours indicator (with reset)

Total accmulated hours indicator (without reset)

HOUR METER
RESET
0 0 0 0 0 .0 h
0 0 0 0 0 .0 h

48
1.890

Rotary indicator

Case

Mounting bracket (supplied)

Decorative nut

No.187 quick connect terminal (4.7 × 6.0 × 0.5) (.185 × .236 × .020)

50
1.969

5.5
.217

75
2.953

94
3.701

44.8
1.764

60Hz
50Hz

Hz setting switch

WIRING DIAGRAM

M

Operating power supply

PANEL MOUNTING

mm inch

• **Panel cutout**

Panel

Case

Mounting bracket (supplied)

Decorative nut

50
1.969

5.5
.217

88.5
3.484

45 +0.6 0
1.772 +.024 0
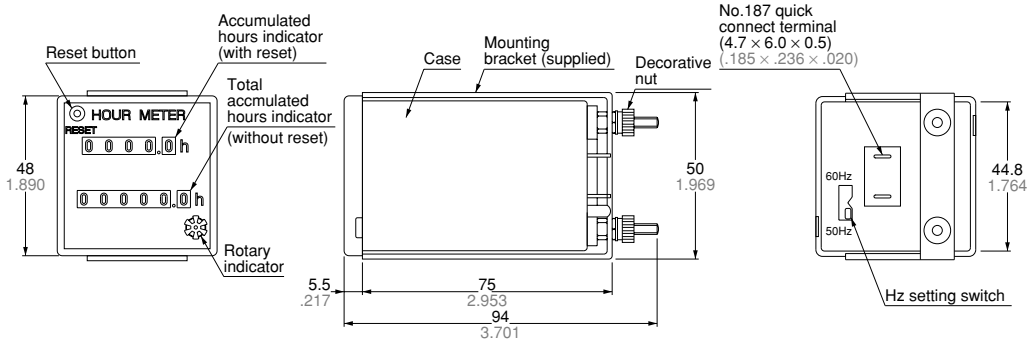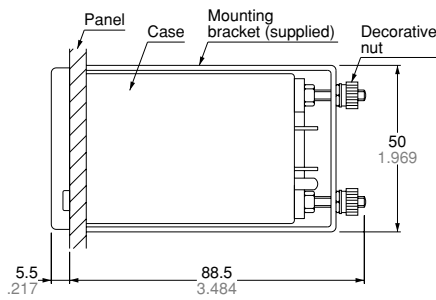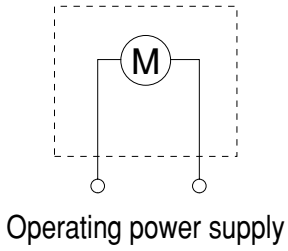
Panasonic
ideas for life

DIN48 MINUTES INDICATOR HOUR METER

TH50

Silver panel

Black panel

mm inch
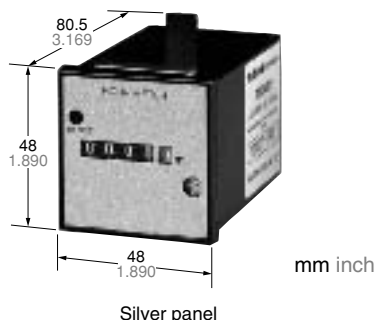
FEATURES

1. Measurement and management in units of minutes
Unlike conventional hour meters, the time can be measured and managed in minutes.

2. Reset button
The hour meters can be reset to zero for repeated measurement.

3. High-performance compact sync motor
The accurately turning motor is employed to provide for longer period of measurement.

4. 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.

5. Dimensions as per DIN 43700 standard
The units are in the 48 × 48 DIN standard size. They can be fitted in panels and give refined metallic appearance.

6. Easier wiring
The flat terminals (#187) are quick and easy to connect.

7. Rotary indicator
The rotary indicator makes one turn every 2 minutes for quick monitoring.

8. CE marking
The hour meters satisfy EMC directives (EN50081-2/EN50082-2) and low-voltage directives (EN61010-1).

SPECIFICATION

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
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
Initial insulation resistance (At 500 V DC)	Min. 100 MΩ Between live and dead metal parts
Initial breakdown voltage	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)
Shock resistance — 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
Weight	150 g 5.29 oz

PRODUCT TYPE

Type	Rated operating voltage	Part No. Silver panel	Part No. Black panel	Rated operating voltage	Part No. Silver panel	Part No. Black panel	Rated operating voltage	Part No. Silver panel	Part No. 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

Note: For CE-marked products, specify "CE" at the end of the part No. when ordering.

