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Panasonic
ideas for life

ELECTRONIC COUNTER (with pre-scaling function)

LC4H-S Counters

4-digit type

6-digit type

11 pin type

Screw terminal type

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

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

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. Easy to use, simple operation, simple settings
- Operation modes (input/output modes) can be set easily, using DIP switches on the side panel.
- Values can be set easily, using key switches on the front panel.

3. Pre-scaling function provided
A pre-scaling function enables conversion of lengths and volumes to any desired values, and displays the results.

4. Built-in power supply for high-capacitance sensor
An internal power supply drives a 12 VDC, 100 mA high-capacitance sensor. (AC power supply types only)
Photoelectric switches, proximity switches and encoders can be directly connected.

5. Dual-path AC sensor can be connected.

6. Basic insulation between the power supply and the input terminal (only for the sensor type model with power supply)
There is no need for caution when connecting between terminals.

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

8. 4-digit or 6-digit display
Two sizes of displays are offered for you to choose the one that suits your needs.

9. 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.

10. Compliant with UL, c-UL and CE.

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

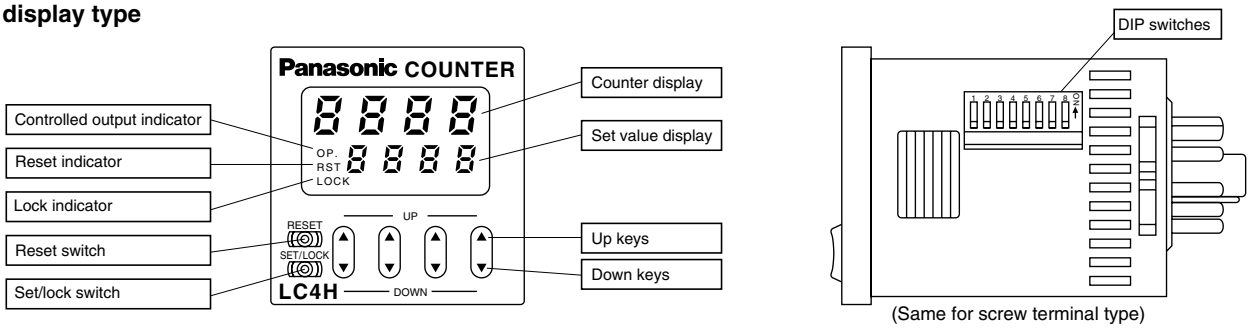
Product types

Digit	Count speed	Operation mode	Output	Operation voltage	Power for sensor	Terminal	Part No.
4	30 Hz/5 KHz 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	100 to 240 V AC	12 V DC 100mA	11 pins	LC4H-PS-R4-AC240V
						Screw terminal	LC4H-PS-R4-AC240VS
				12 to 24 V DC /24 V AC	None	11 pins	LC4H-S-R4-24V
						Screw terminal	LC4H-S-R4-24VS
			Transistor	12 to 24 V DC /24 V AC	None	11 pins	LC4H-S-T4-24V
						Screw terminal	LC4H-S-T4-24VS
6			Relay	100 to 24 V AC	12 V DC 100mA	11 pins	LC4H-PS-R6-AC240V
						Screw terminal	LC4H-PS-R6-AC240VS
				12 to 24 V DC /24 V AC	None	11 pins	LC4H-S-R6-24V
						Screw terminal	LC4H-S-R6-24VS
			Transistor	12 to 24 V DC /24 V AC	None	11 pins	LC4H-S-T6-24V
						Screw terminal	LC4H-S-T6-24VS

Notes) 1. Rubber packing (ATC18002) and an mounting frame (AT8-DA4) are included.
2. 100 to 240 VAC Tr outputs (11-pin terminal, screw-tightening terminal) types are also supported.

