# Panasonic ideas for life

### **DIN 48 SIZE** LCD ELECTRONIC COUNTER

# LC4H/-L Counters

# **LC4H Counters**









**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. Simple Operation

Seesaw buttons make operating the unit even easier than before.

#### 3. Short Body of only 64.5 mm 2.539 inch (screw type) or 70.1 mm 2.760 inch (pin type)

With a short body, it easily installs in even narrow control panels.

#### 4. Conforms to IP66's Weather **Resistant Standards**

The water-proof panel keeps out water and dirt for reliable operation even in poor environments.

# **c¶** us ( €

#### 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
						8 pins	LC4H8-R4-AC240V
				100 to 240 V AC		11 pins	LC4H-R4-AC240V
						Screw terminal	LC4H-R4-AC240VS
			Relay			8 pins	LC4H8-R4-AC24V
			(1c)	24 V AC		11 pins	LC4H-R4-AC24V
			(10)			Screw terminal	LC4H-R4-AC24VS
						8 pins	LC4H8-R4-DC24V
				12 to 24 V DC		11 pins	LC4H-R4-DC24V
4						Screw terminal	LC4H-R4-DC24VS
4						8 pins	LC4H8-T4-AC240V
				100 to 240 V AC		11 pins	LC4H-T4-AC240V
		Maintain				Screw terminal	LC4H-T4-AC240VS
		output/hold count	Transistor			8 pins	LC4H8-T4-AC24V
		Maintain output/over count I     Maintain output/over count II     One shot/over	(1a)	24 V AC		11 pins	LC4H-T4-AC24V
					- Available	Screw terminal	LC4H-T4-AC24VS
				12 to 24 V DC		8 pins	LC4H8-T4-DC24V
	30 Hz (cps)/					11 pins	LC4H-T4-DC24V
	5 KHz (Kcps)					Screw terminal	LC4H-T4-DC24VS
	switchable	count	Relay (1c)	100 to 240 V AC		8 pins	LC4H8-R6-AC240V
	Switchable	One shot/recount I				11 pins	LC4H-R6-AC240V
		One shot/recount II				Screw terminal	LC4H-R6-AC240VS
		One shot/hold count (7 modes)				8 pins	LC4H8-R6-AC24V
						11 pins	LC4H-R6-AC24V
						Screw terminal	LC4H-R6-AC24VS
		(7 modes)				8 pins	LC4H8-R6-DC24V
				12 to 24 V DC		11 pins	LC4H-R6-DC24V
6						Screw terminal	LC4H-R6-DC24VS
U						8 pins	LC4H8-T6-AC240V
				100 to 240 V AC		11 pins	LC4H-T6-AC240V
						Screw terminal	LC4H-T6-AC240VS
			Transistor			8 pins	LC4H8-T6-AC24V
			(1a)	24 V AC		11 pins	LC4H-T6-AC24V
			(1α)			Screw terminal	LC4H-T6-AC24VS
						8 pins	LC4H8-T6-DC24V
				12 to 24 V DC		11 pins	LC4H-T6-DC24V
	1					Screw terminal	LC4H-T6-DC24VS

<sup>\*</sup> A rubber gasket (ATC18002) and a mounting frame (AT8-DA4) are included.

# **LC4H-L Counters**



AEL11 Series (4-digit display)



AEL13 Series (6-digit display)





n type

Screw terminal type

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

### **Features**

1. Low Price

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

**c¶**<sup>®</sup>∪s ( €

- 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.

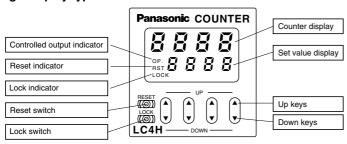
# **Product types**

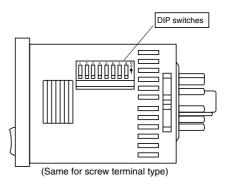
Digit	Count speed	Output mode	Output	Operating voltage	Power down insurance	Terminal type	Part number
						8 pins	LC4HL8-R4-AC240V
				100 to 240 V AC		11 pins	LC4HL-R4-AC240V
						Screw terminal	LC4HL-R4-AC240VS
			Relay			8 pins	LC4HL8-R4-AC24V
			(1c)	24 V AC/DC		11 pins	LC4HL-R4-AC24V
			(10)			Screw terminal	LC4HL-R4-AC24VS
						8 pins	LC4HL8-R4-DC24V
				12 to 24 V DC		11 pins	LC4HL-R4-DC24V
4						Screw terminal	LC4HL-R4-DC24VS
4						8 pins	LC4HL8-T4-AC240V
				100 to 240 V AC		11 pins	LC4HL-T4-AC240V
		Maintain				Screw terminal	LC4HL-T4-AC240VS
			Transistor			8 pins	LC4HL8-T4-AC24V
		output/hold count  • Maintain output/over count I  • Maintain output/over count II  • One shot/over		24 V AC/DC		11 pins	LC4HL-T4-AC24V
			(1a)			Screw terminal	LC4HL-T4-AC24VS
				12 to 24 V DC	Available	8 pins	LC4HL8-T4-DC24V
	30 Hz (cps)/					11 pins	LC4HL-T4-DC24V
	5 KHz (Kcps)					Screw terminal	LC4HL-T4-DC24VS
	switchable	count				8 pins	LC4HL8-R6-AC240V
	Switchable	One shot/recount I				11 pins	LC4HL-R6-AC240V
		One shot/recount II				Screw terminal	LC4HL-R6-AC240VS
		One shot/hold	Polov			8 pins	LC4HL8-R6-AC24V
			Relay (1c)	24 V AC/DC		11 pins	LC4HL-R6-AC24V
		count	(10)			Screw terminal	LC4HL-R6-AC24VS
		(7 modes)				8 pins	LC4HL8-R6-DC24V
				12 to 24 V DC		11 pins	LC4HL-R6-DC24V
6						Screw terminal	LC4HL-R6-DC24VS
O						8 pins	LC4HL8-T6-AC240V
				100 to 240 V AC		11 pins	LC4HL-T6-AC240V
						Screw terminal	LC4HL-T6-AC240VS
			Transistor			8 pins	LC4HL8-T6-AC24V
			(1a)	24 V AC/DC		11 pins	LC4HL-T6-AC24V
			(1a)			Screw terminal	LC4HL-T6-AC24VS
						8 pins	LC4HL8-T6-DC24V
				12 to 24 V DC		11 pins	LC4HL-T6-DC24V
	1					Screw terminal	LC4HL-T6-DC24VS

<sup>\*</sup> A rubber gasket (ATC18002) and a mounting frame (AT8-DA4) are included.

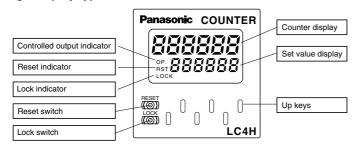
#### Part names

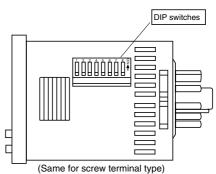
#### • 4-digit display type





#### • 6-digit display type





# **Specifications**

	Item		Ralay out	tput type	Transistor output type			
	nem		AC type	DC type	AC type	DC type		
	Rated operat	ting 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 (U		on (DIR)/Individuality (IND)/Phas ble by DIP switch	e (PHASE)		
	Max. countin	g speed		30 Hz/5 kHz (selec	table by DIP switch)			
	Counting inp	ut (Input 1, 2)	Min. inpu	t signal width: 16.7 ms at 30 Hz	/0.1 ms at 5 kHz, ON time: OFF	time = 1:1		
Rating	Reset input			Min. input signal width: 1 ms,	20 ms (selected by DIP switch)			
natility	Lock input			Min. input sign	al width: 20 ms			
	Input signal		Contact or Open Op	collector input/Input impedance pen impedance: 100 k $\Omega$ or more	e: 1 k $\Omega$ or less, Input residual vole, Max. energized voltage: 40 V [	tage: 2 V or less, DC		
	Output mode	)	HOLD-A/HOLD-B/	HOLD-C/SHOT-A/SHOT-B/SH	OT-C/SHOT-D (7 modes selecta	ble by DIP switch)		
	One shot out	put time		Appro	ox. 1 s			
	Indication		7-segment L	CD, Counter value (backlight re	ed 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° ope. or more)					
	Contact arrangement		1 For		1 Form A (Open collector)			
Contact	Initial contact resistance		100 mΩ (at 1 A 6 V DC)			_		
	Contact mate	erial	Ag alloy/	Au flush	_			
Life	Mechanical (	contact)	$2 \times 10^7$ ope. (Except for	switch operation parts)	_			
LIIO	Electrical (co	ntact)	10⁵ ope. (At rated	l control voltage)	10 <sup>7</sup> ope. (At rated control voltage)			
	Allowable opera	ting voltage range						
Flackiasi	Break down (Initial value)		Between live and dead metal parts: Between input and output Between open contacts	ut: 2,000 Vrms for 1 min				
Electrical	Insulation res (At 500 V DC value)		Between live and dead metal pa Between input and o Between open con	output: Min. 100 MΩ	Between live and dead metal parts: Min. 100 M $\Omega$ (11-pin ty Between input and output: Min. 100 M $\Omega$			
	Temperature	rise	Max. 65° C (under the flow of nominal	operating current at nominal voltage)				
	Vibration	Functional	10 to	55 Hz (1 cycle/min), single am	pplitude: 0.35 mm (10 min on 3 a	xes)		
Mechanical	resistance	Destructive	10	to 55 Hz (1 cycle/min), single a	mplitude: 0.75 mm (1 h on 3 axe	es)		
Mechanicai	Shock	Functional		Min. 98 m 321.522 ft.	/s² (4 times on 3 axes)			
	resistance	Destructive	Min. 294 m 964.567 ft./s² (5 times on 3 axes)					
	Ambient tem	perature	−10° C to 55° C +14° F to +131° F					
Operating	Ambient hum	nidity		Max. 85 % RH (	non-condensing)			
conditions	Air pressure			860 to 1,	,060 h Pa			
	Ripple rate		_	20 % or less	_	20 % or less		
Connection				8-pin/11-pin/s	screw terminal			
Protective co	onstruction			IP66 (front panel w	rith a rubber gasket)			

