

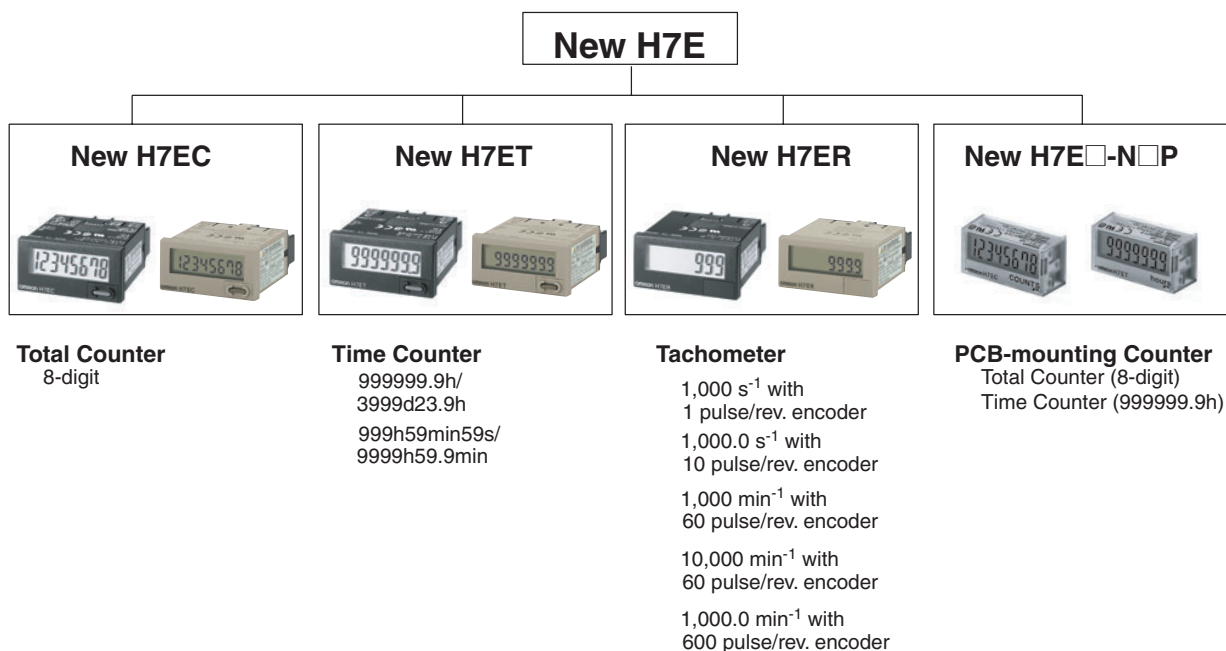
# Self-powered Totalizer New H7E

CSM\_H7E\_-N\_DS\_E\_7\_1

## Compact Economical Totalizer with High Visibility Available with Backlit LCD Display

- Large display with 8.6-mm character height.
- Includes new models with backlight for improved visibility in dimly lit places. (Requires 24-VDC power supply.)
- Black and light-gray cases now available.
- PNP/NPN universal DC voltage input types now available.
- Battery is replaceable for Totalizer reuse and conservation of the environment.
- Key-protect switch to prevent faulty reset key operation.
- Dual operation mode.
- Front face compatible with NEMA4/IP66.
- Short body, all models have a depth of 48.5 mm.
- Finger protection terminal block conforms to VDE0106, Part100.
- Conforms to UL, CSA, and CE marking.  
Conforms to EN61010-1 (pollution degree 2/overvoltage category III.)
- Conforms to EMC standards and EN61326, thus allowing use in residential, commercial and light- and heavy-industry environments.
- Six-language instruction manual provided.
- PCB-mounting models available. (Requires 3-V power supply.)

## ■ Broad Line-up of the New H7E Series



## Contents

### Self-powered Totalizers

H7EC .....	2
H7ET .....	9
H7ER .....	16
H7E□-N□P .....	22

### Common to All Totalizers

Accessories .....	27
Precautions .....	29

# Self-powered Time Counter

## New H7ET

- Seven digits, time range 0 to 3999d23.9h.
- Dual time range: 999999.9  $\longleftrightarrow$  3999d23.9h or 999h59m59s  $\longleftrightarrow$  9999h59.9m



## Model Number Structure

### Model Number Legend

**Note:** Some configurations are not available.

H7ET - N     -    

1    2        3    4

#### 1. Count Input

None: No-voltage input  
V: PNP/NPN universal DC voltage input  
FV: AC/DC multi-voltage input

