

Panasonic
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**PRESET
HOUR METER**

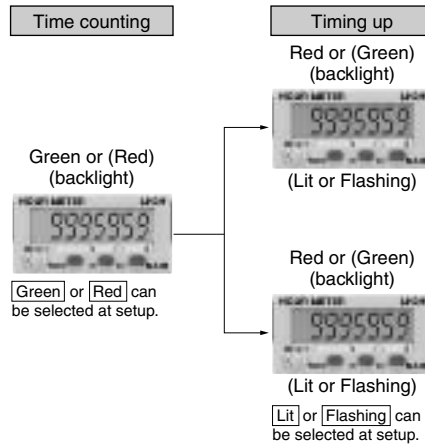
**LH2H
Hour Meter**



FEATURES

1. Preset function equipped in half size (24 × 48 mm 0.945 × 1.890 inch).

2. Display has backlight for instant recognition.



3. 8.7 mm 0.343 inch Character Height (previously 7 mm 0.276 inch)

Easy-to read character height increased from 7 mm to 8.7 mm 0.276 inch to 0.343 inch.



4. Plenty of Digits



5. Select by switch between two time ranges in a single meter.

0 to 999999.9h/0 to 3999d23.9h
Selectable

0 to 999h59m59s/0 to 9999h59.9m
Selectable

6. Conforms to IP66 Protective Construction (Front panel surface)
Weatherproofing supported by using optional mounting bracket and rubber gasket

7. Includes reassuring lock mode and lock switch to prevent erroneous operation.

8. Screw terminals are constructed to protect fingers to ensure safety.

9. Complies with CE marking.

PRODUCT TYPES

No. digits	Measurement time range	Operation mode	Output	Operating voltage	Part No.
7 digits	0 to 999999.9h/ 0 to 3999d23.9h selectable	G (Totalizing ON delay) B (Signal ON delay) F (Signal flicker) E (Pulse ON delay)	Transistor (1a)	24 V DC	LH2HP-FEW-DHK-B-DC24V
	0 to 999h59m59s/ 0 to 9999h59.9m selectable				LH2HP-FEW-HMK-B-DC24V
Options		Mounting frame	Use for waterproofing (front panel surface)		ATH3803
		Rubber gasket			ATH3804

Note: Mounting frame and rubber gasket are not included.

SPECIFICATIONS

Item		Descriptions
Rating	Rated operating voltage	24 V DC
	Rated power consumption	Max. 1.5 W
	Rated control output	100 mA 30 V DC
	Time counting direction	Addition or Subtraction (selectable by front switch)
	Measurement time range	0 to 999999.9h/0 to 3999d23.9h (selectable by slide switch on side) 0 to 999h59m59s/0 to 9999h59.9m (selectable by slide switch on side)
	Start input	Min. input signal width: Min. 30 ms
	Reset input	Min. input signal width: Min. 30 ms
	Input signal	<ul style="list-style-type: none"> • Non-voltage input using contacts or open-collector connection • Input impedance; when shorted: Max. 1 kΩ, when open: Min. 100 kΩ • Residual voltage: Max. 2 V
	Operation mode	Totalizing ON delay, Signal ON delay, Signal flicker, Pulse ON delay (selectable by front switch)
	Display method	7-segment LCD (Switch between red and green for backlight, and between lit and flashing for time up.)
Power failure emory		EEP-ROM (Overwriting times: 1.0×10^5 operations or more)
Time accuracy	Operating time fluctuation	$\pm 0.01\% \pm 50$ ms in case of power on start $\pm 0.01\% \pm 30$ ms in case of input signal start Rated operating voltage: 85 to 110% Ambient temperature: -10 to +55°C +14 to +131°F
	Voltage error	
	Temperature error	
	Setting error	
Contact arrangement		1 Form A (Open collector)
Electrical life (contact)		1.0×10^7 operations (at rated control voltage)
Electrical	Allowable operating voltage range	85 to 110% of rated operating voltage
	Break down voltage (Initial value)	Between input and output: 1,500 V AC, for 1 min.
	Insulation resistance (Initial value)	Between input and output: 100 MΩ (at 500 V DC)
Mechanical	Functional vibration resistance	10 to 55 Hz (1 cycle/min), Single amplitude: 0.15 mm 0.006 inch (10 min. on 3 axes)
	Destructive vibration resistance	10 to 55 Hz (1 cycle/min), Single amplitude: 0.375 mm 0.015 inch (1 hr. on 3 axes)
	Functional shock resistance	Min. 98 m/s ² (4 times on 3 axes)
	Destructive shock resistance	Min. 294 m/s ² (5 times on 3 axes)
Operating conditions	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 (non-condensing)
Protective construction		IP66 (front panel with mounting bracket and rubber gasket)