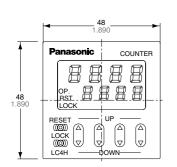
# **Applicable standard**

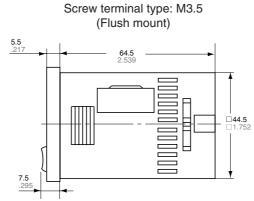
Safety standard	EN61812-1	Pollution Degree 2/Overvoltage Category II
	(EMI)EN61000-6-4	
	Radiation interference electric field strength	EN55011 Group1 ClassA
	Noise terminal voltage	EN55011 Group1 ClassA
	(EMS)EN61000-6-2	
	Static discharge immunity	EN61000-4-2 4 kV contact
		8 kV air
	RF electromagnetic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

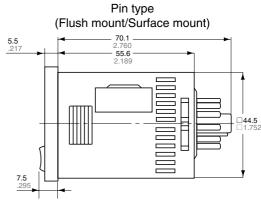
# **Dimensions**

• 4-digit display type

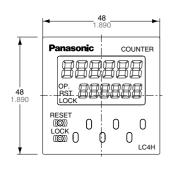
 $$\operatorname{\textsc{mm}}$  inch General tolerance:  $\pm 1.0 \pm .039$ 

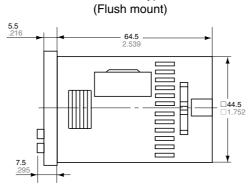




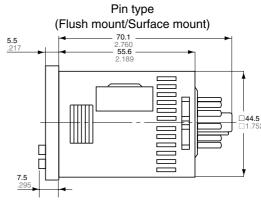


### • 6-digit display type





Screw terminal type: M3.5



### • Dimensions for flush mounting (with adapter installed)

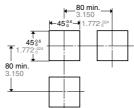
Screw terminal type: M3.5 Pin type Rubber gasket ATC18002 (supplied Rubber gasket Mounting frame for flush mount AT8-DA4 (supplied) 8-pin type (8p cap AD8-RC sold separately) Mounting frame ATC18002 (supplied for flush mount AT8-DA4 (supplied) 11-pin type (11p cap AT8-DP11 sold separately) COUNTER COUNTER 田田田 Ħ Ħ BBBBBB BBBB ##### 48 □44.5 48 50 RESET (((iii)) LOCK (((iii))) LC4H 0 0 0 L<u>C4H</u> COCK O þ **48** 63.5 .48\_ 890

#### . Dimensions for front panel installations

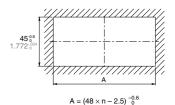
# DIN rail terminal block 8-pin type: AT8-DF8K (sold separately) 11-pin type: AT8-DF11K (sold separately) AT8-DLA1 (sold separately) 95.5 (90.0)

#### • 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



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**

Transistor output type

3<sup>4</sup>5

Input 2-

#### • 8-pin type

Relay output type

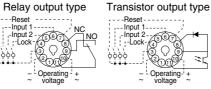
3 6 2 7 1 8

--Input 2--------Input 1---Reset 4 5

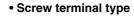
( ) Dimensions for 8-pin type

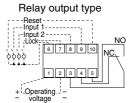
#### • 11-pin type

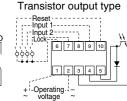
# Relay output type



Ω







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

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

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

Table 2: Setting the input mode

Table 1: Setting the output mode

DIP switch No.		۱o.	Input mode	
6	7	8	input mode	
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.

DIP switches (See note 2) (Same for 6-digit and screw terminal types)

#### 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

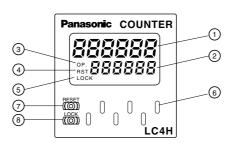
- 1 Counter display
- (2) Set value display
- 3 Controlled output indicator
- (4) Reset indicator
- (5) Lock indicator
- 6 UP keys

Changes the corresponding digit of the set value in the addition direction (upwards).

#### • 6-digit display type

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

#### **Panasonic COUNTER** (1) 3 (2) $\mathbf{B}$ 888 4 (5) 6 • 8 (7)- (GO) 🔻 LC4H



#### · Changing the set value

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

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 countdown 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.

#### (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 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.
- 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.

• Phase

Operation modes

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

 Addition UP • Subtraction DOWN DIR • Directive • Independent IND

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).  IN1  H  A A A A A A  Blocked  Counting (addition)  0 1 2 3 n-3 n-2 n-1 n  Counting (subtraction)  Reset  A Counting (subtraction)
Subtraction DOWN		• Example where IN2 is the counting input and IN1 is the input block (gate).  IN1  H Blocked  0 1 2 3 4 n-1 n Counting (addition) Counting (subtraction)  Reset  * "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.	IN1  H  Addition  AAA  Subtraction  AAA  Addition  Addition  O 1 2 3 4 3 2 1 0 1 2 3 4  Addition  AReset  * "A" must be more than the minimum input signal width.
Independent IND	IN1 is addition input and IN2 is subtraction input.	* IN1 and IN2 are completely independent, so there is no restriction on signal timing.
Phase PHASE	Addition when the IN1 phase advances beyond IN2, and subtraction when the IN2 phase advances beyond IN1.	* "B" must be more than the minimum input signal width.

# LC4H/-L

#### 2. Output mode

• One shot/recount II

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

SHOT-C

Maintain output/hold count
 Maintain output/over count I
 Maintain output/over count II
 One shot/over count
 One shot/recount I
 SHOT-B

One shot/hold count
 SHOT-D

Output mode	Operation	(Exam	ple when ir	put mo	de is e	ither ad	dition o	r subtra	ction)	
	Output control is maintained after count-up completion and until resetting.	Counting (addition)		n-3	n-2	n-1		n		1
Maintain output	During that time, the count display does	Counting (subtraction)		3	2	1		0		]
Hold count	not change from that at count-up completion.	Counting able/unable		Able			 	Unable		
[TIOLD-A]	·	Output control	OFF			_	ON		_	
		* n: Set value								
	Output control is maintained after count-up completion and until resetting.	Counting (addition)		n-2	n-1	n	n+1	n+2		
Maintain output Over count I	However, counting is possible despite completion of count-up.	Counting (subtraction)		2	1	0	-1	-2		]
HOLD-B	completion of count up.	Counting able/unable	•			Able			-	<b>-</b>
		Output control	OFF			ON				
		* n: Set value								
	Output control is maintained after count-up completion and until the next	Counting (addition)		n-2	n-1	n	n+1	n+2		]
Maintain output Over count II	signal enters. However, counting is possible despite completion of count-	Counting (subtraction)		2	1	0	-1	-2		]
HOLD-C	up.	Counting able/unable				Able	<u> </u>			<b>-</b>
		Output control	OFF			ON	i OFF			_
		* n: Set value								
	Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.	Counting (addition)		n-2	n-1	n	n+1	n+2		]
One shot Over count		Counting (subtraction)		2	1	0	-1	-2		]
SHOT-A		Counting able/unable	4			Able ON		<u> </u>	<del>-</del>	-
		Output control	OFF				ox. 1s	OFF		-
		* n: Set value	<u> </u>		ı	. търг	→ <u></u>	]		
	Output control is maintained after count-up completion for a fixed time	Counting (addition)		n-2	n-1	0	1	2		
One shot	(approx. 1 sec). Counting is possible despite completion of count-up.	Counting (subtraction)		2	1	n	n-1	n-2		]
Recount I SHOT-B	However, reset occurs simultaneous	Counting able/unable	•			Able Able	automatic)			•
0.101 B	with completion of count-up. While output is being maintained, restarting of	-	OFF			ION		OFF		_
	the count is not possible	* n: Set value				Appr	ox. 1s			
	Output control is maintained after	Counting (addition)		n-1	n	n+1	0	1		
One shot	count-up completion for a fixed time (approx. 1 sec). Counting is possible	Counting (subtraction)		1	0	-1	n	n-1		]
Recount II	despite completion of count-up.  However, reset occurs simultaneous	_			-	Able	Reset (a	utomatic)		-
SHOT-C	with output OFF.	Counting able/unable			ON	ADIE	1			•
		Output control * n: Set value	<u>OFF</u>		Appr	ox. 1s	OFF			-
	Output control is maintained after count-up completion for a fixed time	Counting (addition)		n-1		n	0	1		]
One shot	(approx. 1 sec). During that time, the	Counting (subtraction)		1		0	n	n-1		]
Hold count SHOT-D	count display does not change from that at count-up completion. Reset	Counting able/unable	Able	-	<del>                                     </del>	able -	A Reset (a	automatic) Able	-	<b>-</b>
	occurs simultaneous with output OFF.	Output control	OFF		ION		OFF			_
		* n: Set value			Appr	ox. 1s	]			

