







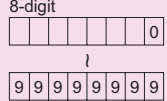
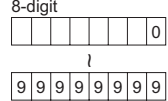
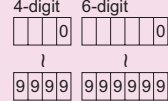
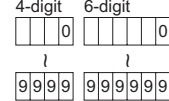
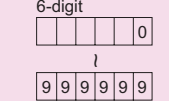












Counters Selection Guide

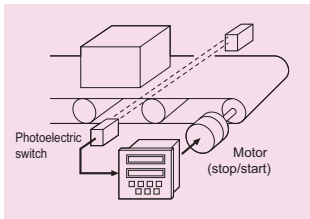
FIBER SENSORS
LASER SENSORS
PHOTOELECTRIC SENSORS
MICRO PHOTOELECTRIC SENSORS
AREA SENSORS
LIGHT CURTAINS
PRESSURE / FLOW SENSORS
INDUCTIVE PROXIMITY SENSORS
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LC2H
LC4H series

Electronic counters						
Types	Total counter	Preset counter				
Product name	LC2H Counter	LC2H Preset Counter	LC4H/-L Counter	LC4H-S Counter	LC4H-W Counter	
Shape	Panel mounting type  PC board mounting type 		  (4-digit display) (6-digit display)	  (4-digit display) (6-digit display)		
Input mode/ Input method	UP type	UP, DOWN type (selectable by front switch)	UP, DOWN, DIR, IND and PHASE (selectable by DIP switch)	UP, DOWN, DIR, IND and PHASE (selectable by DIP switch)	UP, DOWN, DIR, IND and PHASE (selectable by DIP switch)	
Features	8.7 mm 0.343 in tall 8-digit display Mounting method: • One-touch installation type • Installation frame type • PC board mounting type	8.7 mm 0.343 in tall 8-digit display Preset function equipped in half size Display has backlight for instant recognition	Bright and easy-to-read display Simple operation Short body Conforms to IP66's weather resistant standards	Bright and easy-to-read display Simple operation Pre-scale function Built-in power supply for high-capacity sensor (100 to 240 V AC type) Conforms to IP66's weather resistant standards	Bright and easy-to-read display Simple operation Upper and lower limit settings are available Conforms to IP66's weather resistant standards	
Rated operating voltage	Panel mounting type: Unnecessary (Built-in battery) PC board mounting type: 3 V DC (Battery in externally installed)	24 V DC	100 to 240 V AC (50/60 Hz common) 24 V AC/DC (50/60 Hz common) 12 to 24 V DC	100 to 240 V AC (50/60 Hz common)	100 to 240 V AC (50/60 Hz common) 24 V AC (50/60 Hz common) 12 to 24 V DC	
Number of digits (counter capacity)	8-digit 	8-digit 	4-digit 6-digit 	4-digit 6-digit 	6-digit 	
Counter/ Indication	7-segment LCD	7-segment LCD	7-segment LCD Counter value (backlight red LED) Setting value (backlight yellow LED)	7-segment LCD Counter value (backlight red LED) Setting value (backlight yellow LED)	7-segment LCD Counter value (backlight red LED) Setting value (backlight yellow LED)	
Counting speed	Panel mounting type: 30 Hz/2 kHz (Changeable by a switch) PC board mounting type: 30 Hz/2 kHz (Different type)	30 Hz/5 kHz (switchable)	30 Hz/5 kHz	30 Hz/5 kHz	30 Hz/5 kHz	
Input	Counting (signal) input and reset input • Input by short-circuiting or opening contacts • Open collector input • Voltage input	Counting (signal) input and reset input • Input by short-circuiting or opening contacts • Open collector input	2-input (multi-mode) and reset input • Input by short-circuiting or opening contacts • Open collector input	2-input (multi-mode) and reset input • Input by short-circuiting or opening contacts • Open collector input	2-input (multi-mode) and reset input • Input by short-circuiting or opening contacts • Open collector input	
Reset (Reset input specifications conform to those of counting input)	• Front reset button and external reset input terminal • External reset dip terminal	• Manual reset with and external terminal and front reset key • Manual reset types inside one-shot output models	• Manual reset with and external terminal and front reset key • Manual reset types inside one-shot output models	• Manual reset with and external terminal and front reset key • Manual reset types inside one-shot output models	• Manual reset with and external terminal and front reset key • Manual reset types inside one-shot output models	
Preset	_____	• Counter number setting with key switches	• Operation mode setting with dip switches • Counter number setting with key switches	• Operation mode setting with dip switches • Counter number setting with key switches	• Output mode setting with dip switches • Counter number setting with key switches	
Control output*	_____		 or 	 or 	 or 	
Power supply output	_____	_____	_____	External power supply 12 V DC	_____	
Options	Panel mounting type (No need for easy installation type): Mounting frame, rubber gasket	Mounting frame, rubber gasket	11 P plug-in (terminal block, socket) 8 P plug-in (terminal block, socket)	11P plug-in (terminal block, socket)	11 P plug-in (terminal block, socket)	
Available standards	UL, c-UL, CE	UL, c-UL, CE	UL, c-UL, CE	UL, c-UL, CE	UL, c-UL, CE	
Page	P.1259~	P.1261~	P.1263 / P.1264	P.1265	P.1266	

*  Contact output (1 Form C)  Contact output (1 Form A)  Open collector output

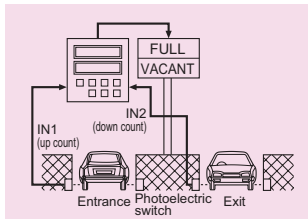
Typical Counter Applications

[DOWN] and **[HOLD-A]** modes for shipment quantity counting



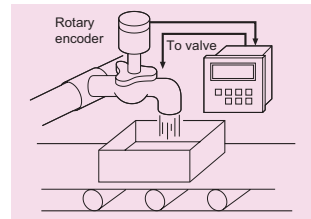
Shipment quantities are counted to control the conveyor line flow.

[IND] and **[HOLD-D]** modes for parking lots



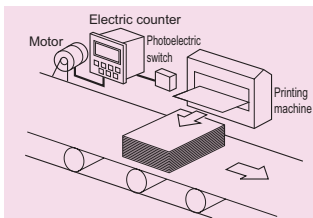
Incoming and outgoing cars are counted to switch the FULL and VACANT signs.

[PHASE] and **[HOLD-A]** modes for valve control



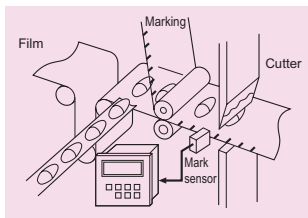
Rotary encoder signals are counted to control a valve aperture.

[UP] and **[SHOT-A]** modes for packing a specified number of copies



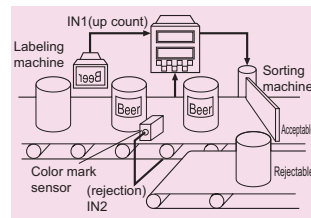
Printed products are counted to package a specified number of copies.

