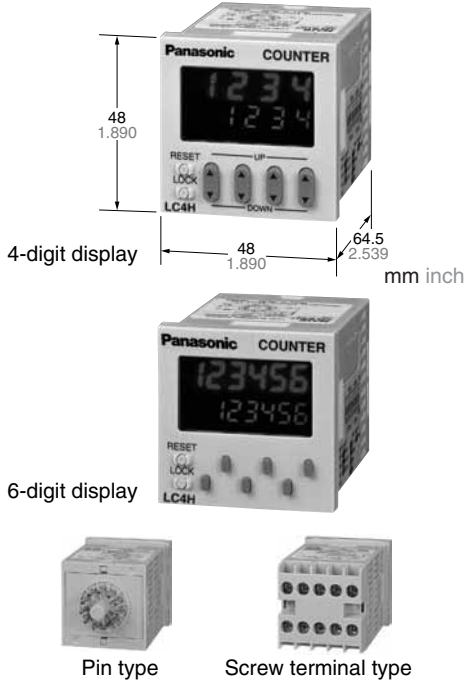


LC4H Counters

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



Features

- Bright and Easy-to-Read Display**
A brand new bright 2-color backlight LCD display. The easy-to-read screen in any location makes checking and setting procedures a cinch.
- Simple Operation**
Seesaw buttons make operating the unit even easier than before.
- Short Body of only 64.5 mm 2.539 inch (screw type) or 70.1 mm 2.760 inch (pin type)**
With a short body, it easily installs in even narrow control panels.
- Conforms to IP66's Weather Resistant Standards**
The water-proof panel keeps out water and dirt for reliable operation even in poor environments.

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.

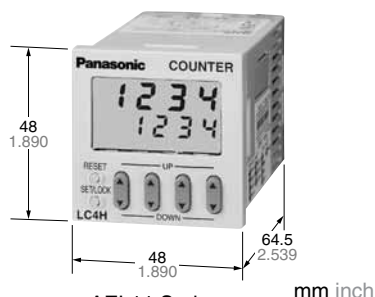
8. Compliant with UL, c-UL and CE.

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

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	<ul style="list-style-type: none"> Maintain output/hold count Maintain output/over count I Maintain output/over count II One shot/over count One shot/recount I One shot/recount II One shot/hold count (7 modes) 	Relay (1c)	100 to 240 V AC	Available	8 pins	LC4H8-R4-AC240V
				24 V AC		11 pins	LC4H-R4-AC240V
				12 to 24 V DC		Screw terminal	LC4H-R4-AC240VS
			Transistor (1a)	100 to 240 V AC		8 pins	LC4H8-R4-AC24V
				24 V AC		11 pins	LC4H-R4-AC24V
				12 to 24 V DC		Screw terminal	LC4H-R4-AC24VS
6			Relay (1c)	100 to 240 V AC		8 pins	LC4H8-R4-DC24V
				24 V AC		11 pins	LC4H-R4-DC24V
				12 to 24 V DC		Screw terminal	LC4H-R4-DC24VS
			Transistor (1a)	100 to 240 V AC		8 pins	LC4H8-T4-AC240V
				24 V AC		11 pins	LC4H-T4-AC240V
				12 to 24 V DC		Screw terminal	LC4H-T4-AC240VS
			Relay (1c)	100 to 240 V AC	Available	8 pins	LC4H8-T4-AC24V
				24 V AC		11 pins	LC4H-T4-AC24V
				12 to 24 V DC		Screw terminal	LC4H-T4-AC24VS
			Transistor (1a)	100 to 240 V AC		8 pins	LC4H8-T4-DC24V
				24 V AC		11 pins	LC4H-T4-DC24V
				12 to 24 V DC		Screw terminal	LC4H-T4-DC24VS
			Relay (1c)	100 to 240 V AC	Available	8 pins	LC4H8-R6-AC240V
				24 V AC		11 pins	LC4H-R6-AC240V
				12 to 24 V DC		Screw terminal	LC4H-R6-AC240VS
			Transistor (1a)	100 to 240 V AC		8 pins	LC4H8-R6-AC24V
				24 V AC		11 pins	LC4H-R6-AC24V
				12 to 24 V DC		Screw terminal	LC4H-R6-AC24VS
			Relay (1c)	100 to 240 V AC	Available	8 pins	LC4H8-R6-DC24V
				24 V AC		11 pins	LC4H-R6-DC24V
				12 to 24 V DC		Screw terminal	LC4H-R6-DC24VS
			Transistor (1a)	100 to 240 V AC		8 pins	LC4H8-T6-AC240V
				24 V AC		11 pins	LC4H-T6-AC240V
				12 to 24 V DC		Screw terminal	LC4H-T6-AC240VS
			Relay (1c)	100 to 240 V AC	Available	8 pins	LC4H8-T6-AC24V
				24 V AC		11 pins	LC4H-T6-AC24V
				12 to 24 V DC		Screw terminal	LC4H-T6-AC24VS
			Transistor (1a)	100 to 240 V AC		8 pins	LC4H8-T6-DC24V
				24 V AC		11 pins	LC4H-T6-DC24V
				12 to 24 V DC		Screw terminal	LC4H-T6-DC24VS