# 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

# **W**us ( **E**

#### **Features**

# 1. Bright and Easy-to-Read Display A brand new bright 2-color backlight LC

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 highcapacitance 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**

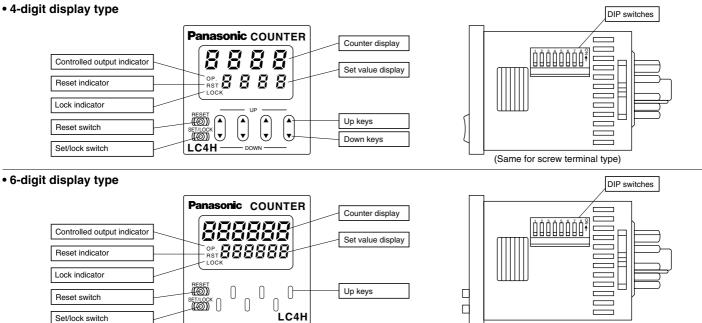
Digit	Count speed	Operation mode	Output	Operation voltage	Power for sensor	Terminal	Part No.
				100 to 240 V AC	12 V DC 100mA	11 pins	LC4H-PS-R4-AC240V
			Dolov	100 to 240 V AC	12 V DC TOOMA	Screw terminal	LC4H-PS-R4-AC240VS
4			Relay	12 to 24 V DC	None	11 pins	LC4H-S-R4-24V
4		Maintain output/hold count		/24 V AC	none	Screw terminal	LC4H-S-R4-24VS
		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)	Transistor Relay	12 to 24 V DC /24 V AC	None	11 pins	LC4H-S-T4-24V
	30 Hz/5 KHz				None	Screw terminal	LC4H-S-T4-24VS
	switchable			100 to 24 V AC	12 V DC 100mA	11 pins	LC4H-PS-R6-AC240V
					12 V DC TOOMA	Screw terminal	LC4H-PS-R6-AC240VS
6				12 to 24 V DC	Nama	11 pins	LC4H-S-R6-24V
0				/24 V AC	None	Screw terminal	LC4H-S-R6-24VS
			Transister	12 to 24 V DC	None	11 pins	LC4H-S-T6-24V
			Transistor	/24 V AC	None	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)

# **Specifications**

	14		Ralay ou	tput type	Transistor output type				
Item			AC type	DC/AC type	DC/AC type				
	Rated opera	ting voltage	100 to 240 V	12 to 24 V DC/24 V AC	12 to 24 V DC/24 V AC				
	Rated freque	ency	50/60 Hz common						
	Rated powe	r consumption	Max. 10 V A	. 3 W					
	Rated contro	ol capacity	5 A 250 V AC	(resistive load)	100 mA, 30 V DC				
	Input mode		Addition (UP)/Subtract	ion (DOWN)/Direction (DIR)/Individuality 5 modes selectable by DIP switches	(IND)/Phase (PHASE)				
	Max. countir	ng speed		30 Hz, 5 kHz (selectable by DIP switches	)				
	Counting input	t (input 1, input 2)	16.7 ms a	at 30 Hz/0.1 ms at 5 kHz ON time: OFF t	ime = 1:1				
	Reset input	<u> </u>	Min. input s	signal width: 1 ms, 20 ms (selected by DI	P switches)				
	Lock input		·	Min. input signal width: 20 ms	,				
Rating	Input signal		Contact, Open collector input/DC two-wire Open impeda	i					
	Output mode	e	HOLD-A, HOLD-B, HOLD-C, SH	HOT-A, SHOT-B, SHOT-C, SHOT-D, 7 m	odes selectable by DIP switches				
	One shot ou	tput time		1 s, 0.5s, 0.2s, 0.1s, 0.05, 0.01s					
	Indication	•	7-segment LCD, Counte	er value (backlight red LED), Setting value	e (backlight yellow LED)				
	Digit		4-digit display type –9999 to 9999 (0 to 9999 for setting) 6-digit display type –99999 to 999999 (0 to 99999 for setting)						
	Decimal point		Can be set to three digits						
	Pre-scaling		0.001 to	0.001 to 9.999 (4-digit type), 0.001 to 99.999 (6-digit type)					
	Memory			P-ROM (Overwriting times: 10 <sup>5</sup> ope. or me	<u> </u>				
	Power for senser		12 V DC (±10%) 100 mA Max.						
	Contact arra	ingement	1 Foi	1 Form A (Open collector)					
Contact	Initial contac	t resistance	100 mΩ (at	_					
	Contact mat	erial	Ag alloy/	_					
1.16	Mechanical	(contact)	2 × 10 <sup>7</sup> ope. (Except for	_					
Life	Electrical (co	ontact)	10⁵ ope. (At rated	d control voltage)	10 <sup>7</sup> ope. (At rated control voltage)				
	Operating vo	oltage range	85 to 264 V AC	, 20.4 to 26.4 V AC					
	Initial withsta	and 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						
Electrical	Initial insulat	tion resistance	Between live and dead metal parts: Min. 100 M $\Omega$ (pin type) Between input and output: Min. 100 M $\Omega$						
	Temperature	e rise	Max. 65° C (under the flow of nominal operating current at nominal voltage)						
	Vibration	Functional	`	cycle/min), single amplitude: 0.35 mm (10					
	resistance	Destructive	· · · · · · · · · · · · · · · · · · ·	cycle/min), single amplitude: 0.75 mm (					
Mechanical	Shock	Functional	Min. 98 m/s <sup>2</sup> (4 times on 3 axes)						
	resistance	Destructive	Min. 294 m/s² (5 times on 3 axes)						
	Ambient tem		-10° C to 55° C +14° F to +131° F						
Operating	Ambient hur	•		Max. 85 % RH (non-condensing)					
conditions	Air pressure			860 to 1,060 h Pa					
Connection				11-pin/screw terminal					
	onstruction			IP66 (front panel with a rubber gasket)					

# **Applicable standard**

Safety standard	EN61812-1	Pollution Degree 2/Overvoltage Category II
	(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)
EMC	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)

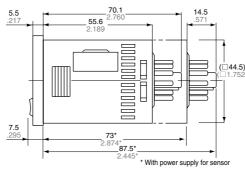
### **Dimensions**

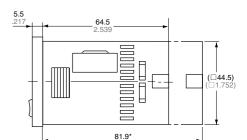
Screw terminal type

mm inch General tolerance: ±1.0 ±.039

#### Pin type (Flush mount/Surface mount)







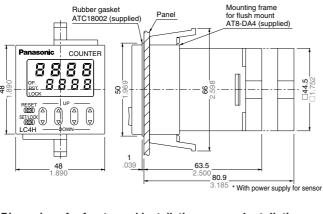
Screw terminal type: M3.5 (Flush mount)

\* With power supply for sensor

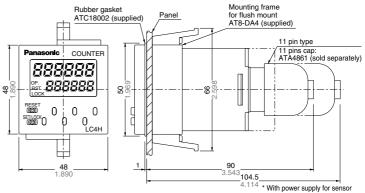
(\* 6-digit display type has the same dimensions.)