[UP] and **[SHOT-B]** modes for packing medicine tablets



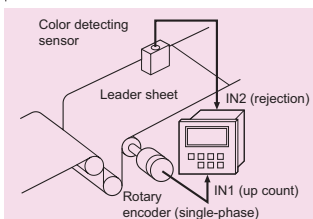
Medicine tablets are packed in specified quantities.

[UP] and **[SHOT-C]** modes for counting acceptables



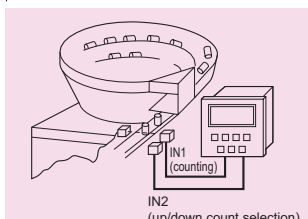
Labeled cans alone are counted up. Rejected cans are not counted.

[UP] and **[SHOT-D]** modes for winding leader sheet



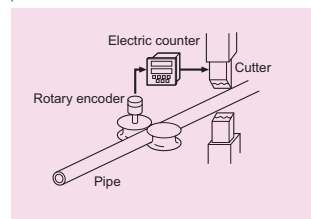
Extra leader sheet being wound is counted by a rotary encoder and a color detecting sensor.

[DIR] input mode for controlling part stocks



Incoming and outgoing parts are counted to keep parts feeders in order to prevent out of stock.

[PHASE] input mode for sizing



Teamed up with a rotary encoder, the counter is used to control the cutting length of pipes.

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SENSORS

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LC4H
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SENSORSPHOTOELECTRIC
SENSORSMICRO
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SENSORSAREA
SENSORSLIGHT
CURTAINSPRESSURE /
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SENSORSINDUCTIVE
PROXIMITY
SENSORSPARTICULAR
USE SENSORSSENSOR
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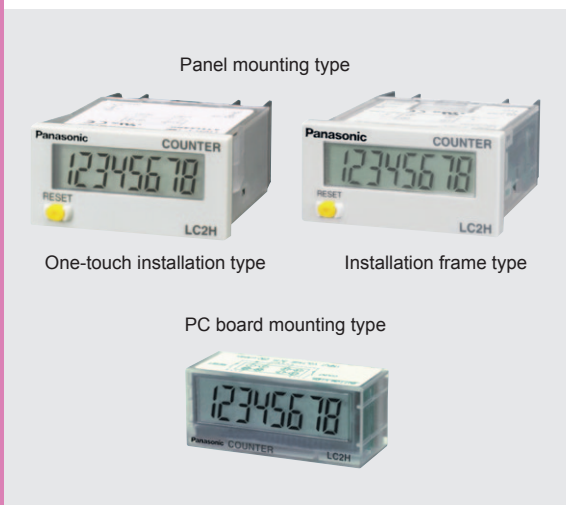
LC2H

LC4H
series

Related Information

■ Precautions in using P.1269~

■ Options P.1289

panasonic-electric-works.net/sunx**Features**

- **7-segment LCD with 8.7 mm 0.343 in character height (total digits: 8)**
Backlight can be switched between green and red (for backlight type)
- **Counting Speed Switchable between 30 Hz and 2 kHz (for panel mounting type)**
- **Battery Replacement Easy on Environment**
- **IP66 compliant for resistance against negative environmental influences (only when panel surface uses rubber packing) (for installation frame type)**
- **Finger protection**
Screw terminals are constructed to protect fingers to ensure safety (for screw terminal section)
- **Replaceable panel cover**
Panel design can be changed from standard (ash gray) to black (sold separately)

Large display in a small body **IP66****PRODUCT TYPES****Panel mounting type**

Installation type	Input method	Counting speed	Backlight	Front reset button	Part No.
One-touch installation type	Non-voltage input type	30 Hz/2 kHz switchable	No	Yes	LC2H-FE-2KK
	Voltage input type (4.5 to 30 V DC)		No	Yes	LC2H-FE-DL-2KK
			Yes	Yes	LC2H-FE-DL-2KK-B
	Free voltage input type (24 to 240 V AC/DC)	30 Hz	No	Yes	LC2H-FE-FV-30
Installation frame type	Non-voltage input type	30 Hz/2 kHz switchable	No	Yes	LC2H-F-2KK
	Voltage input type (4.5 to 30 V DC)		No	Yes	LC2H-F-DL-2KK
			Yes	Yes	LC2H-F-DL-2KK-B
	Free voltage input type (24 to 240 V AC/DC)	30 Hz	No	Yes	LC2H-F-FV-30

Notes: 1) Please ask us about types without front reset button.

2) Products without backlight are listed as standard types under "Specifications".

PC board mounting type

Input method	Counting speed	Backlight	Front reset button	Part No.
Non-voltage input type	2 kHz	No	Yes	LC2H-C-2K-N
	30 Hz	No	Yes	LC2H-C-30-N

Note: There is no front reset button on the PC board mounting type.

CAUTIONS FOR USE

Non-voltage input type

Common to both the panel mounting type, and the P board mounting type

- Never apply voltage to the non-voltage input type. This will damage the internal elements. Also, since there is a possibility of erroneous operation, do not connect in parallel the inputs of a non-voltage input type and another counter from a single input signal.
- Since the current flow is very small from the count input and reset input terminals (① and ③ on the panel mounting type and terminals ⑮ to ⑰ and ⑳ to ㉓ on the PC board mounting type) please use relays and switches with high contact reliability.
- When inputting with an open collector of a transistor, use a transistor for small signals in which IcBO is 1 μ A or less and always input with no voltage.
- When wiring, try to keep all the input lines to the count and reset inputs as short as possible and avoid running them together with high voltage and power transmission lines or in a power conduit. Also, malfunctions might occur if the floating capacitance of these wires exceeds 500 pF (10 m 32.808 ft for parallel wires of 2 mm² 0.003 in²). When using 2 kHz mode, use with a wiring floating capacitance of 120 pF (3 m 9.843 ft for parallel wires of 2 mm² 0.003 in²). In particular, when using shielded wiring, be careful of the capacitance between wires.

PC board mounting type

- For external power supply use manganese dioxide or lithium batteries (CR type: 3V).
- Always reset after external power is applied and confirm that the display reads "0".
- Make the wiring from the battery to the counter unit as short as absolutely possible. Also, be careful of polarity.
- Calculate battery life with the following formula.

$$t = A/I$$

t: battery life [h]

I: LC2H current consumption [mA]

A: battery capacity until minimum operation voltage is reached [mAh]

- Hand solder to the lead terminal. Do not dip solder. With the tip of the soldering iron at 300 °C 572 °F perform soldering within 3 seconds (for 30 to 60 W soldering iron).