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

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.

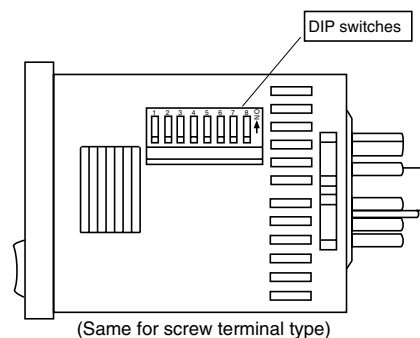
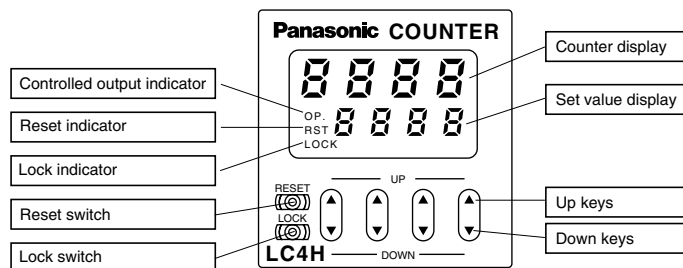
Product types

Digit	Count speed	Output mode	Output	Operating voltage	Power down insurance	Terminal type	Part number			
4	30 Hz (cps)/ 5 KHz (Kcps) switchable	<ul style="list-style-type: none">• 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			
						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				
				8 pins		LC4HL8-T4-AC240V				
				11 pins		LC4HL-T4-AC240V				
				Screw terminal		LC4HL-T4-AC240VS				
Transistor (1a)			8 pins	LC4HL8-T4-AC24V						
			11 pins	LC4HL-T4-AC24V						
			Screw terminal	LC4HL-T4-AC24VS						
			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
									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					
		8 pins			LC4HL8-T6-AC240V					
		11 pins			LC4HL-T6-AC240V					
		Screw terminal			LC4HL-T6-AC240VS					
Transistor (1a)	8 pins	LC4HL8-T6-AC24V								
	11 pins	LC4HL-T6-AC24V								
	Screw terminal	LC4HL-T6-AC24VS								
	8 pins	LC4HL8-T6-DC24V								
	11 pins	LC4HL-T6-DC24V								
	Screw terminal	LC4HL-T6-DC24VS								