#### • Dimensions for flush mounting (with adapter installed)

Rubber gasket ATC18002 (supp COUNTER 8888



# Pin type

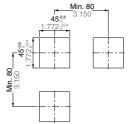


#### • Dimensions for front panel installations

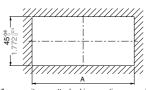
### DIN rail terminal block 11-pin type: AT8-DF11K (sold separately) Ę Г Device installation rail ATA48011 (sold separately) 95.5 (112.9) 3.760 (4.445) \* With power supply for sensor

### • Installation panel cut-out dimensions

The standard panel cut-out dimensions are shown below. Use the 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:

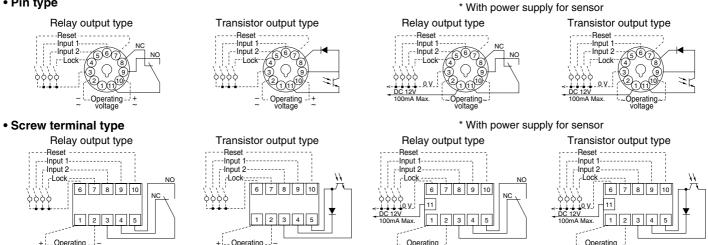
 $A = (48 \times n - 2.5)^{-0.6}$ 

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



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

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

	DII	P switch N	lo.	Output mode
	1	2	3	Output mode
	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

_	DII	P switch N	۱o.	Input mode
	6	7	8	input mode
	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.

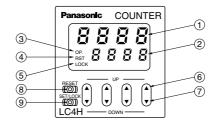
DIP switches (See note 2)

#### 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 kevs

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

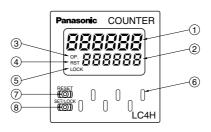
Resets the counting value and the output

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

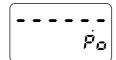
① Holding down the [SET/LOCK] key, press the key for the second digit to access the decimal point position setting mode.



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.

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)

- 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:

$$ightarrow$$
 1 s  $ightarrow$  0.5 s  $ightarrow$  0.2 s  $ightarrow$  0.1 s  $ightarrow$  0.05 s  $ightarrow$  0.01 s  $ightarrow$ 

(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-
- 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".

• Phase

Operation mode

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

 Addition UP DOWN • Subtraction DIR • Directive • Independent IND

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).  IN1  H  A A A A A A A A A A A A A A A A A A
Subtraction DOWN		• Example where IN2 is the counting input and IN1 is the input block (gate).    N1
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.	IN1 H Addition A A A Subtraction A A A Addition  IN2 H Addition A A A A Subtraction A A A Addition  Counting A A A Subtraction A A A Addition  A A A A Subtraction A A A Addition  O 1 2 3 4 3 2 1 0 1 2 3 4  * "A" must be more than the minimum input signal width.
Independent IND	IN1 is addition input and IN2 is subtraction input.	* IN1 and IN2 are completely independent, so there is no restriction on signal timing.
Phase PHASE	Addition when the IN1 phase advances beyond IN2, and subtraction when the IN2 phase advances beyond IN1.	* "B" must be more than the minimum input signal width.

# LC4H-S

#### 2. Output mode

• One shot/hold count

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

SHOT-D

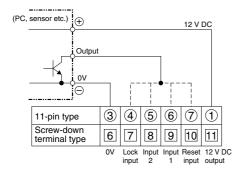
Maintain output/hold count
 Maintain output/over count I
 Maintain output/over count II
 One shot/over count I
 One shot/recount I
 One shot/recount I
 SHOT-B
 One shot/recount II

• One should	d Codific									_
Output mode	Operation	(Exam	ple when ir	nput mo	de is e	ther ad	dition o	r subtra	ction)	
	Output control is maintained after count-up completion and until resetting.	Counting (addition)		n-3	n-2	n-1		n		]
Maintain output	During that time, the count display does not change from that at count-up completion.	Counting (subtraction)		3	2	1		0		]
Hold count		Counting able/unable		Able			1	Unable		_
[TIOLD-A]		Output control  * n: Set value	OFF				ION		•	1
	Output control is maintained after			1	1		I	ı	ı	7
	count-up completion and until resetting.	Counting (addition)		n-2	n-1	n	n+1	n+2		
Maintain output Over count I	However, counting is possible despite completion of count-up.	Counting (subtraction)		2	1	0	-1	-2		
HOLD-B		Counting able/unable	•			Able			-	-
		Output control	OFF			ON				
		* n: Set value								
	Output control is maintained after				l	1			I	1
	count-up completion and until the next	Counting (addition)		n-2	n-1	n	n+1	n+2		
Maintain output Over count II	signal enters. However, counting is possible despite completion of count-	Counting (subtraction)		2	1	0	-1	-2		
HOLD-C	up.	Counting able/unable				Able	<u> </u>			-
		Output control	OFF			ON	l OFF			_
		* n: Set value								
	Output control is maintained after count-up completion for one shot output time. Counting is possible despite completion of count-up.	Counting (addition)		n-2	n-1	n	n+1	n+2		
One shot		Counting (subtraction)		2	1	0	-1	-2		
Over count		Counting able/unable	•			Able				-
SHOT-A		Output control	OFF			ON		OFF		
		* n: Set value				Appro	ox. 1s			-
	Output control is maintained after	Counting (addition)		n-2	n-1	0	1	2		
One shot	count-up completion for one shot output time. Counting is possible despite com-	Counting (subtraction)		2	1	n	n-1	n-2		1
Recount I	pletion of count-up. However, reset occurs simultaneous with completion of			1		A Reset (a			l	J
SHOT-B	count-up. While output is being main-	Counting able/unable	•		Able					-
	tained, restarting of the count is not possible	Output control	OFF	OFF OFF						-
		* n: Set value				Appro	ox. 1s	<u> </u>		_
	Output control is maintained after	Counting (addition)		n-1	n	n+1	0	1		
One shot	count-up completion for one shot output time. Counting is possible despite com-	Counting (subtraction)		1	0	-1	n	n-1		]
Recount II	pletion of count-up. However, reset		•	•	•		Reset (a	utomatic)	•	-
SHOT-C	occurs simultaneous with output OFF.	Counting able/unable	•		ON	Able	<u> </u> 		-	-
		Output control	OFF			ox. 1s	OFF			-
		* n: Set value			Appr	on. 10 ►			<b>.</b>	7
One shot	Output control is maintained after count-up completion for one shot output	Counting (addition)		n-1		n	0	1		
	time. During that time, the count display	Counting (subtraction)		1		0	n	n-1		]
Hold count	does not change from that at count-up				i I I		A Reset (a	automatic)		-
SHOT-D	completion. Reset occurs simultaneous with output OFF.	Counting able/unable	Able	-	Una ION	able	-	Able		-
		Output control	OFF			ov 10	OFF			-
		* n: Set value			Appr	ox. 1s	]			

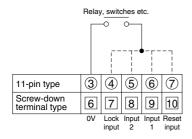
## Input connections

### Signal input type

#### 1) Open collector



#### 3) Contact input

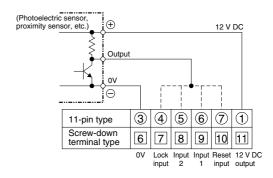


Input 1, input 2, and reset input specifications

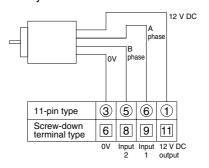
- Impedance during short-circuit: 1 k $\Omega$  max. (At 0  $\Omega$ , the outflow current is approximately 12 mA.)
- Residual voltage during short-circuit: 2 V max.
- Impedance when released: 100 k $\Omega$  min.
- Max. applied voltage: 40 VDC max.

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

#### 2) For voltage output



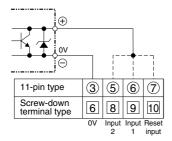
#### 4) For a rotary encoder



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.
- $\bullet$  Impedance when released: 100 k $\Omega$  min.
- Max. applied voltage: 40 DVC max.
- The contact relay should be one which can open/close 5 V, 1.5 mA.

### 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

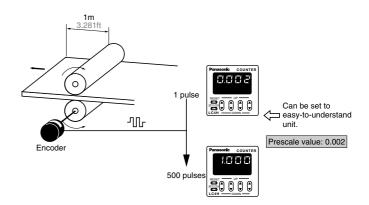
# What is the prescale function?

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).



<sup>\*</sup> 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.

# Panasonic ideas for life

### **DIN 48 SIZE** LCD ELECTRONIC COUNTER

# LC4H-W Counters

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

# **c¶**<sup>®</sup>us ( €



mm inch





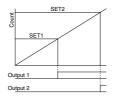
11-pin type

Screw terminal type

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

### **Features**

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



#### 2. Bright and Easy-to-Read Display

A brand new bright 2-color backlight LCD display. The easy-to-read screen in any location makes checking and setting procedures a cinch.