#### 2. Time Range

None: 999999.9h/3999d23.9h  
1: 999h59m59s/9999h59.9m

#### 3. Case Color

None: Light gray  
B: Black

#### 4. Display

None: 7-segment LCD without backlight  
H: 7-segment LCD with backlight

## Ordering Information

### Time Counters

Timer input	Display	Time range			
		999999.9h $\longleftrightarrow$ 3999d23.9h (switchable)		999h59min59s $\longleftrightarrow$ 9999h59.9min (switchable)	
		Light-gray body	Black body	Light-gray body	Black body
PNP/NPN universal DC voltage input (4.5 to 30 VDC)	7-segment LCD with backlight	H7ET-NV-H	H7ET-NV-BH	H7ET-NV1-H	H7ET-NV1-BH
	7-segment LCD	H7ET-NV	H7ET-NV-B	H7ET-NV1	H7ET-NV1-B
AC/DC multi-voltage input (24 to 240 VAC/VDC)	7-segment LCD	H7ET-NFV	H7ET-NFV-B	H7ET-NFV1	H7ET-NFV1-B
No-voltage input	7-segment LCD	H7ET-N	H7ET-N-B	H7ET-N1	H7ET-N1-B

### Accessories (Order Separately)

Name	Model
Compact Flush Mounting Bracket	Y92F-35
Flush Mounting Bracket (See note 1)	Y92F-34
Wire-wrap Terminal (set of two terminals)	Y92S-37
Lithium Battery (See note 2)	Y92S-36
Waterproof Packing (See note 1)	Y92S-32

**Note:** 1. Provided with H7ET. (Order additional Brackets separately as required.)

2. Built into H7ET. Order replacements using the above model number before the service life expires.

# Specifications

## ■ General

Item	H7ET-NV-□ H7ET-NV-□H	H7ET-NFV-□	H7ET-N-□	H7ET-NV1-□ H7ET-NV1-□H	H7ET-NFV1-□	H7ET-N1-□
Operating mode	Accumulating					
Mounting method	Flush mounting					
External connections	Screw terminals					
Reset	External/Manual reset					
Display	7-segment LCD with or without backlight, zero suppression (character height: 8.6 mm) (see note 1)					
Number of digits	7					
Time range	0.0h to 999999.9h ↔ 0.0h to 3999d23.9h (switchable with switch)			0s to 999h59min59s ↔ 0.0min to 9999h59.9min (switchable with switch)		
Timer input	PNP/NPN universal DC voltage input	AC/DC multi-voltage input	No-voltage input	PNP/NPN universal DC voltage input	AC/DC multi-voltage input	No-voltage input
Case color	Light gray or black (-B models)					
Attachment	Waterproof packing, Y92F-34 Flush Mounting Bracket, time unit labels (see note 2)					
Approved standard	UL863, CSA C22.2 No.14, Lloyds Conforms to EN61010-1/IEC61010-1 (pollution degree2/overvoltage category III) Conforms to VDE0106/P100					

**Note: 1.** Only PNP/NPN universal DC voltage input models (-H models) have a backlight.

**2.** "-hours", "-d-h", "-h-m", and "-h-m-s" labels are included.

## ■ Ratings

Item	H7ET-NV□-□ H7ET-NV□-□H	H7ET-NFV□-□	H7ET-N□-□
Supply voltage	Backlight model: 24 VDC (0.3 W max.) (for backlight) No-backlight model: Not required (powered by built-in battery)	Not required (powered by built-in battery)	
Timer input	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input impedance: Approx. 4.7 kΩ)	High (logic) level: 24 to 240 VAC/VDC, 50/60 Hz Low (logic) level: 0 to 2.4 VAC/VDC, 50/60 Hz	No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.
Reset input		No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.	
Minimum pulse width	1 s		
Reset system	External reset and manual reset: Minimum signal width of 20 ms		
Terminal screw tightening torque	0.98 N·m max.		
Ambient temperature	Operating: -10°C to 55°C (with no condensation or icing) Storage: -25°C to 65°C (with no condensation or icing)		
Ambient humidity	Operating: 25% to 85%		