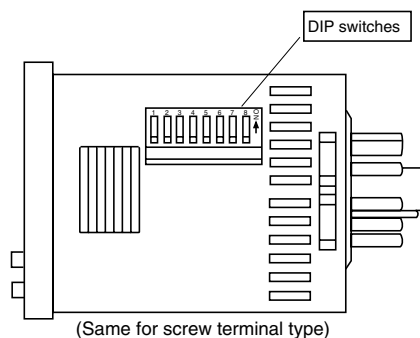
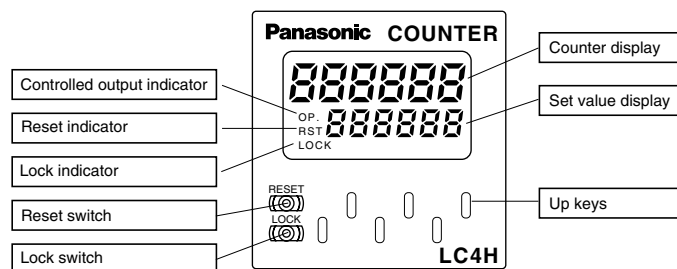
* A rubber gasket (ATC18002) and a mounting frame (AT8-DA4) are included.

Part names

• 4-digit display type



• 6-digit display type



Specifications

Item		Relay output type		Transistor output type	
		AC type	DC type	AC type	DC type
Rating	Rated operating voltage	100 to 240 V AC, 24 V AC	12 to 24 V DC	100 to 240 V AC, 24 V AC	12 to 24 V DC
	Rated frequency	50/60 Hz common	—	50/60 Hz common	—
	Rated power consumption	Max. 10 V A	Max. 3 W	Max. 10 V A	Max. 3 W
	Rated control capacity	5 A 250 V AC (resistive load)		100 mA 30 V DC	
	Input mode	Addition (UP)/Subtraction (DOWN)/Direction (DIR)/Individuality (IND)/Phase (PHASE) 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./s ² (4 times on 3 axes)		
		Destructive	Min. 294 m 964.567 ft./s ² (5 times on 3 axes)		
Operating conditions	Ambient temperature	-10° C to 55° C +14° F to +131° F			
	Ambient humidity	Max. 85 % RH (non-condensing)			
	Air pressure	860 to 1,060 h Pa			
	Ripple rate	—	20 % or less	—	20 % or less
Connection		8-pin/11-pin/screw terminal			
Protective construction		IP66 (front panel with a rubber gasket)			