PART NAMES

1. Front reset key

This key resets the elapsed value. It does not work when the lock switch is ON.

2. Mode key

Use to set preset values or to switch between each mode.

3. Setting key

Used to set digits of preset values or set each mode.

4. Set key

Use to set preset values or to switch between modes.

5. Time unit seal

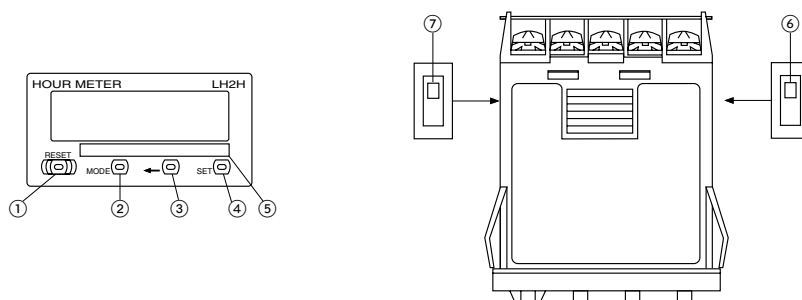
Unit seals are included in the package. Affix them in accordance with the time range.

6. Lock switch

Disable the operation of the front panel reset key and the mode key. With the lock switch on, is displayed for about two seconds when the reset key or mode switch is operated.

7. Time range switch

Switch the time range.



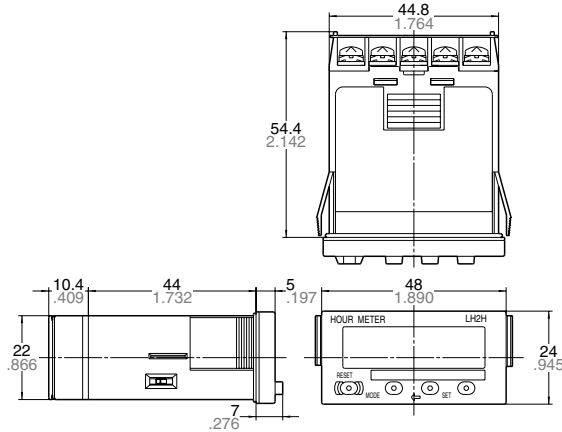
*: Default setting when shipped.

	LH2HP-FEW-DHK-B-DC24V	LH2HP-FEW-HMK-B-DC24V
⑥ Lock switch (unit display 1)	(Terminal block side) ↑ (LCD side)	OFF* ↑ ON
⑦ Time range switch (unit display 2)	(Terminal block side) 0 to 999999.9h* ↑ (LCD side) 0 to 3999d23.9h	(Terminal block side) 0 to 9999h59.9m* ↑ (LCD side) 0 to 999h59m59s

Notes: 1. Make the switch setting before installing to panel.
2. Please turn the power off if you change the setting of the time range switch when the power is on. The setting will become valid when the power is turned back on.

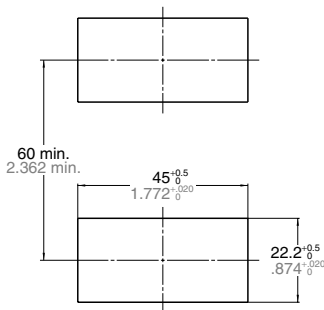
Dimensions

• External dimensions

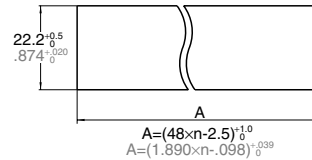


• Panel cut out dimensions

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



• For connected installation (sealed installation) (Only installation frame type)



Notes: 1. Suitable installation panel thickness is 1 to 4.5 mm 0.39 to 0.177 inch.
2. Waterproofing will be lost when installing repeatedly (sealed installation).

