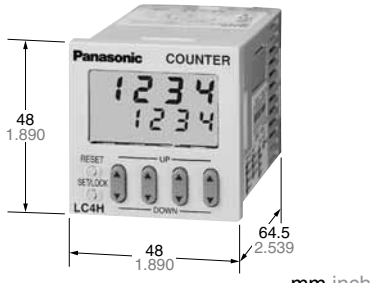
LC4H-L Counters

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



mm inch

AEL11 Series
(4-digit display)

AEL13 Series
(6-digit display)

Pin type

Screw terminal type

Features

1. Low Price
All this at an affordable price to provide you with unmatched cost performance.
2. Display is a bright reflective-type LCD.
3. Inherits all of the characteristics of the LC4H digital timer.
- Seesaw switches ensure easy operation.
- IP66 environmental protection.
- Shortened body
  (pin type: 70.1 mm 2.760 inch,
  screw type: 64.5 mm 2.539 inch
  underhead).

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

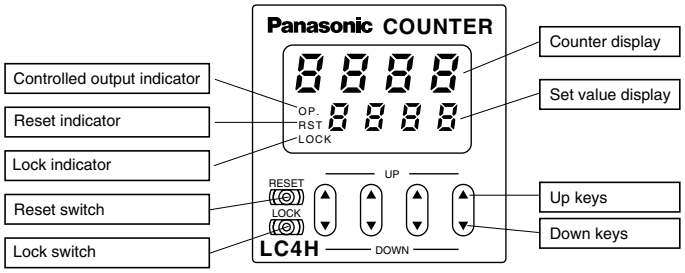
Product types

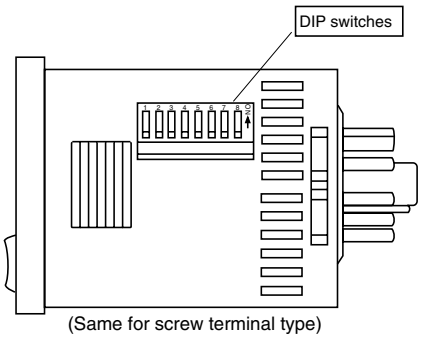
Digit	Count speed	Output mode	Output	Operating voltage	Power down insurance	Terminal type	Part number
4	30 Hz (cps)/ 5 KHz (Kcps) switchable	• Maintain output/hold count • Maintain output/over count I • Maintain output/over count II • One shot/over count • One shot/recount I • One shot/recount II • One shot/hold count (7 modes)	Relay (1c)	100 to 240 V AC	Available	8 pins	LC4HL8-R4-AC240V
						11 pins	LC4HL-R4-AC240V
						Screw terminal	LC4HL-R4-AC240VS
				24 V AC/DC		8 pins	LC4HL8-R4-AC24V
						11 pins	LC4HL-R4-AC24V
						Screw terminal	LC4HL-R4-AC24VS
				12 to 24 V DC		8 pins	LC4HL8-R4-DC24V
						11 pins	LC4HL-R4-DC24V
						Screw terminal	LC4HL-R4-DC24VS
			Transistor (1a)	100 to 240 V AC		8 pins	LC4HL8-T4-AC240V
						11 pins	LC4HL-T4-AC240V
						Screw terminal	LC4HL-T4-AC240VS
				24 V AC/DC		8 pins	LC4HL8-T4-AC24V
						11 pins	LC4HL-T4-AC24V
						Screw terminal	LC4HL-T4-AC24VS
				12 to 24 V DC		8 pins	LC4HL8-T4-DC24V
						11 pins	LC4HL-T4-DC24V
						Screw terminal	LC4HL-T4-DC24VS
6			Relay (1c)	100 to 240 V AC		8 pins	LC4HL8-R6-AC240V
						11 pins	LC4HL-R6-AC240V
						Screw terminal	LC4HL-R6-AC240VS
				24 V AC/DC		8 pins	LC4HL8-R6-AC24V
						11 pins	LC4HL-R6-AC24V
						Screw terminal	LC4HL-R6-AC24VS
				12 to 24 V DC		8 pins	LC4HL8-R6-DC24V
						11 pins	LC4HL-R6-DC24V
						Screw terminal	LC4HL-R6-DC24VS
			Transistor (1a)	100 to 240 V AC		8 pins	LC4HL8-T6-AC240V
						11 pins	LC4HL-T6-AC240V
						Screw terminal	LC4HL-T6-AC240VS
				24 V AC/DC		8 pins	LC4HL8-T6-AC24V
						11 pins	LC4HL-T6-AC24V
						Screw terminal	LC4HL-T6-AC24VS
				12 to 24 V DC		8 pins	LC4HL8-T6-DC24V
						11 pins	LC4HL-T6-DC24V
						Screw terminal	LC4HL-T6-DC24VS

