Panasonic
ideas for life

DIN HALF SIZE
LCD COUNTER

LC2H

c**RL**us CE

Features

1. 8.7 mm .343 inch Character Height (previously 7 mm)
Easy-to-read character height increased from 7 mm to 8.7 mm .276 inch to .343 inch.

2. Plenty of Digits

8.7mm
.343inch

← 8 digits →

3. Counting Speed Switchable between 2 kHz and 30 Hz

4. Panel Mounting Type Features 2 Installation Methods
Comes with very easy one-touch installation type and also installation frame type that uses the bracket on the timer/counter. Choose a method that suits the application.

5. Battery Replacement Easy on Environment
To replace battery simply remove body for the one-touch installation type, and remove battery lid for the installation frame type.

6. Screw Terminals Designed for Safety
Built in finger protection.

7. Panel Covers Replacable (Standard color is ash gray.)
Change the panel design by replacing with a black panel cover.

8. Conforms to IP66 Protective Construction (Only installation frame type.) (Front panel surface)

9. Input Methods
1) Non-voltage input method
2) Voltage input method
3) Free voltage input method

10. Backlight Type Added to Series and Now 2-color Switchable (green/red)
Easy viewing even in dark places and switchable between green and red (Voltage input type).

11. Conforms to Safety Regulations

Panel mounting type
One-touch installation type

Panel mounting type
Installation frame type

PC board mounting type

PRODUCT CHART

Type	Non-voltage input type	Standard type		Backlight type
		Voltage input type (4.5 to 30 V DC)	Free voltage input type (24 to 240 V AC/DC)	Voltage input type (4.5 to 30 V DC)
Installation type				
Panel mounting type — One-touch installation type	○	○	○	○
Panel mounting type — Installation frame type	○	○	○	○
PC board mounting type	○	○	—	—

PRODUCT TYPES

1. Panel mounting type
1) One-touch installation type
① Standard type

No. digits	Counting speed	Front reset	Input method	Part No.
8 digits	2 kHz/30 Hz switchable	Yes	Non-voltage input type	LC2H-FE-2KK
			Voltage input type (4.5 to 30 V DC)	LC2H-FE-DL-2KK
	30 Hz		Free voltage input type (24 to 240 V AC/DC)	LC2H-FE-FV-30

Note) Please ask us about types without front resetting.

② Backlight type

No. digits	Counting speed	Front reset	Input method	Part No.
8 digits	2 kHz/30 Hz switchable	Yes	Voltage input type (4.5 to 30 V DC)	LC2H-FE-DL-2KK-B

07/2004

2) Installation frame type
① Standard type

No. digits	Counting speed	Front reset	Input method	Part No.
8 digits	2 kHz/30 Hz switchable	Yes	Non-voltage input type	LC2H-F-2KK
			Voltage input type (4.5 to 30 V DC)	LC2H-F-DL-2KK
	30 Hz		Free voltage input type (24 to 240 V AC/DC)	LC2H-F-FV-30

Note) Please ask us about types without front resetting.

② Backlight type

No. digits	Counting speed	Front reset	Input method	Part No.
8 digits	2 kHz/30 Hz switchable	Yes	Voltage input type (4.5 to 30 V DC)	LC2H-F-DL-2KK-B

2. PC board mounting type

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

SPECIFICATIONS
1. Panel mounting type

Item \ Type	Standard type — Non-voltage input	Standard type — Voltage input	Backlight type	Standard type — Free voltage type
No. digits	8 digits			
External power supply	Not required (built-in battery)			
Max. counting speed	2 kHz/30 Hz (Switchable by switch)			30 Hz (Note 2)
Min. input signal width (ON: OFF = 1:1)	0.25 ms/16.7 ms (Switchable by switch)			16.7 ms
Count input — Input method (signal)	Non-voltage input using contacts or open collector connection	High level: 4.5 to 30 V DC Low level: 0 to 2 V DC	High level: 4.5 to 30 V DC Low level: 0 to 2 V DC	High level: 24 to 240 V AC/DC Low level: 0 to 2.4 V AC/DC
Count input — Input impedance	When shorted: Max. 10 kΩ When open: Max. 750 kΩ	Approx. 4.7 kΩ		—
Count input — Residual voltage	Max. 0.5 V	—		—
Min. input signal width	200 ms			
Reset input — Input method (signal)	Non-voltage input using contacts or open collector connection	High level: 4.5 to 30 V DC Low level: 0 to 2 V DC		Non-voltage input using contacts or open collector connection
Reset input — Input impedance	When shorted: Max. 10 kΩ When open: Max. 750 kΩ	Approx. 4.7 kΩ		When shorted: Max. 10 kΩ When open: Max. 750 kΩ
Reset input — Residual voltage	Max. 0.5 V			Max. 0.5 V
Display method	7-segment LCD		7-segment LCD With green/red backlight	7-segment LCD
Breakdown voltage (initial)	Between charged and uncharged parts: 1,000 V AC for 1 minute.			Between charged and uncharged parts: 2,000 V AC for 1 minute.
Insulation resistance (initial)	Min. 100 MΩ (measured at 500 V DC) Measurement location same as for break down voltage.			
Backlight power	—		24 V DC (±10%)	—
Protective construction (Note 3)	IEC Standard IP66 (only panel front: when using rubber gasket)			
Accessories (Note 3)	Rubber gasket, mounting bracket			
Battery life	7 years (at 25°C 77°F) Note 1			6 years (at 25°C 77°F)