TH50

DIMENSIONS

General tolerance: ±1.0 ±.039 mm inch

Reset button

HOUR METER

RESET

0 0 0 0 0.0 m

48
1.890

Rotary
indicator

Case

Mounting
bracket (supplied)

Decorative
nut

No.187 quick
connect terminal
(4.7 × 6.0 × 0.5)
(.185 × .236 × .020)

50
1.969

5.5
.217

75
2.953

94
3.701

60Hz

50Hz

44.8
1.764

Hz setting switch

WIRING DIAGRAM

M

Operating power supply

PANEL MOUNTING

mm inch

• Panel cutout

Panel

Case

Mounting
bracket (supplied)

Decorative
nut

50
1.969

5.5
.217

88.5
3.484

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$
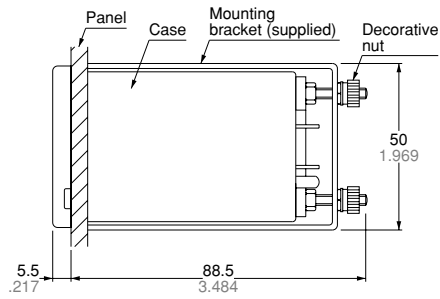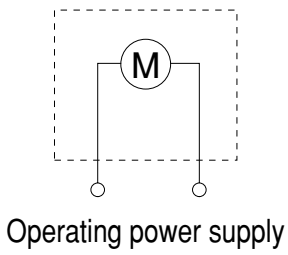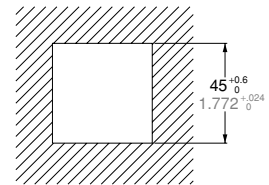
Panasonic
ideas for life

**DIN HALF SIZE
HOUR METER**

TH63·TH64

TH64 (with reset function)

TH63 (without reset function)

mm inch

3. Wide-ranging measurement display
The measurement can be displayed from 0.1 hour up to 99999.9 hours (TH63). The dial size is the same as that of 48 × 48 DIN size hour meters (TH14 and TH24 series).

4. Easy to install
The flat terminals (#187) are used for easier wiring. There is no need to undo the lock spring.

5. 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.

6. Rotary indicator
NAiS's original moire pattern mechanism helps watch the rotary indicator for quick monitoring (one turn every 72 seconds).

7. CE marking
The hour meters satisfy EMC directives (EN50081-2/EN50082-2) and low-voltage directives (EN61010-1).

FEATURES

1. Compact to save panel space
The 24 × 48 mm hour meters are just half the DIN 48 × 48 standard size. They help save the panel space.

2. Reset button
The hour meters can be reset to zero (TH64).

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, 115 to 120 V AC, 200 V AC, 220 V AC, 240 V AC
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) 0 to 9999.9 hours (TH64 series)
Minimum time display		0.1 hours (6 min)
Rated power consumption		Approx. 1.5 W
Initial insulation resistance (At 500 V DC)		Min. 100 MΩ Between live and dead metal parts
Initial breakdown voltage		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
Weight		Approx. 80 g 2.82 oz

PRODUCT TYPE

Type	Rated operating voltage	Part No.	Rated operating voltage	Part No.	Rated operating voltage	Part No.
TH63 types (without reset)	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 types (with reset)	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 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 No. Just specify the standard part No. when ordering.
3. If you want the CE marking on your products, specify "CE" at the end of the part No. when ordering.
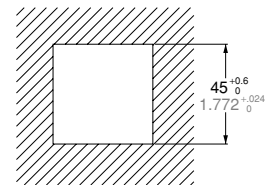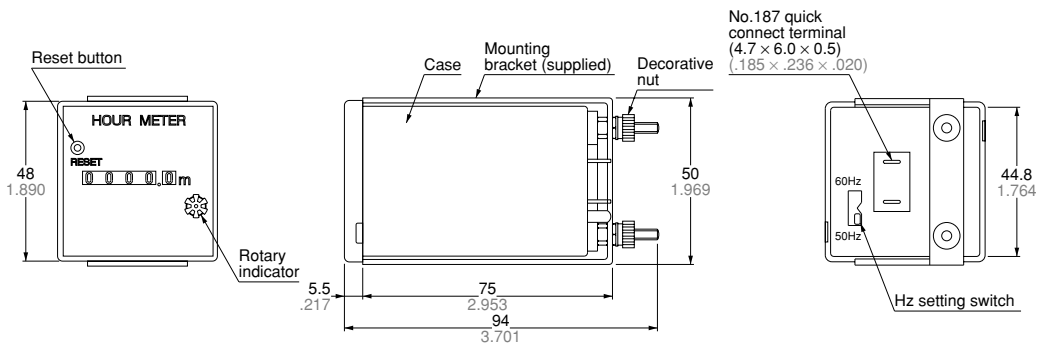
DIMENSIONS

