OMRON

Self-powered Counter

H7EC

Subminiature Totalizing Counter Requires No External Power Supply

- DIN-sized 48 × 24 mm
- Wire-wrap terminal and screw terminal types available.
- AC/DC voltage, DC voltage, and No-voltage input types available.
- Panel adapters for existing cutouts available; see Accessories section.
- Conforms to EMC standards.
- H7EC-FBV conforms to EN61010-1/IEC1010-1.
- Approved by UL.

Ordering Information

■ Totalizing Counters

Operating mode		Up type								
Display		LCD digital (character height: 6.7 mm)								
Reset		External (electrical) reset					External/Manual reset			
Number of digits		7					6			
Count input		AC/DC voltage input	DC voltage input		No-voltage input (contact/solid-state)		DC voltage input		No-voltage input (contact/solid-state)	
Max. counting speed (see note)		20 cps	1 kcps	30 cps	1 kcps	30 cps	1 kcps	30 cps	1 kcps	30 cps
Terminals	**Wire-wrap**	---	H7EC-V	H7EC-VL	H7EC	H7EC-L	H7EC-VM	H7EC-VLM	H7EC-M	H7EC-LM
	Screw	H7EC-FBV	H7EC-BV	H7EC-BVL	H7EC-B	H7EC-BL	H7EC-BVM	H7EC-BVLM	H7EC-BM	H7EC-BLM
Approved standards		UL								

Note: For details about matching the counting speed with the appropriate input device, see the Precautions section.

Specifications

■ Ratings

Supply voltage		Not required (powered by built-in battery)
Count input	**AC/DC voltage input**	High (logic) level: 24 to 240 VAC, 50/60 Hz, or 6 to 240 VDC Low (logic) level: 0 to 1.5 VAC, 50/60 Hz, or 0 to 2 VDC
	DC voltage input	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC
	No-voltage input	Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 500 kΩ min.
Max. counting speed (see note)		1 kcps: Minimum signal width 0.5 ms 30 cps: Minimum signal width 16.7 ms 20 cps: Minimum signal width 25 ms
Reset system		External reset and manual reset types (6-digit models): 20 ms External reset types (7-digit models): 20 ms

Note: ON/OFF ratio 1:1

■ Characteristics

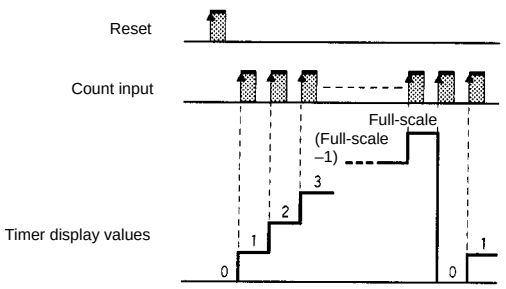
Insulation resistance	100 MΩ min. (at 500 VDC)
Dielectric strength	1,000 VAC, 50/60 Hz for 1 minute between current-carrying terminal and exposed non-current-carrying metal parts.
Impulse withstand voltage	4.5 kV between current-carrying terminal and exposed non-current-carrying metal parts.
Noise immunity	Square-wave between input terminals using a noise simulator: ± 500 V.
Vibration resistance	Mechanical: 10 to 55 Hz; 0.75 mm double amplitude Malfunction: 10 to 55 Hz; 0.3 mm double amplitude
Shock resistance	Mechanical: 294 m/s^2 (approx. 30 G) Malfunction: 98 m/s^2 (approx. 10 G)
Ambient temperature	Operating: –10°C to 55°C Storage: –25°C to 65°C
Ambient humidity	Operating: 35% to 85%
EMC	Emission Enclosure: EN55011 Group 1 class A Emission AC Mains: EN55011 Group 1 class A Immunity ESD: EN61000-4-2: 4 kV contact discharge 8 kV air discharge Immunity RF-interference: ENV50140: 10 V/m (10 k to 1 GHz) Immunity Conducted Disturbance: ENV50141: 10 V (0.15 to 80 MHz) Immunity Burst: EN61000-4-4: 2 kV power-line 2 kV I/O signal-line
Battery life	30 cps type: 7 years min. with continuous input 20 cps, 1 kcps type: 6 years min. with continuous input
Case color	Light gray (Munsell 5Y7/1)
Weight	AC/DC voltage input type: approx. 90 g (including mounting bracket) DC voltage & No-voltage input type: approx. 60 g (including mounting bracket)

