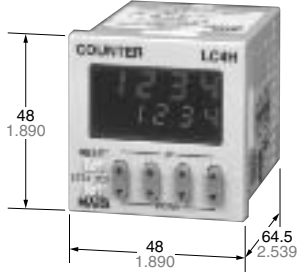


Panasonic
ideas for life

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

LC4H-S



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.

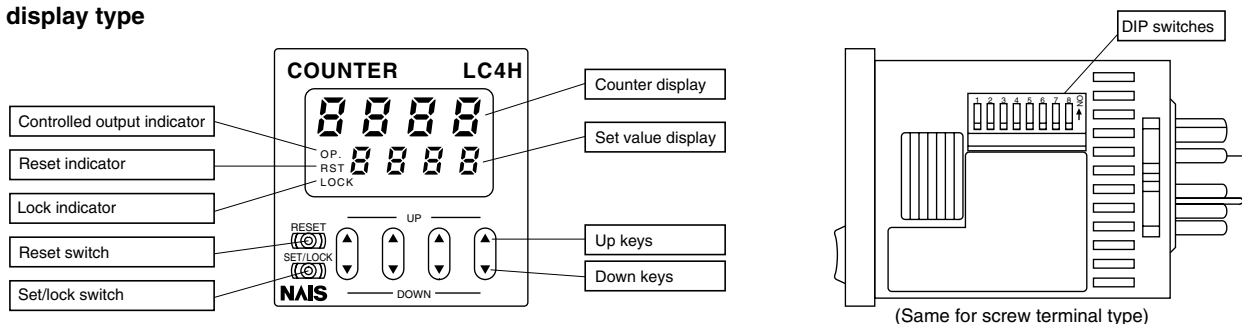
PRODUCT TYPES

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
					Scale Factor	11 Pin	LC4H-S-R4-24V
					Scale Factor	Screw	LC4H-S-R4-24VS
		Transistor	Scale Factor / Voltage Signal Input		11 Pin	LC4H-SV-R4-24V	
			Scale Factor / Voltage Signal Input		Screw	LC4H-SV-R4-24VS	
			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	30 Hz (cps) 5 kHz (kcps) switchable	Relay	100-240 V AC with 12V DC power supply	Available	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
					Scale Factor	11 Pin	LC4H-S-R6-24V
					Scale Factor	Screw	LC4H-S-R6-24VS
		Transistor	Scale Factor / Voltage Signal Input		11 Pin	LC4H-SV-R6-24V	
			Scale Factor / Voltage Signal Input		Screw	LC4H-SV-R6-24VS	
			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	

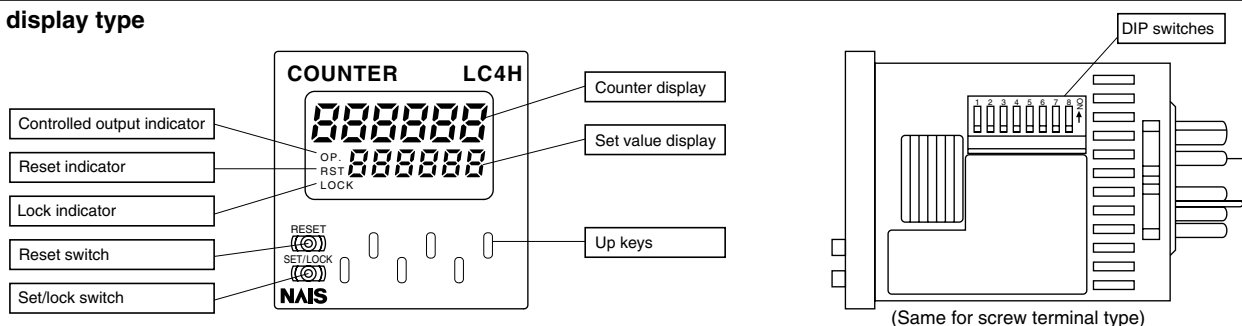
* A rubber gasket (ATC18002) and a mounting frame (AT8-DA4) are included.

