NAiS

DIN HALF SIZE LCD DISPLAY HOUR METER

LH24 Hour Meters

- **Large 7-digit LCD display value reading**
- **Unnecessary "0"s are eliminated from the upper digits of elapsed value for easy reading**
- **Wide range of measurement:**
  0 to 3999 days 23.9 hours (exclusive for flush mounting type)
  0 to 99999.99 hours
  0 to 9999 hours 59.9 minutes
- **Two mounting types available**
  LH24-F: Flush mounting type
  LH24-C: PC board mounting type

PRODUCT TYPE

1) Non-voltage input type

Types	Part Number		Rated operating voltage	Max. current consumption	Counting range	Input
	with manual reset	without manual reset				
LH24-F Flush mounting types	LH24-F-DH	LH24-F-DH-N	Built-in battery (Battery life: 10 years)	—	0 to 3999 days 23.9 hours	Non-voltage input
	LH24-F-H	LH24-F-H-N			0 to 99999.99 hours	
	LH24-F-HM	LH24-F-HM-N			0 to 9999 hours 59.9 min	
LH24-C PC board mounting types	LH24-C-H	—	3 V DC (Uses manganese dioxide lithium battery)	20 μA (When resetting: 20 μA)	0 to 99999.99 hours	
	LH24-C-HM	—			0 to 9999 hours 59.9 min	

2) Voltage input type

Types	Part Number		Rated operating voltage	Maximum current consumption	Counting range	Input
	with manual reset	without manual reset				
LH24-F Flush mounting types	LH24-F-DH-AL	LH24-F-DH-AL-N	Built-in battery (Battery life: 6 years)	—	0 to 3999 days 23.9 hours	100 to 120 V AC/DC (signal reset is controlled by non-voltage input)
	LH24-F-H-AL	LH24-F-H-AL-N			0 to 99999.99 hours	
	LH24-F-HM-AL	LH24-F-HM-AL-N			0 to 9999 hours 59.9 min	
	LH24-F-DH-AH	LH24-F-DH-AH-N			0 to 3999 days 23.9 hours	200 to 240 V AC/DC (signal reset is controlled by non-voltage input)
	LH24-F-H-AH	LH24-F-H-AH-N			0 to 99999.99 hours	
	LH24-F-HM-AH	LH24-F-HM-AH-N			0 to 9999 hours 59.9 min	
	LH24-F-DH-DL	LH24-F-DH-DL-N	Built-in battery (Battery life: 10 years)		0 to 3999 days 23.9 hours	4.5 to 30 V DC
	LH24-F-H-DL	LH24-F-H-DL-N			0 to 99999.99 hours	
	LH24-F-HM-DL	LH24-F-HM-DL-N			0 to 9999 hours 59.9 min	

SPECIFICATIONS

Input signals

		Non-voltage input type		Voltage input type	
		Flush mounting type	PC board mounting type	AC/DC input type	DC input type
Operation signal	Minimum operating signal width	40 ms (Maximum 25 ms deviation)			
	Input method	Non-voltage input: Contact/Open collector		ON: 100 to 120 V AC/DC, 200 to 240 V AC/DC OFF: 0 to 2 V AC/DC	ON: 4.5 to 30 V DC OFF: 0 to 2 V DC
	Input impedance	Maximum: 1 kΩ when short-circuited Minimum: 100 kΩ when open-circuited			7.5 kΩ
	Residual voltage	0.5 V			—
Signal reset	Min. signal reset width	20 ms	500 ms	20 ms	
	Input method	Non-voltage input: Contact/Open collector			ON: 4.5 to 30 V DC OFF: 0 to 2 V DC
	Input impedance	Maximum: 1 kΩ when short-circuited Minimum: 100 kΩ when open-circuited			7.5 kΩ
	Residual voltage	0.5 V			—
Manual reset minimum input width		20 ms	500 ms	20 ms	