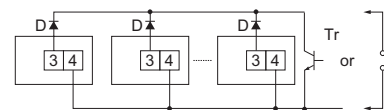
Voltage input type

- Be aware that applying more than 30 V DC to count input terminals ① and ②, and reset input terminals ③ and ④ will cause damage to the internal elements.
- For external resetting use H level (application of 4.5 to 30 V DC) between reset terminals ③ and ④ of the rear terminals. In this case, connect (+) to terminal 3 and (-) to terminal ④. This is the valid polarity; therefore, the counter will not work if reversed.
- When wiring, try to keep all the input lines to the count and reset inputs as short as possible and avoid running them together with high voltage and power transmission lines or in a power conduit. Also, malfunctions might occur if the floating capacitance of these wires exceeds 500 pF (10 m 32.808 ft for parallel wires of 2 mm² 0.003 in²).

Free voltage input type

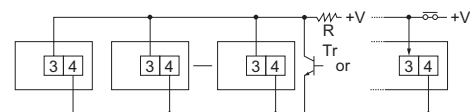
- Use count input terminals ① and ② for free voltage input and reset terminals ③ and ④ for non-voltage input.
- Be aware that the application of voltage that exceeds the voltage range of the H level to the count input terminal, and the application of voltage to the reset input terminal, can cause damage to the internal elements.
- Since the current flow is very small from reset input terminal ③, please use relays and switches with high contact reliability.
- When inputting a reset with an open collector of a transistor, use a transistor for small signals in which IcBO is 1 μ A or less and always input with no voltage.
- To reset externally, short reset input terminals ③ and ④ on the rear.
- Input uses a high impedance circuit; therefore, erroneous operation may occur if the influence of induction voltage is present. If you plan to use wiring for the input signal that is 10 m 32.808 ft or longer (wire capacitance 120 pF/m at normal temperature), we recommend the use of a CR filter or the connection of a bleeder resistor.

How to reset multiple panel mounting type counters all at once (input is the same for count) Non-voltage input type



- Notes: 1) Use the following as a guide for choosing transistors used for input (Tr).
Leakage current < 1 μ A
2) Use as small a diode (D) as possible in the forward voltage so that the voltage between terminals 3 and 4 during reset input meets the standard value (0.5 V).
(At IF = 20 μ A, forward voltage: Max. 0.1 V)

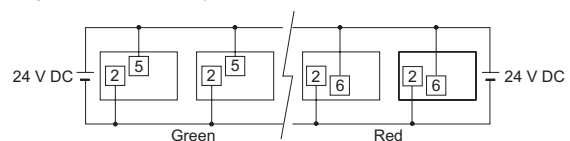
Voltage input type



Note: Make sure that H (reset ON) level is at least 4.5 V.

Backlight luminance

To prevent varying luminance among backlights when using multiple backlight types, please use the same backlight power supply.



FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

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LC4H series

CAUTIONS FOR USE

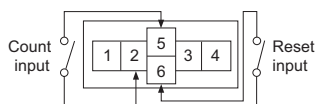
Input and output connection

Input connection

• Contact input

Use highly reliable metal plated contacts. Since the contact'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 to have a maximum counting speed of 30 Hz.



• Non-contact input (Transistor input)

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

$V_{CEO} = \text{Min. } 20 \text{ V}$

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

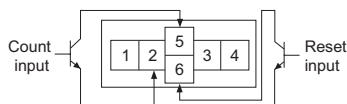
$I_{CBO} = \text{Max. } 6 \mu\text{A}$

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

* The short-circuit impedance should be less than 1 k Ω .

[When the impedance is 0 Ω , the current coming from the count input terminal is approximately 5 mA and from the reset input terminal is approximately 1.5 mA.]

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



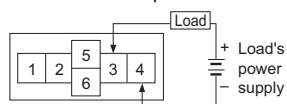
• Input wiring

When wiring, use shielded wires or metallic wire tubes, and keep the wire lengths as short as possible.

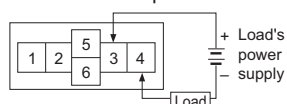
Output connection

Since the transistor output of counter is insulated from the internal circuitry by a photo-coupler, it can be used as an NPN output or PNP (equal value) output.

As NPN output



As PNP output



Self-diagnosis function

If a malfunction occurs, one of the following displays will appear.

Display	Contents	Output condition	Restoration procedure	Preset values after restoration
Err-00	Malfunctioning CPU	OFF	Enter front reset key or restart counter	The preset value at start-up before the CPU malfunction occurred.
Err-01	Malfunctioning memory*			0

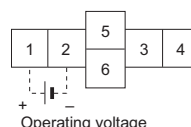
* Includes the possibility that the EEPROM's life has expired.

Terminal connection

- When wiring the terminals, refer to the terminal layout and wiring diagrams and be sure to perform the wiring properly without errors.

An external power supply is required in order to run the main unit.

Power should be applied between terminals ① and ②. Terminal ① acts as the positive "+" connection and terminal ② as the negative "-".



- After turning the counter off, make sure that any resulting induced voltage or residual voltage is not applied to power supply terminals ① through ②. (If the power supply wire is wired parallel to the high voltage wire or power wire, an induced voltage may be generated at the power supply terminal.)
- Have the power supply voltage pass through a switch or relay so that it is applied at one time.

FIBER
SENSORSLASER
SENSORSPHOTO-
ELECTRIC
SENSORSMICRO
PHOTO-
ELECTRIC
SENSORSAREA
SENSORSLIGHT
CURTAINSPRESSURE /
FLOW
SENSORSINDUCTIVE
PROXIMITY
SENSORSPARTICULAR
USE
SENSORSSENSOR
OPTIONSSIMPLE
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SAVING
UNITSWIRE-
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series

LC4H DIN□48 Size Electronic Counter

Related Information

■ Precautions in usingP.1267~/P.1269~

■ Options P.1287~


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**Advanced electronic
counters meeting
the needs of the times**

Features

- **Bright and easy-to-read display (for 4-digit and 6-digit types)**
2-color backlight LCD display
- **Simple operation**
Seesaw buttons (for 4-digit type)
- **Short body of only 70.1 mm 2.760 in (Pin type) or 64.5 mm 2.539 in (Screw terminal type)**
- **IP66 compliant for resistance against negative environmental influences (only when panel surface uses rubber packing)**
- **Screw terminal type (M3.5) and Pin type are both standard options**
- **Replaceable panel cover**
Panel design can be changed from standard (ash gray) to black (sold separately)

