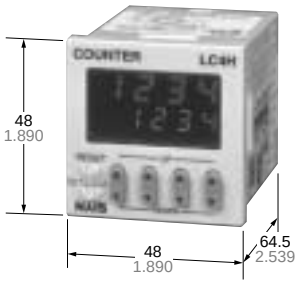
NAiS

new:
DIN 48 SIZE
LCD ELECTRONIC COUNTER
Scale factor, power supply

LC4H-SV Counters



mm inch

R4/T4 systems (4-digit display)

R6/T6 systems (6-digit display)

Pin type

Screw terminal type

NEW FEATURES:

1. Scale Factor:
A scale factor can be entered into LC4H-SV series. After that one count shows the real unit/value of the machine/application.

2. 12 V DC Power Supply:
The 100 – 240 V AC types are equipped with a 12 V DC power supply 100 mA.
It is possible to connect photo-sensors, proximity switches or encoders without additional devices.

3. Voltage Signal Input:
PNP input types are available.

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

4. 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.

5. 4-digit or 6-digit display
Two sizes of displays are offered for you to choose the one that suits your needs.

6. Conforms With EMC and Low Voltage Directives
Conforms with EMC directives (EN50081-2/EN50082-2) and low-voltage directives (VDE0435/Part 2021) for CE certification vital for use in Europe.

PRODUCT TYPES

Digit	Count speed	Output	Operation voltage	Power down insurane	Additional function	Terminal	P/N
4	30 Hz (cps) 5 kHz (kcps) switchable	Relay	100-240 V AC with 12V DC power supply	Available	Scale Factor	11 Pin	LC4H-PS-R4-AC240V
					Scale Factor	Screw	LC4H-PS-R4-AC240VS
					Scale Factor / Voltage Signal Input	11 Pin	LC4H-PSV-R4-AC240V
					Scale Factor / Voltage Signal Input	Screw	LC4H-PSV-R4-AC240VS
			24 V AC/DC		Scale Factor	11 Pin	LC4H-S-R4-24V
					Scale Factor	Screw	LC4H-S-R4-24VS
					Scale Factor / Voltage Signal Input	11 Pin	LC4H-SV-R4-24V
					Scale Factor / Voltage Signal Input	Screw	LC4H-SV-R4-24VS
		Transistor			Scale Factor	11 Pin	LC4H-S-T4-24V
					Scale Factor	Screw	LC4H-S-T4-24VS
					Scale Factor / Voltage Signal Input	11 Pin	LC4H-SV-T4-24V
					Scale Factor / Voltage Signal Input	Screw	LC4H-SV-T4-24VS
6		Relay	100-240 V AC with 12V DC power supply		Scale Factor	11 Pin	LC4H-PS-R6-AC240V
					Scale Factor	Screw	LC4H-PS-R6-AC240VS
					Scale Factor / Voltage Signal Input	11 Pin	LC4H-PSV-R6-AC240V
					Scale Factor / Voltage Signal Input	Screw	LC4H-PSV-R6-AC240VS
			24 V AC/DC		Scale Factor	11 Pin	LC4H-S-R6-24V
					Scale Factor	Screw	LC4H-S-R6-24VS
					Scale Factor / Voltage Signal Input	11 Pin	LC4H-SV-R6-24V
					Scale Factor / Voltage Signal Input	Screw	LC4H-SV-R6-24VS
		Transistor			Scale Factor	11 Pin	LC4H-S-T6-24V
					Scale Factor	Screw	LC4H-S-T6-24VS
					Scale Factor / Voltage Signal Input	11 Pin	LC4H-SV-T6-24V
					Scale Factor / Voltage Signal Input	Screw	LC4H-SV-T6-24VS

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

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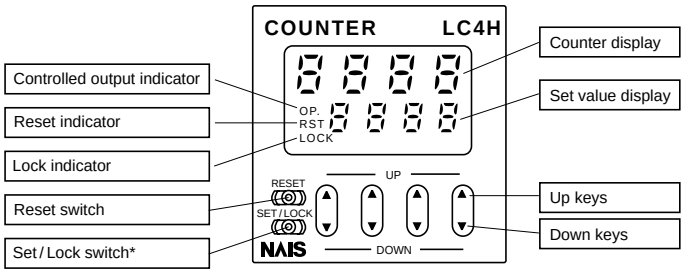
SPECIFICATIONS