## ■ Characteristics

Item	H7ET-NV□-□ H7ET-NV□-H□	H7ET-NFV□-□	H7ET-N□-□
<b>Time accuracy</b>	±100 ppm (25°C)		
<b>Insulation resistance</b>	100 MΩ min. (at 500 VDC) between current-carrying metal parts and exposed non-current-carrying metal parts, and between the backlight power supply and timer input terminals/reset terminals for backlight models	100 MΩ min. (at 500 VDC) between current-carrying metal parts and exposed non-current-carrying metal parts and between timer input terminals and reset terminals	100 MΩ min. (at 500 VDC) between current-carrying metal parts and exposed non-current-carrying metal parts
<b>Dielectric strength</b>	1,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and exposed non-current-carrying metal parts and between the backlight power supply and timer input terminals/reset terminals for backlight models	3,700 VAC, 50/60 Hz for 1 min between timer input terminals and exposed non-current-carrying metal parts 2,200 VAC, 50/60 Hz for 1 min between reset terminals and exposed non-current-carrying metal parts and between timer input terminals and reset terminals	1,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and exposed non-current-carrying metal parts
<b>Impulse withstand voltage</b>	4.5 kV between current-carrying terminal and exposed non-current-carrying metal parts	4.5 kV between current-carrying terminal and exposed non-current-carrying metal parts 3 kV between timer input terminals and reset terminals	4.5 kV between current-carrying terminal and exposed non-current-carrying metal parts
<b>Noise immunity</b>	Square-wave noise generated by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise) ±600 V (Between timer input terminals/ Between reset terminals) ±480 V (Between the backlight power supply terminals for backlight models)		
		±1.5 kV (Between timer input terminals) ±500 V (Between reset terminals)	±500 V (Between timer input terminals/ Between reset terminals)
<b>Static immunity</b>	±8 kV (malfunction)		
<b>Vibration resistance</b>	Malfunction: 0.15-mm single amplitude at 10 to 55 Hz for 10 min each in 3 directions Destruction: 0.375-mm single amplitude at 10 to 55 Hz for 2 hrs each in 3 directions		
<b>Shock resistance</b>	Malfunction: 200 m/s² 3 times each in 6 directions Destruction: 300 m/s² 3 times each in 6 directions		
<b>EMC</b>	(EMI) Emission Enclosure: (EMS) Immunity ESD:  Immunity RF-interference from AM Radio Waves: Immunity RF-interference from Pulse-modulated Radio Waves: Immunity Conducted Disturbance: Immunity Burst:	EN61326 EN55011 Group 1 class B EN61326 EN61000-4-2: 4 kV contact discharge (level 2) 8 kV air discharge (level 3) EN61000-4-3: 10 V/m (80 MHz to 1 GHz) (level 3) EN61000-4-3: 10 V/m (900 MHz ± 5 MHz) (level 3) EN61000-4-6: 10 V (0.15 to 80 MHz) (level 3) EN61000-4-4: 2 kV power line (level 3) 2 kV I/O signal line (level 4)	
<b>Degree of protection</b>	Front panel: IP66, NEMA4 with waterproof packing Terminal block: IP20		
<b>Weight (see note)</b>	No-backlight model: Approx. 60 g Backlight model: Approx. 65 g	Approx. 60 g	Approx. 60 g

**Note:** Weight includes waterproof packing and flush mounting bracket.

### ■ Reference Value

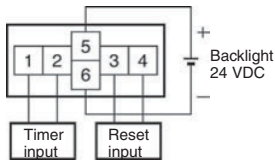
Item	Value	Note
Battery life	10 years min. with continuous input at 25°C (lithium battery)	The battery life is calculated according to the conditions in the left column and therefore is not a guaranteed value. Use these value as reference for maintenance or replacement.

# Connections

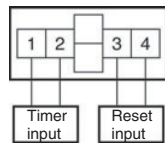
## Terminal Arrangement

Bottom view: View of the Time Counter rotated horizontally 180°

**Backlight Model**



**No-backlight Model**

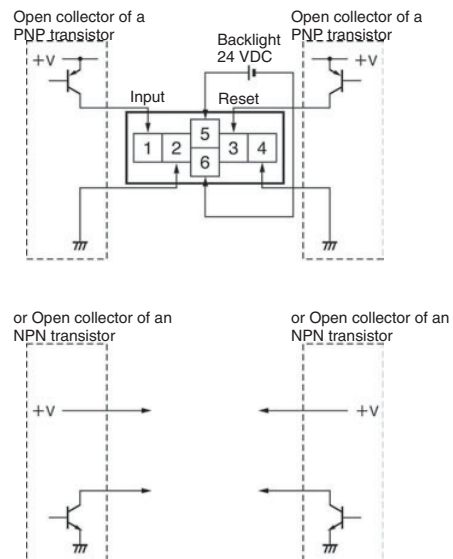
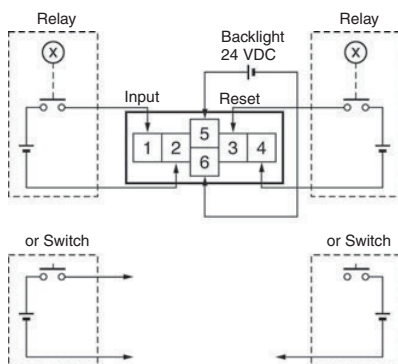