General tolerance: ±0.5 ±.020 mm inch

Reset button (only for TH64 type)

Rotary indicator

Hz selector lever

No.187 quick
connect terminal

HOUR METER

24
.945

0 0 0 0.0 h

48
1.890

4.5
.177

53
2.087

66
2.598
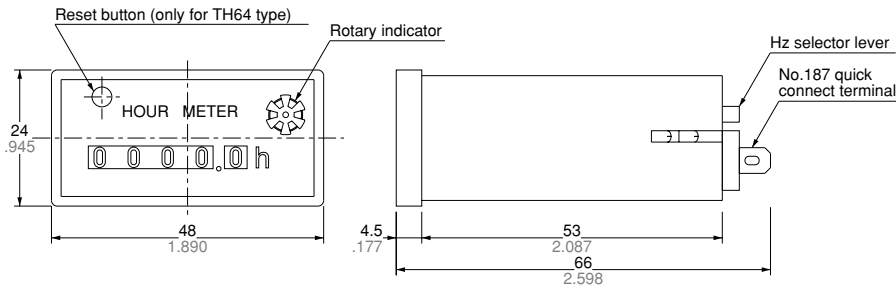
WIRING DIAGRAM

• **Panel cutout**   mm inch

M

Operating power supply

$45^{+0.6}_{0}$
$1.772^{+.024}_{0}$

$22.2^{+0.3}_{0}$
$.874^{+.012}_{0}$

R0.5 or less

Panel (thickness:
1 to 5 mm .039 to .197 inch)

For panel thickness of
5 to 9 mm .197 to .354 inch)
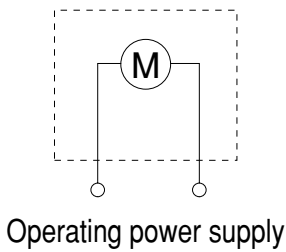
Mounting spring
(included)
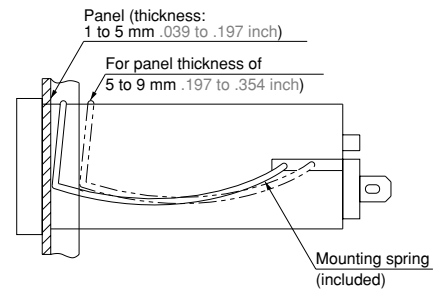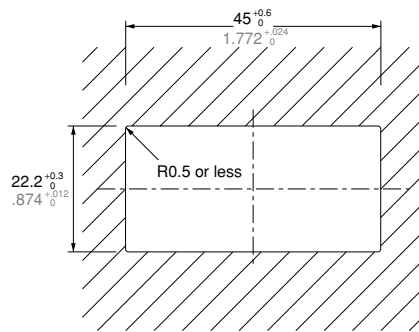
MOUNTING

1. Cut a $22.2^{+0.6}_{0} \times 45^{+0.6}_{0}$ mm $(.874^{+.024}_{0} \times 1.772^{+.024}_{0}$ 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.

Unfasten

Fasten
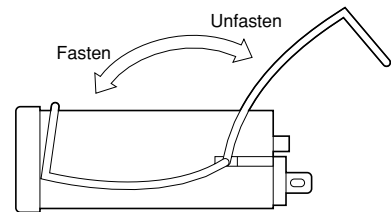
Panasonic
ideas for life

SIMPLE DISPLAY UNIT

MESSAGE RUNNER KP3H

IN OPERATI **N NOW** IN OPERATION NOW!

A FAULT HAS OCC **RRED** A FAULT HAS

Green

Orange

FEATURES

Use dedicated transmission software to transfer messages created in Microsoft Excel to the Message Runner

Use the dedicated transmission software (conversion software) to transmit and save messages created using Microsoft Excel to the Message Runner. Up to 64 messages can be saved and saved messages can be easily displayed using the terminals on the rear panel.

Roomy message display

The easy-to-read 8-character display can be scrolled to display messages of up to 32 characters in length.

Green and orange character display

Text can be displayed in either green or orange to reflect the equipment status and provide this information at a glance.

Compact DIN36x72 profile

The compact DIN36x72 profile allows the unit to be easily installed in control boxes where space was formerly unavailable.

Maintenance free

Troublesome lamp replacement is not required because LEDs are used for the LCD backlight. Also, a backup battery is not required because message data is stored in flash memory in the Message Runner.