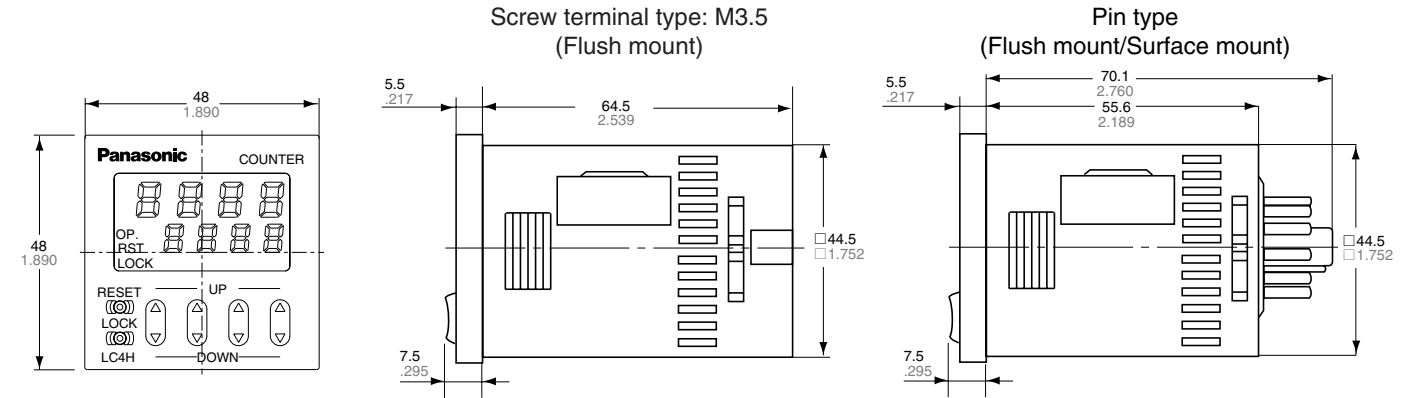
LC4H/-L

Applicable standard

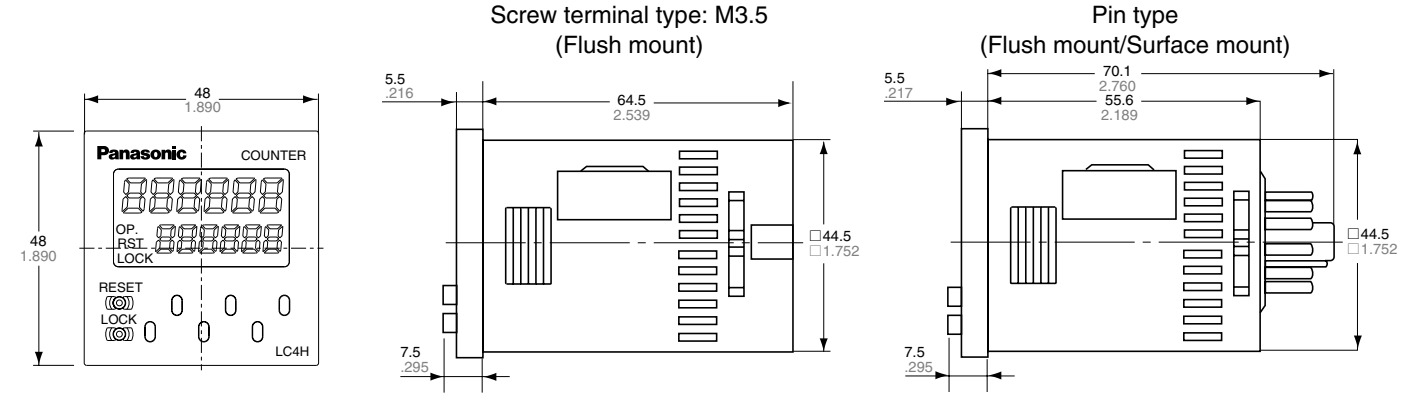
Safety standard	EN61812-1	Pollution Degree 2/Overvoltage Category II
EMC	(EMI)EN61000-6-4 Radiation interference electric field strength Noise terminal voltage (EMS)EN61000-6-2 Static discharge immunity	EN55011 Group1 ClassA EN55011 Group1 ClassA
	RF electromagnetic field immunity EFT/B immunity Surge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

• 4-digit display type

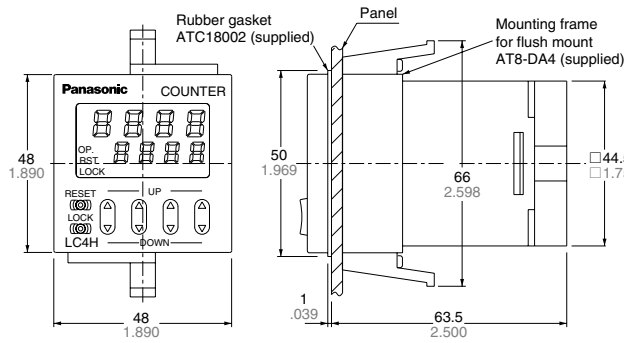


• 6-digit display type

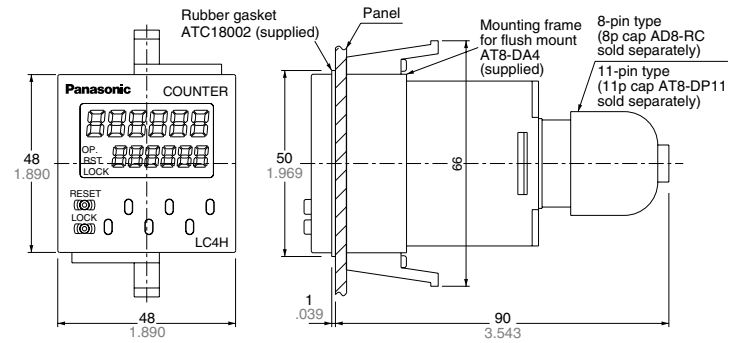


• Dimensions for flush mounting (with adapter installed)