Notes) 1. The value given for battery life is calculated based on continuous operation (count input signal ON/OFF = 1:1); therefore, this value is not guaranteed.
 Also, battery life is decreased 30% when operation is continuous with 2 kHz count inputting in 2 kHz mode.
 2. Operation is at 25 Hz when operation is continuous with 24 V AC.
 3. Only for installation frame type.

LC2H

2. PC board mounting type

Item	Type		PC board mounting type
Input method			Non DC voltage input
No. digits			8 digits
Rated operation voltage			3 V DC
Allowable operation voltage range			2.7 to 3.3 V DC
Current consumption			Max. 30 μA (max. 250 μA during reset input)
Max. counting speed			2 kHz · 30 Hz
Count input	Min. input signal width (ON: OFF = 1:1)		0.25 ms · 16.7 ms
	Input method		Non-voltage input using contacts or open collector connection
	Input impedance		When shorted: Max. 10 kΩ / When open: Max. 750 kΩ
	Residual voltage		Max. 0.5 V
	Min. input signal width		10 ms
Reset input	Input method		Non-voltage input using contacts or open collector connection
	Input impedance		When shorted: Max. 10 kΩ / When open: Max. 750 kΩ
	Residual power		Max. 0.5 V
Break down voltage (initial)			Between charged and uncharged parts: 1,000 V AC for 1 minute.
Insulation resistance (initial)			Min. 100 MΩ (measured at 500 V DC) Measurement location same as for break down voltage.

3. Common

Item	Type		Panel mounting/PC board mounting types
Vibration resistance	Functional		10 to 55 Hz (1 cycle/min.), single amplitude: 0.15 mm .006 inch (10 min. on 3 axes)
	Destructive		10 to 55 Hz (1 cycle/min.), single amplitude: 0.375 mm .015 inch (1 hr. on 3 axes)
Shock resistance	Functional		Min. 98 m/s² (4 times on 3 axes)
	Destructive		Min. 294 m/s² (5 times on 3 axes)
Operation temperature			−10 to +55°C +14 to +131°F (without frost or dew)
Storage temperature			−25 to +65°C −13 to +149°F (without frost or dew)
Ambient humidity			35 to 85% RH

PART NAMES

1. Front reset button
This button resets the count value. It does not work when the lock switch is ON. Be aware that battery life will decrease if this switch is used frequently.

2. Lock switch (Refer to chart on right.)
Disable the front reset button.
Note) Turn ON at the LCD side (reset disabled) and OFF at the terminal block side (reset enabled).

3. Count speed switch (Refer to chart on right.)
Use this switch to switch the count speed between 30 Hz and 2 kHz. (On the non-voltage and voltage input types, 30 Hz is on the LCD side and 2 kHz is on the terminal block side. Fixed at 30 Hz for free voltage input type.)
Note) You must press the front reset button when you change the count speed switch setting.
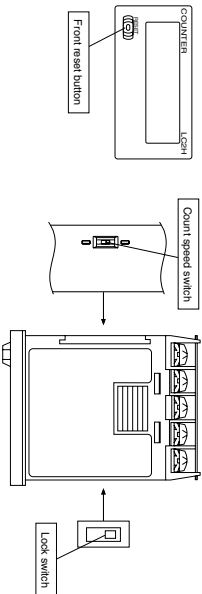
|	Non-voltage input/voltage input	Free voltage input
Lock switch (Unit display 1)	(Terminal block side) OFF※ ⟷ (LCD side) ON	—
Count speed switch (Unit display 2)	(Terminal block side) 2k Hz ⟷ (LCD side) 30Hz※	(Fixed at 30 Hz)

Notes) 1. ※Default setting when shipped.
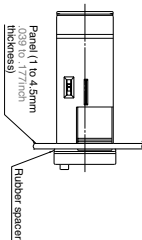2. Make the switch setting before installing to panel.