## Connections

### H7ET Time Counter

#### PNP/NPN Universal DC Voltage Input Model With Backlight

1. Contact Input (Input by a Relay or Switch Contact)
2. Solid-state Input

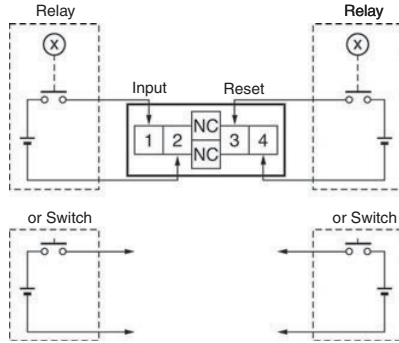


**Note:** 1. Terminals 2 and 4 (input circuit and reset circuit) are functionally isolated.

2. Select input transistors according to the following:  
Dielectric strength of the collector  $\geq 50$  V  
Leakage current  $< 1 \mu\text{A}$

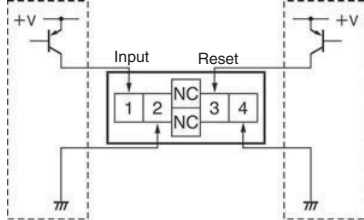
## PNP/NPN Universal DC Voltage Input Model Without Backlight

### 1. Contact Input (Input by a Relay or Switch Contact)



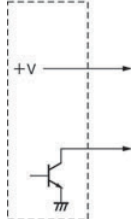
### 2. Solid-state Input

Open collector of a PNP transistor

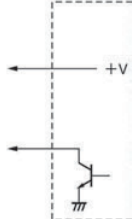


Open collector of a PNP transistor

or Open collector of an NPN transistor



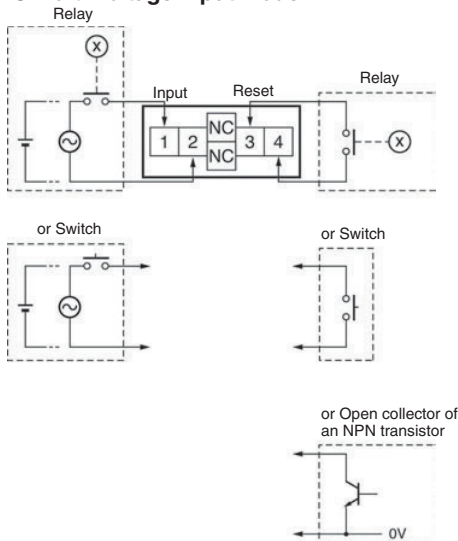
or Open collector of an NPN transistor



**Note:** 1. Terminals 2 and 4 (input circuit and reset circuit) are functionally isolated.

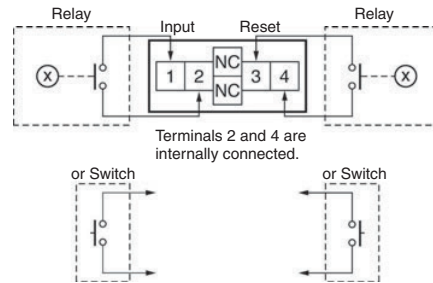
2. Select input transistors according to the following:  
Dielectric strength of the collector  $\geq 50$  V  
Leakage current  $< 1 \mu\text{A}$

## AC/DC Multi-voltage Input Model



## No-voltage Input Model

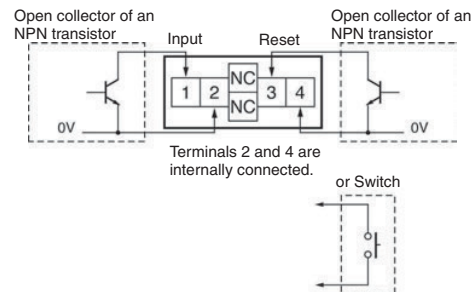
### 1. Contact Input (Input by a Relay or Switch Contact)



**Note:** Use Relays and Switches that have high contact reliability because the current flowing from terminals 1 or 3 is as small as approx.  $10 \mu\text{A}$ . It is recommended that OMRON's G3TA-1A/ID be used as the SSR.

### 2. Solid-state Input

(Open Collector Input of an NPN Transistor)



**Note:** 1. Residual voltage in the output section of Proximity Sensors or Photoelectric Sensors becomes less than 0.5 V because the current flowing from terminals 1 or 3 is as small as approx.  $10 \mu\text{A}$ , thus allowing easy connection.