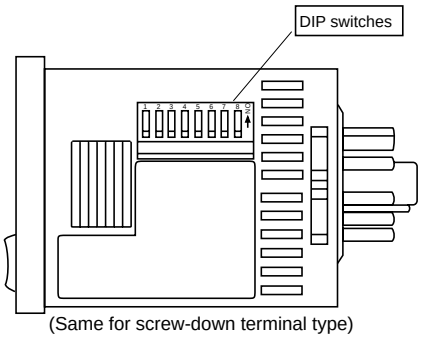
Basic Specifications, setting the Operation Mode and Counter, Operation Modes (input/output) are the same as LC4H standard type. Please refer to these data some pages before.

ADDITIONAL SPECIFICATIONS

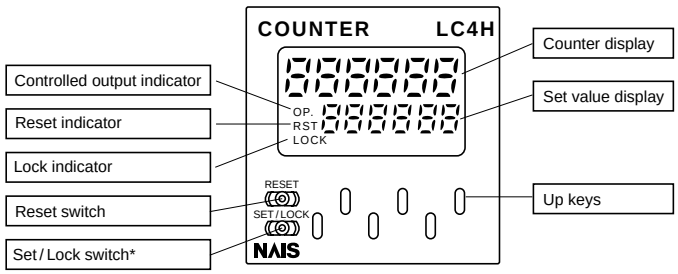
Item	Specification
One shot output time	6 possibilities: 1.0s, 0.5s, 0.2s, 0.1s, 0.05s, 0.01s (refer to setting procedure)
Power supply for sensor	12 V DC (±10%) 100 mA max. (100 – 240 V AC types only)
Scale factor	selectable: 0.001 D 9.999 (4-digit type) 0.001 D 99.999 (6-digit type)
Decimal point	selectable at the last 3 digit

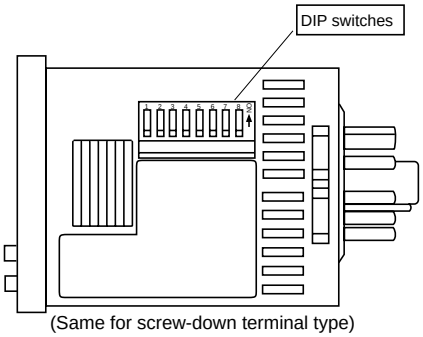
PART NAMES





(Same for screw-down terminal type)





(Same for screw-down terminal type)

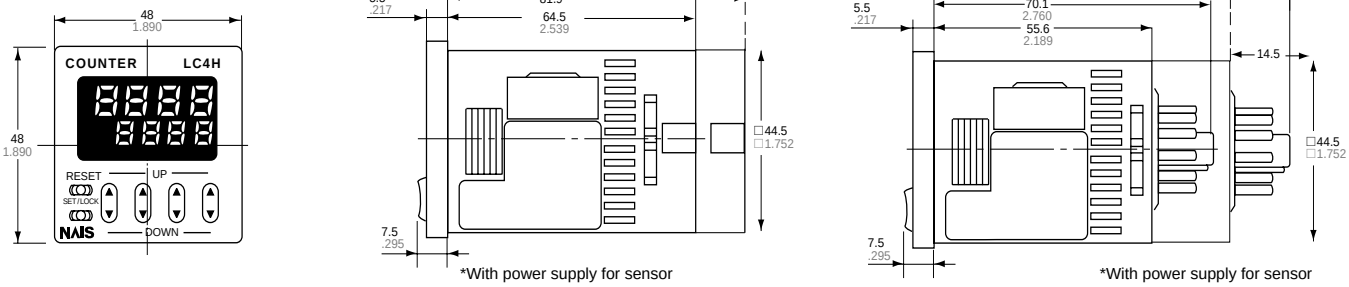
* The Set / Lock switch is new at the LC4H-SV counter series.
The standard LC4H counter does have only the lock switch.