Part names

• 4-digit display type



• 6-digit display type

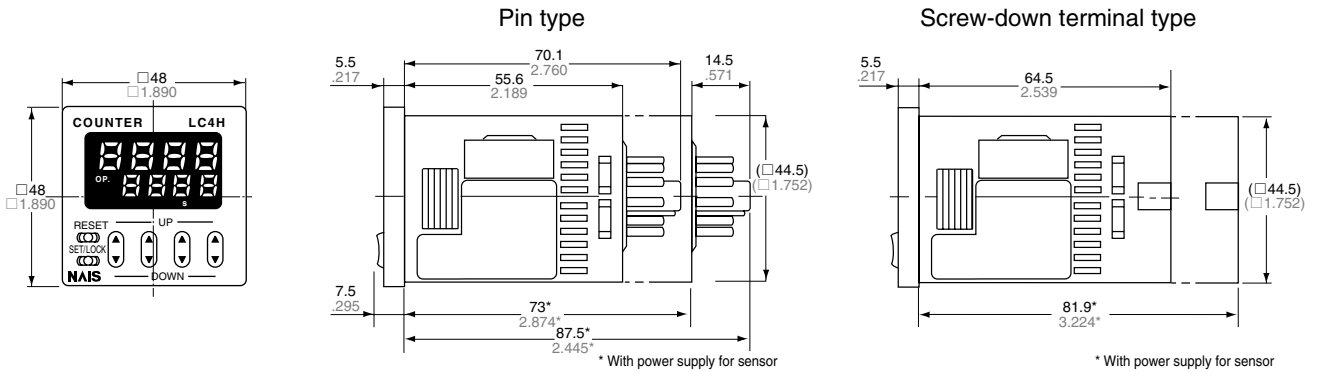


Specifications

Item	Relay output type		Transistor output type
	AC type	DC/AC type	DC/AC type
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 sensor	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)
		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/s ² (4 times on 3 axes)	
	Destructive	Min. 294 m/s ² (5 times on 3 axes)	
Operating conditions	Ambient temperature	-10° C to 55° C +14° F to +131° F	
	Ambient humidity	Max. 85 % RH	
	Air pressure	860 to 1,060 h Pa	
Connection	11-pin/screw terminal		
Protective construction	IP66 (front panel with a rubber gasket)		

Dimensions

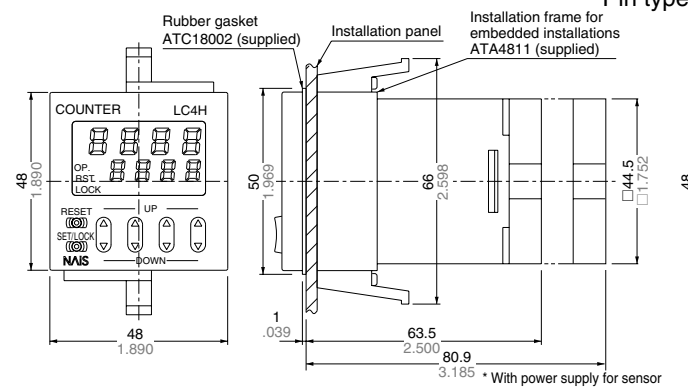
(units: mm inch)



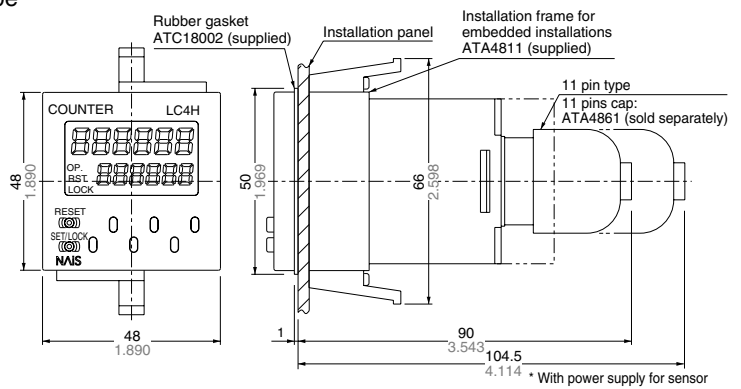
(* 6-digit display type has the same dimensions.)