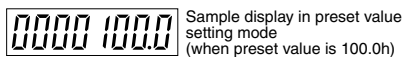
How to set

1. Preset value setting mode

This is the mode for setting preset values.



1) Pressing the MODE key takes you to the preset value setting mode.



Sample display in preset value setting mode (when preset value is 100.0h)

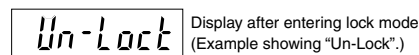
- Pressing the setting key moves the flashing digit left by one. Following the highest digit it returns to the lowest digit and each time the digit setting key is pressed it moves one to the left.
- Pressing the set key increases the value by one. (After 9 it returns to 0 and then changes to 1, 2, 3, etc.)
- Pressing the front panel reset key sets the displayed preset value and returns you to the regular operation mode.
- In the preset value setting mode if you do not operate the digit setting key or the set key for ten seconds or more you will be returned to regular operation. In this case the preset value will not change.

2. Lock mode

This mode prohibits everything except the preset value setting mode.

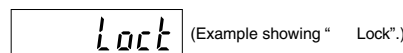


- Pressing the set key while holding down the mode key takes you to the lock mode.
- The display reads "Un-Lock" after entering the lock mode (initial setting).



Display after entering lock mode (Example showing "Un-Lock".)

- Pressing the setting key changes the display between "Lock" and "Un-lock".



(Example showing "Lock".)

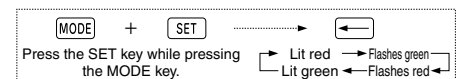
- Pressing the front panel reset key sets the content displayed and returns you to regular operation mode.

Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

- When the lock mode display reads "Lock", you will not be able to move to the backlight setting mode, the time counting direction setting mode, or the operation setting mode.

3. Backlight setting mode

This is the mode for setting the backlight during time up.



- Pressing the SET key two times while holding down the MODE key takes you to the backlight setting mode.
- The display in the backlight setting mode reads "LED"



Display after entering the backlight setting mode.

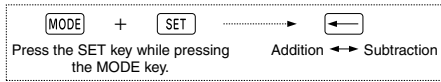
- The LED backlight will be red (initial setting).
- The backlight changes from flashing green to flashing red to lit green and to lit red with each press of the setting key.
- Pressing the front panel reset key sets the current backlight color and returns you to regular operation mode.

Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

LH2H

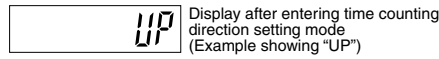
4. Time counting direction setting mode

This is the mode for setting addition or subtraction.

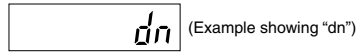


1) Pressing the SET key three times while holding down the MODE key takes you to the time counting direction setting mode.

2) The display after entering the time counting direction setting mode reads "UP" (initial setting).



3) Pressing the setting key changes the display to "dn" (subtraction) and pressing it again changes it to "UP" (addition). The display alternates between "dn" and "UP".

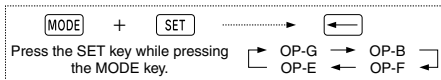


4) Pressing the front panel reset key sets the content displayed and returns you to regular operation mode.

Note: You will not be returned to regular operation mode if you do not press the front panel reset key.

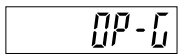
5. Operation mode

This sets the operation mode.

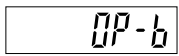


1) Pressing the SET key four times while holding down the MODE key takes you to the operation setting mode.

2) The display reads "OP-G" (Totalizing ON delay) after entering the operation setting mode.