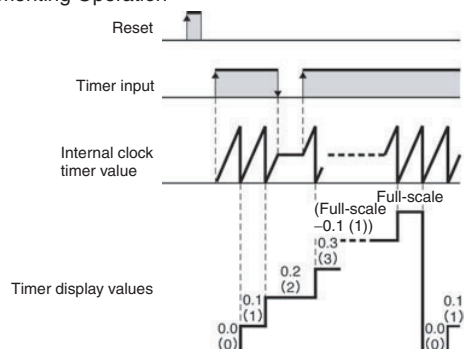
2. Select input transistors according to the following:  
Dielectric strength of the collector  $\geq 50$  V  
Leakage current  $< 1 \mu\text{A}$

# Operation

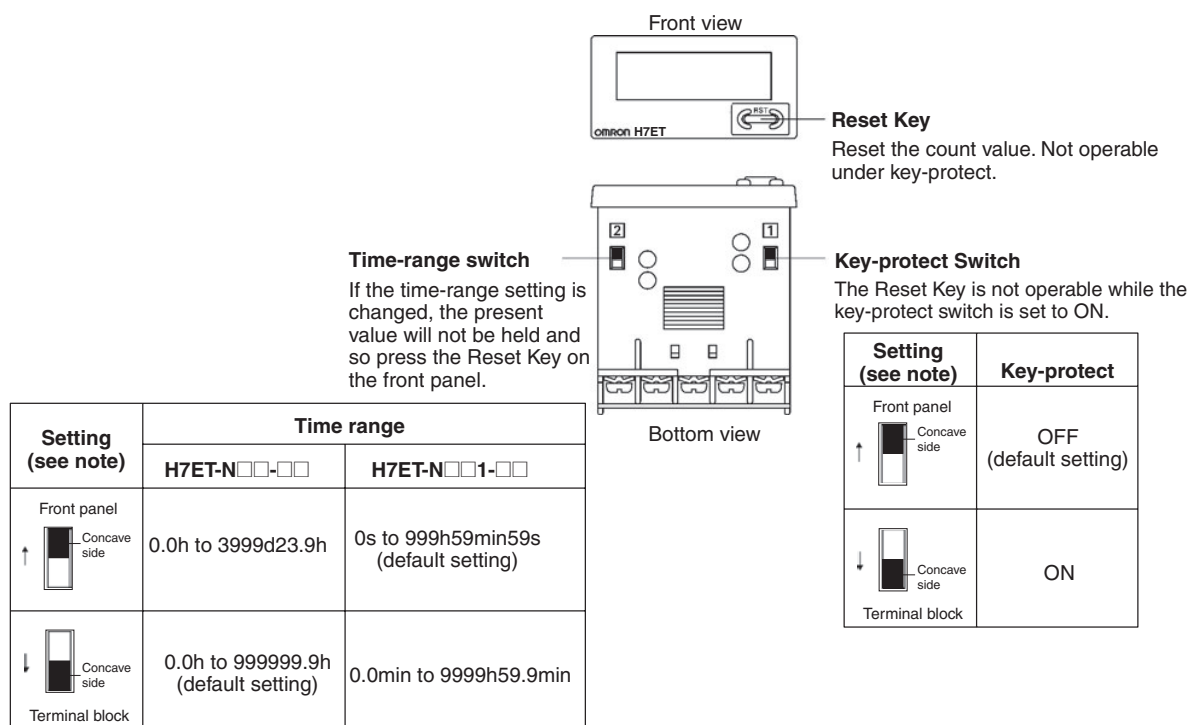
## ■ Operating Modes

### H7ET Time Counter

Incrementing Operation  
(Up)