• Dimensions for embedded installation (with adapter installed)

Screw terminal type



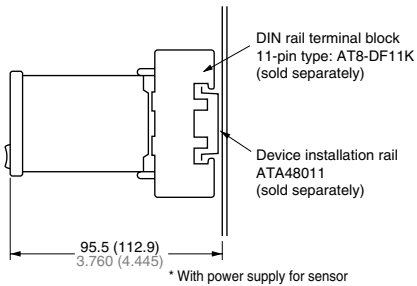
Pin type



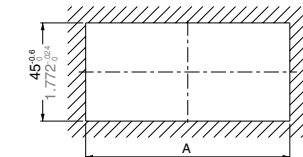
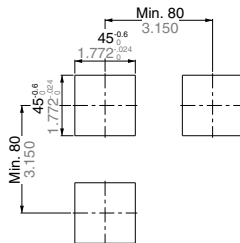
• Dimensions for front panel installations

• Installation panel cut-out dimensions

• For connected installations



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



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

$$A = (48 \times n - 2.5) \pm 0.6$$

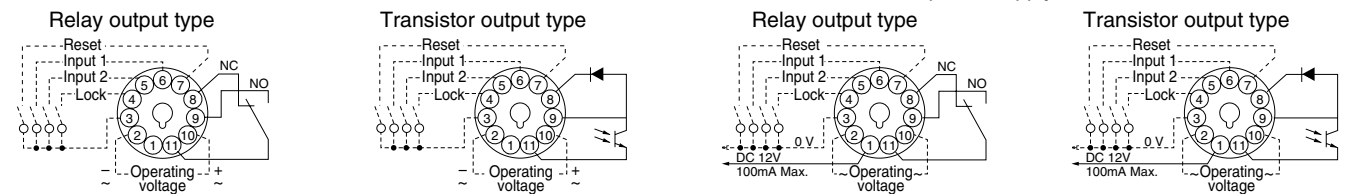
Note 1: The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.

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

Terminal layouts and Wiring diagrams

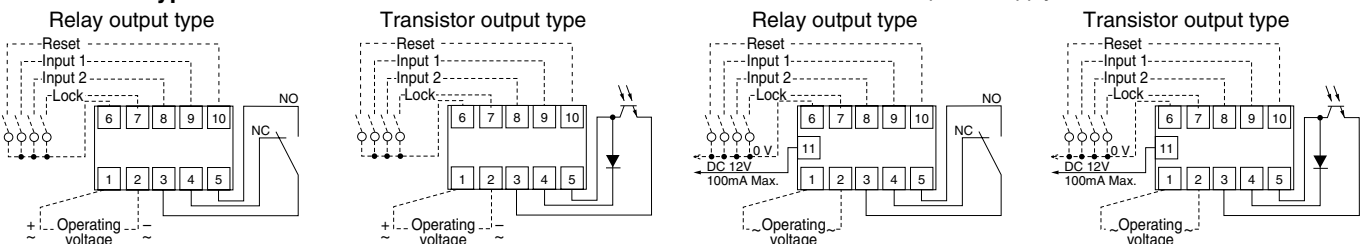
• Pin type

* With power supply for sensor



• Screw terminal type

* With power supply for sensor



Note) For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 99.

Setting the operation mode and counter

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

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

DIP switches

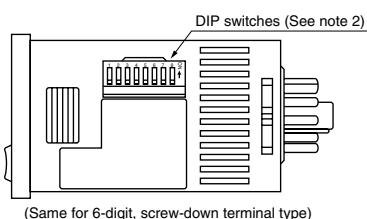
Item	DIP switch		
	OFF	ON	
1	Output mode		
2			
3			
4	Minimum reset input signal width	20 ms	1 ms
5	Maximum counter setting	30 Hz	5 kHz
6	Input mode		
7			
8			

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)



- 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.