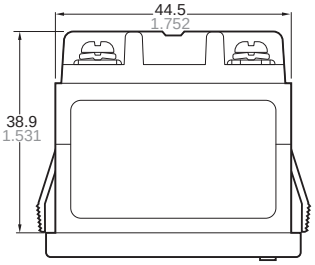
Characteristics

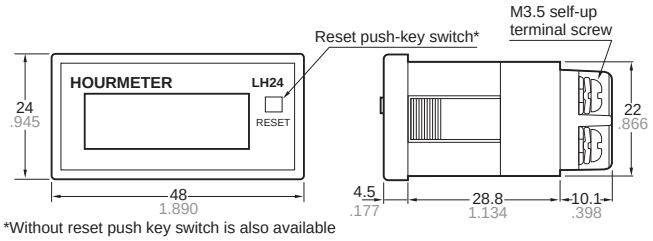
Type		Non-voltage input type		Voltage input type	
		LH24-F Flush mounting type	LC24-C PC board mounting type	AC/DC input type	DC input type
Rated operating voltage		Built-in battery	3 V DC (manganese dioxide lithium battery)	Built-in battery	
Battery life		10 years	—	6 years	10 years
Shock resistance	Functional	10 G (4 times on 3 axes)			
	Destructive	30 G (5 times on 3 axes)			
Vibration resistance	Functional	10 to 55 Hz: 1 cycle/min double amplitude of 0.3 mm (10 minutes on 3 axes)			
	Destructive	10 to 55 Hz: 1 cycle/min double amplitude of 0.75 mm (1 hour on 3 axes)			
Ambient temperature		-10 to +55°C (+14 to 131°F)			
Storage temperature		-25 to +65°C (+13 to 149°F)			
Ambient humidity		35 to 85% RH			
Counting direction		Addition (UP)			

DIMENSIONS

mm (inch)

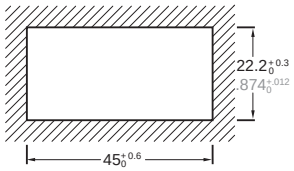
LH24-F, flush mounting type (Common for non-voltage input type and voltage input type)





*Without reset push key switch is also available

Panel cutout dimensions

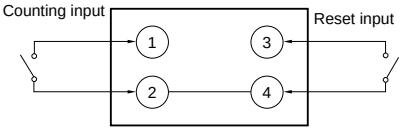


Panel thickness: 1-4.5 mm

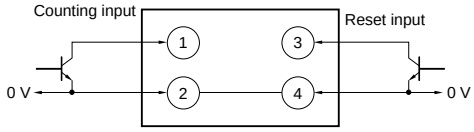
WIRING DIAGRAM

1) Non-voltage input type

Contact input



Open collector input

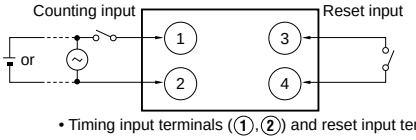


Note: ②–④ are connected internally.

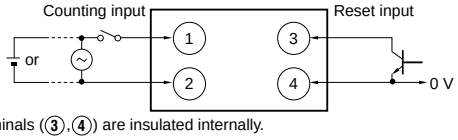
2) Voltage input type

• AC/DC voltage input

(1) Reset terminal (contact input)



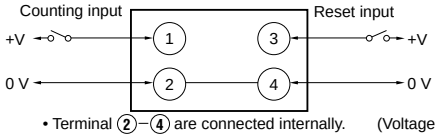
(2) Reset terminal (open collector input)



• Timing input terminals (①, ②) and reset input terminals (③, ④) are insulated internally.

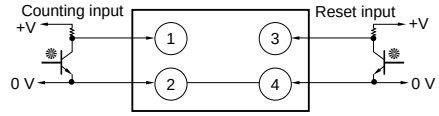
• DC voltage input

(1) Contact input



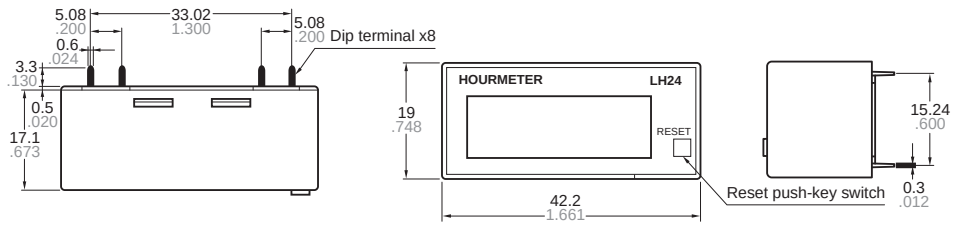
• Terminal ②–④ are connected internally.

(2) Open collector input

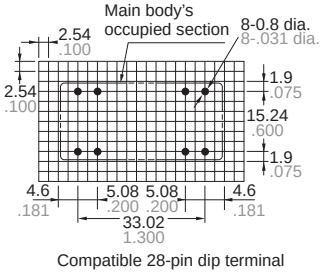


(Voltage signal is recognized when the transistor ❋ is switched to OFF.)