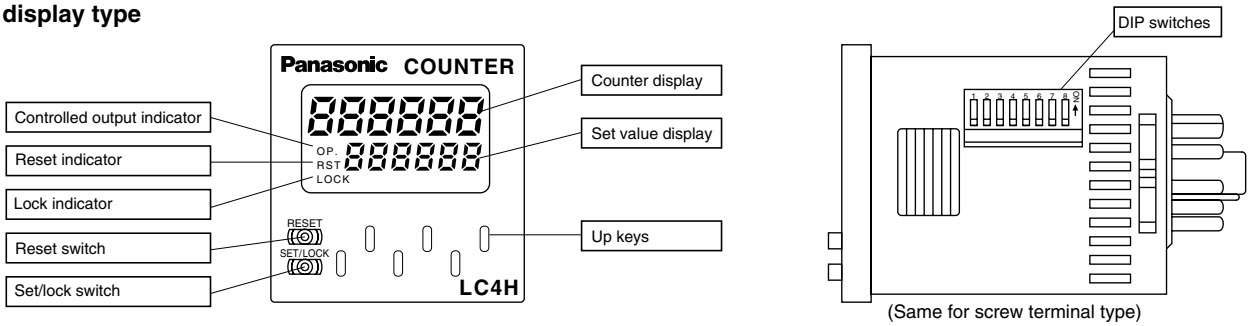
Part names

• 4-digit display type



(Same for screw terminal type)

• 6-digit display type



(Same for screw terminal type)

Specifications

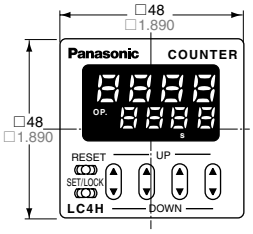
Item			Ralay output type		Transistor output type
			AC type	DC/AC type	DC/AC type
Rating	Rated operating voltage		100 to 240 V	12 to 24 V DC/24 V AC	12 to 24 V DC/24 V AC
	Rated frequency		50/60 Hz common		
	Rated power consumption		Max. 10 V A	Max. 3 W	
	Rated control capacity		5 A 250 V AC (resistive 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)		2×10^7 ope. (Except for switch operation parts)		—
	Electrical (contact)		10^5 ope. (At rated control voltage)		10^7 ope. (At rated control voltage)
Electrical	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 (10 min on 3 axes)		
		Destructive	10 to 55 Hz (1 cycle/min), single amplitude: 0.75 mm (1 h on 3 axes)		
	Shock resistance	Functional	Min. 98 m/s^2 (4 times on 3 axes)		
		Destructive	Min. 294 m/s^2 (5 times on 3 axes)		
Operating conditions	Ambient temperature		–10° C to 55° C +14° F to +131° F		
	Ambient humidity		Max. 85 % RH (non-condensing)		
	Air pressure		860 to 1,060 h Pa		
Connection			11-pin/screw terminal		
Protective construction			IP66 (front panel with a rubber gasket)		

Applicable standard

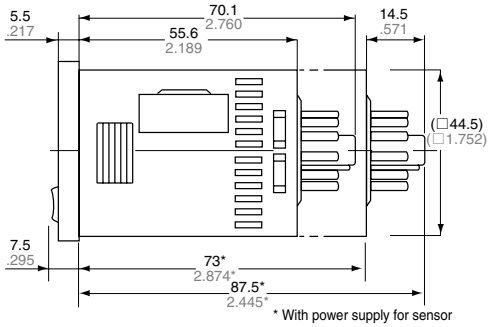
Safety standard	EN61812-1	Pollution Degree 2/Overvoltage Category II	
EMC	(EMI)EN61000-6-4		
	Radiation interference electric field strength	EN55011 Group1 ClassA	
	Noise terminal voltage	EN55011 Group1 ClassA	
	(EMS)EN61000-6-2		
	Static discharge immunity	EN61000-4-2	4 kV contact 8 kV air
	RF electromagnetic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

Dimensions

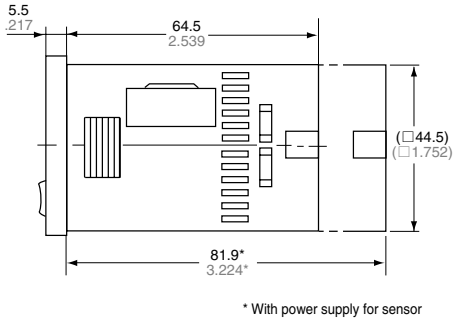
mm inch
General tolerance: ±1.0 ±.039



Pin type (Flush mount/Surface mount)