IP66

Mode selectable

DIN□48

PRODUCT TYPES

Digit	Count speed	Output mode	Output	Operating voltage	Power down insurance	Terminal type	Part No.			
4	30 Hz/ 5 kHz switchable	<ul style="list-style-type: none">• Maintain output/hold count• Maintain output/over count I• Maintain output/over count II• One shot/over count• One shot/recount I• One shot/recount II• One shot/hold count (7 modes)	Relay output (1 Form c) (8 pin type is 1 Form a)	100 to 240 V AC	Available	8 pins	LC4H8-R4-AC240V			
				24 V AC/DC		11 pins	LC4H-R4-AC240V			
						Screw terminal	LC4H-R4-AC240VS			
						12 to 24 V DC	8 pins	LC4H8-R4-AC24V		
				11 pins			LC4H-R4-AC24V			
				Screw terminal			LC4H-R4-AC24VS			
			Transistor output (1 Form a)	100 to 240 V AC		8 pins	LC4H8-R4-DC24V			
				24 V AC/DC		11 pins	LC4H-R4-DC24V			
						Screw terminal	LC4H-R4-DC24VS			
						12 to 24 V DC	8 pins	LC4H8-T4-AC240V		
				11 pins			LC4H-T4-AC240V			
				Screw terminal			LC4H-T4-AC240VS			
6			30 Hz/ 5 kHz switchable	<ul style="list-style-type: none">• Maintain output/hold count• Maintain output/over count I• Maintain output/over count II• One shot/over count• One shot/recount I• One shot/recount II• One shot/hold count (7 modes)		Relay output (1 Form c) (8 pin type is 1 Form a)	100 to 240 V AC	Available	8 pins	LC4H8-T4-DC24V
							24 V AC/DC		11 pins	LC4H-T4-DC24V
									Screw terminal	LC4H-T4-DC24VS
									12 to 24 V DC	8 pins
							11 pins			LC4H-R6-AC240V
							Screw terminal			LC4H-R6-AC240VS
						Transistor output (1 Form a)	100 to 240 V AC		8 pins	LC4H8-R6-AC24V
							24 V AC/DC		11 pins	LC4H-R6-AC24V
									Screw terminal	LC4H-R6-AC24VS
									12 to 24 V DC	8 pins
							11 pins			LC4H-R6-DC24V
							Screw terminal			LC4H-R6-DC24VS
Transistor output (1 Form a)	100 to 240 V AC	8 pins			LC4H8-T6-AC240V					
	24 V AC/DC	11 pins			LC4H-T6-AC240V					
		Screw terminal			LC4H-T6-AC240VS					
		12 to 24 V DC			8 pins	LC4H8-T6-AC24V				
	11 pins				LC4H-T6-AC24V					
	Screw terminal				LC4H-T6-AC24VS					
Transistor output (1 Form a)	100 to 240 V AC	8 pins			LC4H8-T6-DC24V					
	24 V AC/DC	11 pins			LC4H-T6-DC24V					
		Screw terminal			LC4H-T6-DC24VS					
		12 to 24 V DC			8 pins	LC4H8-T6-DC24V				
	11 pins				LC4H-T6-DC24V					
	Screw terminal				LC4H-T6-DC24VS					

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

LC4H-L DIN□48 Size Electronic Counter

Related Information

■ Precautions in usingP.1267~/P.1269~

■ Options P.1287~

FIBER
SENSORSLASER
SENSORSPHOTOELECTRIC
SENSORSMICRO
PHOTOELECTRIC
SENSORSAREA
SENSORSLIGHT
CURTAINSPRESSURE /
FLOW
SENSORSINDUCTIVE
PROXIMITY
SENSORSPARTICULAR
USE SENSORSSENSOR
OPTIONSSIMPLE
WIRE-
SAVING
UNITSWIRE-
SAVING
SYSTEMSMEASUREMENT
SENSORSSTATIC CONTROL
DEVICES

ENDOSCOPE

LASER
MARKERSPLC /
TERMINALSHUMAN MACHINE
INTERFACESENERGY CONSUMPTION
VISUALIZATION
COMPONENTS

FA COMPONENTS

MACHINE VISION
SYSTEMSUV CURING
SYSTEMS

Timers

Time Switches

Counters

Hour Meters

Options

Limit Switches

Fan Motors

Temperature
ControllersSelection
Guide

Applications

LC2H

LC4H
series

6-digit display

4-digit display

Pin type

Screw terminal type

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Features

- Display is a bright reflective-type LCD
- Inherits all of the characteristics of LC4H electronic counter (Easy operation, shortened body and IP66 environmental protection)

• Replaceable panel cover

Panel design can be changed from standard (ash gray) to black (sold separately)

• Reasonable price

IP66

Mode selectable

DIN□48

Economical electronic counters

PRODUCT TYPES

Digit	Count speed	Output mode	Output	Operating voltage	Power down insurance	Terminal type	Part No.
4	30 Hz/ 5 kHz switchable	<ul style="list-style-type: none"> • Maintain output/hold count • Maintain output/over count I • Maintain output/over count II • One shot/over count • One shot/recount I • One shot/recount II • One shot/hold count (7 modes) 	Relay output (1 Form c) (8 pin type is 1 Form a)	100 to 240 V AC	Available	8 pins	LC4HL8-R4-AC240V
				24 V AC/DC		11 pins	LC4HL-R4-AC240V
				12 to 24 V DC		Screw terminal	LC4HL-R4-AC240VS
			Transistor output (1 Form a)	100 to 240 V AC		8 pins	LC4HL8-R4-AC24V
				24 V AC/DC		11 pins	LC4HL-R4-AC24V
				12 to 24 V DC		Screw terminal	LC4HL-R4-AC24VS
			Relay output (1 Form c) (8 pin type is 1 Form a)	100 to 240 V AC		8 pins	LC4HL8-R4-DC24V
				24 V AC/DC		11 pins	LC4HL-R4-DC24V
				12 to 24 V DC		Screw terminal	LC4HL-R4-DC24VS
6			Transistor output (1 Form a)	100 to 240 V AC	Available	8 pins	LC4HL8-T4-AC240V
				24 V AC/DC		11 pins	LC4HL-T4-AC240V
				12 to 24 V DC		Screw terminal	LC4HL-T4-AC240VS
			Relay output (1 Form c) (8 pin type is 1 Form a)	100 to 240 V AC		8 pins	LC4HL8-T4-AC24V
				24 V AC/DC		11 pins	LC4HL-T4-AC24V
				12 to 24 V DC		Screw terminal	LC4HL-T4-AC24VS
			Transistor output (1 Form a)	100 to 240 V AC		8 pins	LC4HL8-T4-DC24V
				24 V AC/DC		11 pins	LC4HL-T4-DC24V
				12 to 24 V DC		Screw terminal	LC4HL-T4-DC24VS
			Relay output (1 Form c) (8 pin type is 1 Form a)	100 to 240 V AC	Available	8 pins	LC4HL8-R6-AC240V
				24 V AC/DC		11 pins	LC4HL-R6-AC240V
				12 to 24 V DC		Screw terminal	LC4HL-R6-AC240VS
			Transistor output (1 Form a)	100 to 240 V AC		8 pins	LC4HL8-R6-AC24V
				24 V AC/DC		11 pins	LC4HL-R6-AC24V
				12 to 24 V DC		Screw terminal	LC4HL-R6-AC24VS
			Relay output (1 Form c) (8 pin type is 1 Form a)	100 to 240 V AC		8 pins	LC4HL8-R6-DC24V
				24 V AC/DC		11 pins	LC4HL-R6-DC24V
				12 to 24 V DC		Screw terminal	LC4HL-R6-DC24VS
			Transistor output (1 Form a)	100 to 240 V AC	Available	8 pins	LC4HL8-T6-AC240V
				24 V AC/DC		11 pins	LC4HL-T6-AC240V
				12 to 24 V DC		Screw terminal	LC4HL-T6-AC240VS
			Relay output (1 Form c) (8 pin type is 1 Form a)	100 to 240 V AC		8 pins	LC4HL8-T6-AC24V
				24 V AC/DC		11 pins	LC4HL-T6-AC24V
				12 to 24 V DC		Screw terminal	LC4HL-T6-AC24VS
			Transistor output (1 Form a)	100 to 240 V AC		8 pins	LC4HL8-T6-DC24V
				24 V AC/DC		11 pins	LC4HL-T6-DC24V
				12 to 24 V DC		Screw terminal	LC4HL-T6-DC24VS