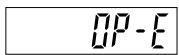
3) Pressing the setting key causes the display to change as follows: OP-B (Signal ON delay)



OP-F (Signal flicker)



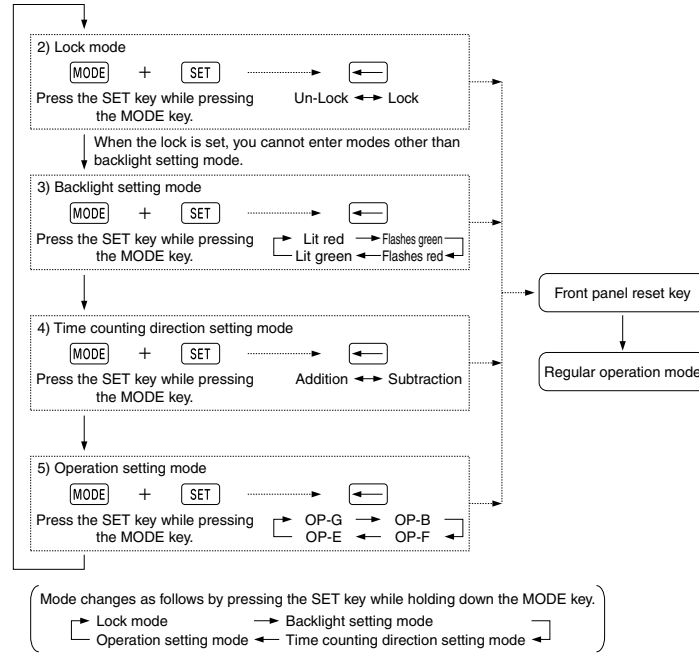
OP-E (Pulse ON delay)



OP-G (Totalizing ON delay)

4) Pressing the front panel reset key sets the display content and returns you to regular operation mode.

Note: You will not be returned to regular operation mode if you do not press the front panel reset key.



Please be aware that after doing a front panel reset key and returning to regular operation mode, the preset values, elapsed value and output will be as shown in this table.

	Preset value	Elapsed value	Output change
Lock mode	×	×	×
Backlight setting mode	×	×	×
Time counting direction setting mode	×	Addition: "0" Subtraction: "Preset value"	ON→OFF
Operation setting mode	×	Addition: "0" Subtraction: "Preset value"	ON→OFF

Note: "x" sign: No change

Changing the set time (preset value)

1. It is possible to change the set time even during time delay with the timer. However, be aware of the following points.

1) If the set time is changed to less than the elapsed time (elapsed value) with the time delay set to the addition direction, time delay will continue until the elapsed time reaches full scale, returns to "0 (zero)", and then reaches the new set time.

If the set time is changed to a time above the elapsed time, the time delay will continue until the elapsed time reaches the new set time.

2) If the time delay is set to the subtraction direction, time delay will continue until "0 (zero)" regardless of the new set time.
2. If the set time is changed to "0 (zero)", the hour meter will operate differently depending on the operation mode.

In the G (Totalizing ON delay), B (Signal ON delay), and E (Pulse ON delay) modes, the output turns ON when the start input is ON. However, the output will be OFF while reset is being input. In the F (Signal flicker) mode, the flicker operation will not work even if start input is turned ON.

Operation mode

Operation mode	Explanation	Time chart
Totalizing ON delay (G)	<ul style="list-style-type: none"> Elapsed value does not clear at power ON. (Power outage countermeasure function) The output remains ON even after the power is OFF and restarted. 	
Signal ON delay (B)	<ul style="list-style-type: none"> Clears elapsed value at power ON. Time delay starts at start ON and output resets at start OFF. Time delay starts at reset OFF and power ON while start is ON. 	
Signal Flicker (F)	<ul style="list-style-type: none"> Clears elapsed value at power ON. Time delay starts at start ON. After timer completion, control output reverses, elapsed value clears, and time delay starts. Ignores start input during time delay. 	
Pulse ON delay (E)	<ul style="list-style-type: none"> Clears elapsed value at power ON. Time delay starts at start ON. After timer completion, control output is ON. Ignores start input during time delay. 	

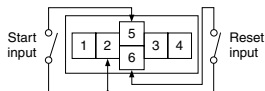
Cautions for use

1. Input and output connection

1) Input connection

(1) Contact input

Use highly reliable metal plated contacts. Since the contact's bounce time leads directly to error in the timer operating time, use contacts with as short a bounce time as possible.