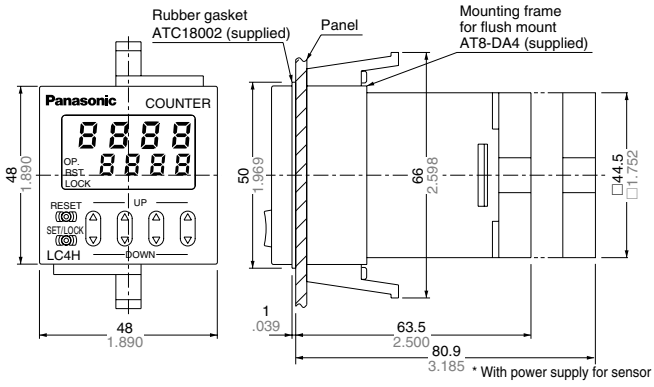
Screw terminal type: M3.5 (Flush mount)



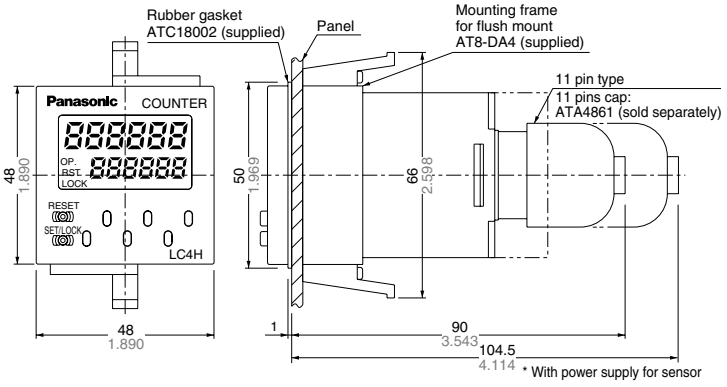
(* 6-digit display type has the same dimensions.)

• Dimensions for flush mounting (with adapter installed)

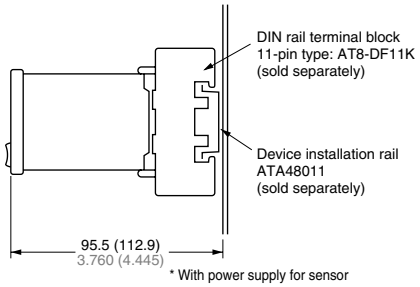
Screw terminal type



Pin type

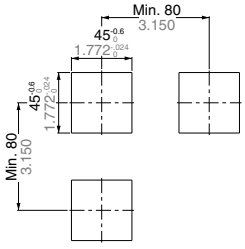


• Dimensions for front panel installations

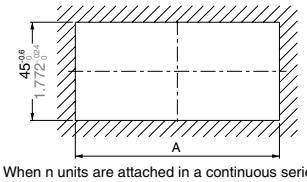


• Installation panel cut-out dimensions

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



• For connected installations



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

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

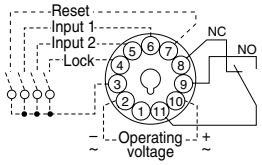
Note 1: The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.