Operation

■ Operating Modes

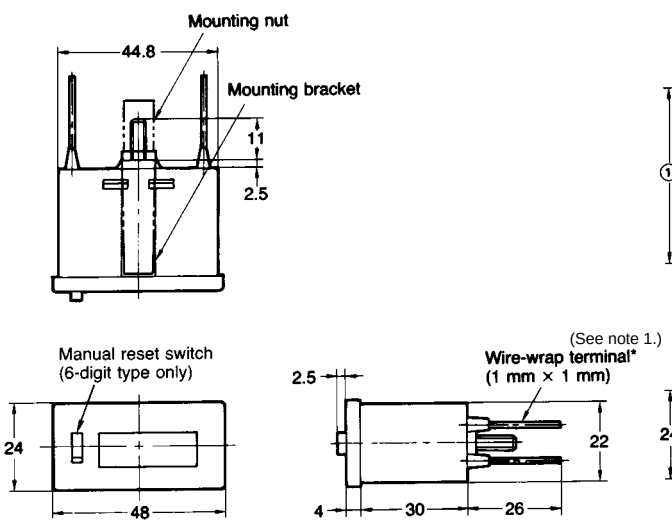
H7EC Totalizing Counter

Incrementing Operation (Up)

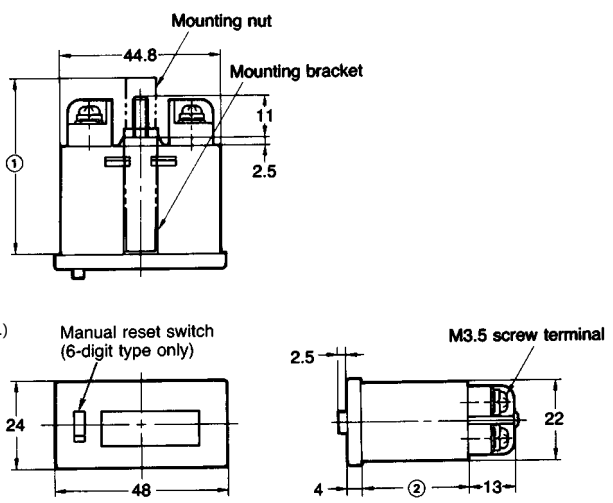


Dimensions

Wire-wrap Terminal Type (see note 1)



Screw Terminal Type (see note 2)

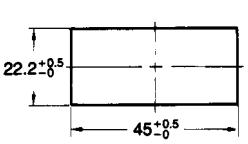


Note: 1. The wire-wrap terminal type can also be surface mounted.

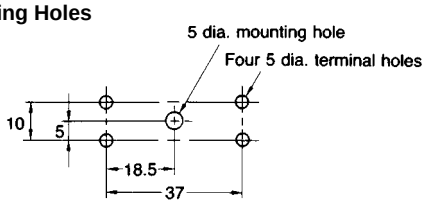
2. As shown in the chart below, two dimensions of the AC/DC voltage input type differ from other screw-terminal types.

Dimension	AC/DC voltage input type	DC voltage input types No-voltage input types
①	78.9	48.9
②	60	30

Panel Cutout



Mounting Holes

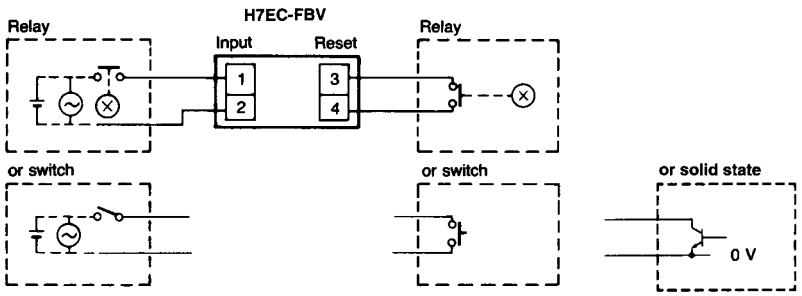


Installation

■ Connections

AC/DC Voltage Input Type

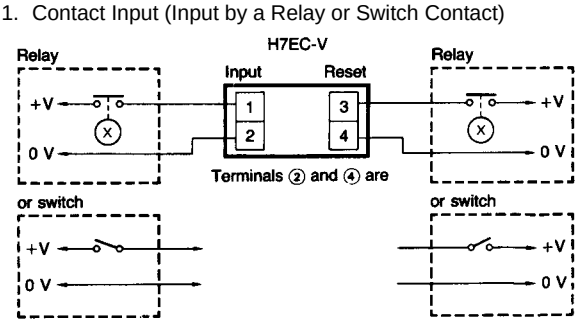
1. Contact Input (Voltage Input Through a Relay or Switch Contact)