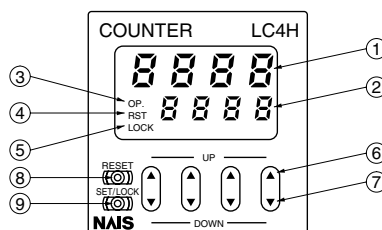
Setting procedure 2) Setting the set value

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

Front display section

• 4-digit display type

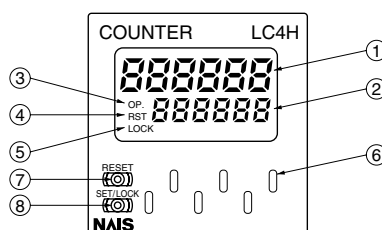
- ① Counter display
 - ② Set value display
 - ③ Controlled output indicator
 - ④ Reset indicator
 - ⑤ Lock indicator
 - ⑥ UP keys
 - ⑦ DOWN keys
- Changes the corresponding digit of the set value in the addition direction (upwards)



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

• 6-digit display type

- ① Counter display
- ② Set value display
- ③ Controlled output indicator
- ④ Reset indicator
- ⑤ Lock indicator
- ⑥ UP keys
- ⑦ DOWN keys



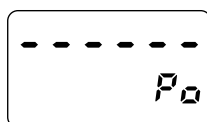
- ⑥ UP keys
- Changes the corresponding digit of the set value in the addition direction (upwards)
- ⑦ RESET switch
 - ⑧ SET/LOCK switch
- This is used to handle pre-scaling values, one-shot times, decimal point position settings, and key lock operations (to disable Up key, Down key, and Reset key operations).

Setting procedure 3) Setting the input mode

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

• Decimal point position setting mode

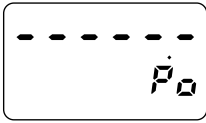
- ① Holding down the [SET/LOCK] key, press the key for the second digit to access the decimal point position setting mode.



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

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

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



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

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

• Setting the pre-scaling value

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

Example) 4-digit type



Example) 6-digit type



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

- ② When the setting mode has been accessed, release the [SET/LOCK] key.
③ Use the [UP] or [DOWN] key to set the pre-scaling value (this applies only to 4-digit models).
Select either: 0.001 to 9.999 (4-digit) or 0.001 to 99.999 (6-digit)
④ Press the [RESET] key to set the displayed pre-scaling value and return to normal operation.

• Setting the one-shot output time

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



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

- ② When the setting mode has been accessed, release the [SET/LOCK] key.
③ Each time the 1st-digit [UP] key is pressed, the one-shot output time changes in the following sequence, moving to the right:

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

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

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

Changing the set value

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

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

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

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

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

2) Down-count (subtraction) input
When counting is set to the subtraction direction, counting will continue until full scale is reached (-999 with the 4-digit type and -99999 with the 6-digit type), and then the display will change to "-----" with the 4-digit type and "-----" with the 6-digit type.

The counting value does not become "0 (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

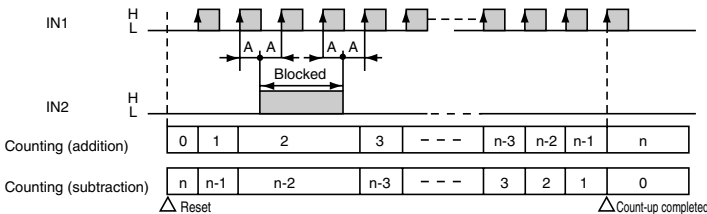
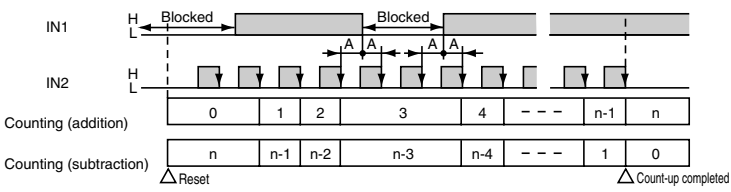
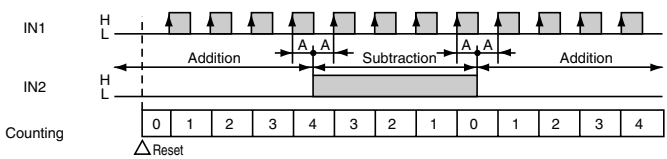
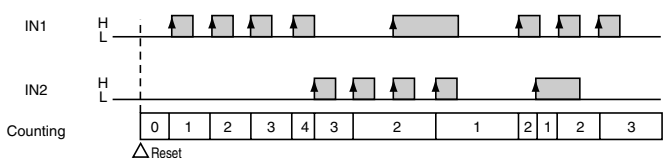
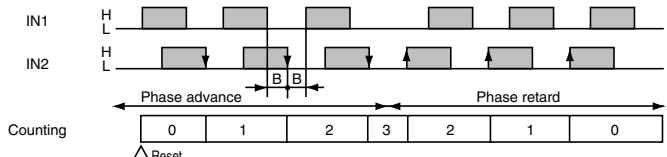
For more information regarding the cautions for use of LC4H series counter, refer to page 118 "LC4H series CAUTIONS FOR USE".