Body
(Message Runner AKP31003 or AKP31007)

Transfer cable
(AKP3811: included in AKP3820)

(RS converter)

Development kit AKP3820 (cable + software)

Excel (Microsoft)
(For creating messages)

+
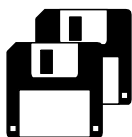
Transfer software
(Conversion software)
AKP3816
included in AKP3820

Compatible with a variety of equipment:

Simple control panels

Test equipment

Food processing equipment

Packing equipment
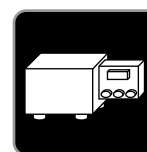
Washing equipment

In/out display panels

Message Runner KP3H

■ PRODUCT TYPE

Types	Contents	Part No.
Body (With face characters)	Message Runner KP3H (12-24V DC)	AKP31003
Body (Without face characters)	Message Runner KP3H (12-24V DC)	AKP31007
Transfer cable unit	1m message transfer cable with FD containing transfer software (conversion software)	AKP3820
Transfer cable	1m message transfer cable	AKP3811
Message creation software	FD English	AKP3816
Rubber packing	Use when water resistance is required for the panel.	AKP3804
Panel cover (Black) (With face characters)	A panel cover (ash gray) for the body is provided as standard.	AKP3801
Panel cover (Black) (Without face characters)		AKP3805
Connector with lead wires	Length: 1 m (one line) Length: 3 m (one line)	AKP3835 AKP3837

■ DIMENSIONS AND PART NAME (mm inch)
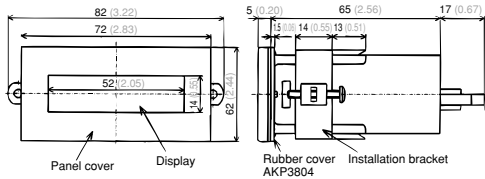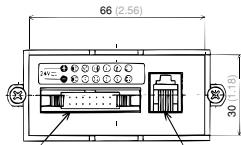
Input connector 1; AXM214011 (Matsushita Electric Works 14-pin MIL connector)

● Panel cutout dimensions

Applicable thickness: 1.0 to 5.0

■ SPECIFICATIONS

● General specifications

Item	Description
Rated power supply	12-24VDC
Operating voltage range	10.8 to 26.4VDC
Power consumption	Apporox.1.1W
Ambient temperature	0 to 40¡C 32 to 104¡F
Ambient humidity	20 to 85%RH (non-condensing)
Storage temperature	−20 to 60¡C −4 to 140¡F
Storage humidity	10 to 85%RH (non-condensing)
Vibration resistance	Conforms to JIS C0040, 10 to 55 Hz (1-minute cycle) Double amplitude: 0.75 mm 0.03 inch, 10 min. on 3 axes
Shock resistance	Conforms to JIS C0041, 98m/s² min., 4 times on 3 axes
Noise immunity	1,000 V [p-p] min., pulse width 50 ns, 1 µs between power supply terminals (based on noise simulator)
Static noise resistance	5kV (min.) when conducting (panel surface and periphery) 10kV (min.) when not conducting (panel surface and periphery)
Protective construction	IP66 (when rubber packing is used and from the front panel only)
Mass	Approx. 110g 3.88oz

● Display

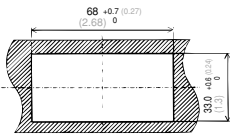| Item	Description
Display	Negative-type dot matrix LCD
Resolution	64 × 16 dots
Backlighting	Green/Orange LED (can be set for each message)
Character display	8 characters × 1 line
Message length	32 characters (max.)
Character types	Internal PC character set (depending on the internal character type, some characters cannot be displayed (circled characters and Roman numerals and so on))
Backlight control	Can be specified as either green or orange for each message
Character control	Scrolling (slow, medium or fast) and blinking display is possible

● Memory

Item	Description
Message storage	64
Internal memory	F-ROM (battery backup not required)

● External connection specifications

Item	Description
Power/display control input	Connect via 14-pin connector Unit side: AXM214011 (MIL connector manufactured by Matsushita Electric Works) (2 pins for power supply, and 9 pins for display control)
Message transfer input	4-pin (modular connector) (special-purpose message transfer cable optional)

■ TERMINAL WIRING (INPUT CONNECTORS)

*Be sure to turn off the power of the Message Runner unit and computer before connecting or disconnecting the connector and transmission cable.

● Input connector 1 (for power and message call up and display)
● Connector used
Use a connector that is compatible with the unit connector (AXM214011 Matsushita Electric Works: 14P MIL connector).
Recommended connector: AXM114415 (Matsushita Electric Works 14-wire bracket cable type (with strain relief))
(Not included with Message Runner unit. Please purchase separately.)
The AKP3835 connector (optional) with lead wires is also available.

● Input connector 2 (for message input)
● Messages can be input to the unit by connecting a special-purpose transfer cable (Part No.: AKP3820)
Refer to the instruction manual provided with the transfer cable unit (AKP3820) for further details.