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

FIBER SENSORS
LASER SENSORS
PHOTOELECTRIC SENSORS
MICRO PHOTOELECTRIC SENSORS
AREA SENSORS
LIGHT CURTAINS
PRESSURE / FLOW SENSORS
INDUCTIVE PROXIMITY SENSORS
PARTICULAR USE SENSORS
SENSOR OPTIONS
SIMPLE WIRE-SAVING UNITS
WIRE-SAVING SYSTEMS
MEASUREMENT SENSORS
STATIC CONTROL DEVICES
ENDOSCOPE
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PLC / TERMINALS
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FA COMPONENTS
MACHINE VISION SYSTEMS
UV CURING SYSTEMS
Timers
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Temperature Controllers
Selection Guide
Applications
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LC4H series

Related Information

■ Precautions in usingP.1267~/P.1269~

■ Options P.1287~



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Electronic counters with pre-scale function connectable to an AC two-wire sensor

Features

- **Bright and easy-to-read display (for 4-digit and 6-digit display types)**
2-color backlight LCD display
- **Easy to use, simple operation, simple settings**
 - Operation modes can be set using DIP switches on the side panel
 - Set values can be set using key switches on the front panel
- **Pre-scaling function provided**
- **Built-in power supply for highcapacitance sensor (for AC power supply type)**
- **Two-wire system DC sensor can be connected**
- **Screw terminal type (M3.5) and Pin type are both standard models.**
- **Replaceable panel cover**
Panel design can be changed from standard (ash gray) to black (sold separately)

IP66

Mode selectable

DIN¼48

PRODUCT TYPES

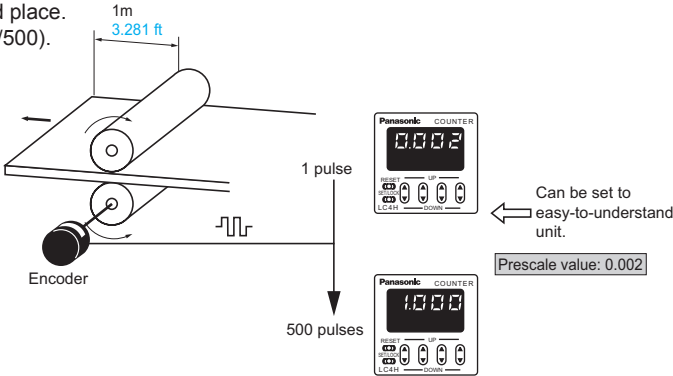
Digit	Count speed	Operation mode	Output	Operating voltage	Power for sensor	Terminal type	Part No.
4	30 Hz/ 5 kHz switchable	• Maintain output/hold count • Maintain output/over count I • Maintain output/over count II • One shot/over count • One shot/recount I • One shot/recount II • One shot/hold count (7 modes)	Relay output	100 to 240 V AC	12 V DC 100 mA	11 pins	LC4H-PS-R4-AC240V
				12 to 24 V DC / 24 V	None	Screw terminal	LC4H-PS-R4-AC240VS
				12 to 24 V DC / 24 V	None	11 pins	LC4H-S-R4-24V
			Transistor output	12 to 24 V DC / 24 V	None	Screw terminal	LC4H-S-R4-24VS
				100 to 240 V AC	12 V DC 100 mA	11 pins	LC4H-PS-R6-AC240V
				12 to 24 V DC / 24 V	None	Screw terminal	LC4H-PS-R6-AC240VS
6			Relay output	100 to 240 V AC	12 V DC 100 mA	11 pins	LC4H-PS-R6-AC240V
				12 to 24 V DC / 24 V	None	Screw terminal	LC4H-PS-R6-AC240VS
			Transistor output	12 to 24 V DC / 24 V AC	None	11 pins	LC4H-S-R6-24V
				12 to 24 V DC / 24 V AC	None	Screw terminal	LC4H-S-R6-24VS

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

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 3.281 ft has been fed:

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



LC4H-W DIN□48 Size Electronic Counter

Related Information

■ Precautions in usingP.1267~/P.1269~

■ Options P.1287~



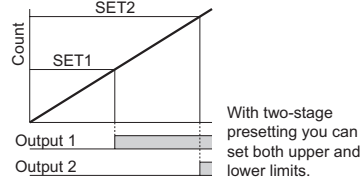
11-pin type



Screw terminal type

panasonic-electric-works.net/sunx

Features

- **Two-stage presetting (upper and lower limits)**

- **Bright and easy-to-read display**
2-color backlight LCD display
- **Simple operation**
Seesaw buttons
- **Short body of only 70.1 mm 2.760 in (Pin type) or 64.5 mm 2.539 in (Screw type)**
- **IP66 compliant for resistance against negative environmental influences (only when panel surface uses rubber packing)**

IP66

Mode selectable

DIN□48

Electronic counters with two-step preset function

PRODUCT TYPES

Digit	Count speed	Output mode		Output	Operating voltage	Power down insurance	Terminal type	Part No.
		Output 1	Output 2					
6	30 Hz/5 kHz switchable	• Maintain output/over count I • Maintain output/over count II • Maintain output/over count III • One shot/over count (4 modes)	• Maintain output/hold count • Maintain output/over count I • Maintain output/over count II • Maintain output/over count III • One shot/over count • One shot/recount I • One shot/recount II • One shot/hold count (8 modes)	Relay output (1 Form a + 1 Form a)	100 to 240 V AC	Available	11 pins	LC4H-W-R6-AC240V
					24 V AC		Screw terminal	LC4H-W-R6-AC240VS
					12 to 24 V DC		11 pins	LC4H-W-R6-AC24V
				Transistor output (1 Form a + 1 Form a)	100 to 240 V AC		Screw terminal	LC4H-W-R6-AC24VS
					24 V AC		11 pins	LC4H-W-R6-DC24V
					12 to 24 V DC		Screw terminal	LC4H-W-R6-DC24VS
					100 to 240 V AC		11 pins	LC4H-W-T6-AC240V
					24 V AC		Screw terminal	LC4H-W-T6-AC240VS
					12 to 24 V DC		11 pins	LC4H-W-T6-AC24V
					12 to 24 V DC		Screw terminal	LC4H-W-T6-DC24VS
					12 to 24 V DC		11 pins	LC4H-W-T6-DC24V
					12 to 24 V DC		Screw terminal	LC4H-W-T6-DC24VS