DIMENSIONS (units: mm inch)

• LC4H electrical counter

Screw-down terminal type (embedded installation)

Pin type (embedded installation/ front panel installation)

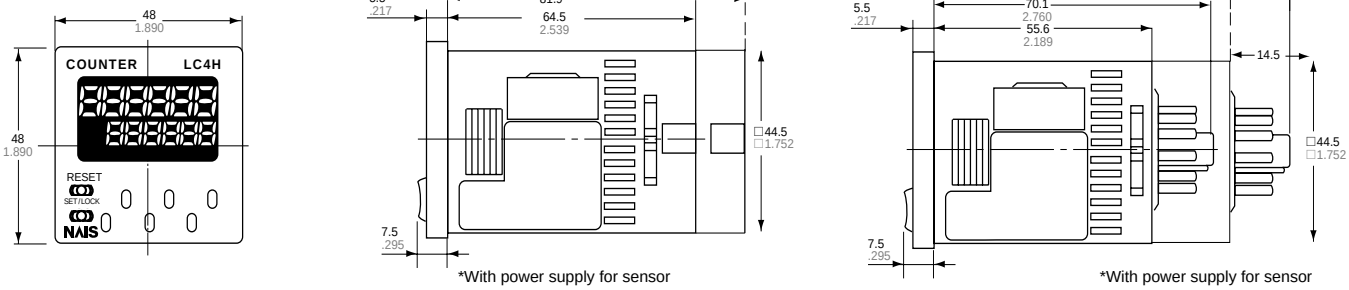


*With power supply for sensor

*With power supply for sensor

Screw-down terminal type (embedded installation)

Pin type (embedded installation/ front panel installation)

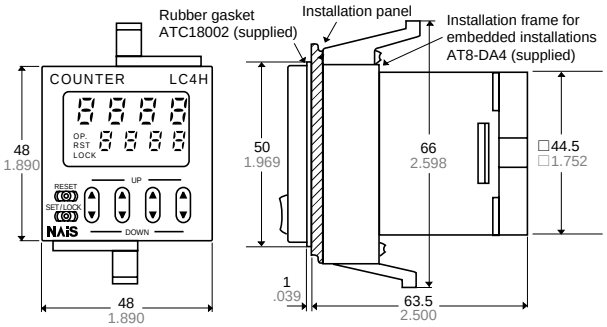


*With power supply for sensor

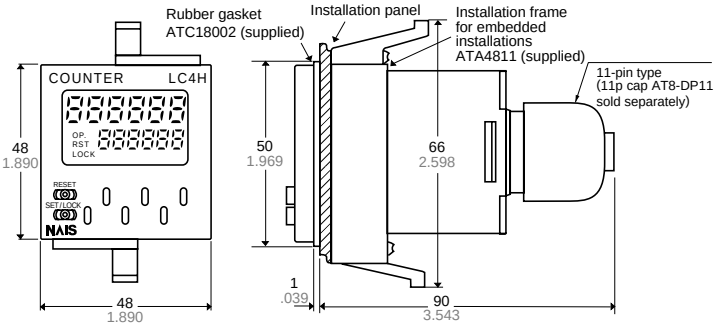
*With power supply for sensor

• Dimensions for embedded installation (with adapter installed)

Screw-down terminal type

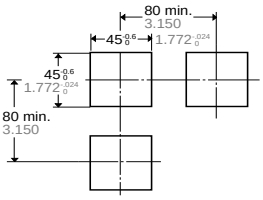


Pin type



• Installation panel cut-out dimensions

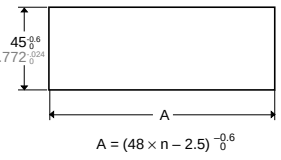
The standard panel cut-out dimensions are shown below. Use the installation frame (AT8-DA4) and rubber gasket (ATC18002).



• 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.