● When using a non-contact (transistor) input, connect as follows:
As a guideline, the collector current of the transistor should be 50 V or higher, and the leakage current should be less than 1 µA.

■ MESSAGE CALL UP

● Specified call up
● Specify the message number to call up and display on the screen. The C2 terminal should not be connected. (Turn off SW7.)
32 16 8 4 2 1 are for a 6-digit binary number. (For the switches, 1 is ON and 2 is OFF.)

Message No.	32 SW6	16 SW5	8 SW4	4 SW3	2 SW2	1 SW1
00	0	0	0	0	0	0
01	0	0	0	0	0	1
02	0	0	0	0	1	0
61	1	1	1	1	0	1
62	1	1	1	1	1	0
63	1	1	1	1	1	1

The 64 messages are numbered from 00 to 63.

● Sequential call up
1. Turn on terminal C2 (SW7 on).
2. Messages stored in the unit are displayed in order from message 00 by switching pin 1 on and off.
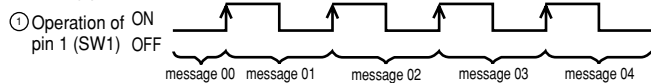
When the power is turned on, message 00 is displayed. After that the message number is incremented by switching pin 1 on and off.
(An interval of at least 1.5 seconds is required between on/off switching for operational reasons.)

● Reset
The unit is reset if terminal R is short-circuited to terminal C1 (SW8 is turned on). (When this is done the display darkens. This is normal and does not indicate a failure.)
● With specified call-up display, the specification message appears when operation resumes.
● With sequential call-up display, the display returns to message 00 when operation resumes.

**Industry Type
Multi-Range AC Input**

FP 24VDC Power Supplies

| 30.4 mm |

90 mm

**FP0 Power supply
FP0-PSA2**

| 42 mm |

115 mm

**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.

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)

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 OVERVIEW

1. International Standards
IEC standard

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

2. U.S.A.

LISTING MARK

RECOGNITION MARK

UL specifications
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", and applies to industrial products (finished products). Under this type of approval, products must be approved unconditionally. The other type is called "recognition", and is a conditional approval which applies to parts and materials.

Certification

Fig. 1

Component Acceptance

Fig. 2

CUL

Fig. 3

Fig. 4

Fig. 5

Fig. 6

CSA specifications
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. 1. The mark shown in Fig. 2 is called the "Component Acceptance" mark, and indicates conditional approval which is applicable to parts. The C-UL mark shown in Figs. 3 and 4 indicates that the product has been tested and approved in UL laboratories, based on CSA standards, through mutual approval activities. The marks shown in Fig. 5 (finished products) and Fig. 6 (parts) are consolidations of the C-UL and UL marks, and indicate that the product or part has obtained both C-UL and UL approval.

3. Europe
EN standard

European Standards/Norme Europeennee (France)/Europ_ishe 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

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
PRODUCT SERVICE

TÜV Rheinland

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

TIMER

Products Name	Recognized by UL Standards		Certified by CSA Standards		Lloyd's Register Standards		Remarks
	File No.	Recognized rating	File No.	Certified rating	File No.	Certified rating	
PM4H-A PM4H-S PM4H-M PM4H-SD PM4H-W	E122222	5A250VAC PILOT DUTY C300	LR39291	5A250VAC PILOT DUTY C300	98/10004	5A 250V AC (resistive)	"The standard models conform to the UL/CSA standard. (To place an order, you do not need to specify the tailing character ⑨ of each item number.)
PM4H-F	E122222	3A250VAC PILOT DUTY C300	LR39291	3A250VAC PILOT DUTY C300	98/10004	3A 250V AC (resistive)	
LT4H LT4H-W	E122222	3A250VAC PILOT DUTY C300 / 100mA30VDC	E122222 (C-UL)	3A250VAC PILOT DUTY C300 / 100mA30VDC	—	—	"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.)"
QM4H	E43149	5A250VAC PILOT DUTY C300	E43149 (C-UL)	5A250VAC PILOT DUTY C300	—	—	
PM4S	E43149	5A250VAC PILOT DUTY C300	E43149 (C-UL)	5A250VAC PILOT DUTY C300	—	—	
S1DX (Relay output) 2C	E122222	7A125VAC 6A250VAC 1/6HP125, 250VAC PILOT DUTY C300	LR39291	7A125VAC 6A250VAC 1/6HP125, 250VAC PILOT DUTY C300	98/10004	7A 250V AC (resistive)	"The standard models conform to the UL/CSA standard. (To place an order, you do not need to specify the tailing character ⑨ of each item number.)"
S1DX (Relay output) 4C	E122222	5A250VAC 1/10HP125, 250VAC PILOT DUTY C300	LR39291	5A250VAC 1/10HP125, 250VAC PILOT DUTY C300	98/10004	5A 250V AC (resistive)	
PM5S-A PM5S-S PM5S-M	E59504 (C-UL)	5A250VAC PILOT DUTY C300	E59504 (C-UL)	5A250VAC PILOT DUTY C300	—	—	"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.)