#### 3. Simple Operation

Seesaw buttons make operating the unit even easier than before.

4. Short Body of only 64.5 mm 2.539 inch (screw type) or 70.1 mm 2.760 inch (pin type)

With a short body, it easily installs in even narrow control panels.

#### 5. Conforms to IP66's Weather **Resistant Standards**

The water-proof panel keeps out water and dirt for reliable operation even in poor environments.

#### 6. Screw terminal and Pin Type are **Both Standard Options**

The two terminal types are standard options to support either front panel installation or embedded installation.

### 7. Changeable Panel Cover

Also offers a black panel cover to meet your design considerations.

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

#### 9. Low Price

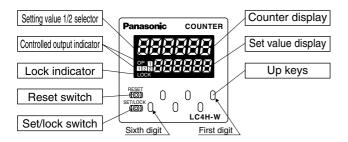
All this at an affordable price to provide you with unmatched cost performance.

# **Product types**

Digit	Count speed	Outpu	Output mode		Operating	Power down	Terminal type	Part number										
Digit	Count speed	Output 1	Output 2	Output	voltage	insurance	reminar type	rait number										
														100 to 240 V AC		11 pins	LC4H-W-R6-AC240V	
			- Maintain autout/hald		100 to 240 V AC		Screw terminal	LC4H-W-R6-AC240VS										
			Maintain output/hold count	Relay	041/ 40		11 pins	LC4H-W-R6-AC24V										
		Maintain output/over	• Maintain output/over count I	, ,			Screw terminal	LC4H-W-R6-AC24VS										
	30 Hz (cps)/  30 Hz (cps)/  • Maintain output/over count II				12 to 24 V DC		11 pins	LC4H-W-R6-DC24V										
6		12 to 24 V DC	Available	Screw terminal	LC4H-W-R6-DC24VS													
О	5 KHz (Kcps) switchable	Maintain output/over   Count III	ontain output/over count II  ntain output/over count III  ntain output/over count III  ntain output/over count III  one shot/over count		100 to 240 V AC	Available	11 pins	LC4H-W-T6-AC240V										
		count III     One shot/over count									100 to 240 V AC		Screw terminal	LC4H-W-T6-AC240VS				
		(4 modes)	One shot/recount I     One shot/recount II	Transistor (1a+1a)	041/ 40		11 pins	LC4H-W-T6-AC24V										
			One shot/hold count		a) 24V AC		Screw terminal	LC4H-W-T6-AC24VS										
			(8 modes)	(8 modes)	(8 modes)	(8 modes)	(8 modes)	(8 modes)	(8 modes)	(8 modes)	(8 modes)	(8 modes)	(8 modes)		40 to 04 V DO		11 pins	LC4H-W-T6-DC24V
					12 to 24 V DC		Screw terminal	LC4H-W-T6-DC24VS										

<sup>\*</sup> A rubber gasket (ATC18002) and a mounting frame (AT8-DA4) are included.

#### Part names



UP keys

: Used to set the corresponding digits for the count-up mode.

RESET key

: Used to reset counting and its output.

SET/LOCK key: Used to select between the Setting 1 display and Setting 2 display and to lock the keys (UP and RESET keys not responsive to touch). Used also to set and confirm the input mode.

# Specifications

	ltom		Ralay ou	tput type	Transistor	output type
	Item		AC type	DC type	AC type	DC type
	Rated opera	ting 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
Contact Life  Electrical  Mechanical	Rated freque	ency	50/60 Hz common	_	50/60 Hz common	_
	Rated power	r consumption	Max. 10 V A	Max. 3 W	Max. 10 V A	Max. 3 W
	Rated contro	ol capacity	3 A, 250 V AC	(resistive load)	100 mA,	30 V DC
	Input mode		Addition (UP)/Subtraction (D	OWN)/Direction (DIR)/Individual	ty (IND)/Phase (PHASE) (5 mod	des selectable by DIP switch)
	Counting sp	eed		30 Hz(cps)/5 KHz(cps) (s	selectable by DIP switch)	
	Counting inp	out (Input 1, 2)	Min. input sigr	nal width: 16.7 ms at 30 Hz(cps)/	0.1 ms at 5 KHz(cps) ON time:	OFF time = 1:1
Rating	Reset input			Min. input signal width: 1 ms, 2	20 ms (selected by DIP switch)	
Rating  Contact  Life	Input signal			collector input/Input impedance pen impedance: 100 k $\Omega$ or more		
	Output mode	е		Output 1. HOLD-B, C, Output 2. HOLD-A, B, C S (selectable b	HOT-A, B, C, D (8 modes)	
	One shot ou	tput time		Appro	x. 1 s	
	Indication		7-segment L	CD, Counter value (backlight re	d LED), Setting value (backlight	yellow LED)
	Digit			-99999 to 999999 (-5 digits to 6	digits) (0 to 999999 for setting)	
	Memory			EEP-ROM (Overwriting	times: 10⁵ ope. or more)	
	Contact arra	ngement	1 Form A	+ 1 Form A	1 Form A + 1 Form	A (Open collector)
Contact	Contact resista	ance (Intial value)	100 mΩ (at	1 A 6 V DC)	-	_
	Contact mat	erial	Ag alloy	/Au flush	-	_
ifo	Mechanical	(contact)	Min. 2 ×	10 <sup>7</sup> ope.	-	_
	Electrical (co	ontact)	Min. 10⁵ ope. (At ra	ted control voltage)	Min. 10 <sup>7</sup> ope. (At ra	ited control voltage)
	Allowable op voltage rang			85 to 110 % of rate	d operating voltage	
=lootrical	Break down (Initial value)		Between input and outp	s: 2,000 Vrms for 1 min (pin type) ut: 2,000 Vrms for 1 min s: 1,000 Vrms for 1 min		al parts: 2,000 Vrms for 1 min ut: 2,000 V AC for 1 min
ziecilicai	Insulation re (At 500 V DO value)		Between input and	parts: Min. 100 M $\Omega$ (pin type) putput: Min. 100 M $\Omega$ ntact: Min. 100 M $\Omega$	Between live and dead metal Between input and	parts: Min. 100 M $\Omega$ (pin type output: Min. 100 M $\Omega$
	Temperature	e rise	Max. (under the flow of nominal opera	65°C ating current at nominal voltage)	-	_
	Vibration	Functional	10 t	o 55 Hz (1 cycle/min), single am	plitude: 0.35 mm (10 min on 3 a	xes)
Acchanical	resistance	Destructive	10	to 55 Hz (1 cycle/min), single a	mplitude: 0.75 mm (1 h on 3 axe	es)
lechanicai	Shock	Functional		Min. 98 m/s <sup>2</sup> (4 t	imes on 3 axes)	
	resistance	Destructive		Min. 294 m/s <sup>2</sup> (5	times on 3 axes)	
	Ambient tem	perature		–10°C to 55°C ⊣	-14°F to +131°F	
perating	Ambient hun	nidity		Max. 85 % RH (ı	non-condensing)	
onditions	Air pressure			860 to 1,	060 h Pa	
	Ripple rate		_	20 % or less	_	20 % or less
Connection				11-pin/scre	w terminal	
rotective co	onstruction			IP66 (front panel w	th a rubber gasket)	

# **Applicable standard**

Safety standard	EN61812-1	Pollution Degree 2/Overvoltage Category II
	(EMI)EN61000-6-4 Radiation interference electric field strength	EN55011 Group1 ClassA
	Noise terminal voltage (EMS)EN61000-6-2	EN55011 Group1 ClassA
	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)
EMC	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)

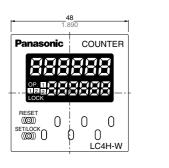
### **Dimensions**

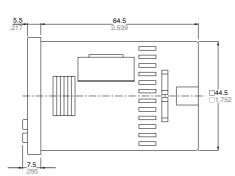
• LC4H-W electrical counter

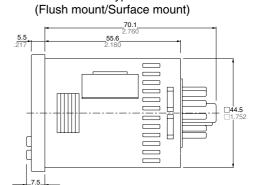
mm inch

General tolerance:  $\pm 1.0 \pm .039$ 

# Screw terminal type (Flush mount): M3.5



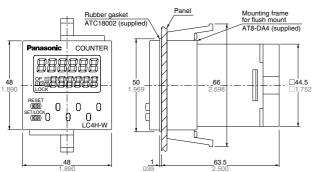




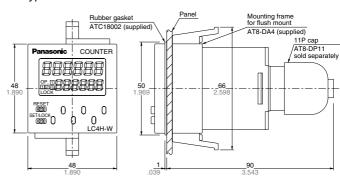
Pin type

#### • Dimensions for flush mounting (with adapter installed)

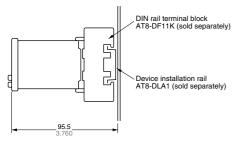
Screw terminal type



#### Pin type

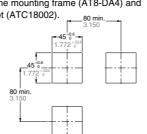


#### • Dimensions for front panel installations

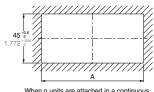


#### Installation panel cut-out dimensions

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:  $A = (48 \times n - 2.5)^{+0.6}_{-0.0}$ 

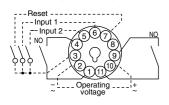
Note 1): The installation panel thickness should be between 1 and 5 mm .039 and .197 inch.