(2) Non-contact input (Transistor input)

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

$$V_{CE0} = \text{Min. } 20 \text{ V}$$

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

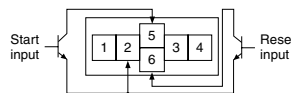
$$I_{CBO} = \text{Max. } 6 \mu\text{A}$$

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 start 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 .



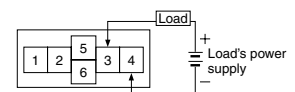
(3) Input wiring

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

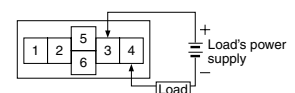
2) Output connection

Since the transistor output of hour meter 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



2. 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 hour meter	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.

3. Power failure memory

The EEPROM is overwriting with the following timing.

Operation mode	Overwrite timing
G (Totalizing ON delay) mode	Change of preset value or when power is OFF after start and reset input turns ON
Other modes	When power is OFF after changing preset value

4. Terminal connection

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

2) After turning the hour meter 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.)

3) Have the power supply voltage pass through a switch or relay so that it is applied at one time.

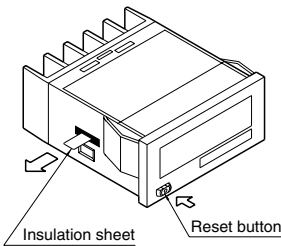
PRECAUTIONS IN USING THE LH2H SERIES

CAUTIONS FOR USE

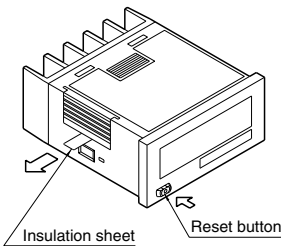
1. Insulation sheet

Before using a panel mounting type, please pull and remove the insulation sheet 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.

• LH2H hour meter (one-touch installation type)



• LH2H hour meter (installation frame type)



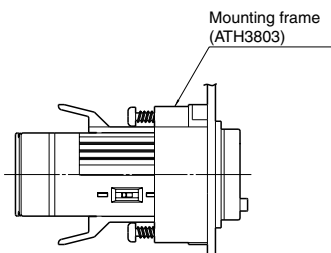
2. Waterproof construction

• LH2H hour meter (installation frame type)

The operation part of the panel installation type (installation frame type) is constructed to prevent water from entering the unit and a rubber gasket is provided to prevent water from entering the gap between the unit and the panel cutout.

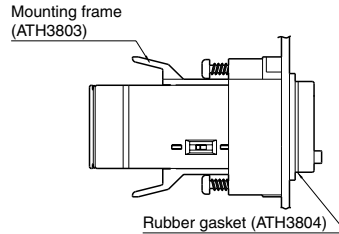
There must be sufficient pressure applied to the rubber gasket to prevent water from entering.

Be sure to use the mounting screws when installing the mounting frame (ATH3803). Note: The one-touch installation type is not waterproof.



• LH2H preset hour meter

1) When using the waterproof type (IP66: panel front only), install the hour meter to the front plate with mounting frame ATH3803 (sold separately) and rubber gasket ATH3804 (sold separately). Be sure to tighten using mounting screws.



When installing the mounting frame and rubber gasket please remove the pre-attached o-ring.

2) Panel installation order

- (1) Remove o-ring.
- (2) Place rubber gasket.
- (3) Insert hour meter into panel.
- (4) Insert mounting frame from the rear.
- (5) Secure with mounting screws (two locations)

3. Do not use in the following environments

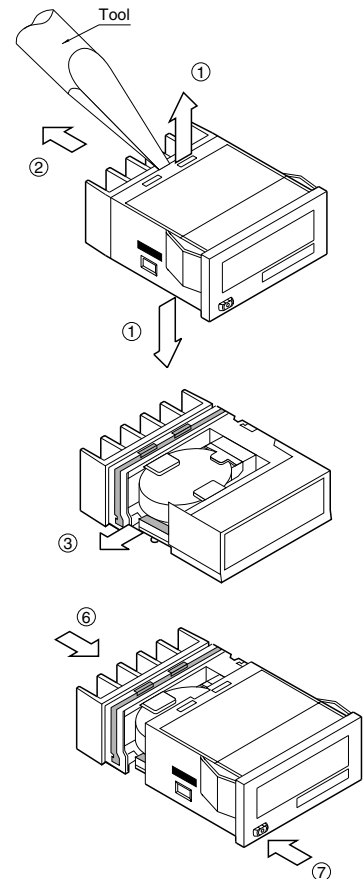
- 1) In places where the temperature changes drastically.
- 2) In places where humidity is high and there is the possibility of dew. (When dew forms the display may vanish and other display errors may occur.)