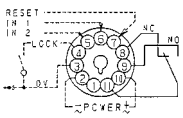


TERMINAL LAYOUT AND WIRING

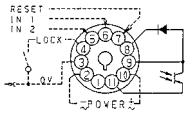
With power supply for sensor

• 11 pin type

Relay output type

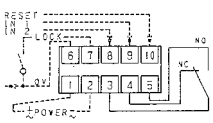


Transistor output type

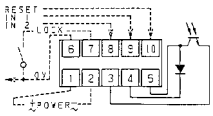


• Screw-down terminal type

Relay output type

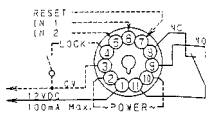


Transistor output type

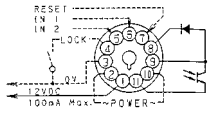


• 11 pin type

Relay output type

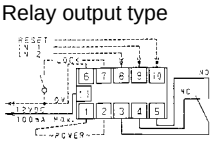


Transistor output type

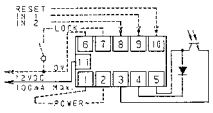


• Screw-down terminal type

Relay output type



Transistor output type

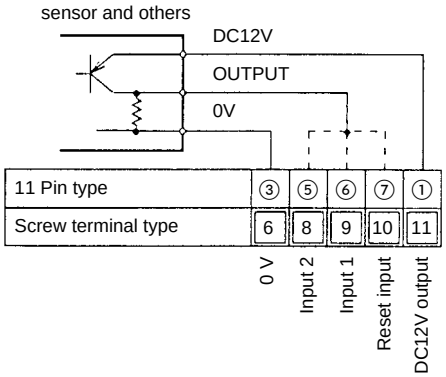


Note: For connecting the output leads of the transistor output type, refer to 6) Transistor output on page 99.

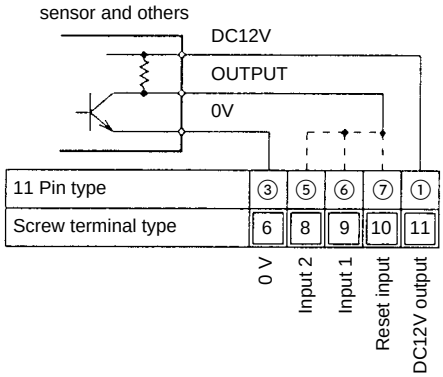
INPUT AND OUTPUT

Input signal condition

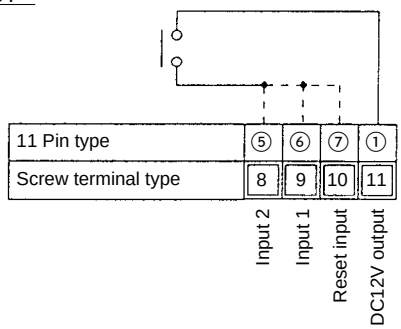
PNP transistor type



NPN transistor type



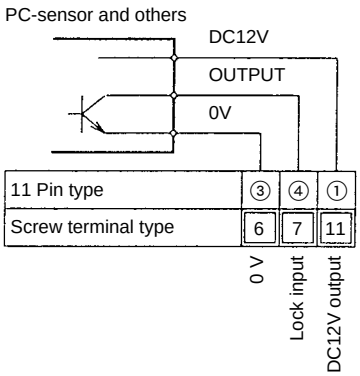
Contact type



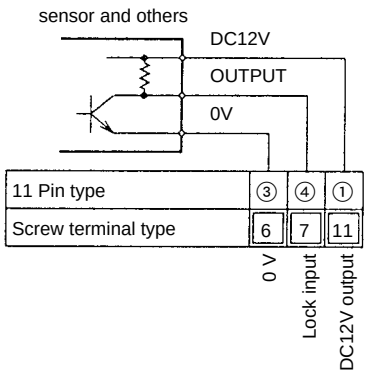
Input 1 · 2, Reset input

- High-level (input ON)
  DC 4.5 F 30 V
- Low-level (input OFF)
  DC 0 F 2 V
- Max. energized voltage: 30 V DC

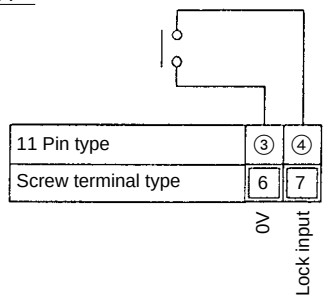
Open collector type



Voltage output type



Contact type



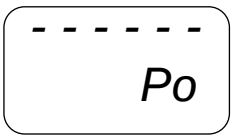
Lock input

- Input impedance: 1 kΩ or les
  (Approx. 1.5 mA flowing current at 0Ω)
- Input residual voltage: 2V
- Open impedance: 100 kΩ
- Max. energized voltage: 40 V DC
- Use contact which can switch 5 V, 1.5 mA load.