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

Part names

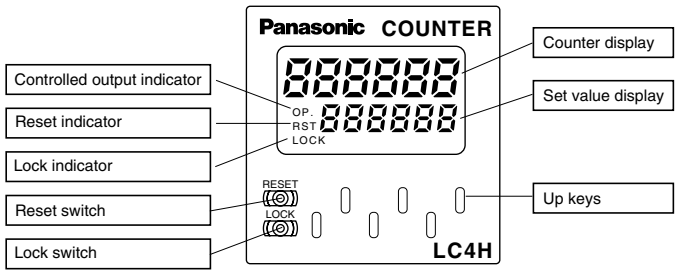
• 4-digit display type

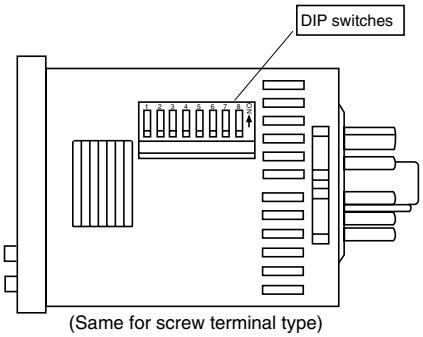




(Same for screw terminal type)

• 6-digit display type





(Same for screw terminal type)

Specifications

Item			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	12 to 24 V DC	100 to 240 V AC, 24 V AC	12 to 24 V DC
	Rated frequency		50/60 Hz common	—	50/60 Hz common	—
	Rated power consumption		Max. 10 V A	Max. 3 W	Max. 10 V A	Max. 3 W
	Rated control capacity		5 A 250 V AC (resistive load)		100 mA 30 V DC	
	Input mode		Addition (UP)/Subtraction (DOWN)/Direction (DIR)/Individuality (IND)/Phase (PHASE) 5 modes selectable by DIP switch			
	Max. counting speed		30 Hz/5 kHz (selectable by DIP switch)			
	Counting input (Input 1, 2)		Min. input signal width: 16.7 ms at 30 Hz/0.1 ms at 5 kHz, ON time: OFF time = 1:1			
	Reset input		Min. input signal width: 1 ms, 20 ms (selected by DIP switch)			
	Lock input		Min. input signal width: 20 ms			
	Input signal		Contact or Open collector input/Input impedance: 1 kΩ or less, Input residual voltage: 2 V or less, 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 (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	Allowable operating voltage range		85 to 110 % of rated operating voltage			
	Break down voltage (Initial value)		Between live and dead metal parts: 2,000 Vrms for 1 min (11-pin type) 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	
	Insulation resistance (At 500 V DC) (Initial value)		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 (10 min on 3 axes)			
		Destructive	10 to 55 Hz (1 cycle/min), single amplitude: 0.75 mm (1 h on 3 axes)			
	Shock resistance	Functional	Min. 98 m 321.522 ft./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 (non-condensing)			
	Air pressure		860 to 1,060 h Pa			
	Ripple rate		—	20 % or less	—	20 % or less
Connection			8-pin/11-pin/screw terminal			
Protective construction			IP66 (front panel with a rubber gasket)			