COUNTER LC2H

Front reset button

Count speed switch

Lock switch

Dimensions

1. Panel mounting type

• External dimensions

1) One-touch installation type

• Panel installation diagram

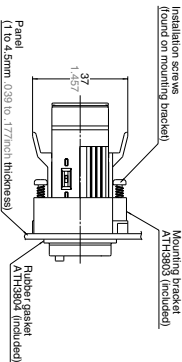Panel (1 to 4.5mm
.039 to .177inch
thickness)
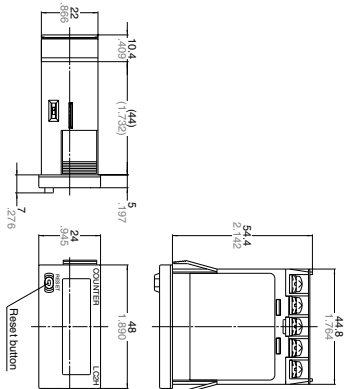
Rubber spacer

Note) When installing to a 4.5 mm .177 inch thick panel, remove the rubber spacer first.

10.4
.409

(44)
(1.732)

7
.276

5
.197

22
.866

24
.945

54.4
2.142

44.8
1.764

COUNTER

48
1.890

LC2H

Reset button

2) Installation frame type

• Panel installation diagram

Panel
(1 to 4.5mm .039 to .177inch thickness)

Installation screws
(found on mounting bracket)

Mounting bracket
ATH3803 (included)

Rubber gasket
ATH3804 (included)

37
1.457

10.4
.409

44
1.732

7
.276

5
.197

22
.866

24
.945

54.4
2.142

44.8
1.764

COUNTER

48
1.890

LC2H

Reset button
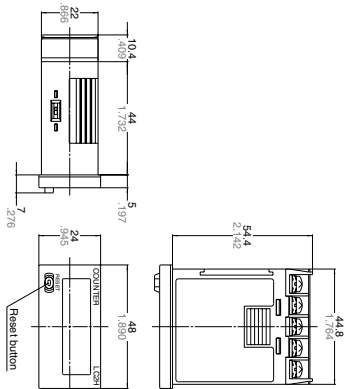
• Panel cut-out dimensions

The standard panel cut-out is shown below.
Use the mounting bracket (ATH3803) and the rubber packing (ATH3804).
(Only mounting bracket installation type.)

60 min.
2.362 min.

45$^{+0.5}_{0}$
1.772$^{+.020}_{0}$

22.2$^{+0.5}_{0}$
.874$^{+.020}_{0}$
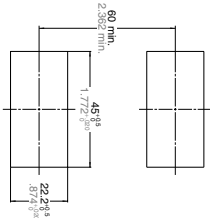
• When installing repeatedly (sealed installation)
(Only mounting bracket installation type.)

22.2$^{+0.5}_{0}$
.874$^{+.020}_{0}$

A

A=(48×n−2.5)$^{+0}_{-1.0}$
A=(1.890×n−.098)$^{+0}_{-.039}$
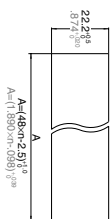
Notes) 1. Suitable installation panel thickness is 1 to 4.5 mm .039 to .177 inch.
2. Waterproofing will be lost when installing repeatedly (sealed installation).

• Terminal layout and wiring diagrams

1) Standard type

Non voltage input type		Voltage input type		Free voltage input type	
Count input	Reset input	Count input	Reset input	Count input	Reset input

Count input
① ② ③ ④

Reset input

①~④ are connected internally.

Count input
+V
0V

Reset input
+V
0V

Count input
⑦ or

Reset input

2) Backlight type

Voltage input type

Voltage input type

Count input
+V
Reset input
+V
0V
0V

<Backlight>
0V
+V
<When green>
<When red>
0V
+V

2. PC board mounting type

• External dimensions

5.08±0.3
.200±.012
0.6±0.1
.024±.004
33.02±0.3
.1300±.012

3.3±0.3
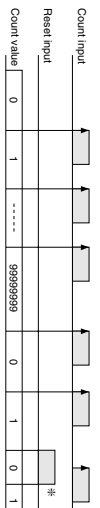.130±.012

43.4
1.709

LC2H COUNTER

19
.748

DIP switch × 8

5.08±0.3
.200±.012

17.3
.681

0.5±0.3
.020±.012

15.24±0.3
.600±.012

0.3±0.1
.012±.004

General tolerance: ±1.0 ±.039 mm inch

PC board pattern (BOTTOM VIEW)

8-0.8 dia.
8-.031 dia.

2.54
.100

2.54
.100

5.19
.204

5.08
.200

5.08
.200

33.02
1.300

5.19
.204

1.9
.075

1.9
.075

15.24
.600

Mounting area

Connection sockets
28 pin DIP terminal

• Terminal layout and wiring diagrams

Count input
Reset input

15 16 17
14 12
3 1

① ~ ③, ⑫~⑭, ⑮~⑰ and ㉖~㉘ are connected internally.