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

FIBER SENSORS

LASER SENSORS

PHOTOELECTRIC SENSORS

MICRO PHOTOELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

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LC2H

LC4H series

Terminal wiring

- When wiring the terminals, refer to the terminal layout and wiring diagrams and be sure to perform the wiring properly
- When using the instrument with an flush mounting, the screw-down terminal type is recommended. For the pin type, use either the rear terminal socket (AT78041) or the 8P cap (AD8-RC) for the 8-pin type, and the rear terminal socket (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 socket (ATC180031) for the 8-pin type and the DIN rail socket (ATC180041) for the 11-pin type.
- After turning the unit off, make sure that any resulting induced voltage or residual voltage is not applied to power supply terminals ② through ⑦ (8-pin type) ② through ⑩ (11-pin type) or ① and ② (screw 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.)
- 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.

Input connections (except LC4H-S/AC type)

The power circuit has no 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.

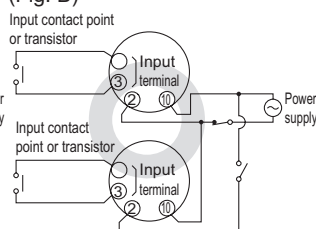
If the counter is powered on and off independently as shown in Fig. A, the counter's internal circuitry may get damaged. Be careful never to allow such circuitry. (Figs. A, B and C show the circuitry for the 11-pin type.)

(Fig. A)



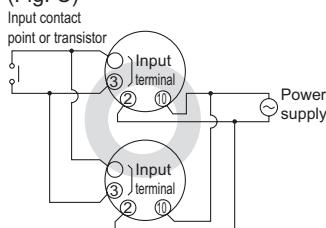
If independent power circuitry must be used, keep the input contacts or transistors separate from each other, as shown in Fig. B.

(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. C.

(Fig. C)

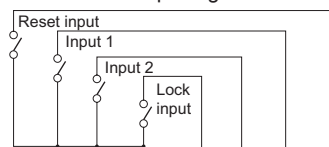


Input and output

- Signal input type

<Contact point input>

Use highly reliable metal plated contacts. Since the contact point's bounce time leads directly to error in the counter operations, use contacts with as short a bounce time as possible. In this case, select a maximum count speed of 30 Hz for input 1 and 2, and a minimum input signal width of 20 ms.



8-pin type	①	—	⑤	④	③
11-pin type	③	④	⑤	⑥	⑦
Screw terminal type	⑥	⑦	⑧	⑨	⑩

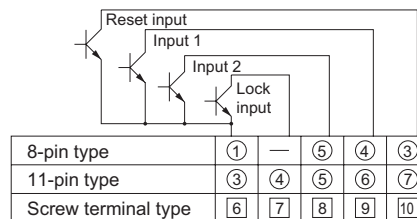
Note: LC4H-W does not have the lock input ④, ⑦.

<Non-contact point input>

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

$V_{CE0} = 20 \text{ V min.}$ $I_C = 20 \text{ mA min.}$ $I_{CBO} = 6 \mu\text{A max.}$

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



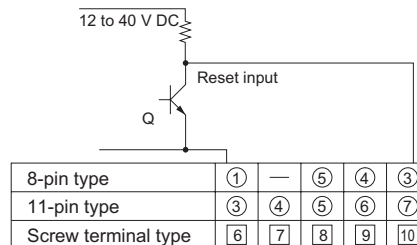
Note: LC4H-W does not have the lock input ④, ⑦.

- The short-circuit impedance should be less than 1 kΩ.

When the impedance is 0 Ω, the current coming from the start 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 kΩ.

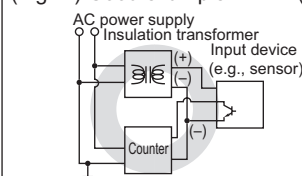
- As shown in the diagram below, from a non-contact point circuit (proximity switches, beam sensor [photoelectric sensors], etc.) with a power supply voltage of between 12 and 40 V, the signal can be input without using an open collector transistor. In the case of the diagram below, when the non-contact point transistor Q switches from off to on (when the signal voltage goes from high to low), the signal is input.



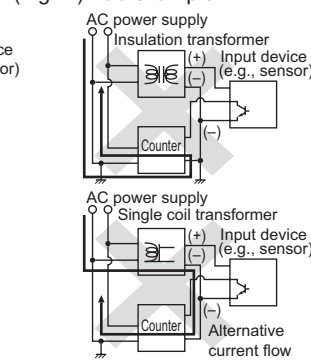
(The above example is for reset input)

- 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
- 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



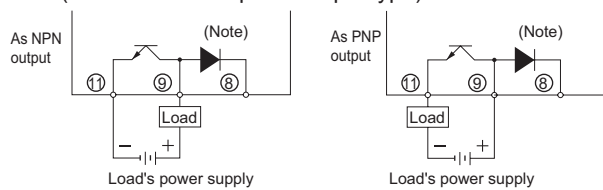
(Fig. B) Bad example



- The input signal is applied by the shorting of each input terminal with the common terminal (terminal ① for 8-pin types, terminal ③ for 11-pin types 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.

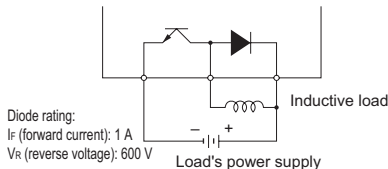
• Transistor output

- 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 below example is 11-pin type)



Note: With LC4H 8-pin type and 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)



- When wiring, use shielded wires or metallic wire tubes, and keep the wire lengths as short as possible.
- For the load of the controlled output, make sure that it is lower than the rated control capacity.

Output mode setting

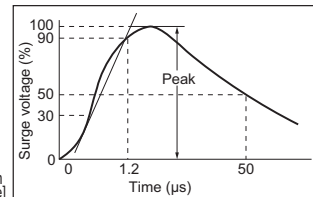
The output mode can be set with the DIP switches on the side of the counter. Make the DIP switch settings before installing the counter on the panel.

Conditions of usage

- Avoid locations subject to flammable or corrosive gases, excessive dust, oil, vibrations, or excessive shocks.
- Since the cover of the timer 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.
- If power supply surges exceed the values given below, the internal circuits may become damaged. Be sure to use surge absorbing element to prevent this from happening.

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

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

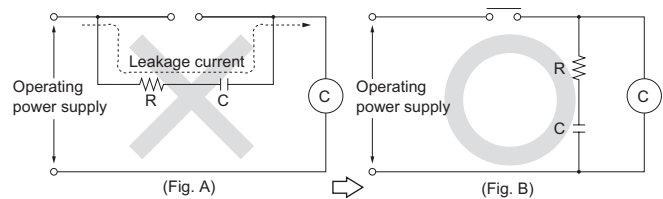


- Regarding external noise, the values below are considered the noise-resistant voltages. If voltages rise above these values, malfunctions or damage to the internal circuitry may result, so take the necessary precautions.