Applicable standard

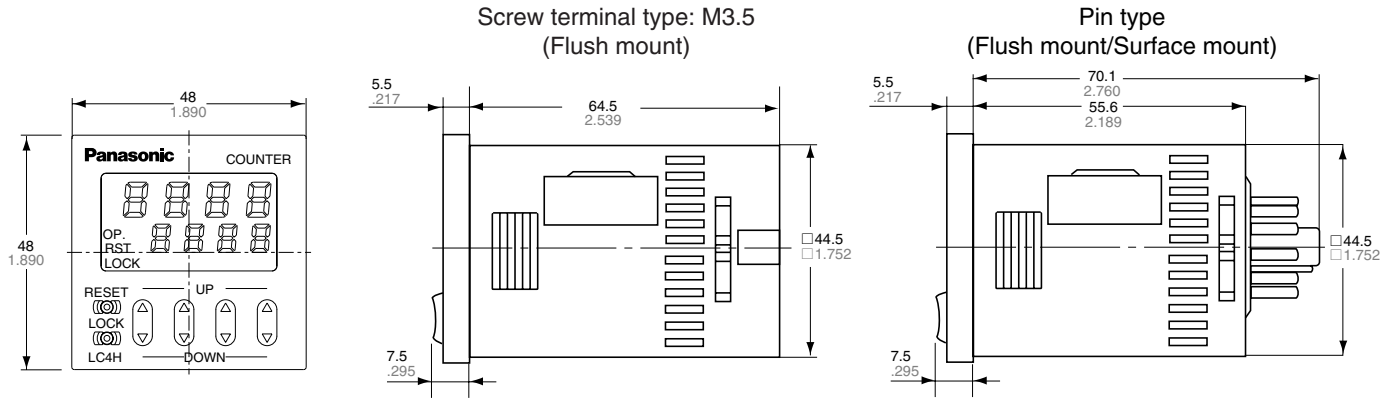
Safety standard	EN61812-1	Pollution Degree 2/Overvoltage Category II	
EMC	(EMI)EN61000-6-4		
	Radiation interference electric field strength	EN55011 Group1 ClassA	
	Noise terminal voltage	EN55011 Group1 ClassA	
	(EMS)EN61000-6-2		
	Static discharge immunity	EN61000-4-2	4 kV contact 8 kV air
	RF electromagnetic 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