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

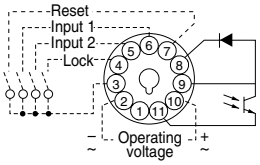
Terminal layouts and Wiring diagrams

• Pin type

Relay output type

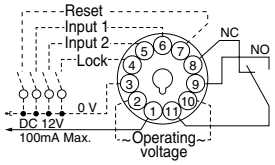


Transistor output type

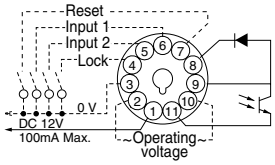


* With power supply for sensor

Relay output type

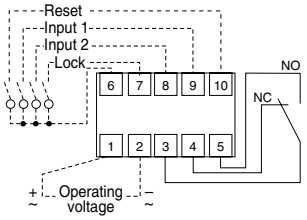


Transistor output type

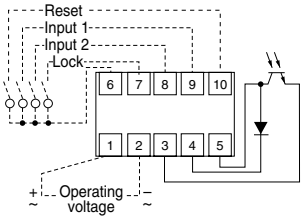


• Screw terminal type

Relay output type

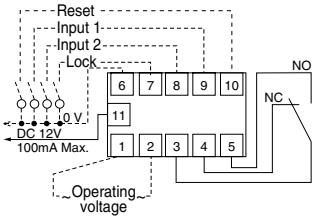


Transistor output type

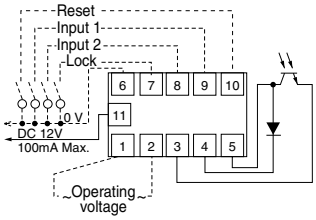


* With power supply for sensor

Relay output type



Transistor output type



Note) For connecting the output leads of the transistor output type, refer to 5) Transistor output on page 141.

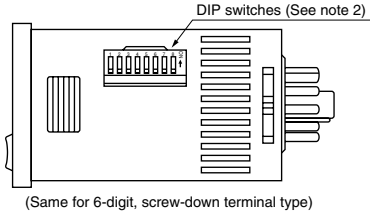
Setting the operation mode and counter

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

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

DIP switches

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



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

Table 1: Setting the output mode

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

Table 2: Setting the input mode

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

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

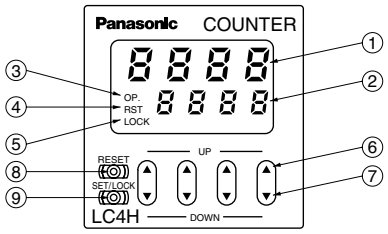
Setting procedure 2) Setting the set value

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

Front display section

• 4-digit display type

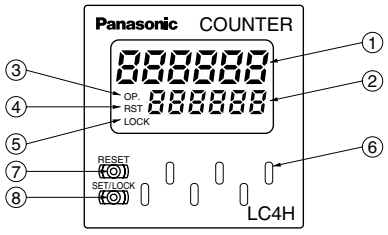
① Counter display
② Set value display
③ Controlled output indicator
④ Reset indicator
⑤ Lock indicator
⑥ UP keys
Changes the corresponding digit of the set value in the addition direction (upwards)



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

• 6-digit display type

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



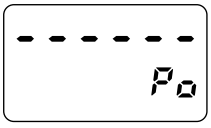
⑥ UP keys
Changes the corresponding digit of the set value in the addition direction (upwards)
⑦ RESET switch
Resets the counting value and the output
⑧ SET/LOCK switch
This is used to handle pre-scaling values, one-shot times, decimal point position settings, and key lock operations (to disable Up key,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

Setting procedure 3) Setting the input mode

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

• Decimal point position setting mode

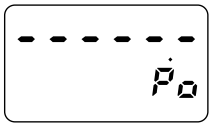
① Holding down the [SET/LOCK] key, press the key for the second digit to access the decimal point position setting mode.