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).  <p>* "A" must be more than the minimum input signal width.</p>
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.	 <p>* "A" must be more than the minimum input signal width.</p>
Independent IND	IN1 is addition input and IN2 is subtraction input.	 <p>* IN1 and IN2 are completely independent, so there is no restriction on signal timing.</p>
Phase PHASE	Addition when the IN1 phase advances beyond IN2, and subtraction when the IN2 phase advances beyond IN1.	 <p>* "B" must be more than the minimum input signal width.</p>

LC4H-S

2. Output mode

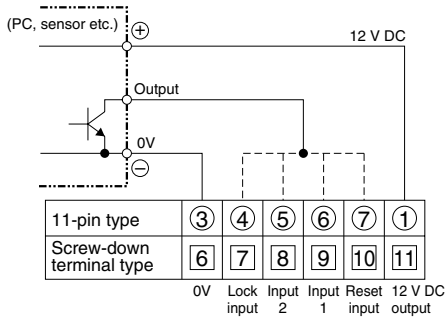
For the output mode, you can choose one of the following seven modes

- 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

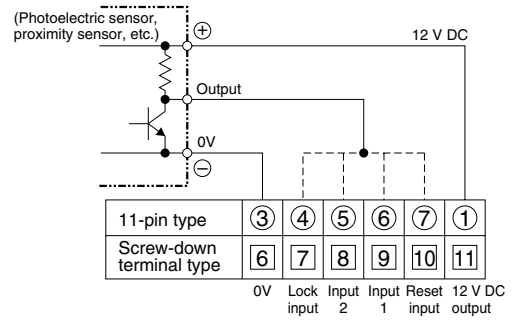
Output mode	Operation	(Example when input mode is either addition or subtraction)
Maintain output Hold count HOLD-A	Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion.	<p>* n: Set value</p>
Maintain 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.	<p>* n: Set value</p>
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.	<p>* n: Set value</p>
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.	<p>* n: Set value</p>
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	<p>* n: Set value</p>
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.	<p>* n: Set value</p>
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.	<p>* n: Set value</p>

Input connections

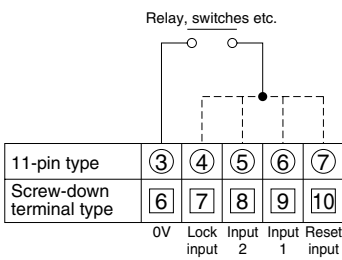
- Signal input type
 - Open collector



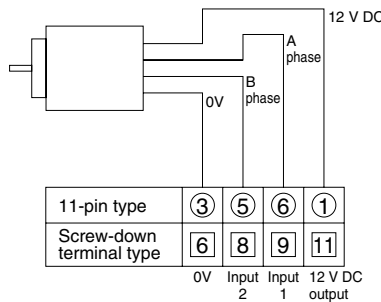
- For voltage output



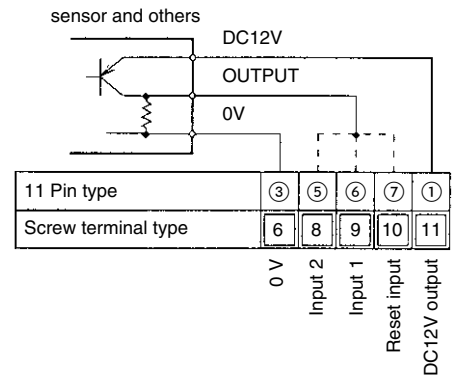
- Contact input



- For a rotary encoder



- PNP transistor type



Input 1, input 2, and reset input specifications

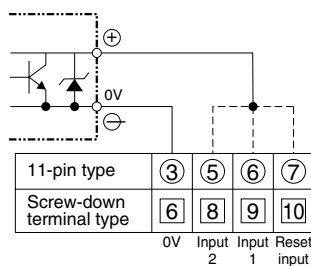
- Impedance during short-circuit: 1 kΩ max. (At 0 Ω, the outflow current is approximately 12 mA.)
- Residual voltage during short-circuit: 2 V max.
- Impedance when released: 100 kΩ min.
- Max. applied voltage: 40 VDC max.