## Nomenclature

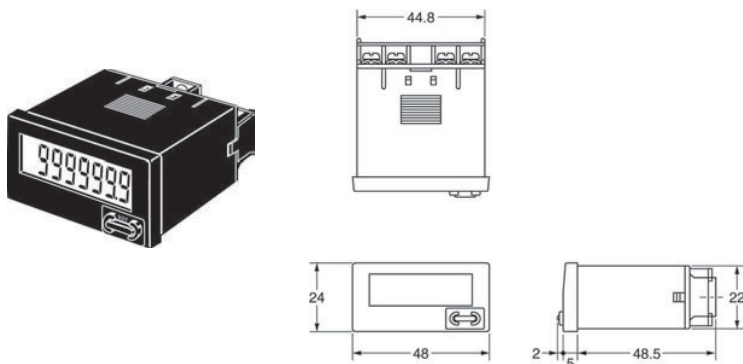


**Note:** Perform switch setting before mounting to a control panel.

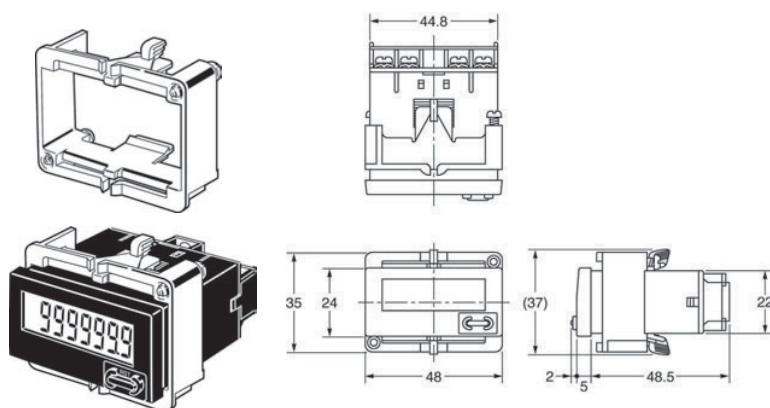
## Dimensions

**Note:** All units are in millimeters unless otherwise indicated.

### H7ET-N

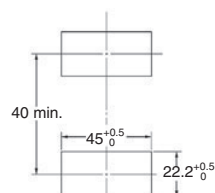


### Dimensions with Y92F-34 Flush Mounting Bracket

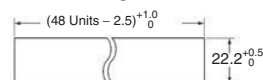


### Panel Cutout

Separate mounting



Dense mounting



Waterproofing is not possible for dense mounting

- When mounting, insert the Counter into the cutout, insert the adapter from the back and push in the Counter while making the gap between the front panel and the cutout panel as small as possible. Use screws to secure the Counter. If waterproofing is desired, insert the waterproof packing.
- When several Counters are installed, ensure that the ambient temperature will not exceed specifications.
- The appropriate thickness of the panel is 1 to 5 mm.

**Note:** A Compact Flush Mounting Bracket (Y92F-35) can also be used. Refer to *Accessories* for details.

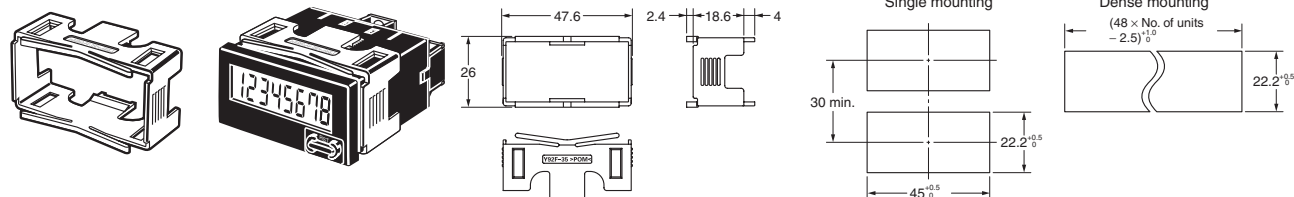


## Accessories (Order Separately) (Common)

### ■ New H7E (Except for PCB-mounting Counter)

The New H7E models are supplied with a mounting bracket (Y92F-34) and nut. Additionally, the Y92F-75/-76/-77B Flush Mounting Adapters shown here allow the New H7E models to be fitted to existing panel cutouts.

#### Y92F-35 Compact Flush Mounting Bracket

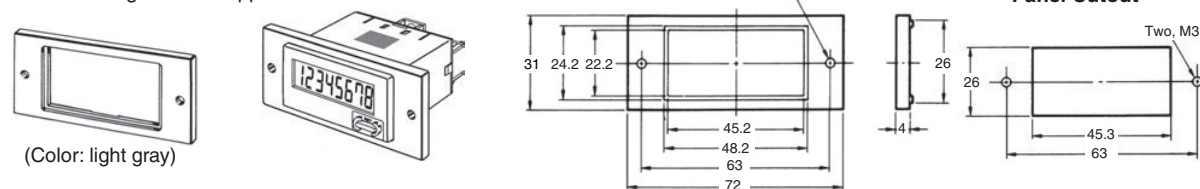


Degree of protection (front): IP40 (not waterproof)  
The DIP switch of the H7E□-N can be operated in mounted condition. Vibration resistance and shock resistant are the same level as the H7E□-N series.

- The minimum mounting interval is 30 mm.  
Note: An interval of 40 mm is recommended for easier wiring.
- Do not allow the ambient temperature of the H7E□-N to exceed the specifications (55°C).
- Mounting is possible onto panels with a thickness of 1 to 5 mm.

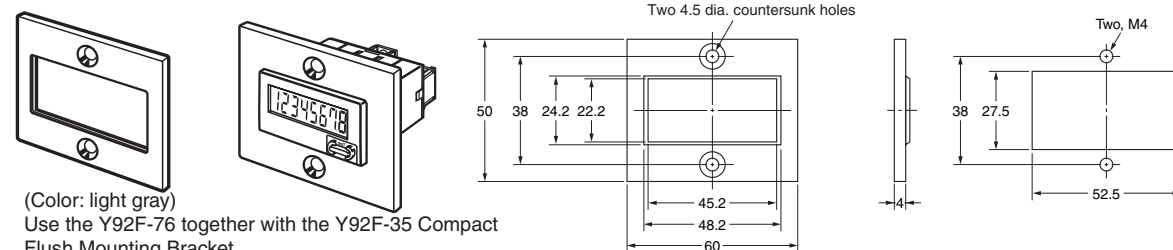
#### Y92F-75 Flush Mounting Adapter for 26 × 45.3 Rectangular Cutout