Note: There is no 12 V DC output for 12 – 24 V DC / 24 V AC type.

SETTING THE DECIMAL POINT

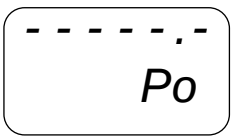
① Press 2nd [key] and [SET/LOCK key] simultaneously to enable operation mode change.



ex.) 6-digit type
Decimal point setting mode display
(Example of initial value display)

② Release the [SET/LOCK key]

③ Set a decimal point with 2-digit, 3-digit, 4-digit [UP key] or [DOWN key] (4-digit type only)
(when setting with 1-digit [UP key] or [DOWN key] (4-digit type only), the setting is no decimal point.)



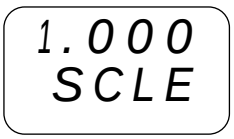
ex.) 6-digit type
(Example of 2-digit [UP key] operation)

④ Press [RESET key] to complete preset procedure.

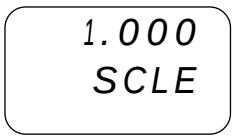
SETTING THE PRESCALE VALUE

① Press 1st [key] and [SET/LOCK key] simultaneously to enable operation mode change.

ex.) 4-digit type



ex.) 6-digit type



Prescale value setting mode display
(Example of initial value display)

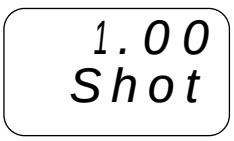
② Release the [SET/LOCK key]

③ Set a prescale value with [UP key] or [DOWN key] (4-digit type only)

④ Press [RESET key] to complete preset procedure.

SETTING THE ONE-SHOT OUTPUT TIME

① Press 3rd [key] and [SET/LOCK key] simultaneously to enable operation mode change.



ex.) 6-digit type
One-shot output time setting mode
(Example of initial value display)

② Release the [SET/LOCK key]

③ Press 1st [UP key] to change operation mode setting clockwise.

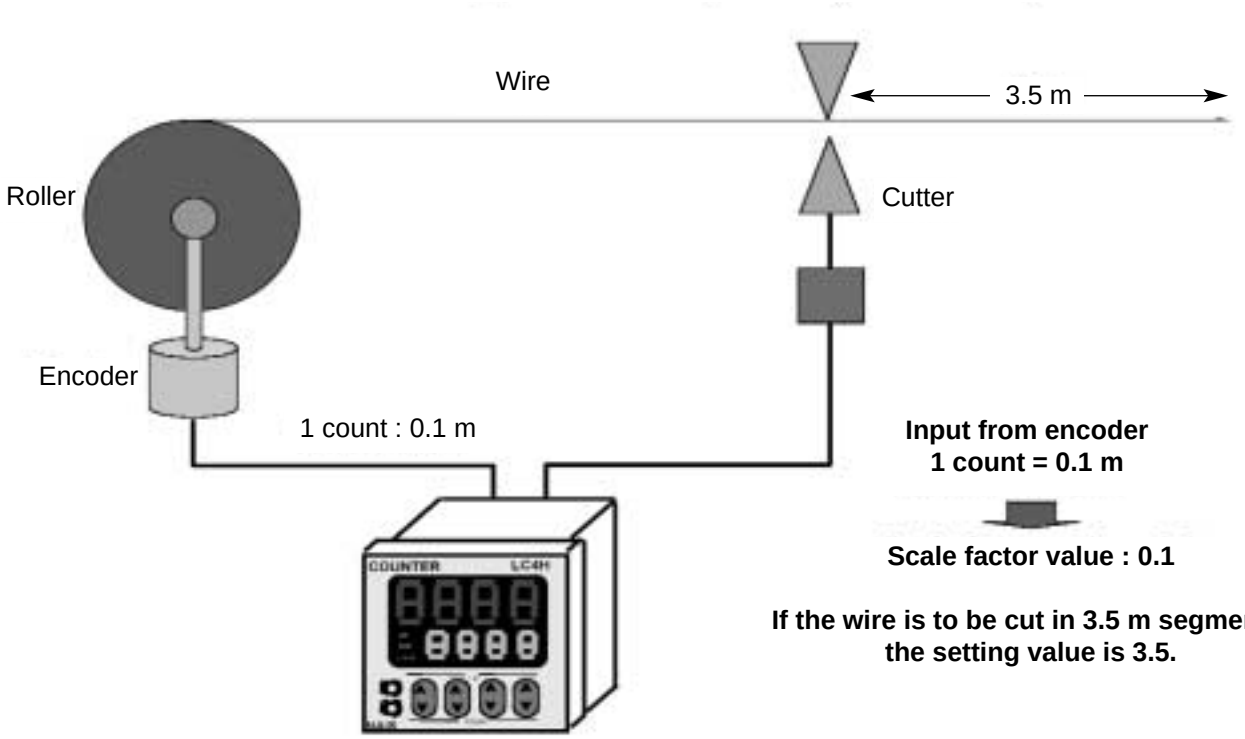
1 s → 0.5 s → 0.2s → 0.1 s → 0.05 s → 0.01 s