LH24-C, PC board mounting type



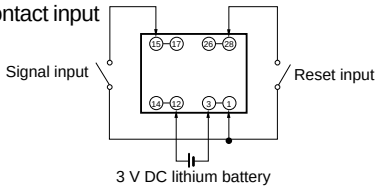
PC board pattern (Bottom view)



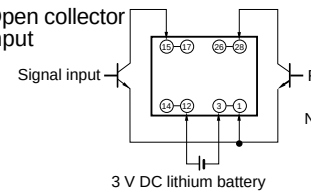
Compatible 28-pin dip terminal

WIRING DIAGRAM

Contact input

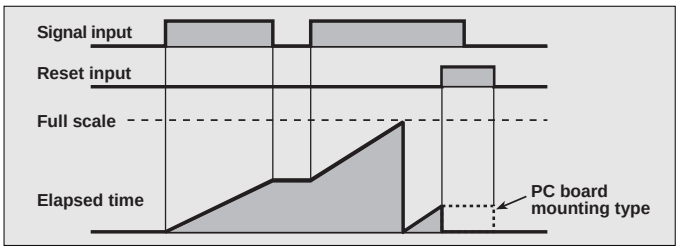


Open collector input



Note: ①–③, ⑫–⑭ ⑮–⑰, and ㉖–㉘ are connected internally.

OPERATION EXPLANATION



1) Time is counted while the signal input is ON. The decimal point on the front panel LCD flashes during counting operation.
2) When the elapsed (measuring) time is fullscale, the display returns to "0" and measurement starts from "0" again.
3) While the reset input is ON, the signal time is not counted and the display is "0". In the case of the PC board mounting type, while the reset input is ON, the display does not change. However, when the reset input becomes OFF, the display will change to "0".

CAUTIONS

<Non-voltage input type>

1. Since the current from the signal input and reset input terminals [❶-❸ (flush mounting type), ⓯-㉘ (PC board mounting type)] is small, use relays and switches which have high-reliability contact performance.
2. When input signals are triggered through the transistor's open collector, use a small signal transistor with an I_{CBO} less than 1 µA, being sure to trigger them with no voltage across the collector.
3. When connecting the signal input and reset input wires, do not run them parallel to high-voltage or power cables and avoid using the same conduit. Use shielded wires or metallic conduits which are as short as possible. If the floating capacitance of the wires exceeds 500 pF (approx. 10 m for parallel wires of 2 mm^2), it will cause malfunctions.
4. Lithium batteries are built in the flush mounting types. Never throw them into a fire. Do not dispose of them in trash intended to be incinerated.

•PC board mounting type—

1. After connecting the external power, be sure to reset it to make sure that "0" appears on the display.
2. Battery life is calculated as follows:

$$t = \frac{A}{I}$$

t: Battery life (h)
I: Consumption current (mA)
A: Battery capacity when the operating voltage becomes minimum.

3. Hand soldering:

Soldering iron	30 W to 60 W
Iron tip temperature	Approx. 300°C (572°F)
Soldering time	Less than approx. 3 seconds

<Voltage input type>

• AC/DC Voltage input type

1. Apply voltage to the signal input terminal. Do not apply voltage to the reset input terminal. When voltage exceeding the range of the rated input voltage is applied to the signal input terminal, or if voltage is applied to the reset terminal, it may cause break-down of internal elements.
2. Since the current from the reset input terminal is small, use relays and switches which have high-reliability contact performance.
3. When reset is triggered through the transistor's open collector, use a small signal transistor with an I_{CBO} less than 1 µA, being sure to trigger it with no voltage across the collector.
4. For external reset, make a temporary short-circuit between the rear reset terminals [❸-❹].

• DC voltage input type

1. When more than 30 V DC is applied to the signal or reset input terminals, it may cause breakdown of internal elements.
2. For external reset, voltage is applied between the rear reset terminals [❸-❹] to the H level (4.5 to 30 V DC). In this case, connect (–) to terminal ❹ and (+) to terminal ❸]. Since they are polarized, they will not operate with reverse polarity.

• Common

1. When connecting the signal input wires [❶-❷] and reset input wires [❸-❹], do not run them in parallel with high-voltage or power cables. Avoid running signal or reset wires in a power conduit. Use shielded wires or metal conduits which are as short as possible. If the floating capacitance of these wires exceeds 500 pF (approximately 10 m for parallel wires of 2 mm^2), it will cause malfunctions.
2. Lithium batteries are built in. Never throw them into a fire. Do not dispose of them in trash intended to be incinerated.

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>>Panasonic(松下)