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

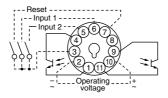
# **Terminal layouts and Wiring diagrams**

Pin type

Relay output type

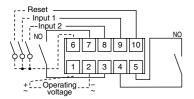


#### Transistor output type

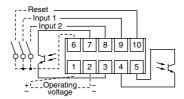


#### Screw terminal type

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 counter

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

Set the output 1 and output 2 with the DIP switches on the side of the counter.

The minimum input signal width and maximum counting speed for the reset are set at the same time.

Table 1

#### **DIP** switches

DIF 8	Item OFF ON  1 Output mode Refer to table 1  4 Minimum reset input signal width 20ms 1ms  5 Maximum counter setting 30Hz 5kHz  6 Output mode Refer to table 2  Output 2  DIP switches (see note 2)					DI	P swith N	lo	Output mode
	Item	OFF	ON			1	2	3	(Output 1)
1						ON	ON	ON	— (See note 1)
2	•	Refer to	table 1			OFF	OFF	OFF	HOLD-B
3	Output 1					ON	OFF	OFF	HOLD-C
4	Minimum reset input signal width	20ms	1ms			OFF	ON	OFF	HOLD-D
5	Maximum counter setting	30Hz	5kHz			ON	ON	OFF	SHOT-A
6						OFF	OFF	ON	— (See note 1)
-	•	Refer to	table 2		]	ON	OFF	ON	— (See note 1)
8	Output 2					OFF	ON	ON	— (See note 1)
	DIP switches (see note 2)					DI	P swith N	lo.	Output mode
	123458789					6	7	8	(Output 2)
		$\rightarrow$				ON	ON	ON	HOLD-A
						ON OFF	ON OFF	ON OFF	HOLD-A HOLD-B
						_	_	_	
						OFF	OFF	OFF	HOLD-B
						OFF ON	OFF OFF	OFF OFF	HOLD-B HOLD-C
	Item OFF ON  1 2 Output mode Refer to table 1  4 Minimum reset input signal width 20ms 1ms  5 Maximum counter setting 30Hz 5kHz  6 Output mode Refer to table 2  Output 2  DIP switches (see note 2)					OFF ON OFF	OFF OFF ON	OFF OFF	HOLD-B HOLD-C HOLD-D

#### Setting procedure 2) Setting the set value

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

(4)

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.

SHOT-D

4) The DIP switches are set as ON before shipping.

#### Front display section

(Same for screw terminal type)

- 1 Counter display
- 2 Set value display
- 3 Controlled output indicator
- 4 Setting 1/2 selection display (\*Note)
- (5) Lock indicator

\*Note:

Pressing the [SET/LOCK] key switches the display between the set value 1 and 2 displays.

Display either set value [1] or [2], and

set the value

(3) LOCK (5) (7)(8) LC4H-W Sixth digit First digit

点点点点点点

**Panasonic** 

#### (6) UP keys

ON

ON

(1)

(2)

6

**OFF** 

COUNTER

[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

Used to select between the Setting 1 display and Setting 2 display, to set and confirm the input mode, and to lock the keys (UP and RESET keys not responsive to touch).

#### Procedure 3) Setting the input mode

Set the input mode using the key and switch in the front display section on the counter front.

- (1) Hold down the SET/LOCK key and press the UP key for the first digit. The setting mode is accessed.
- (2) Now release the SET/LOCK key.
  (3) Press the UP key for the first digit and the input position changes counterclockwise.

Example) Input mode displayed (UP: addition mode)





(4) Press the RESET key and the input mode being displayed is set. The display then goes back to normal.

#### · Checking the input mode

Hold down the SET/LOCK key and press the UP key for the second digit. The input mode is displayed for about 2 seconds and then the display goes back to normal. (During these 2 seconds, all operations other than the display are being performed.)

#### Locking the keys

Hold down the SET/LOCK key and press the UP key for the sixth digit. The keys will lock. This means that the UP and RESET keys do not respond to touch. To unlock the keys, hold down the SET/LOCK key and press the UP key for the sixth digit again.

The input mode, maximum counting speed and minimum reset signal width cannot be preset independently for Setting 1 and Setting 2

# Selecting the Setting 1 or Setting 2 dis-

Press the SET/LOCK key and the display changes between Setting 1 and Setting 2. (This operation does not affect overall operation.)

#### . Changing the setting

1. While the counter is working, the UP key can be used to change the setting. Keep the following points in mind, however.

1) Suppose that a preset count-up value is smaller than the displayed count value. The counter counts up to the full scale mark (999999), goes back to "0", and counts up again to the preset number. When the preset count-up value is larger than the displayed count value, the counter counts up to the preset value.

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

#### 2. When the preset value is "0", the counter does not start in the count-up mode. It starts counting up when the count value comes to "0" again.

1) Up-count input

The counter counts up to the full scale mark (99999), goes back to "0" and starts counting up

2) Down-count input

The counter counts down to the full scale mark (-99999) and the display reads - - - - - . The count value does not become "0" and so the counter does not count up.

3) Direction input, individual input, and phase input The preset value is counted up or down to any number other than "0" once. When it comes to "0" again. the counter starts counting up.

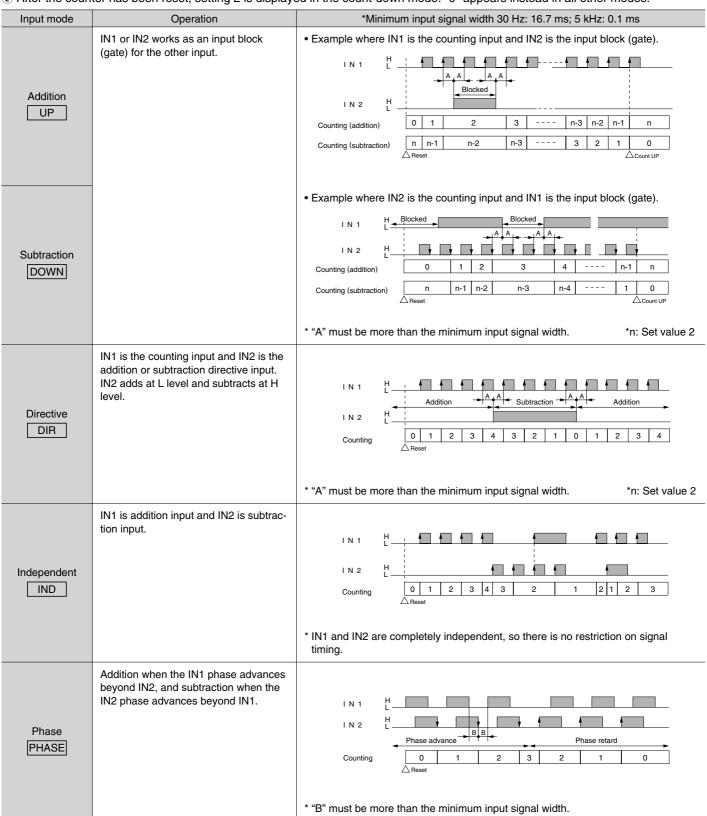
# **Operation modes**

#### 1. Input mode

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

<ul> <li>Addition</li> </ul>	UP
<ul> <li>Subtraction</li> </ul>	DOWN
<ul> <li>Directive</li> </ul>	DIR
• Independent	IND
• Phase	PHASE

② After the counter has been reset, setting 2 is displayed in the count-down mode. "0" appears instead in all other modes.



#### 2. Output mode

For the set value 1, you can choose one of the following four modes.

• Maintain output/over count I

HOLD-B

• Maintain output/over count II

HOLD-C

• Maintain output/over count III

HOLD-D

• One shot/over count

SHOT-A

For the set value 2, you can choose one of the following eight modes.