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

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

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



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

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

• Setting the pre-scaling value

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

Example) 4-digit type

Example) 6-digit type

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

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

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

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

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

• Setting the one-shot output time

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

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

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

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

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

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

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

Changing the set value

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

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

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

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

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

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

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

CAUTIONS FOR USE

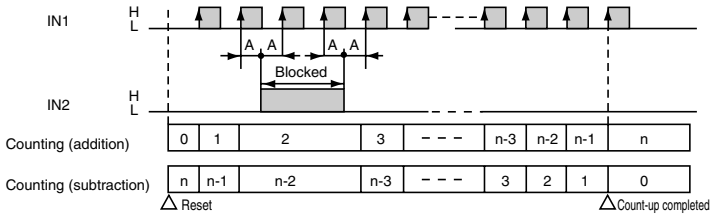
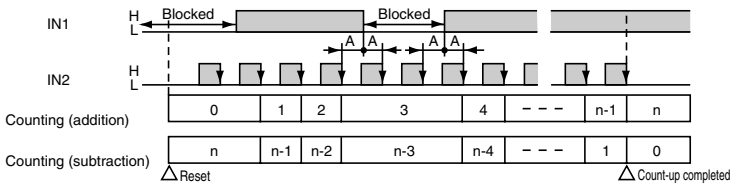
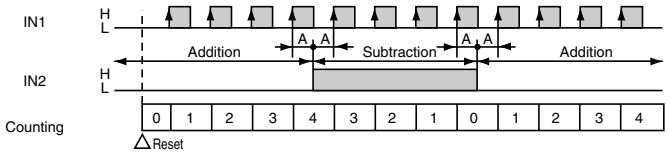
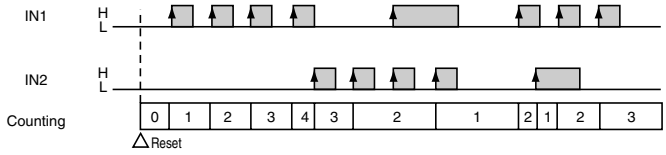
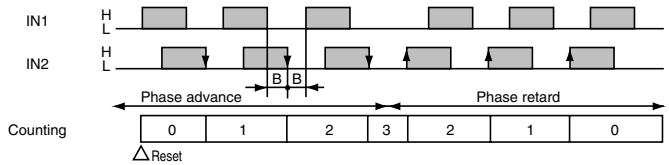
For more information regarding the cautions for use of LC4H series counter, refer to page 140 "PRECAUTIONS IN USING THE LC4H SERIES".

Operation mode

1. Input mode

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

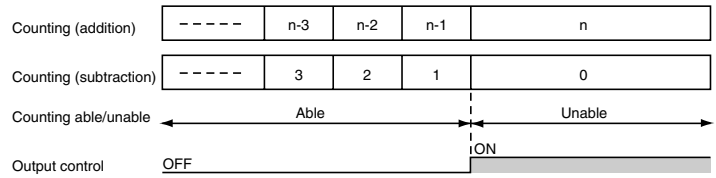
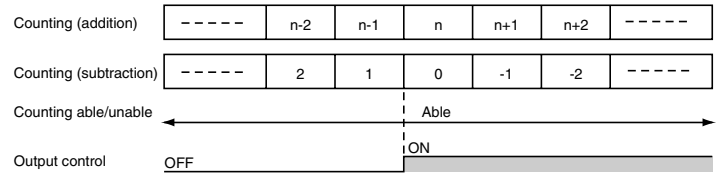
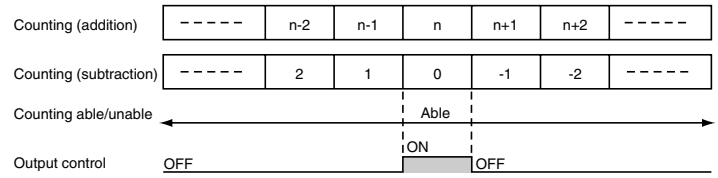
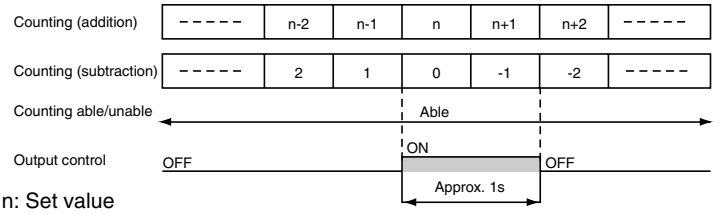
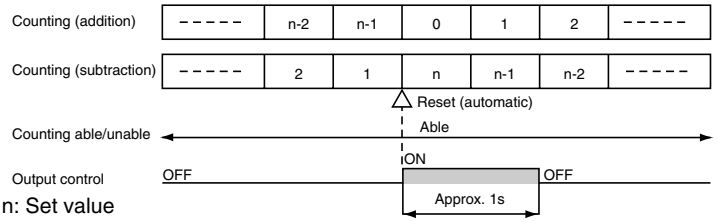
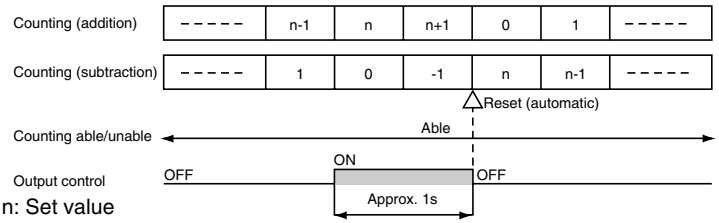
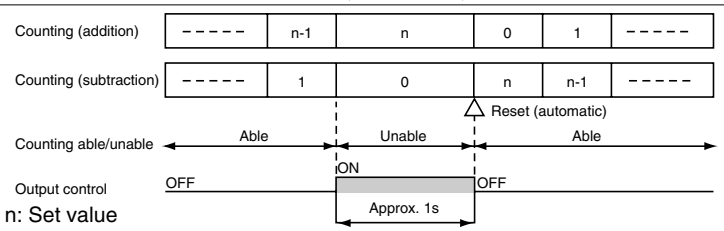
- Addition UP
- Subtraction DOWN
- Directive DIR
- Independent IND
- Phase PHASE