Use mounting bracket supplied with the Counter



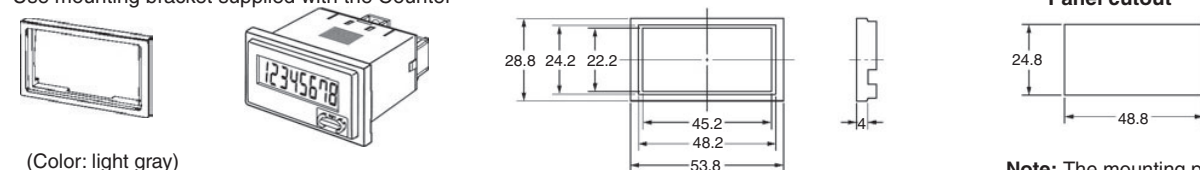
#### Y92F-76 Flush Mounting Adapter for 27.5 × 52.5 Rectangular Cutout

Use the Y92F-76 together with the Y92F-35 Compact Flush Mounting Bracket.  
Do not use the Flush Mounting Adapter supplied with the Counter.



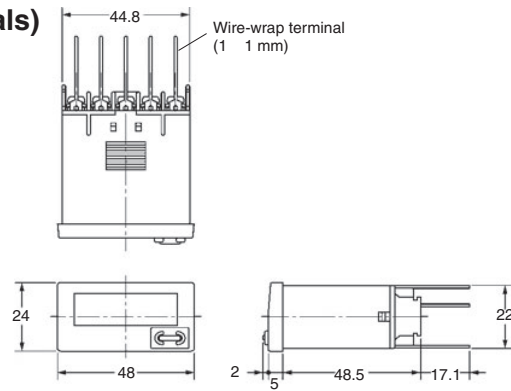
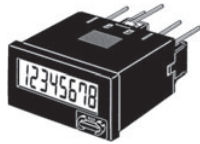
#### Y92F-77B Flush Mounting Adapter for 24.8 × 48.8 Rectangular Cutout

Use mounting bracket supplied with the Counter



**Note:** The mounting panel thickness should be between 1 and 5 mm.

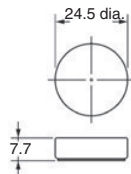
## Y92S-37 Wire-wrap Terminal (Set of Two Terminals)



When using the Wire-wrap Terminal, be sure to use the correct wires and peripheral devices. (The correct wires, bits and sleeves are shown in the table on the right.)

Wire	Bit	Sleeve	Wrapped state
AWG22	2-A	2-B	Normal
AWG24	1-A	1-B	Normal
AWG26	3-A	1-B	Normal

## Y92S-36 Lithium Battery (3 V)



## Precautions (Common)

Refer to *Safety Precautions for All Counters*.

### ■ New H7E (Except for PCB-mounting Counter)

#### ⚠ WARNING

This product has a built-in lithium battery. Do not short-circuit the + and – terminals, charge, disassemble, deform, or expose the battery to fire. The battery may explode (break), catch fire, or cause liquid leakage.

Do not use any battery other than the specified one (Y92S-36). Using another battery may cause liquid leakage or breakage, resulting in malfunction or injury.

#### ⚠ CAUTION

If a voltage other than the rated one is applied, internal elements may be damaged.

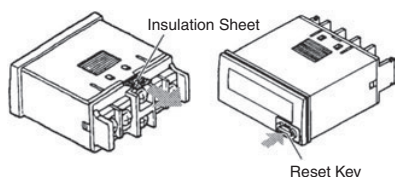
Do not use the Counter in the following places:

- Locations subject to direct sunlight.
- Locations subject to corrosive gases.
- Locations subject to dust.

### Before Use

- An insulation sheet has been inserted to maintain the quality of the Totalizer in the event of a long period without use. Be sure to remove this sheet before attempting to use the product.

Remove the insulation sheet and press the Reset Key on the front panel of the Counter. (With the H7ER-N, -NV(-H), -NV1(-H), models, "0" or "0.0" will be displayed after 1 s.)

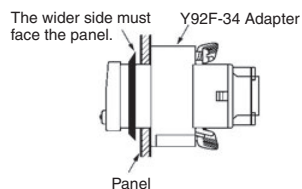


- Switch settings on the Counter must be performed before mounting it to a control panel.
- Do not use the Counter in the following locations:
  - Locations subject to severe changes in temperature.
  - Locations subject to condensation as the result of high humidity.