ACCESSORIES

Products Name	Recognized by UL Standards		Certified by CSA Standards		Lloyd's Register Standards		Remarks
	File No.	Recognized rating	File No.	Certified rating	File No.	Certified rating	
Common mounting tracks for timers	E59504	10A250VAC AT8-RFV (AT78029) AT8-RFD (AT78039) 7A250VAC AT8-DF8L (ATA48211) AT8-RR (AT78049) 8P cap was an approved as an option. AD8-RC (AD8013)	LR39291	10A250VAC AT8-RFV (AT78029) AT8-RFD (AT78039) 7A250VAC AT8-RR (AT78049) AT8-DF8L (ATA48211) 8P cap was an approved as an option. AD8-RC (AD8013)	—	—	
	E148103	AT8-DF8K (ATC180031) AT8-DF11K (ATC180041) AT8-R8K (AT78041) AT8- R11K (AT78051) Relay Socket	E148103 (C-UL)	AT8-DF8K (ATC180031) AT8-DF11K (ATC180041) AT8-R8K (AT78041) AT8- R11K (AT78051)	—	—	

INTERNATIONAL STANDARDS

COUNTERS

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

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

Note) 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 AT8-RFV (AT78029) AT8-RFD (AT78039) 7A250V AC AT8-DF8L (ATA48211) AT8-RR (AT78049) 8P cap CSA-certified as option. AD8-RC (AD8013)	LR26550 LR39291	10A250V AC AT8-RFV (AT78029) AT8-RFD (AT78039) 7A250V AC AT8-DF8L (ATA48211) AT8-RR (AT78049) 8P cap UL-listed as option. AD8-RC(AD8013)	
	E148103	AT8-DF8K (ATC180031) AT8-DF11K (ATC180041) AT8-R8K (AT78041) AT8- R11K (AT78051) Relay Socket	E148103 (C-UL)	AT8-DF8K (ATC180031) AT8-DF11K (ATC180041) AT8-R8K (AT78041) AT8- R11K (AT78051)	

CE MARKINGS OVERVIEW

Counter, Hour Meter conforming to EN/IEC standards

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

Product classification	Product name	EMC directives	Low-voltage directives
Timers	LT4H	EN 50081-2/EN 50082-2	VDE 0435/Part 2021
	LT4H-W	EN 50081-2/EN 50082-2	VDE 0435/Part 2021
	QM4H	EN 61000-6-4/EN 61000-6-2	EN61812-1
	PM4H	EN 50081-2/EN 50082-2	VDE 0435/Part 2021
	PM4S	EN 50081-2/EN 61000-6-2	EN 60101-1
	PM5S	EN 50081-2/EN 50082-2	VDE 0435/Part 2021
	S1DX	EN 50081-2/EN 50082-2	VDE 0435/Part 2021
Counters	LC4H	EN 50081-2/EN 50082-2	VDE 0435/Part 2021
	LC4H-S	EN 50081-2/EN 50082-2	VDE 0435/Part 2021
	LC4H-W	EN 50081-2/EN 50082-2	VDE 0435/Part 2021
	LC2H	EN 50081-2/EN 50082-2	EN 61010-1
Hour Meters	TH13	EN 50081-2/EN 50082-2	EN 61010-1
	TH23	EN 50081-2/EN 50082-2	EN 61010-1
	TH14	EN 50081-2/EN 50082-2	EN 61010-1
	TH24	EN 50081-2/EN 50082-2	EN 61010-1
	TH40	EN 50081-2/EN 50082-2	EN 61010-1
	TH50	EN 50081-2/EN 50082-2	EN 61010-1
	TH63	EN 50081-2/EN 50082-2	EN 61010-1
	TH64	EN 50081-2/EN 50082-2	EN 61010-1
	LH2H	EN 50081-2/EN 50082-2	EN 61010-1
	TH8	EN 50081-2/EN 50082-2	EN 61010-1