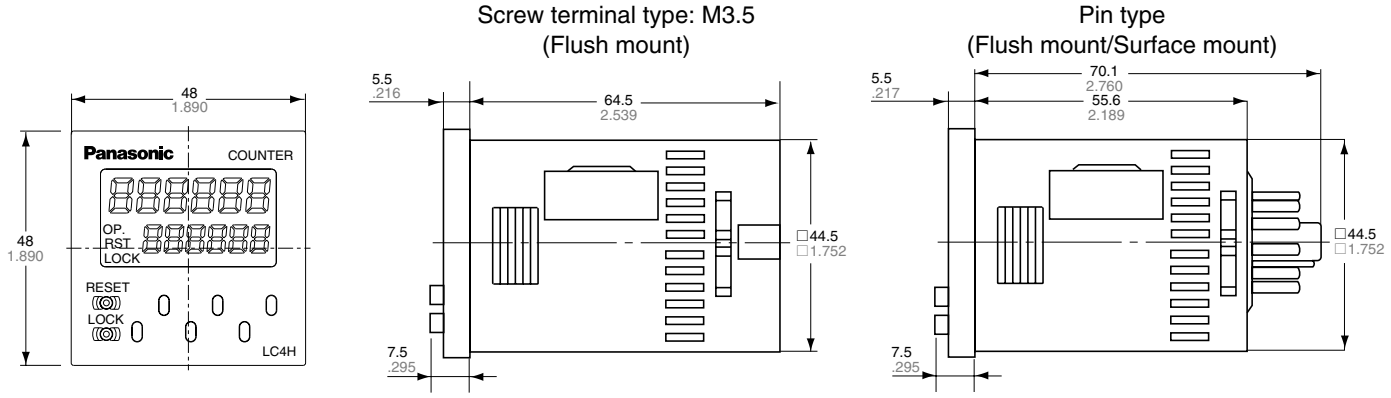
mm inch

General tolerance: ±1.0 ±.039

• 4-digit display type

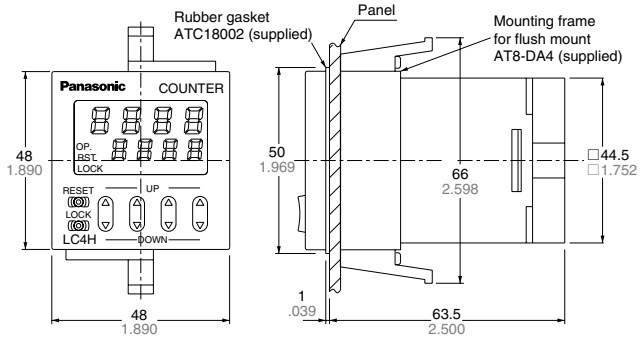


• 6-digit display type

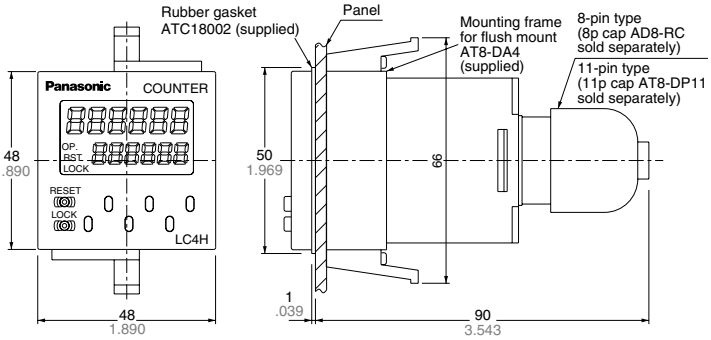


• Dimensions for flush mounting (with adapter installed)

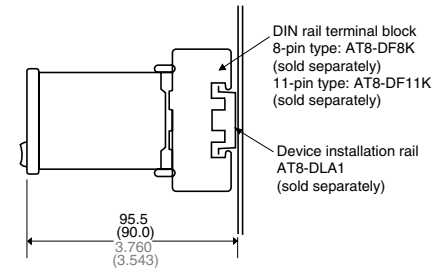
Screw terminal type: M3.5



Pin type



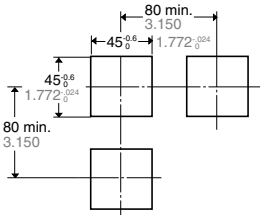
• Dimensions for front panel installations



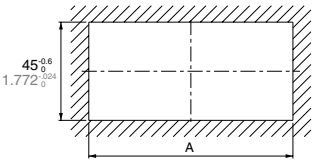
( ) Dimensions for 8-pin type.

• Installation panel cut-out dimensions

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



• For connected installations



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

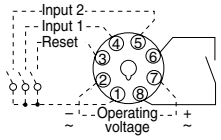
Note 1: The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.

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

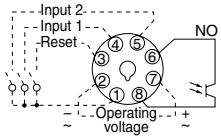
Terminal layouts and Wiring diagrams

• 8-pin type

Relay output type

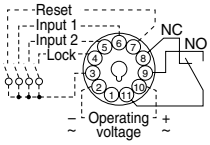


Transistor output type

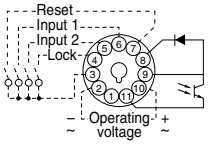


• 11-pin type

Relay output type

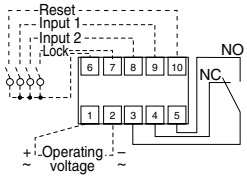


Transistor output type

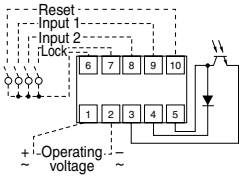


• Screw terminal type

Relay output type



Transistor output type



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

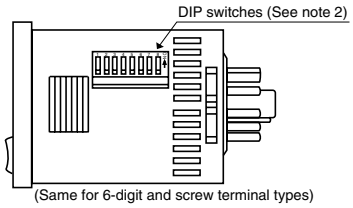
Setting the operation mode and set value

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

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

DIP switches

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



(Same for 6-digit and screw terminal types)