### Mounting Precautions for Flush Mounting

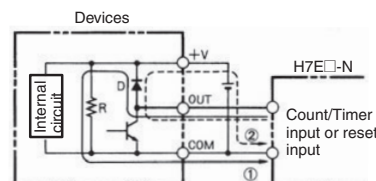
Although the operating section is watertight (conforming to NEMA4, IP66), rubber packing is provided to avoid water leakage through the gap between the Counter and panel cutout. Unless this rubber packing is tightly squeezed on, water may permeate inside the panel. Therefore, be sure to tighten the screws for fixing the Y92F-34 Flush Mounting Bracket. (Excessive tightening may also deform the rubber packing.)

#### Screw for the Flush Mounting Bracket



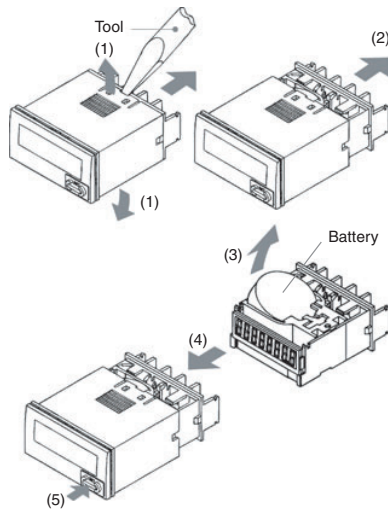
### Reset Input and Count/Timer Input

- The H7E operates using its built-in Battery. If the H7E is connected to a device that has +V and OUT terminals that are connected with a diode as shown in the circuit diagram, the circuit indicated by the arrow 1 or 2 will be formed when the device is turned OFF. As a result, the H7E may be reset or count by one. It is recommended that such devices not be connected to the H7E.



- If an excessive voltage is applied to the count/timer input or reset input terminals, the internal elements may be damaged. Ensure that the following voltages are not exceeded:
  - PNP/NPN universal voltage input model: 30 VDC
  - AC/DC voltage input model:
    - At count/timer input: 240 VAC (peak voltage: 338V)
    - 240 VDC
    - At reset input: No voltage can be applied. (No-voltage input)
  - No-voltage input model: No voltage can be applied.
- Avoid wiring close to high-tension or large-current lines.
- Do not remove the outer case when voltage is being applied to the power supply terminals or the input terminals.
- The input for the H7E□-NFV-□ is a high-impedance circuit and so influence from an induced voltage may result in malfunction. Therefore, when the input signal wiring is longer than 10 m (line capacitance of 120 pF/m, at room temperature), it is recommended that a CR filter or a bleeder resistor is connected.

7. Press the Reset Key before use (not necessary for H7ER-N,-NV,-NV1). (5)



## EN/IEC Standards

The count or timer input, reset input, and backlight power supply terminals of the no-voltage input or PNP/NPN universal DC voltage input models (H7E□-N,-N1, H7E□-NV(-H),-NV1(-H)) are not isolated.

A SELV power supply conforming to Appendix H of IEC61010-1 should be used for the count or timer input, reset input and backlight power supply terminals. A SELV power supply is a power supply for which the input and output have double or reinforced insulation, and for which the output voltage is 30 Vrms with 42.4 V peak or 60 VDC max. (Only the H7E□-NV□-H has a backlight.)

The terminals for count or timer input and reset input for AC/DC multi-voltage input models have basic insulation.

Connect the reset input terminals to a device that does not have exposed current-carrying parts and has basic insulation for 240 VAC.

## Others

If the indicator keeps flickering or is OFF, the internal battery may be close to the end of its service life. In such a case, it is suggested that the battery be replaced.

## Read and Understand This Catalog

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments.

## Warranty and Limitations of Liability

### WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

OMRON MAKES NO WARRANTY OR REPRESENTATION, EXPRESS OR IMPLIED, REGARDING NON-INFRINGEMENT, MERCHANTABILITY, OR FITNESS FOR PARTICULAR PURPOSE OF THE PRODUCTS. ANY BUYER OR USER ACKNOWLEDGES THAT THE BUYER OR USER ALONE HAS DETERMINED THAT THE PRODUCTS WILL SUITABLY MEET THE REQUIREMENTS OF THEIR INTENDED USE. OMRON DISCLAIMS ALL OTHER WARRANTIES, EXPRESS OR IMPLIED.

### LIMITATIONS OF LIABILITY

OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

## Application Considerations

### SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

### PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

## Disclaimers

### CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

### DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

### PERFORMANCE DATA

Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

### ERRORS AND OMISSIONS

The information in this document has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

2010.6

In the interest of product improvement, specifications are subject to change without notice.

**OMRON Corporation**  
Industrial Automation Company

<http://www.ia.omron.com/>

(c)Copyright OMRON Corporation 2010 All Right Reserved.