(4-digit type can be set counterclockwise by [DOWN key])

④ Press [RESET key] to complete preset procedure.

Application example 1:

LC4H-SV is used for measuring and cutting wire (unit/meter)



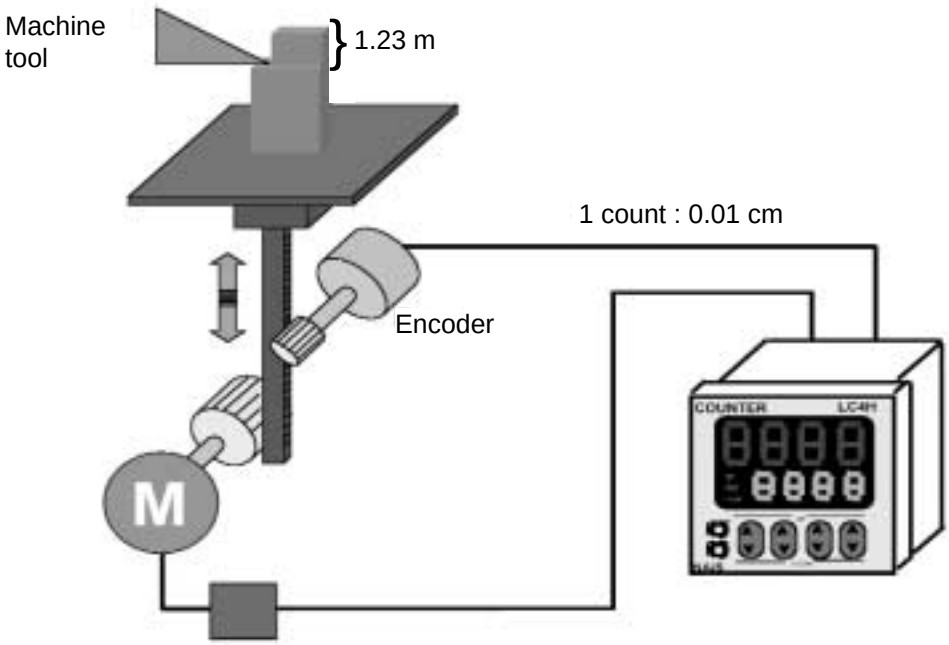
Input from encoder
1 count = 0.1 m

Scale factor value : 0.1

If the wire is to be cut in 3.5 m segments, the setting value is 3.5.

Application example 2:

LT4H-SV is used for 1 axis positioning (unit/cm)



Input from encoder
1 count = 0.01cm

Scale factor value : 0.01

If the material is to be cut in 1.23 cm segments, the setting value is 1.23.

LC4H series CAUTIONS FOR USE

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) For embedded installation applications, the screw-down terminal type is recommended.
Use either the rear terminal block (AT8-RR) or the 8P cap (AD8-RC) for the 8-pin type, and the 11P cap (AT8-DP11) for the 11-pin type. Avoid soldering directly to the round pins on the unit.
For front panel installation applications, use the 11-pin type DIN rail terminal block (ATC18004).