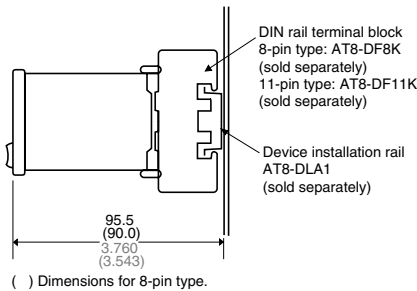
Screw terminal type: M3.5



Pin type



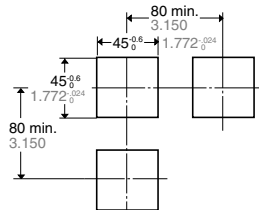
• Dimensions for front panel installations



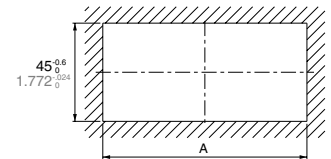
() Dimensions for 8-pin type.

• 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



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

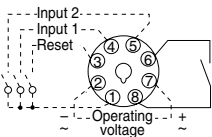
Note 1: The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.

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

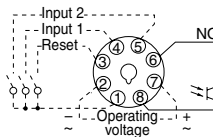
Terminal layouts and Wiring diagrams

• 8-pin type

Relay output type

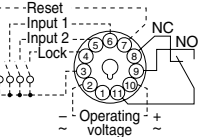


Transistor output type

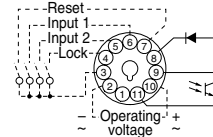


• 11-pin type

Relay output type

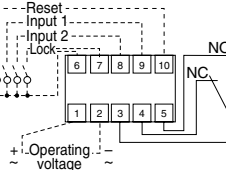


Transistor output type

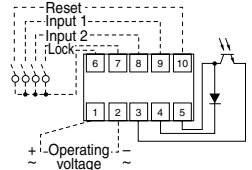


• Screw terminal type

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

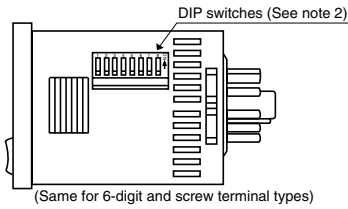
	Item	DIP switch	
		OFF	ON
1	Output mode	Refer to table 1	
2			
3			
4	Minimum reset input signal width	20 ms	1 ms
5	Maximum counter speed	30 Hz	5 kHz
6	Input mode	Refer to table 2	
7			
8			

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.

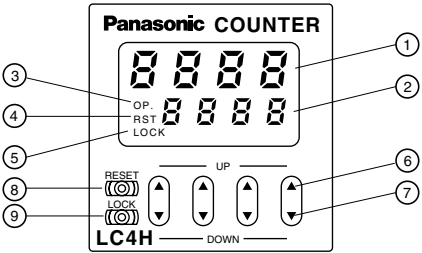
Setting procedure 2) Setting the set value

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

Front display section

• 4-digit display type

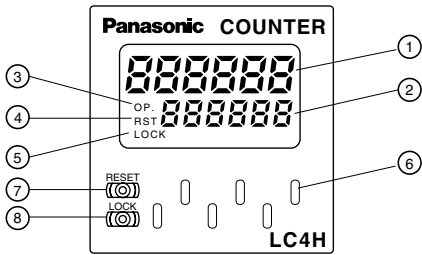
- ① Counter display
 - ② Set value display
 - ③ Controlled output indicator
 - ④ Reset indicator
 - ⑤ Lock indicator
 - ⑥ UP keys
- Changes the corresponding digit of the set value in the addition direction (upwards).