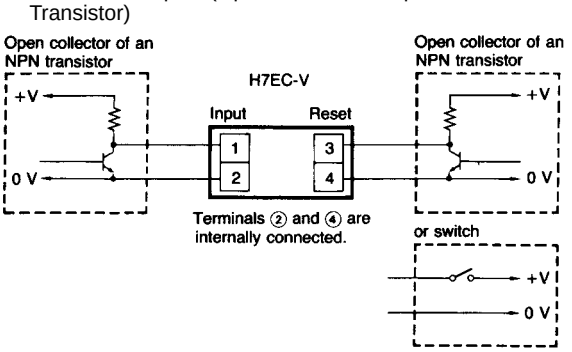
DC Voltage Input Type

Note: Select input transistors according to the following:
Dielectric strength of the collector ≧ 50 V
Leakage current < 1 μA

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



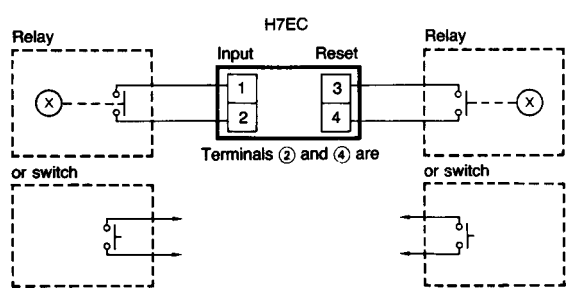
2. Solid-state Input (Open Collector Input of an NPN Transistor)



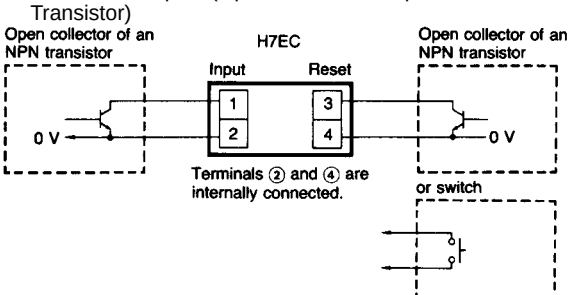
No-voltage Input Type

Note: Select input transistors according to the following:
Dielectric strength of the collector ≧ 50 V
Leakage current < 1 μA

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



2. Solid-state Input (Open Collector Input of an NPN Transistor)



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 μA. It is recommended that OMRON's G3TA-IA/ID be used as an SSR.

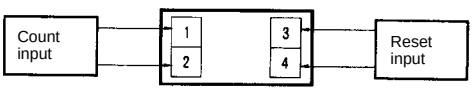
Note: Residual voltage in the output section of proximity sensors or photoelectric sensors becomes less than 0.5 V because the current flowing from terminals 1 or 3 is as small as approx. 10 μA, thus allowing easy connection.

■ Terminal Arrangement

Bottom View: View of the Totalizing Counter Rotated Horizontally 180°

H7EC Totalizing Counter

DC voltage input type, No-voltage input type, AC/DC voltage input type, non-restrictive voltage input type

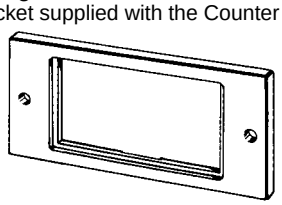


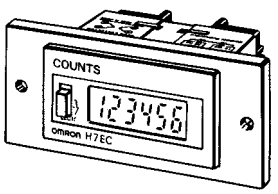
Note: Terminal 2 and terminal 4 are connected in the following manner:
DC voltage input type/No voltage input type: Short-circuited, not insulated
AC/DC voltage input type: Insulated

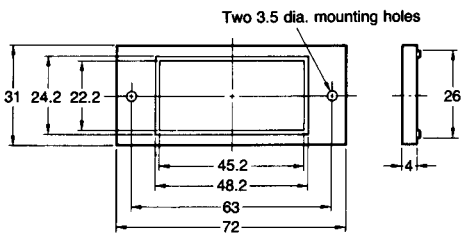
Accessories (Order Separately)

The H7EC are supplied with the mounting bracket and nut. Additionally, the panel adapters shown here allow the H7EC models to be fitted to existing panel cutouts.