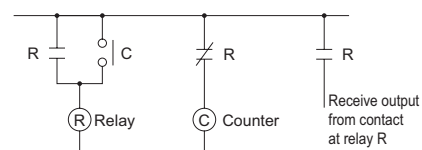
	Power supply terminals			Input terminals
	AC type	DC type	24 V AC type	
Noise voltage	1,500 V	1,000 V		600 V

- Noise wave form (noise simulator) · Pulse · width : 1 μ s, 50 ns
- Rise time : 1 ns
- Polarity : \pm
- Cycle : 100 cycles/second

- When connecting the operating power supply, make sure that no leakage current enters the counter. For example, when performing contact protection, if set up like that of fig. A, leakage current will pass through C and R, enter the unit, and cause incorrect operation. The fig. B shows the correct setup.



- 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.



Self-diagnosis function

If a malfunction occurs, one of the following displays will appear.

Display	Contents	Output condition	Restoration procedure	Preset values after restoration
--- or ---	Minimum value went below -999 or -99999. See note 1.	No change	Enter reset or RESET switch.	No change
d IPEt-	Incorrect DIP switch setting.		Restart unit (correct DIP switch settings)	
Ett-00	Malfunctioning CPU.	OFF	Enter reset, RESET switch, or restart unit.	The values at start-up before the CPU malfunction occurred.
Ett-01	Malfunctioning memory. See note 2.			0

Notes: 1) When the counter value goes below the minimum value during any of the subtraction, directive, independent, or phase input modes.
 2) Includes the possibility that the EEPROM's life has expired.

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

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LC2H

LC4H series


For precautions regarding individual products, see the "Precautions in using" section of the individual product pages.

SAFETY PRECAUTIONS

To prevent injury and accidents, be sure to observe the following instructions. Make sure to read the operating instructions and the following precautions for use before installation, operation, maintenance, or inspection. Before using the product, the users must have a thorough understanding of the equipment, safety information, and miscellaneous precautions for its use.


Warning Indicates a possible hazard that will result in death or serious physical injury of the operator in the event of incorrect handling.

Caution Indicates a possible hazard that will result in physical injury of the operator or only property damage in the event of incorrect handling.



- Take safety measures outside the product so that the whole system maintains its safety level even if the product broke down or an external factor caused any abnormality.
- Do not use the product in any flammable gas atmosphere. Otherwise, this may result in an explosion.

Warning Do not expose the product to fire. The batteries and/or electronic components may explode.



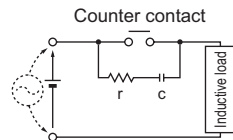
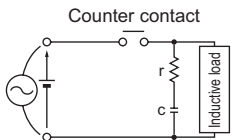
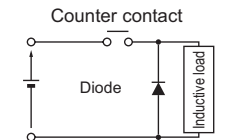
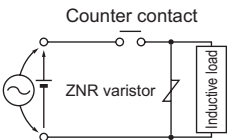
- To prevent overheating or smoke, secure sufficient margins in relation to the guaranteed characteristics and performance values of the product.
- Do not try to disassemble or modify the product. Otherwise, this may result in overheating or smoke.
- Do not touch the terminals while the power is on. Otherwise, this may result in an electric shock.
- Setup emergency stop and interlock circuits outside the product.
- Securely connect the cables and connectors. Otherwise, loose connections may result in overheating or smoke.
- Securely solder the joints. Otherwise, insufficient soldering may result in overheating or smoke.
- Do not put foreign substances, such as liquids, combustibles, or metals, into the product. Otherwise, this may result in overheating or smoke.
- Do not perform any work (e.g. connection, removal) while the power is on. Otherwise, this may result in electric shock.

Caution

CAUTIONS FOR CIRCUITS

Protective circuit for counter contact

In the circuit that switches an inductive load, a contact failure may occur at a contact due to surge or inrush current resulting from that switching. Therefore, it is recommended that the following protective circuit be used to protect the contact.

Circuit		CR circuit		Diode circuit	Varistor circuit
					
Application	AC	△ (Note)	○	×	○
	DC	○	○	○	○
Features/ Notes		If the load is a relay or solenoid, the reset time is delayed. Effective when connected to both contacts if the power supply voltage is 24 or 48 V and the voltage across the load is 100 to 200 V.		The diode connected in parallel causes the energy stored in the coil to flow to the coil in the form of current and dissipates it as joule heat at the resistance component of the inductive load. This circuit further delays the reset time compared to the CR circuit. (2 to 5 times the release time listed in the catalog)	Using the constant-voltage characteristics of the varistor, this circuit prevents excessively high voltages from being applied across the contacts. This circuit also slightly delays the reset time.
		If the load is a counter, leakage current flows through the CR circuit causing faulty operation. Note: If used with AC voltage, be sure the impedance of the load is sufficiently smaller than that of the c and r.			
Device Selection		As a guide in selecting c and r, c: 0.5 to 1 μF per 1 A contact current r: 0.5 to 1 Ω per 1 V contact voltage Values vary depending on the properties of the load and variations in counter characteristics. Capacitor c acts to suppress the discharge the moment the contacts open. Resistor r acts to limit the current when the power is turned on the next time. Test to confirm. Use a capacitor c with a breakdown voltage of 200 to 300 V. Use AC type capacitors (non-polarized) for AC circuits.		Use a diode with a reverse breakdown voltage at least 10 times the circuit voltage and a forward current at least as large as the load current. In electronic circuits where the circuit voltages reverse breakdown voltage of about 2 to 3 times the power supply voltage.	

Type of load and inrush current

The type of load and its inrush current characteristics, together with the switching frequency are important factors which cause contact welding. Particularly for loads with inrush currents, measure the steady state current and inrush current and use a relay or magnet switch which provides an ample margin of safety. The table below shows the relationship between typical loads and their inrush currents.

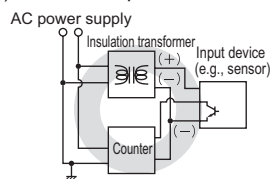
Type of load	Inrush current
Resistive load	Rating current
Solenoid load	10 to 20 times the rating current
Motor load	5 to 10 times the rating current
Incandescent lamp load	10 to 15 times the rating current
Mercury lamp load	1 to 3 times the rating current
Sodium vapor lamp load	1 to 3 times the rating current
Capacitive load	20 to 40 times the rating current
Transformer load	5 to 15 times the rating current

When you want large load and long life of the counter, do not control the load direct with a counter. When the counter is designed to use a relay or a magnet switch, you can acquire the longer life of the counter.