• Maintain output/hold count

HOLD-A

• Maintain output/over count I

HOLD-B

• Maintain output/over count II

HOLD-C HOLD-D

• Maintain output/over count III • One shot/over count

SHOT-A

• One shot/recount I

SHOT-B SHOT-C

• One shot/recount II • One shot/hold count

SHOT-D

• Output mode for set value 1

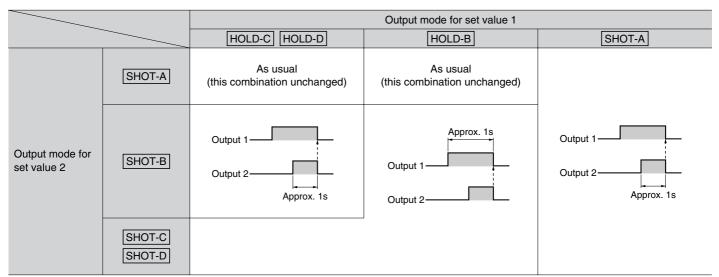
Output mode to	Operation	(Example	when input	mode is	s either	additio	n or sub	otraction	1)
	Output control is maintained after count-up completion and until resetting.								
	However, counting is possible despite completion of count-up.	Counting (addition)		n-2	n-1	n	n+1	n+2	
Maintain output Over count I HOLD-B	·	Counting (subtraction)		n+2	n+1	n	n-1	n-2	
		Counting able/unable	•			Able			
		Output control 1	OFF			O N			
		* n: Set value 1							
Maintain output Over count II	Output control is maintained after count-up completion and until the next								
	signal enters. However, counting is possible despite completion of count-	Counting (addition)		n-2	n-1	n	n+1	n+2	
	up.	Counting (subtraction)		n+2	n+1	n	n-1	n-2	
HOLD-C		Counting able/unable	•			Able	1		
		Output control 1	OFF			ON			
		* n: Set value 1							
	If the count value is greater than or equal to the preset value when counting up, the control output is held. The								
		Counting (addition)		n-2	n-1	n	n+1	n+2	
Maintain output	count operation is possible anyway.	Counting (subtraction)		n+2	n+1	n	n-1	n-2	
Over count III		Counting able/unable	•			Able			
HOLD-D		Output control 1 (addition) O F F				ON			
		Output control 2 (subtraction)				OFF			
		* n: Set value 1							
	Output control is maintained after								
	count-up completion for a fixed time (approx. 1 sec). Counting is possible	Counting (addition)		n-2	n-1	n	n+1	n+2	
One shot	despite completion of count-up.								
One shot Over count		Counting (subtraction)		n+2	n+1	n Able	n-1	n-2	
SHOT-A		Counting able/unable	-			ON			-
		Output control 1	OFF				ox. 1s	OFF	
						-	-	-1	
		* n: Set value 1							

# LC4H-W

### • Output mode for set value 2

	(Example	when input mo	ode is eithe	r additio	n or sub	otraction	1)		
Output control is maintained after	(	,					,		
count-up completion and until resetting.  During that time, the count display does	Counting (addition)		n-3 n-2	n-1		n			
not change from that at count-up completion.	Counting (subtraction)		3 2	1		0			
	Counting able/unable	•	Able		-	n	e		
	Output control 2	OFF			ON				
	* n: Set value 2								
Output control is maintained after				_					
However, counting is possible despite	Counting (addition)		n-2 n-1	n	n+1	n+2			
completion of count-up.	Counting (subtraction)		2 1	0	-1	-2			
	Counting able/unable	•		Able					
	Output control 2	OFF		ON					
0.1.1.1	* n: Set value 2								
count-up completion and until the next									
				_					
up.	Counting (subtraction)		2 1	0	-1	-2			
	Counting able/unable	4			1		-		
	Output control 2	OFF OFF							
	* n: Set value 2								
If the count value is greater than or	11. Set value 2								
equal to the preset value when counting up, the counter starts counting up again. The count operation is possible	Counting (addition)		n-2 n-1	n	n+1	n+2			
	Counting (subtraction)		2 1	0	-1	-2			
anyway.	Counting able/unable	•		Able	1				
	Output control 2 (addition)	OFF	OFF						
	Output control 2 (subtraction)	OFF							
	* n: Set value 2								
Output control is maintained after									
count-up completion for a fixed time	Counting (addition)		n-2 n-1	n	n+1	n+2			
despite completion of count-up.	Counting (subtraction)		2 1	0	-1	-2			
	Counting able/unable	•		Able	Able				
	Output control 2	OFF				OFF			
				Appr	ox. 1s	.]			
	* n: Set value 2								
Output control is maintained after									
count-up completion for a fixed time (approx. 1 sec). Counting is possible	Counting (addition)		n-2 n-1	0	1	2			
despite completion of count-up.	Counting (subtraction)		2 1	n Reset (	n-1	n-2			
However, reset occurs simultaneous with completion of count-up. While out-			Reset (automatic)						
· · · · · · · · · · · · · · · ·	Counting able/unable		•			ON			
with completion of count-up. While out- put is being maintained, restarting of		<b>▼</b>		<del>-</del>		10FF	-		
with completion of count-up. While out-	Counting able/unable Output control 2	OFF		O N	ox. 1s	] O F F			
	Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion.  Output control is maintained after count-up completion and until resetting. However, counting is possible despite completion of count-up.  Output control is maintained after count-up completion and until the next signal enters. However, counting is possible despite completion of count-up.  If the count value is greater than or equal to the preset value when counting up, the counter starts counting up again. The count operation is possible anyway.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.	Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion.  Counting (subtraction) Counting up, the count value is greater than or equal to the preset value when counting up, the counter starts counting up again. The count operation is possible anyway.  Counting (subtraction)	Operation  Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion.  Output control 2  Output control 2  Output control 2  Output control 2  Output control 3  * n: Set value 2  Output control 2  Output control 2  Output control 3  * n: Set value 2  Output control 4  Output control 2  OF F  * n: Set value 2  Output control 3  OF F  * n: Set value 2  Output control 3  OF F  * n: Set value 2  Output control 3  OF F  * n: Set value 2  Output control 4  OF F  * n: Set value 2  Output control 5  * n: Set value 2  Output control 6  Output control 7  Output control 8  * n: Set value 2  Output control 9  * n: Set value 2  If the count value is greater than or equal to the preset value when counting up, the counter starts counting up again. The count operation is possible anyway.  Output control 2 (addition)  Output control 2 (addition)	Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion.  Output control is maintained after count-up completion and until resetting. Counting ablelumable Quiput control is maintained after count-up completion and until resetting. However, counting is possible despite completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion and until the next signal enters. However, counting is possible despite completion of count-up.  Output control is maintained after count-up completion and until the next signal enters. However, counting is possible despite completion of count-up.  If the count value is greater than or equal to the preset value when counting up, the counter starts counting up again. The count operation is possible anyway.  Output control 2 (subtraction)  Counting ablefunable  Output control 2 (subtraction)  Counting (subtraction)  Output control 2 (subtraction)  OFF  Output control 2 (subtraction)  OFF  *n: Set value 2  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.  Output control 2 (subtraction)  Counting (subtraction)  OFF  Output control 2 (subtraction)  OFF  Output control 2 (subtraction)  OFF  *n: Set value 2  Output control 3 (subtraction)  OFF  Output control 4 (subtraction)  OFF  Output control 5 (subtraction)  OFF  *n: Set value 2  Output control 6 (subtraction)  OFF  *n: Set value 2  Output control 7 (subtraction)  Output control 8 (subtraction)  OFF  *n: Set value 2	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.  Courting (subtraction)  Counting subternable  Output control is maintained after count-up completion and until the next signal enters. However, counting is possible despite completion of count-up.  Output control is maintained after count-up completion for counting is possible despite completion of counting up, the counter starts counting up again. The count operation is possible anyway.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible count-up.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible count-up.  Output control is maintained after count-up completion of count-up.	Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  Output control is maintained after count-up completion of count-up.  If the count value is greater than or equal to the preset value when count-up completion and until the next input, the counter starts counting up again. The count operation is possible anyway.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.  Output control is maintained after count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion for a fixed time (approx. 1 sec). Counting is possible despite completion for a fixed time (approx. 1 sec). Counting is possible despite completion for a fixed time (approx. 1 sec). Counting is possible despite completion for a fixed time (approx. 1 sec). Counting is possible despite completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up.	Output control is maintained after count-up completion and until resetting. During that time, the count display does not change from that at count-up completion.  Counting (autistication)  Counting (autistication)  Counting (autistication)  Counting (autistication)  Counting (autistication)  OFF  Counting (autistication)  OFF  Counting (autistication)  OFF  ON  This Set value 2  Counting (autistication)  OFF  ON  ON		

Output mode	Operation	(Example when input mode is either addition or subtraction)							
	Output control is maintained after								
One shot Recount II SHOT-C	count-up completion for a fixed time (approx. 1 sec). Counting is possible despite completion of count-up. However, reset occurs simultaneous with output OFF.	Counting (addition)		n-1	n	n+1	0	1	
		Counting (subtraction)		1	0	-1	n	n-1	
					1		Reset	automatic)	
		Counting able/unable	•		1	Able	-		-
		Output control 2	OFF			OFF			
					Appr	ox. 1s			
		* n: Set value 2							
	Output control is maintained after								
	count-up completion for a fixed time (approx. 1 sec). During that time, the count display does not change from that at count-up completion. Reset occurs simultaneous with output OFF.	Counting (addition)		n-1		n	0	1	
One shot Hold count SHOT-D		Counting (subtraction)		1		0	n	n-1	
				•	1	4	A Reset (	automatic)	,
		Counting able/unable	Able		Unable		-	Able	
		Output control 2	OFF		O N		OFF		
					Appr	ox. 1s			
		* n: Set value 2							



Note) When control output 1 is on, the output mode of setting 2 (SHOT-A, B, C, D) is also on and output 1 changes as shown in the above table.