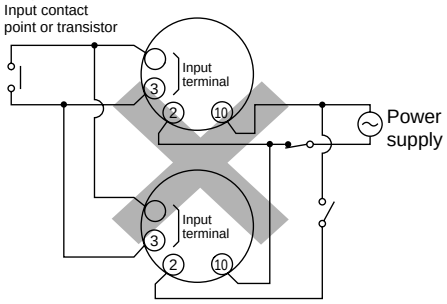
3) After turning the unit off, make sure that any resulting induced voltage or residual voltage is not applied to power supply terminals ② through ⑦ (8-pin type), ② through ⑩ (11-pin type) or 1 and 2 (screw-down terminal type). (If the power supply wire is wired parallel to the high voltage wire or power 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

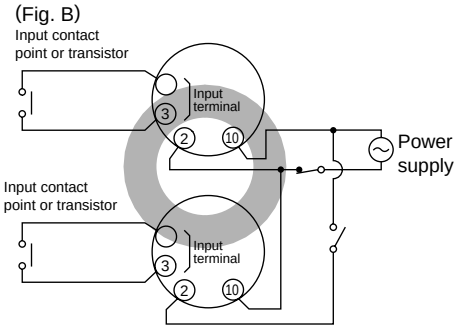
The power circuit has no transformer. When an input signal is fed to two or more counters at once, do not arrange the power circuit in an independent way. If the counter is powered on and off independently as shown in Fig. A, the counter's internal circuitry may get damaged.Be careful never to allow 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. When power circuitry is not independent,

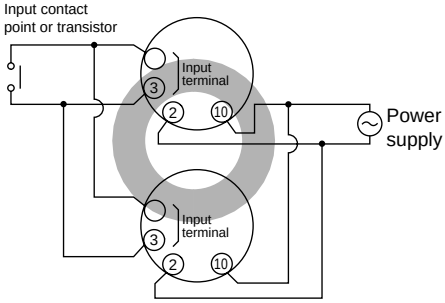
(Fig. B)



one input signal can be fed to two or more counters at once, as shown in Fig. C.

3. Input and output

(Fig. C)

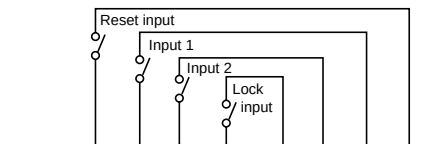


1) Signal input type

(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.

(2) Non-contact point input



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

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

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

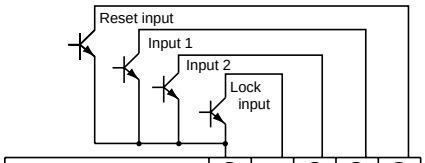
V_{CEO} = 20 V min.

I_C = 20 mA min.

I_{CBO} = 6µA max.

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

* The short-circuit impedance should be



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

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

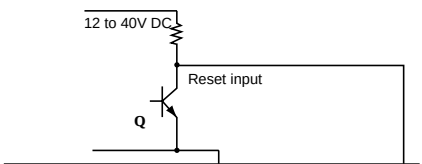
less than 1 kΩ.

[When the impedance is 0 W, 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 kΩ.

* 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.

2) The input mode and output mode



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

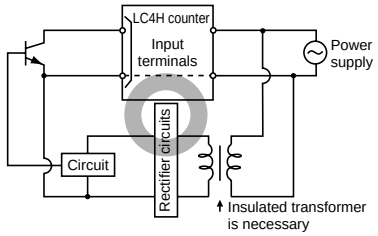
(The above example is for reset input)

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

3) For the power supply of the input

device, use a single-phase or double-phase insulated power transformer. The second-phase side must not be grounded.

4) Since the power supply circuitry does



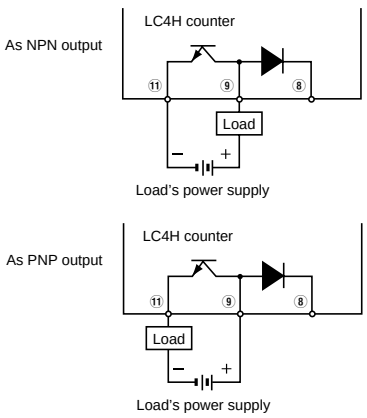
not contain a transformer, be aware that it is not possible for simultaneous input from an input contact point or transistor to a LC4H counter with independent power supply operation.

5) 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-down terminal types). Never connect other terminals or voltages higher than DC 40 V, because it may destroy the internal circuitry.