INPUT METHOD

1. Standard type

Panel mounting type		Non-voltage input type		
		Voltage input type		
Contact input	Transistor input	Transistor input	PC board mounting type	
	NPN transistor	NPN transistor	Transistor input	
		PNP transistor	NPN transistor	Free voltage input type

Count input
1 2
3 4
Reset input
(② and ④ are connected internally.)

Count input
1 2
3 4
Reset input
(② and ④ are connected internally.)

+V
Count input
0V
1 2
3 4
Reset input
0V
+V
(② and ④ are connected internally.)

Count input
3V DC
13 11
14 12
Reset input

+V
Count input
1 2
3 4
Reset input
+V

Count input
3V DC
27 25
28 26
Reset input

Count input
or
1 2
3 4
or
Reset input

Notes) 1. When using contact input, since current flow is small from terminals ① and ③ on the panel mounting type and terminals ⑮ to ⑰ and ㉖ to ㉘ on the PC board mounting type, please use relays and switches with high contact reliability.
2. When using transistor input, use the following as a guide for which transistors (Tr) to use for inputting. (Collector withstand voltage ≧ 50 V, leakage current < 1 μA)

Notes) 1. ② and ④. (The input and reset circuits are functionally insulated.)
2. When using transistor (Tr) input, use the right as a guide. (Collector withstand voltage ≧ 50 V, leakage current < 1 μA)
3. 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.

2. Backlight type

	Voltage input type				Backlight connection
Contact input	NPN transistor	Transistor input			
		PNP transistor			Green 24V DC / Red 24V DC

Notes) 1. Do not reverse the polarities when connecting the DC voltage for the backlight.
2. ② and ④. (The input and reset circuits are functionally insulated).
3. When using transistor (Tr) input, use the right as a guide. (Collector withstand voltage ≧ 50 V, leakage current < 1 μA)
4. 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.

Explanation of operation

1. Counting takes place when the count input signal is ON.
2. Counting resumes again when the count value reaches 99999999 (full scale value) and then returns to "0" with a new count input.
3. No measurement takes place when a reset is input.
1) When reset is ON, resetting takes place and the count becomes "0".
2) Press the front reset button when you want to reset manually (only panel installation type).

	Count input				
Reset input					
Count value	0	1	-----	99999999	0	1	0	1

Note) ※Count becomes "1" when the reset input is turned OFF while the count signal is being input.

Note) Be aware that battery life will decrease if the count input or reset input are left ON.

Cautions for use

1. Non-voltage input type
For both panel mounting and PC board mounting types

1) 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.
2) 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 ㉖ to ㉘ on the PC board mounting type) please use relays and switches with high contact reliability.
3) When inputting with an open collector of a transistor, use a transistor for small signals in which ICBO is 1 μA or less and always input with no voltage.
4) 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). 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). In particular, when using shielded wiring, be careful of the capacitance between wires.

PC board mounting type
1) For external power supply use manganese dioxide or lithium batteries (CR type: 3V).
2) Always reset after external power is applied and confirm that the display reads "0".
3) Make the wiring from the battery to the counter unit as short as absolutely possible. Also, be careful of polarity.
4) 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]

5) 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).

2. Voltage input type
1) 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.
2) 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.
3) 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).

3. Free voltage input type
1) Use count input terminals ① and ② for free voltage input and reset terminals ③ and ④ for non-voltage input.
2) 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.

3) Since the current flow is very small from reset input terminal ③, please use relays and switches with high contact reliability.

4) When inputting a reset with an open collector of a transistor, use a transistor for small signals in which ICBO is 1 μA or less and always input with no voltage.

5) To reset externally, short reset input terminals ③ and ④ on the rear.

6) 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 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.

4. How to reset multiple panel mounting type counters all at once (input is the same for count)

Non-voltage input type
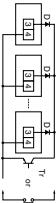
Notes) 1. Use the following as a guide for choosing transistors used for input (Tr).
Leakage current < 1 μA

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 μA, forward voltage 0.1 and higher.)
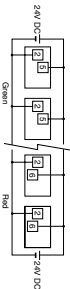
Voltage input type
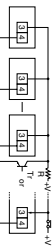
Note) Make sure that H (reset ON) level is at least 4.5 V.

5. Backlight luminance

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

6. Insulation sheet

Before using a panel mounting type, please pull and remove the insulation sheet from the side of the product in the direction of the arrow.

In consideration that the product might be stored for long periods without being used, an insulation sheet is inserted before shipping. Remove the insulation sheet and press the front reset button.