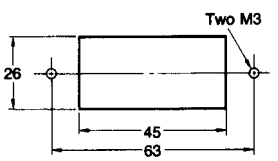
Flush Mounting Adapter Y92F-75
for 26 × 45 Rectangular Cutout
Use mounting bracket supplied with the Counter



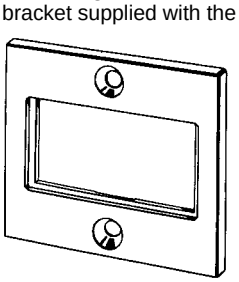


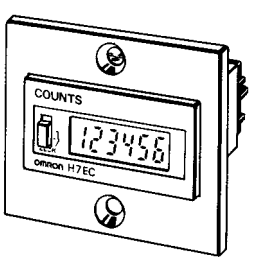


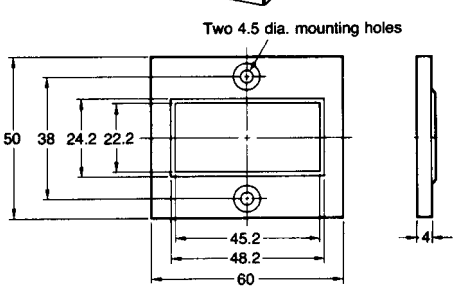
Panel Cutout



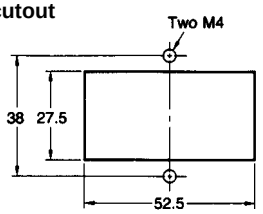
Flush Mounting Adapter Y92F-76
for 27.5 × 52.5 Rectangular Cutout
Use mounting bracket supplied with the Counter





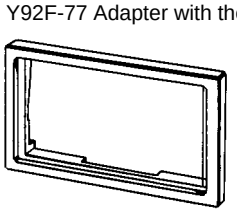


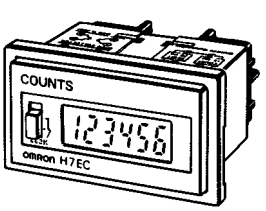
Panel cutout

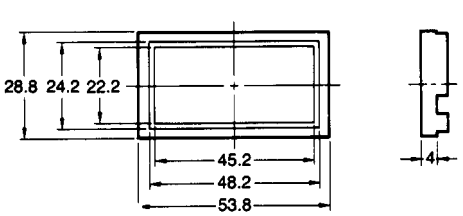


Flush Mounting Adapter Y92F-77
for 24.8 × 48.8 Rectangular Cutout

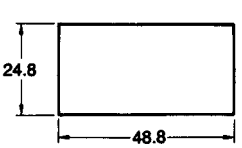
Note: Use the Y92F-77 Adapter with the attached No.2 Mounting Bracket. The -FBV models cannot be used.







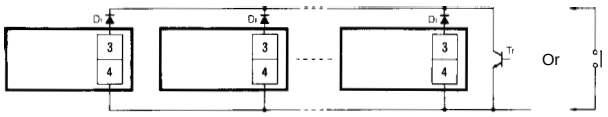
Panel Cutout



Precautions

Reset Input or Count Input to More than One H7E Counter at a Time

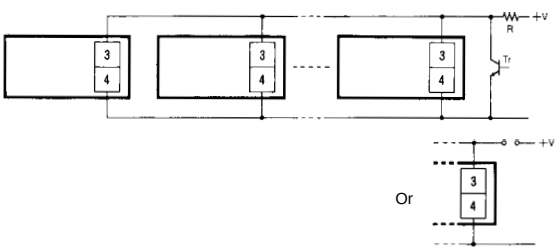
- No-voltage Input



Note: 1. The leakage current of the transistor used for input must be less than 1 μA.

2. The forward voltage of the D_1 must be as low as possible (i.e., 0.1 V maximum with an IF of 20 μA) so that the voltage between terminals 3 and 4 will be 0.5 V when reset input is ON.