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



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.

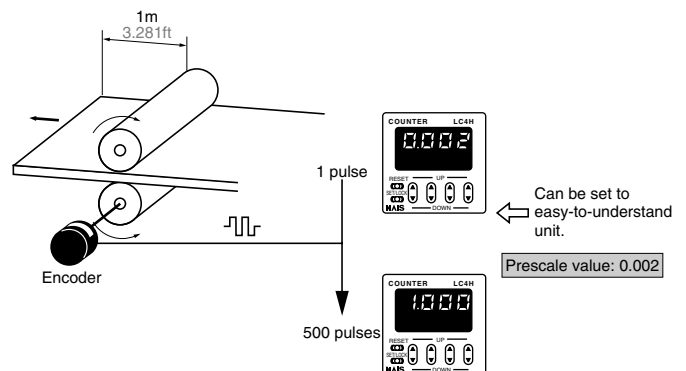
What is the prescale function?

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).



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).

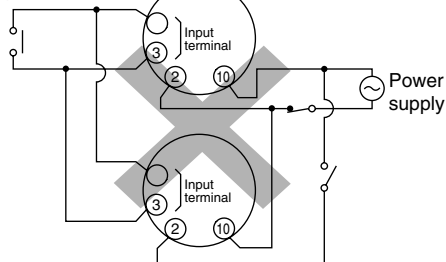
3) After turning the unit off, make sure that any resulting induced voltage or residual voltage is not applied to power supply terminals ② through ⑦ (8-pin type), ② through ⑩ (11-pin type) or ① and ② (screw-down terminal type). (If the power supply wire is wired parallel to the high voltage wire or power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

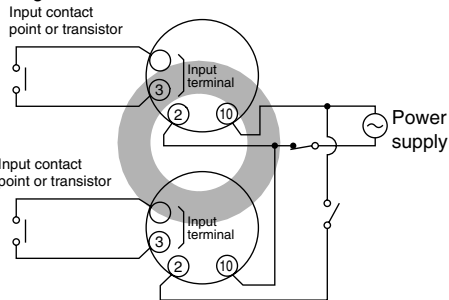
(Fig. A)
Input contact point or transistor



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,

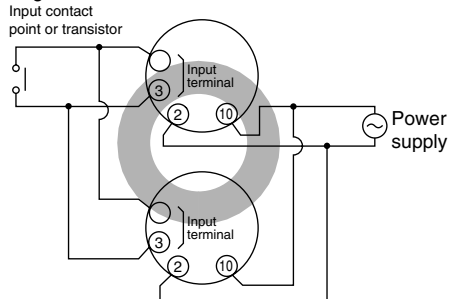
(Fig. B)



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

3. Input and output

(Fig. C)

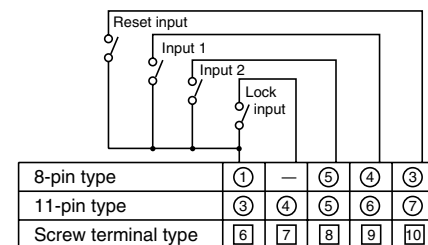


1) Signal input type

(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



Note: The LC4H-W does not have the lock input ④ ⑦.

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

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

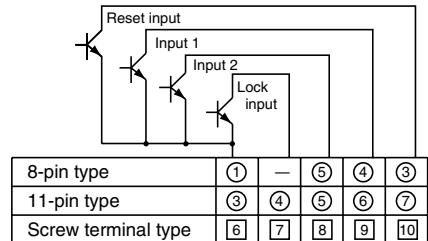
$I_C = 20 \text{ mA min.}$

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

Also, use transistors with a residual volt-

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

* The short-circuit impedance should be



Note: The LC4H-W does not have the lock input ④ ⑦.