Table 1: Setting the output mode

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

Table 2: Setting the input mode

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

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

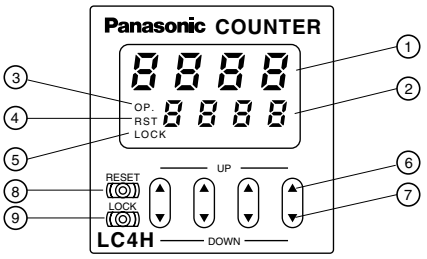
Setting procedure 2) Setting the set value

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

Front display section

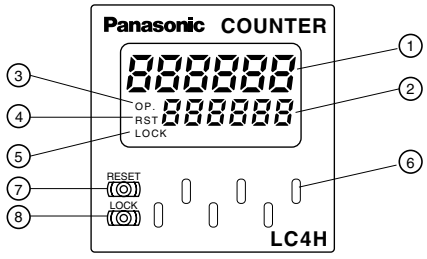
• 4-digit display type

① Counter display
② Set value display
③ Controlled output indicator
④ Reset indicator
⑤ Lock indicator
⑥ UP keys
Changes the corresponding digit of the set value in the addition direction (upwards).
⑦ DOWN keys
Changes the corresponding digit of the set value in the subtraction direction (downwards).
⑧ RESET switch
Resets the counting value and the output.
⑨ LOCK switch
Locks the operation of all keys on the counter.



• 6-digit display type

① Counter display
② Set value display
③ Controlled output indicator
④ Reset indicator
⑤ Lock indicator
⑥ UP keys
Changes the corresponding digit of the set value in the addition direction (upwards).
⑦ RESET switch
Resets the counting value and the output.
⑧ LOCK switch
Locks the operation of all keys on the counter.



• Changing the set value

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

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

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

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

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

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

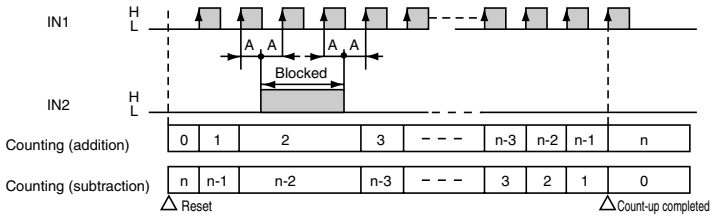
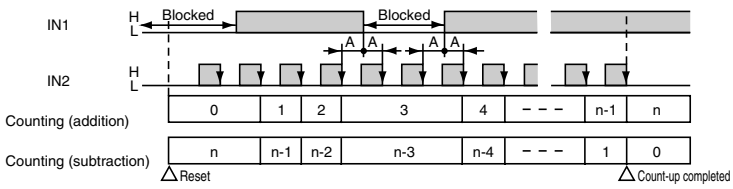
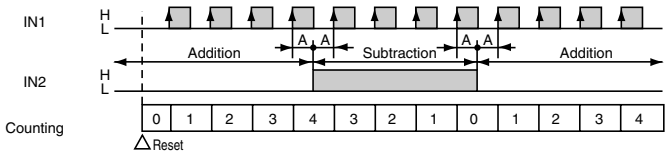
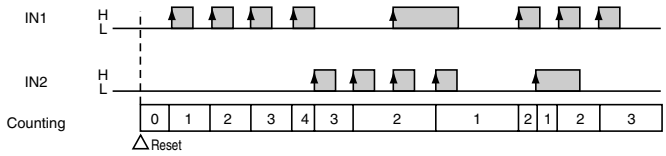
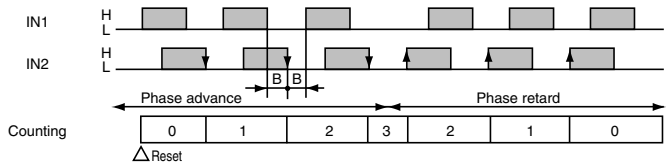
3) For directive, independent, and phase input, when the counting value increases or decreases from the value "0" and then returns back to the value "0," count-up is completed.