4. Conditions of use

- 1) Do not use on places where there is flammable or corrosive gas, lots of dust, presence of oil, or where the unit might be subject to strong vibrations or shocks.
- 2) Since the cover is made of polycarbonate resin, do not use in places where the unit might come into contact with or be exposed to environments that contain organic solvents such as methyl alcohol, benzene and thinner, or strong alkali substances such as ammonia and caustic soda.

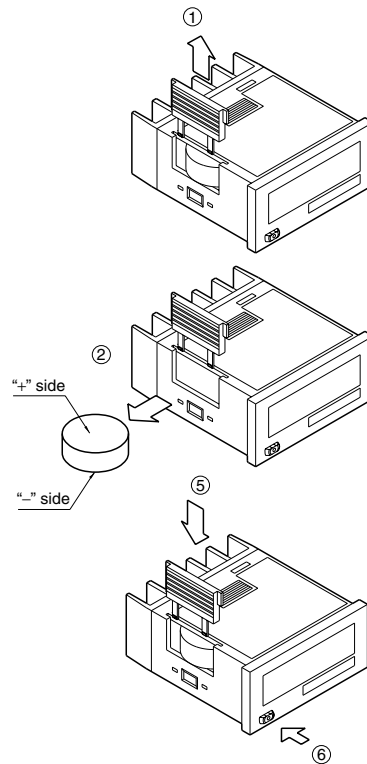
5. Cautions regarding battery replacement

- 1) Remove wiring before replacing the battery. You may be electrocuted if you come into contact to a part where high voltage is applied.
- 2) Make sure you are not carrying a static electric charge when replacing the battery.
- 3) Battery replacement procedure
For LH2H hour meter (one-touch installation type)
 - (1) Remove the up/down hook of the case using a tool.
 - (2) Pull the unit away from the case.
 - (3) Remove the battery from the side of the unit. Do not touch the display or other parts.
 - (4) Before inserting wipe clean the surface of the new battery.
 - (5) Insert the new battery with the "+" and "-" sides in the proper position.
 - (6) After replacing the battery, return the unit to the case. Verify that the hook of the case has properly engaged.
 - (7) Before using, press the reset button on the front.



For LH2H hour meter
(installation frame type)

- (1) Remove the battery cover from the case.
- (2) Remove the battery from the side of the case. The battery will come loose if you put the battery side face down and lightly shake the unit.
- (3) Before inserting wipe clean the surface of the new battery.
- (4) Insert the new battery with the “+” and “-” sides in the proper position.
- (5) After replacing the battery, return the battery cover to the case. Verify that the hook of the battery cover is properly engaged.
- (6) Before using press the reset button on the front.



Options

1. Accessories (for LH2H hour meter)

Panel cover (black)



Part No.: ATH3801

You can change the design of the front panel by replacing it with this black panel cover. The counter comes with an ash gray panel cover as standard.

Note: No panel cover option (black) is available for the LH2H preset hour meter.

2. Lithium battery (3 V)



Part No.: ATH3802

Packaged with the LH2H (excluding the PC board mounting type).

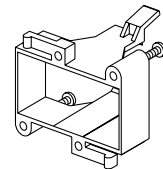
Warning

- Make sure the “+” and “-” polarities are positioned correctly.
- Do not throw the old battery into a fire, short circuit it, take it apart, or allow it to come into contact with heat.
- The battery is not rechargeable.

3. Installation parts

Mounting frame

Suitable for installation frame type LH2H hour meter and LH2H preset hour meter



Part No.: ATH3803

Packaged with the mounting bracket type LH2H hour meter

Rubber gasket

Suitable for installation frame type LH2H hour meter and LH2H preset hour meter



Part No.: ATH3804

Packaged with the mounting bracket type LH2H hour meter