6) Transistor output

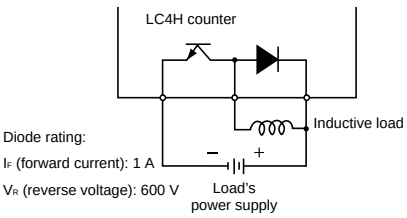
(1) Since the transistor output is insulated from the internal circuitry by a photocoupler, it can be used as an NPN output or PNP (equal value) output. (The above example is 11-pin type)

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



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

7) 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.

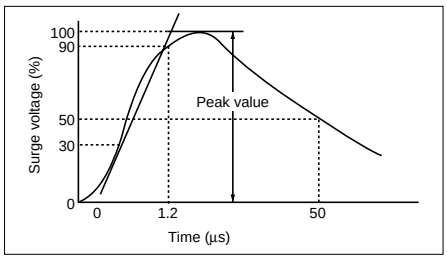
2) Since the cover of the unit is made of polycarbonate resin, avoid contact with or use in environments containing methyl alcohol, benzene, thinners, and other organic solvents; and ammonia, caustic sodas, and other alkaline substances.

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.

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

• **Surge wave form**

[± (1.2 × 50) ms uni-polar full wave voltage]

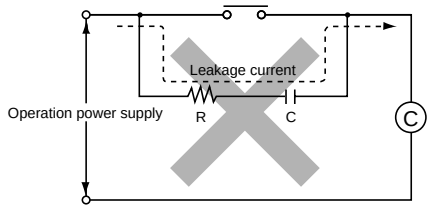


4) Regarding external noise, the values below are considered the noise-resistant voltages. If voltages rise above these values, malfunctions or damage to the internal circuitry may result, so take the necessary precautions.

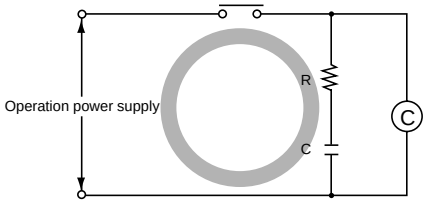
	Power supply terminals		Input terminals
	AC type	DC type 24V AC type	
Noise voltage	1,500V	1,000V	600V

Noise wave form (noise simulator)
Rise time: 1 ns
Pulse width: 1 μs, 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.

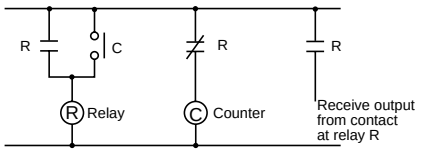


(Fig. A)



(Fig. B)

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.



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 or –99999. See note 1.	No change	Enter reset or RESET key.	No change
d iPEH	Incorrect DIP switch setting.		Restart unit (correct DIP switch settings)	
EH-00	Malfunctioning CPU.	OFF	Enter reset, RESET key, or restart unit.	The values at start-up before the CPU malfunction occurred.
EH-01	Malfunctioning memory. See note 2.			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. CE Marking Certification

1) EMC directive (89/336/EEC)
As a counter unit, the LC4H series conforms to EMC directives. Applicable standards are EN50081-2 and EN50082-2.
2) Low voltage directive (73/23/EEC)
In order to satisfy VDE0435/Part 2021, be sure to adhere to the following installation conditions and precautions.
(1) The counter uses a non-transformer power supply and the power supply and input signal terminals are not insulated.
• When a sensor is connected to the input circuit, install double insulation on the sensor side.
• With contact-point inputting, use double-insulated relays, etc.
(2) Always connect loads insulated with basic insulation specifications to the output contact points. The counter unit is also insulated with basic insulation specifications. The combination of the two satisfies VDE, which calls for double insulation.
(3) For the applied power supply, use one protected by an over-current protection device that conforms with EN/IEC standards (e.g. 250 V, 1 A fuse).
(4) During installation, always use a terminal block or the appropriate sockets. Do not touch the terminals, or other part of the counter unit while it is on. Before installation or removal of the unit, first verify that no voltage is being applied to any of the terminals.
(5) Do not use the counter in a safety circuit. When the unit is being used in a circuit such as a heater circuit, install a protection circuit on the machine side.