Operation modes

1. Input mode

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

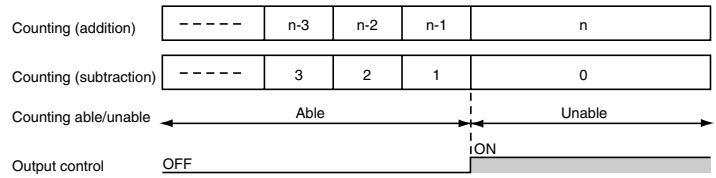
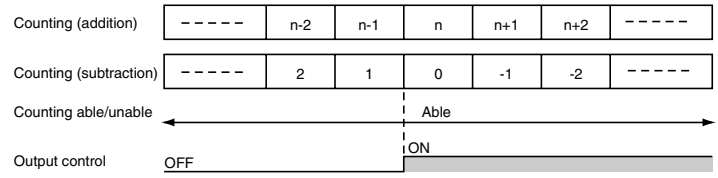
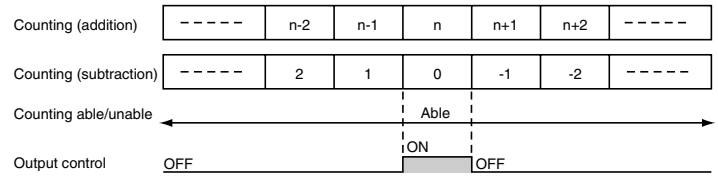
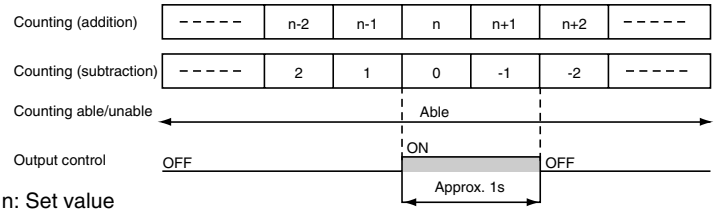
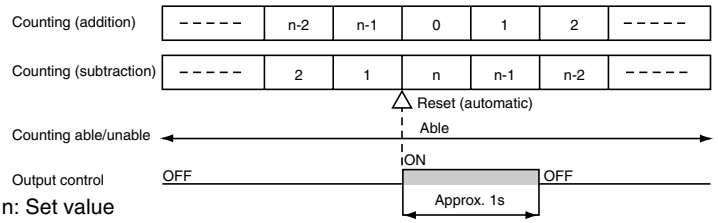
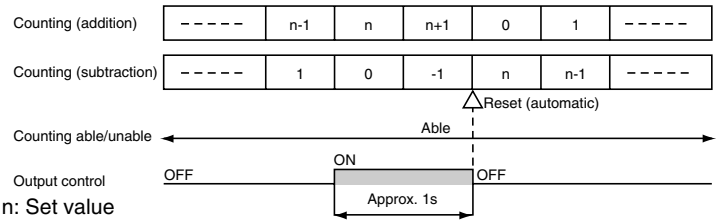
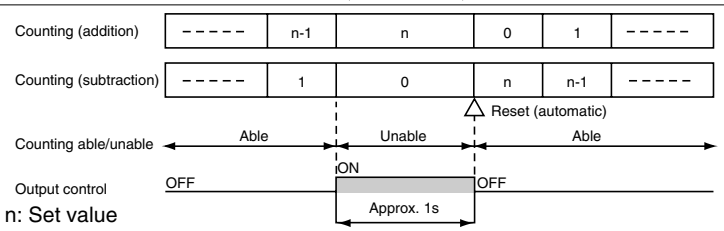
- Addition UP
- Subtraction DOWN
- Directive DIR
- Independent IND
- Phase PHASE

Input mode	Operation	*Minimum input signal width 30 Hz: 16.7 ms; 5 kHz: 0.1 ms
Addition UP	IN1 or IN2 works as an input block (gate) for the other input.	• Example where IN1 is the count counting and IN2 is the input block (gate). 
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 a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.	 * n: Set value
One shot Recount I SHOT-B	Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. However, reset occurs simultaneous with completion of count-up. While output is being maintained, restarting of the count is not possible	 * n: Set value
One shot Recount II SHOT-C	Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. However, reset occurs simultaneous with output OFF.	 * n: Set value
One shot Hold count SHOT-D	Output control is maintained after count-up completion for a fixed time (approx. 1 sec). During that time, the count display does not change from that at count-up completion. Reset occurs simultaneous with output OFF.	 * n: Set value