#### 3. Count-up

- (1) In control output 1, when the count value is equal to the preset value 1, it is counted. (However, if the output mode of the preset value 1 is HOLD-D, it is counted when the count value is greater than or equal to the preset value 1, regardless of the input mode.)
- (2) In control output 2, when the count value is equal to 0 in the count-down input mode, it is counted. In the other modes, when the count value is equal to the preset value 2, it is counted. (However, if the output mode of the preset value 2 is HOLD-D, it is counted when the count value is greater than or equal to the preset value 2, regardless of the input mode.)
- (3) It is not counted even when the counting conditions are satisfied right after resetting. It can be counted from when the count value changes.

# PRECAUTIONS IN USING THE LC4H SERIES

## **Precautions during usage**

#### 1. Terminal wiring

- 1) When wiring the terminals, refer to the terminal layout and wiring diagrams and be sure to perform the wiring properly without errors.
- 2) When using the instrument with an flush mounting, the screw-down terminal type is recommended. For the pin type, use either the rear terminal block (AT78041) or the 8P cap (AD8-RC) for the 8-pin type, and the rear terminal block (AT78051) or the 11P cap (AT8-DP11) for the 11-pin type. Avoid soldering directly to the round pins on the unit. When using the instrument with a front panel installation, use the DIN rail terminal block (AT8-DF8K) for the 8-pin type and the DIN rail terminal block (AT8-DF11K) for the 11-pin type.
- 3) After turning the counter off, make sure that any resulting induced voltage or residual voltage is not applied to power supply terminals ② through ⑦ (8pin type), ② through ⑩ (11-pin type) or 1 and 2 (screw 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.

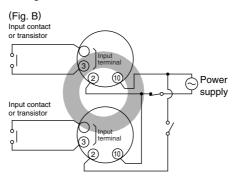
#### 2. Input connections (except LC4H-S/AC type)

The power circuit has no transformer without a transformer (power and input terminals are not insulated). When an input signal is fed to two or more counters at once, do not arrange the power circuit in an independent way.

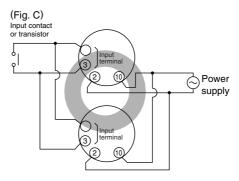
If the counter is powered on and off independently as shown in Fig. A, the counter's internal circuitry may get damaged.Be careful never to allow such circuitry. (Figs. A, B and C show the circuitry for the 11-pin type.)

(Fig. A) Power

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



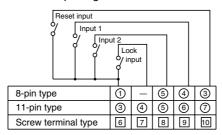
When power circuitry is not independent, one input signal can be fed to two or more counters at once, as shown in Fig.



#### 3. Input and output

- 1) Signal input type
- (1) Contact point input

Use highly reliable metal plated contacts. Since the contact point's bounce time leads directly to error in the 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.



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

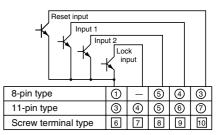
(2) Non-contact point input Connect with an open collector. Use transistors whose characteristics satisfy the criteria given below.

VCEO = 20 V min.

Ic = 20 mA min.

Iсво =  $6\mu A$  max.

Also, use transistors with a residual voltage of less than 2 V when the transistor



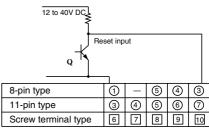
Note: The LC4H-W does not have the lock input

\* The short-circuit impedance should be less than 1 k $\Omega$ .

[When the impedance is 0  $\Omega$ , 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 $\Omega$ .

\* 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.



(The above example is for reset input)

2) The input mode and output mode change depending on the DIP switch settings. Therefore, before making any connections, be sure to confirm the operation mode and operation conditions currently set.

# PRECAUTIONS IN USING THE LC4H SERIES

3) The LC4H series use power supply without a transformer (power and input terminals are not insulated). In connecting various kinds of input signals, therefore, use a power transformer in which the primary side is separated from the ungrounded secondary side as shown in Fig. A, for the power supply for a sensor and other input devices so that short-circuiting can be prevented.

Once the wiring to be used is completely installed and prior to installing this counter, confirm that there is complete insulation between the wires connected to the power terminals (2 each) and the wires connected to each input terminal. If the power and input lines are not insulated, a short-circuit may occur inside the counter and result in internal damage. In addition, when moving your equipment to a new installation location, confirm that there is no difference in environmental conditions as compared to the previous location.

(except LC4H-S/AC type)

(Fig. A) Good example

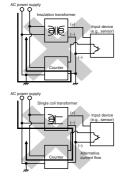
AC power supply

Insulation transformer

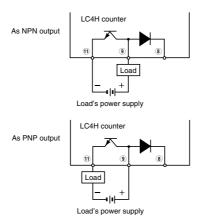
Input device

(e.g. sented)

(Fig. B) Bad example

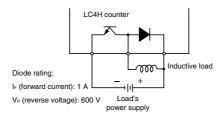


- 4) The input signal is applied by the shorting of each input terminal with the common terminal (terminal ① for 8-pin type, terminal ③ for 11-pin type and terminal ⑥ for screw terminal types). Never connect other terminals or voltages higher than 40 V DC, because it may destroy the internal circuitry.
- 5) Transistor output
- (1) Since the transistor output is insulated from the internal circuitry by a photocoupler, it can be used as an NPN output or PNP (equal value) output. (The above example is 11-pin type)



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

(2) Use the diode connected to the output transistor's collector for absorbing the reverse voltage from induced loads. (LC4H only)



6) 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.

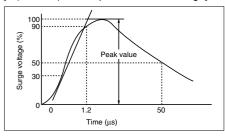
#### 5. Conditions of usage

- 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.
- 4) Regarding external noise, the values

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

#### Surge wave form

[ $\pm$  (1.2  $\times$  50) ms uni-polar full wave voltage]



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.

Noise wave form (noise simulator)

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

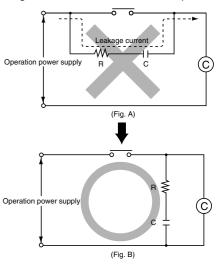
Rise time: 1 ns

Pulse width: 1  $\mu s$ , 50 ns

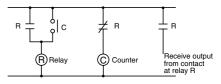
Polarity: ±

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.



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.



### PRECAUTIONS IN USING THE LC4H SERIES

#### 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		Enter reset or RESET		
or 0 0 0 0 0	or –99999. See note 1.	No change	key.	No change	
	Incorrect DIP switch setting.	No change	Restart unit (correct DIP switch settings)	No change	
	Malfunctioning CPU.	OFF	Enter reset, RESET key,	The values at start-up before the CPU malfunction occurred.	
	Malfunctioning memory. See note 2.	OFF	or restart unit.	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. Compliance with the CE marking** When using in applications to which EN61812-1 applies, abide by the following conditions.

- Overvoltage category II, pollution level 2 (for sensor type model with power supply)
- Connections between the power supply and input/output have basic insulation. Use a device with basic insulation to connect to the I/O terminals.
   (for sensor type model without power supply)
- This counter employs a power supply without a transformer, so the power and input signal terminals are not insulated.

- When a sensor is connected to the input circuit, install double insulation on the sensor side.
- (2) In the case of contact input, use dual-insulated relays, etc.
- The load connected to the output contact should have basic insulation.
   This counter is protected with basic insulation and can be double-insulated to meet EN/IEC requirements by using basic insulation on the load.
- Applied voltage should be protected with an overcurrent protection device (example: 250 V 1A fuse, etc.) that conforms to the EN/IEC standards.
- 2) You must use a terminal block or socket for installing the pin-type counter. Do not touch the terminal section or other parts of the timer unit while an electric current is applied. Before installation or removal, confirm that there is no voltage being applied to any of the terminals.
- 3) Do not use this timer with a safety circuit. For example, when using a timer in a heater circuit, etc., provide a protection circuit on the machine side.