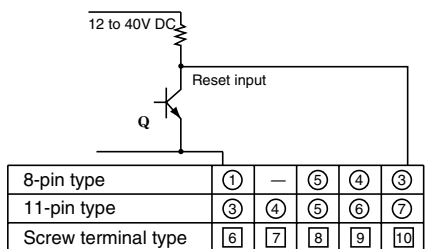
less than 1 k Ω .

[When the impedance is 0 Ω , the current coming from the input 1 and input 2 terminals is approximately 12 mA, and from the reset input and lock input terminals is approximately 1.5 mA.]

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

* 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



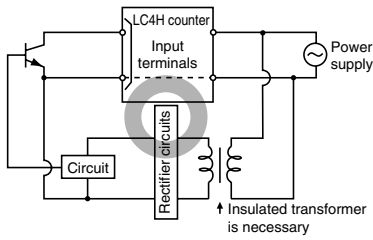
(The above example is for reset input)

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



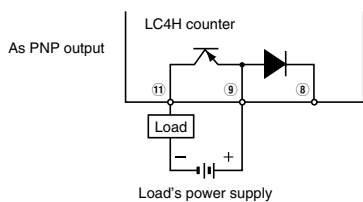
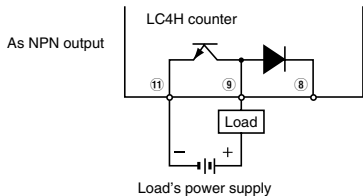
not contain a transformer, be aware that it is not possible for simultaneous input from an input contact point or transistor to a LC4H counter with independent power supply operation.

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 photo-coupler, it can be used as an NPN output or PNP (equal value) output. (The above example is 11-pin type)

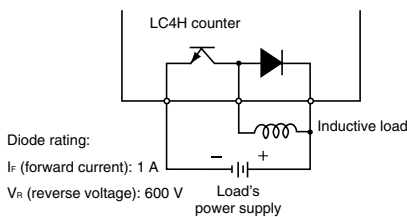
(2) Use the diode connected to the out-



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



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.

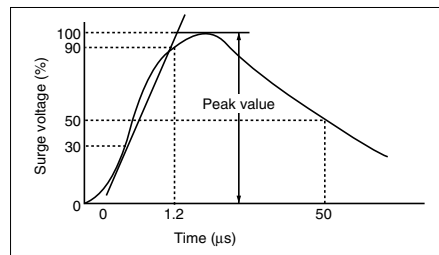
5. Conditions of usage

- 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]



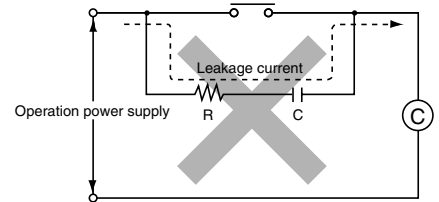
4) Regarding external noise, the values below are considered the noise-resistant voltages. If voltages rise above these values, malfunctions or damage to the internal circuitry may result, so take the necessary precautions.

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

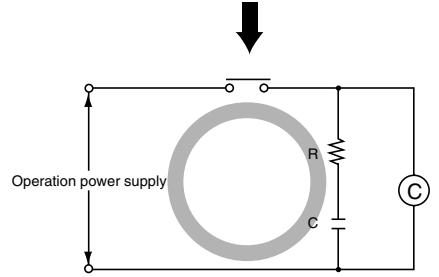
Noise wave form (noise simulator)

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.

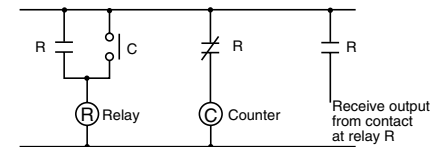


(Fig. A)



(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.



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
d IP E H	Incorrect DIP switch setting.		Restart unit (correct DIP switch settings)	
E H - 0 0	Malfunctioning CPU.	OFF	Enter reset, RESET key, or restart unit.	The values at start-up before the CPU malfunction occurred.
E H - 0 1	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 protec-

tion 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.