- 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 -999999 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
<div>Addition</div> <div>UP</div>	IN1 or IN2 works as an input block (gate) for the other input.	<p>• Example where IN1 is the count counting and IN2 is the input block (gate).</p> <p>Counting (addition) 0 1 2 3 --- n-3 n-2 n-1 n</p> <p>Counting (subtraction) n n-1 n-2 n-3 --- 3 2 1 0</p> <p>Δ Reset Δ Count-up completed</p>
<div>Subtraction</div> <div>DOWN</div>		<p>• Example where IN2 is the counting input and IN1 is the input block (gate).</p> <p>Counting (addition) 0 1 2 3 4 --- n-1 n</p> <p>Counting (subtraction) n n-1 n-2 n-3 n-4 --- 1 0</p> <p>Δ Reset Δ Count-up completed</p> <p>* "A" must be more than the minimum input signal width.</p>
<div>Directive</div> <div>DIR</div>	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>Counting 0 1 2 3 4 3 2 1 0 1 2 3 4</p> <p>Δ Reset</p> <p>* "A" must be more than the minimum input signal width.</p>
<div>Independent</div> <div>IND</div>	IN1 is addition input and IN2 is subtraction input.	<p>Counting 0 1 2 3 4 3 2 1 2 1 2 3</p> <p>Δ Reset</p> <p>* IN1 and IN2 are completely independent, so there is no restriction on signal timing.</p>
<div>Phase</div> <div>PHASE</div>	Addition when the IN1 phase advances beyond IN2, and subtraction when the IN2 phase advances beyond IN1.	<p>Counting 0 1 2 3 2 1 0</p> <p>Δ Reset</p> <p>* "B" must be more than the minimum input signal width.</p>

LC4H/-L

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>Counting (addition) ----- n-3 n-2 n-1 n</p> <p>Counting (subtraction) ----- 3 2 1 0</p> <p>Counting able/unable ←----- Able ----- Unable -----→</p> <p>Output control OFF ----- ON -----</p> <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>Counting (addition) ----- n-2 n-1 n n+1 n+2 -----</p> <p>Counting (subtraction) ----- 2 1 0 -1 -2 -----</p> <p>Counting able/unable ←----- Able -----→</p> <p>Output control OFF ----- ON -----</p> <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>Counting (addition) ----- n-2 n-1 n n+1 n+2 -----</p> <p>Counting (subtraction) ----- 2 1 0 -1 -2 -----</p> <p>Counting able/unable ←----- Able -----→</p> <p>Output control OFF ----- ON ----- OFF</p> <p>* n: Set value</p>
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.	<p>Counting (addition) ----- n-2 n-1 n n+1 n+2 -----</p> <p>Counting (subtraction) ----- 2 1 0 -1 -2 -----</p> <p>Counting able/unable ←----- Able -----→</p> <p>Output control OFF ----- ON ----- OFF</p> <p style="text-align: center;">Approx. 1s</p> <p>* n: Set value</p>
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	<p>Counting (addition) ----- n-2 n-1 0 1 2 -----</p> <p>Counting (subtraction) ----- 2 1 n n-1 n-2 -----</p> <p>Counting able/unable ←----- Able -----→</p> <p>Output control OFF ----- ON ----- OFF</p> <p style="text-align: center;">Approx. 1s</p> <p>* n: Set value</p>
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.	<p>Counting (addition) ----- n-1 n n+1 0 1 -----</p> <p>Counting (subtraction) ----- 1 0 -1 n n-1 -----</p> <p>Counting able/unable ←----- Able -----→</p> <p>Output control OFF ----- ON ----- OFF</p> <p style="text-align: center;">Approx. 1s</p> <p>* n: Set value</p>
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.	<p>Counting (addition) ----- n-1 n 0 1 -----</p> <p>Counting (subtraction) ----- 1 0 n n-1 -----</p> <p>Counting able/unable ←----- Able ----- Unable ----- Able -----→</p> <p>Output control OFF ----- ON ----- OFF</p> <p style="text-align: center;">Approx. 1s</p> <p>* n: Set value</p>

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