Note) For detailed conditions for certification, refer to "CE Marking" in "CAUTIONS FOR USE". For certified products, refer to their relevant pages. All products other than LT4H, LT4H-W, LC4H and LC4H-W do not bear the CE marking. If you want the CE marking on those products, please specify "CE" at the end of the part No. when ordering.
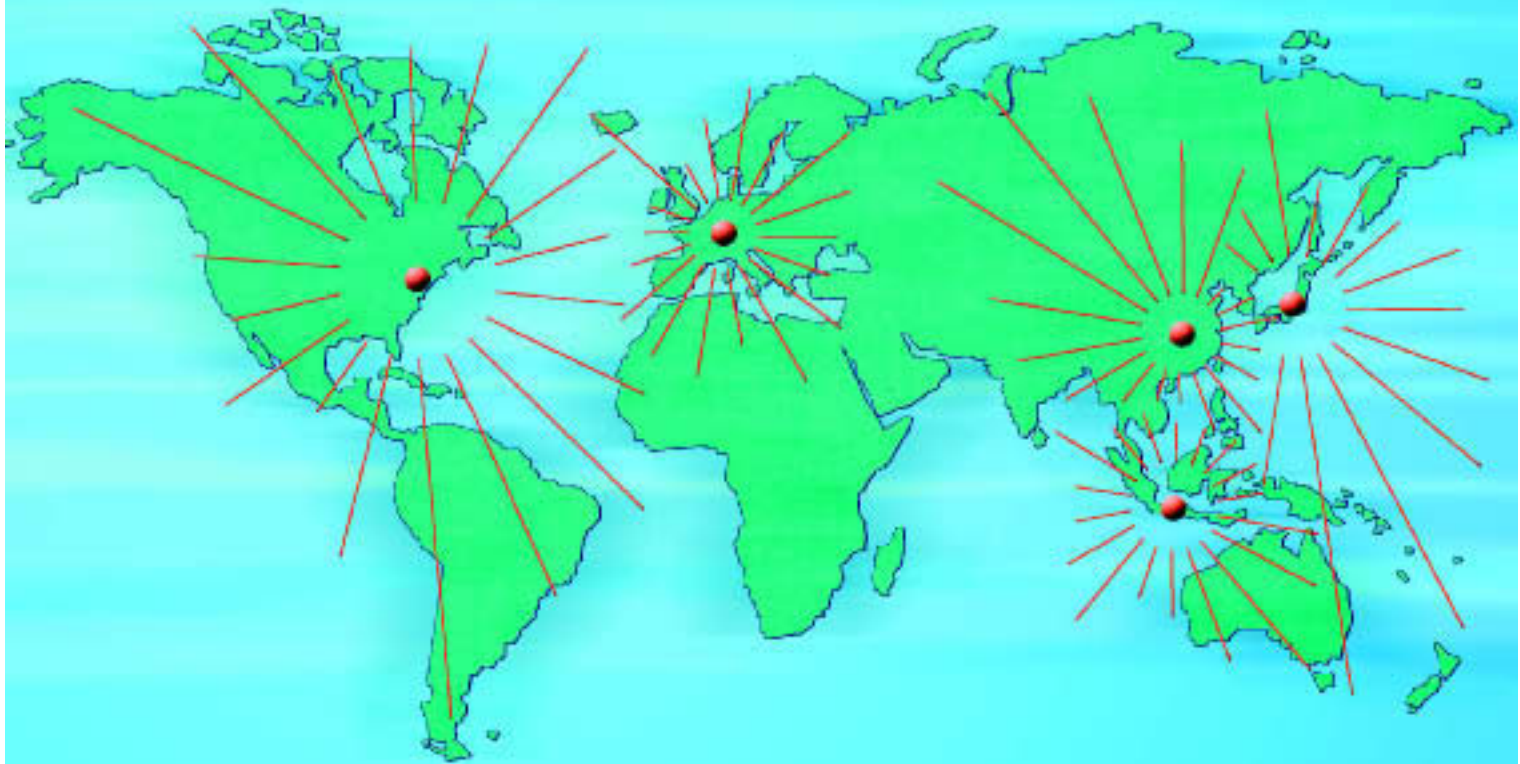
What are EN standards?

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.)

Global Network

North America	Europe	Asia Pacific	China	Japan
Aromat Corporation	**Matsushita Electric Works (Europe) AG**	**Matsushita Electric Works (Asia Pacific) Pte. Ltd.**	**Matsushita Electric Works (China) Co., Ltd.**	**Matsushita Electric Works, Ltd.** *Global Headquarter*

Matsushita Electric Works

Please contact our Global Sales Companies in:

Europe

▶ **Europe**	**Matsushita Electric Works (Europe) AG**	Rudolf-Diesel-Ring 2, 83607 Holzkirchen, Tel. (08024) 648-0, Fax (08024) 648-111, www.mew-europe.com
▶ **Austria**	**Matsushita Electric Works Austria GmbH**	Josef Madersperger Str. 2, 2362 Biedermannsdorf, Tel. (0 22 36) 2 68 46, Fax (0 22 36) 4 61 33, www.matsushita.at
	MEW Electronic Materials (Europe) GmbH	Industriehafenstraße 9, 4470 Enns, Tel. (0 72 23) 8 83, Fax (0 72 23) 8 83 33, www.mew-europe.com
▶ **Benelux**	**Matsushita Electric Works Benelux B.V.**	De Rijn 4, (Postbus 211), 5684 PJ Best, (5680 AE Best), Netherlands, Tel. (0499) 372727, Fax (0499) 372185, www.matsushita.nl, www.matsushita.be
▶ **Czech Republic**	**Matsushita Electric Works (CZ) s.r.o.**	Prumyslová 1, CZ-34815 Planá, Tel. 374799990, Fax 374799999, www.nais.cz
▶ **France**	**Matsushita Electric Works France S.A.R.L.**	B.P. 44, F-91371 Verrières le Buisson CEDEX, Tél. 01 60135757, Fax 01 60135758, www.matsushita-france.fr
	MEW Electronic Materials (France) S.p.A.	26 Allée du Clos des Charmes, 77090 Collegien, Tél. 01 64622919, Fax 01 64622809
▶ **Germany**	**Matsushita Electric Works Deutschland GmbH**	Rudolf-Diesel-Ring 2, 83607 Holzkirchen, Tel. (08024) 648-0, Fax (08024) 648-555, www.matsushita.de
▶ **Ireland**	**Matsushita Electric Works UK Ltd.**	Irish Branch Office, Waverley, Old Naas Road, Bluebell, Dublin 12, Tel: (01) 4600969, Fax: (01) 4601131, www.matsushita.ie
▶ **Italy**	**Matsushita Electric Works Italia s.r.l.**	Via del Commercio 3-5 (Z.I. Ferlina), 37012 Bussolengo (VR), Tel. (045) 6752711, Fax (045) 6700444, www.matsushita.it
	MEW Building Materials (Europe) s.r.l.	Viale Elvezia 18, 20154 Milano (MI), Tel. (02) 33604525, Fax (02) 33605053
	MEW Lighting (Europe) s.r.l.	Via del Commercio 3-5 (Z.I. Ferlina), 37012 Bussolengo (VR), Tel. (045) 6703882, Fax (045) 6717420
▶ **Portugal**	**Matsushita Electric Works España S.A.**	Portuguese Branch Office, Avda Adelino Amaro da Costa 728 R/C J, 2750-277 Cascais, Tel. (21) 4812520, Fax (21) 4812529
▶ **Scandinavia**	**Matsushita Electric Works Scandinavia AB**	Sjöängsvägen 10, 19272 Sollentuna, Sweden, Tel. (08) 59476680, Fax (08) 59476690, www.matsushita.se
	MEW Fire & Security Technology AB	Citadellsvägen 23, 21118 Malmö, (040) 6977000, Fax (040) 6977099, www.mfstech.com
▶ **Spain**	**Matsushita Electric Works España S.A.**	Barajas Park, San Severo 20, 28042 Madrid, Tel. (91) 3293875, Fax (91) 3292976, www.matsushita.es
▶ **Switzerland**	**Matsushita Electric Works Schweiz AG**	Grundstrasse 8, 6343 Rotkreuz, Tel. (041) 7997050, Fax (041) 7997055, www.matsushita.ch
▶ **United Kingdom**	**Matsushita Electric Works UK Ltd.**	Sunrise Parkway, Linford Wood, Milton Keynes, MK14 6LF, Tel. (01908) 231555, Fax (01908) 231599, www.matsushita.co.uk

North & South America

▶ **USA**	**Aromat Corporation Head Office USA**	629 Central Avenue, New Providence, N.J. 07974, Tel. 1-908-464-3550, Fax 1-908-464-8513, www.aromat.com

Asia Pacific / China / Japan

▶ **China**	**Matsushita Electric Works (China) Co., Ltd.**	2013, Beijing Fortune, Building No. 5, Dong San Huan Bei Lu, Chaoyang District, Beijing, Tel. 86-10-6590-8646, Fax 86-10-6590-8647
▶ **Hong Kong**	**Matsushita Electric Works (Hong Kong), Ltd.**	Rm1601, 16/F, Tower 2, The Gateway, 25 Canton Road, Tsimshatsui, Kowloon, Hong Kong, Tel. (852) 2956-3118, Fax (852) 2956-0398
▶ **Japan**	**Matsushita Electric Works, Ltd.**	1048 Kadoma, Kadoma-shi, Osaka 571-8686, Japan, Tel. 06-6908-1050, Fax 06-6908-5781, www.mew.co.jp/e-acg/
▶ **Singapore**	**Matsushita Electric Works (Asia Pacific) Pte. Ltd.**	101 Thompson Road, #25-03/05, United Square, Singapore 307591, Tel. (65) 6255-5473, Fax (65) 6253-5689