- Voltage Input

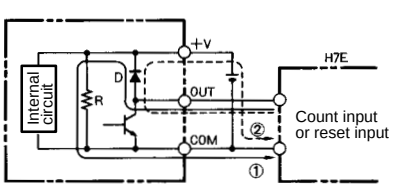


Note: H (Reset ON) level must be 4.5 V minimum.

$$H = \frac{4.7\ (k\Omega)/N + V}{4.7\ (k\Omega)/N + R}$$

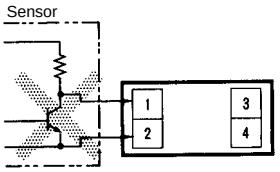
Reset Input and Count Input

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 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.

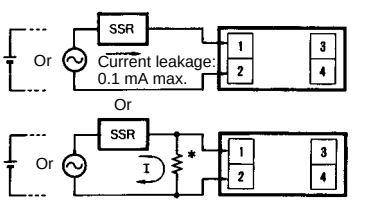


Input and Power Supply

- Do not impose voltage on the Counter if the Counter is a model that operates with no-voltage input, otherwise the internal circuit of the Counter may be damaged.
  Do not connect any single input signal in parallel to Counter models operating with non-voltage input and those operating with voltage input, otherwise the Counters may malfunction.
- When connecting a sensor to the Counter that operates with no-voltage input, make sure that the sensor has open collector output.



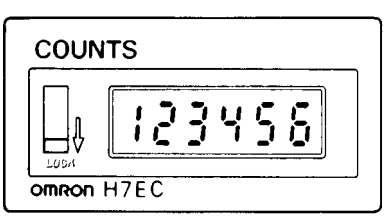
- When using shielded wire, stray capacitance may occur. The operation of the Counter might be affected when using wires which have a capacitance exceeding 500 pF (about 10 m, with parallel wires of 2 mm^2). Keep all wires as short as possible.
- When connecting an open collector input from a transistor to the Counter that operates with no-voltage input, make sure that the leakage current of the transistor is 5 μA maximum.
- When connecting count input from an SSR to the Counter that operates with free-voltage input, use OMRON's G3TA-IA or G3TA-ID SSR, otherwise make sure that the leakage current of the SSR is 0.1 mA maximum or connect a bleeder resistor in parallel to the input circuit of the Counter.



*Bleeder resistor
The voltage between terminals 1 and 2 must be 1.5 V maximum when the SSR is OFF.

Manually Resetting Counters (-M Models)

Reset the Counter by pressing the reset button, located to the left of the display window. To prevent an accidental reset, lock the reset button by sliding the button downward, without depressing it. A small "click" sound may be heard, both when locking and unlocking the reset button. Slide the button up to unlock.



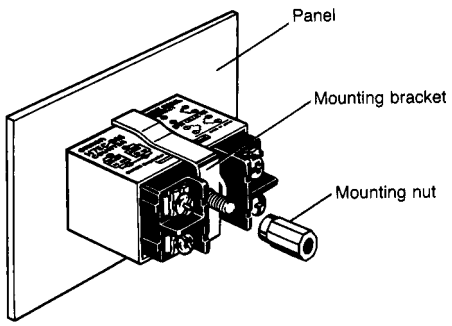
Wire-wrap Terminals

The dimensions of the terminals used on H7E wire-wrap models measure 1 × 1 mm. When wiring a Counter with wire-wrap terminals, select one of the three gauges of wire from the table below. Also listed in the table are the appropriate wiring hardware.

Wire gauge	Bit	Sleeve	Method
AWG22	2-A	2-B	Normal wire-wrap
AWG24	1-A	1-B	Normal wire-wrap
AWG26	3-A	3-B	Normal wire-wrap

How to Mount the Counter

Insert the H7E Counter from the front of the mounting panel. Slide the mounting bracket into place from the rear of the panel, and tighten the knurled nut by hand. Do not use tools (such as pliers) to tighten the nut. Excessive tightening may damage the Counter.



⚠ Caution

The H7EC has a built-in lithium battery. Be sure to dispose of the old H7EC properly, as lithium batteries are likely to explode if incinerated.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Cat. No. M060-E1-1 **In the interest of product improvement, specifications are subject to change without notice.**

OMRON Corporation
Industrial Automation Company

Measuring and Supervisory Controls Division
28th Fl., Crystal Tower Bldg.,
1-2-27, Shiromi, Chuo-ku,
Osaka 540-6028 Japan
Phone: (81)6-6949-6035 Fax: (81)6-6949-6069

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