Input mode	Operation	*Minimum input signal width 30 Hz: 16.7 ms; 5 kHz: 0.1 ms
Addition UP	IN1 or IN2 works as an input block (gate) for the other input.	• Example where IN1 is the counting input and IN2 is the input block (gate). 
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.

2. Output mode

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

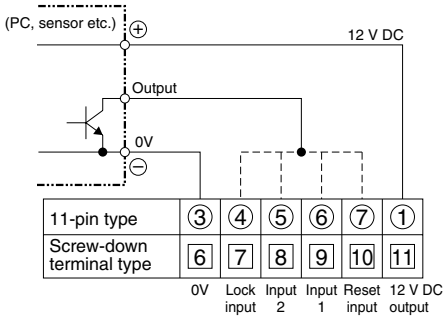
- Maintain output/hold count HOLD-A
- Maintain output/over count I HOLD-B
- Maintain output/over count II HOLD-C
- One shot/over count SHOT-A
- One shot/recount I SHOT-B
- One shot/recount II SHOT-C
- One shot/hold count SHOT-D

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

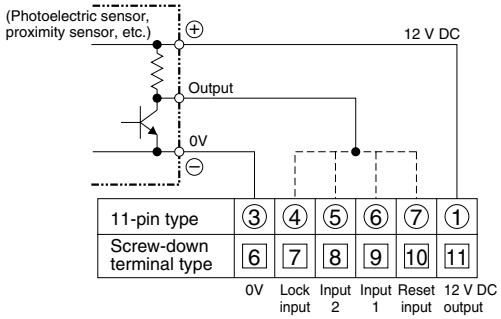
Input connections

• Signal input type

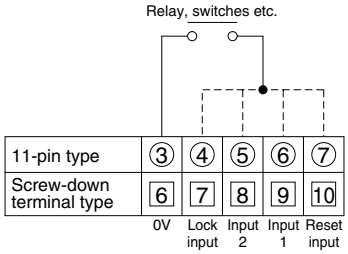
1) Open collector



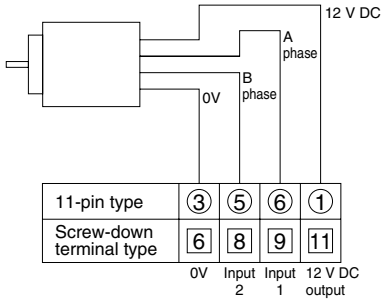
2) For voltage output



3) Contact input



4) For a rotary encoder



Input 1, input 2, and reset input specifications

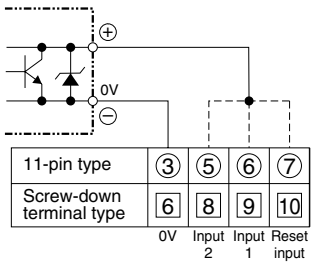
- Impedance during short-circuit: 1 kΩ max.
  (At 0 Ω, the outflow current is approximately 12 mA.)
- Residual voltage during short-circuit: 2 V max.
- Impedance when released: 100 kΩ min.
- Max. applied voltage: 40 VDC max.

Lock input specifications

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

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

5) For a dual-line sensor



Dual-line sensor specifications

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

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

What is the prescale function?

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

Example

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

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