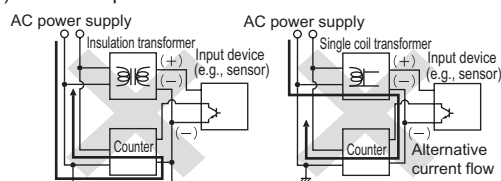
Connection of input (Except for LC4H-S/AC type)

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. Do not use a single coil transformer (e.g., Sly-Duck). Otherwise, the internal circuit of the counter will be short-circuited as shown in Fig. B resulting in breakdown.

(Fig. A) Good example

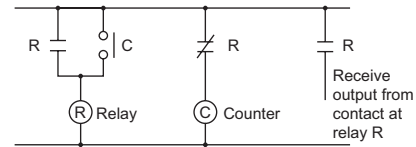


(Fig. B) Bad example



Long continuous current flow

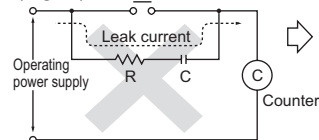
Avoid keeping the counter on for a long period of time (over one month). Otherwise heat is generated and accumulated inside the counter, which may deteriorate its electronic parts. If the counter must be kept on for a long period of time, a relay is added. See the circuit diagram below.



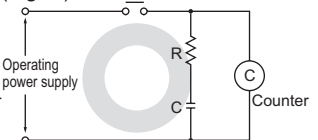
Leakage current

- For connecting and disconnecting operating voltage to the counter, a circuit should be used, which will prevent the flow of leakage current. For example, a circuit for contact protection as shown in Fig. A. will permit leakage current flow through R and C, causing erroneous operation of the counter. Instead, the circuit shown in Fig. B should be used.

(Fig. A)



(Fig. B)



If the counter is directly switched with a non-contact element, leak current may flow into the counter and cause it to malfunction.

FIBER SENSORS

LASER SENSORS

PHOTO-ELECTRIC SENSORS

MICRO PHOTO-ELECTRIC SENSORS

AREA SENSORS

LIGHT CURTAINS

PRESSURE / FLOW SENSORS

INDUCTIVE PROXIMITY SENSORS

PARTICULAR USE SENSORS

SENSOR OPTIONS

SIMPLE WIRE-SAVING UNITS

WIRE-SAVING SYSTEMS

MEASUREMENT SENSORS

STATIC CONTROL DEVICES

ENDOSCOPE

LASER MARKERS

PLC / TERMINALS

HUMAN MACHINE INTERFACES

ENERGY CONSUMPTION VISUALIZATION COMPONENTS

FA COMPONENTS

MACHINE VISION SYSTEMS

UV CURING SYSTEMS

Timers

Time Switches

Counters

Hour Meters

Options

Limit Switches

Fan Motors

Temperature Controllers

Selection Guide

Applications

LC2H

LC4H series

CAUTIONS FOR USE (COMMON)

Terminal connections

Correctly connect the terminals while seeing the terminal layout/wiring diagram. In particular, the DC type, which has polarities, does not operate with the polarities connected reverse.

Any incorrect connection can cause abnormal heating or ignition.

We recommend installation using Y (fork type) terminal for screw terminal type.

Connection to operation power supply

- Power supply voltage must be applied at a time through a switch, a relay, and other parts.
- The operating voltage for the DC type must be at the specified ripple factor or less. The average voltage must fall within the allowable operating voltage range.

Rectification type	Ripple factor
Single-phase, full-wave	48% approx.
Three-phase, full-wave	4% approx.
Three-phase, half-wave	17% approx.

- Make sure that no induced voltage and residual voltage are applied between the power terminals on the counter after the power switch is turned OFF. (If the power line is wired in parallel with the high-voltage and motor lines, induced voltage may be produced between the power terminals.)

Control output

- Keep the load capacity below the counter's rated control capacity. If used above the rating, the counter's service life may shorten. With the transistor output type counters, transistors may be damaged.

Installing the counter

- To install the counter, use the dedicated terminal socket or socket (cap). Avoid connecting the terminals (pins) on the counter by directly soldering them.
- In order to maintain the characteristics, do not remove the counter cover (case).

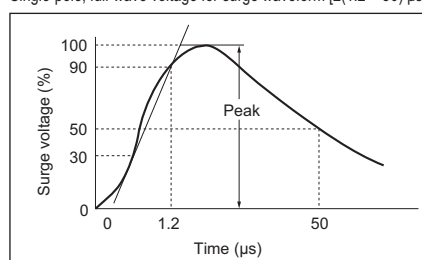
Superimposed surge of power supply

For the superimposed surge of power supply, the standard waveform ($\pm 1.2 \times 50 \mu\text{s}$) is taken as the standard value for surge-proof voltage.

(The positive and negative voltages are applied each three or five times between the power supply terminals.)

For the standard values for the LC4H series, see the respective items in "Cautions for use."

Single-pole, full-wave voltage for surge waveform [$\pm(1.2 \times 50) \mu\text{s}$]



If external surge occurs exceeding the specified value, the internal circuit may break down. In this case, use a surge absorption element. The typical surge absorption elements include a varistor, a capacitor, and a diode. If a surge absorption element is used, use an oscilloscope to see whether or not the external surge exceeding the specified value appears.

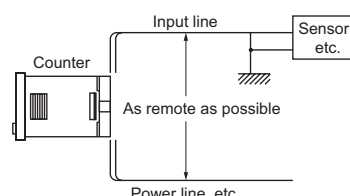
Signal input

The counter's signal input comes in two ways. One is by opening and closing the input terminal. The other is by applying a specified H-level or L-level voltage to the input terminal.

For an input sensor's residual voltage, input impedance, input voltage level and other signal input conditions, see the ratings for each type of product.

Operating environment

- For the ambient operating temperature and humidity, see the ratings for each type of product.
- Avoid using the counter in a location where inflammable or corrosive gas is generated, the counter is exposed to much dust and other foreign matter; water or oil is splashed on the counter; or vibrations or shocks are given to the counter.
- The counter cover (case), the knobs, and the dials are made of polycarbonated resin. Therefore, prevent the counter from being exposed to organic solvents such as methyl alcohol, benzene, and thinner, strong alkaline substances such as caustic soda, and ammonia and avoid using the counter in atmosphere containing any of those substances.
- If the counter is used where noises are emitted frequently, separate the input signal elements (such as a sensor), the wiring for the input signal line, and the counter as far as possible from the noise source and the high power line containing noises.



Checking the actual load

In order to increase the reliability in the actual use, check the quality of the counter in the actual usage.

Others

- If the counter is used exceeding the ratings (operating voltage and control capacity), the contact life, or any other specified limit, abnormal heat, smoke, or ignition may occur.
- LC2H series counter, incorporates a lithium battery. Never disassemble the lithium battery or throw it into fire because this may affect humans and facilities. The lithium battery must be disposed of as an incombustible like other used batteries.
- If any malfunction of the counter is likely to affect human life and properties, give allowance to the rated values and performance values. In addition, take appropriate safety measures such as a duplex circuit from the viewpoint of product liabilities.

MEMO