Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!
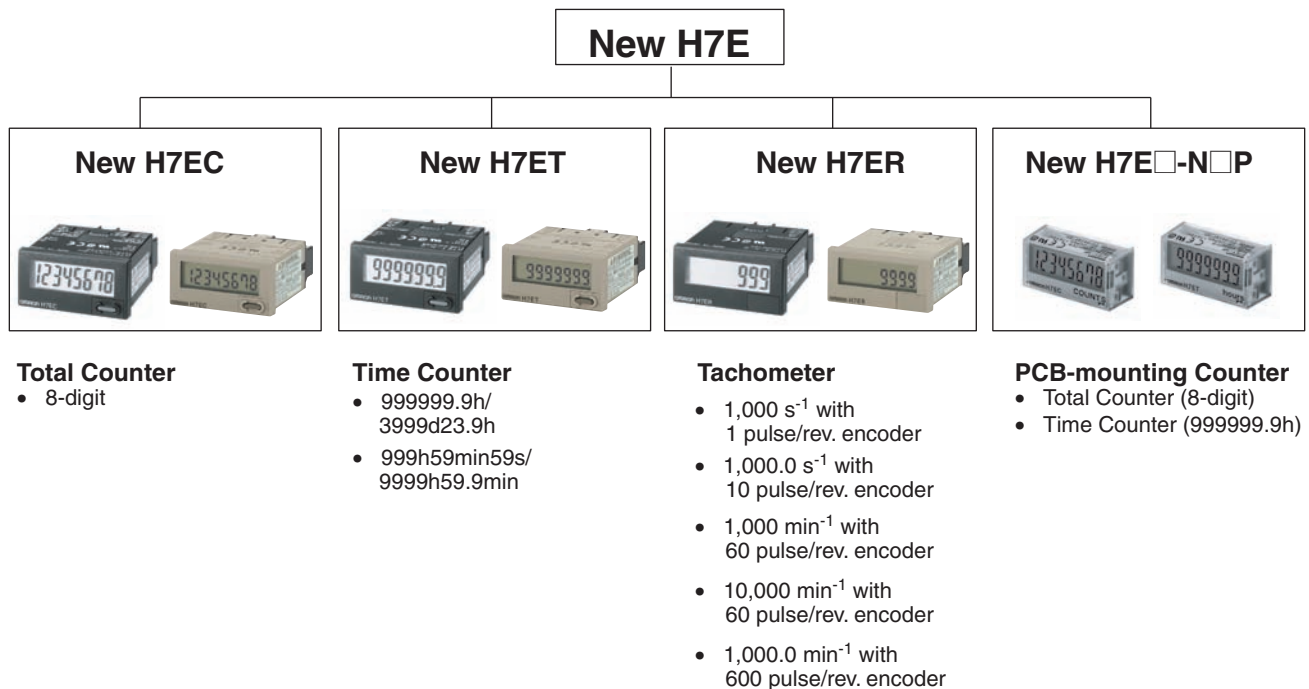

Contact us

Self-powered Totalizer
New H7E

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

New H7EC	New H7ET	New H7ER	New H7E□-N□P

Total Counter
- 8-digit

Time Counter
- 999999.9h/ 3999d23.9h
- 999h59min59s/ 9999h59.9min

Tachometer
- 1,000 s^{-1} with 1 pulse/rev. encoder
- 1,000.0 s^{-1} with 10 pulse/rev. encoder
- 1,000 min^{-1} with 60 pulse/rev. encoder
- 10,000 min^{-1} with 60 pulse/rev. encoder
- 1,000.0 min^{-1} with 600 pulse/rev. encoder

PCB-mounting Counter
- Total Counter (8-digit)
- Time Counter (999999.9h)

Contents

Self-powered Totalizers

Common to All Totalizers

- Eight-digits, counting range 0 to 99999999.
- Dual input speed: 30 Hz $\longleftrightarrow$ 1 kHz (except for AC/DC multi-voltage input models)

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Model Number Structure

■ Model Number Legend

Note: Some configurations are not available.

H7EC - N ☐ - ☐ ☐
       1   2 3

1. Count Input
  None: No-voltage input
  V: PNP/NPN universal DC voltage input
  FV: AC/DC multi-voltage input

2. Case Color
  None: Light gray
  B: Black

3. Display
  None: 7-segment LCD without backlight
  H: 7-segment LCD with backlight

Note: Estimates can be provided for coatings and other specifications that are not given in the datasheet. Ask your OMRON representative for details.

Ordering Information

■ Total Counters

Count input	Max. counting speed	Display	Model	
			Light-gray body	**Black body**
PNP/NPN universal DC voltage input (4.5 to 30 VDC)	30 Hz $\longleftrightarrow$ 1 kHz (switchable)	7-segment LCD with backlight	H7EC-NV-H	H7EC-NV-BH
		7-segment LCD	H7EC-NV	H7EC-NV-B
AC/DC multi-voltage input (24 to 240 VAC/VDC)	20 Hz	7-segment LCD	H7EC-NFV	H7EC-NFV-B
No-voltage	30 Hz $\longleftrightarrow$ 1 kHz (switchable)	7-segment LCD	H7EC-N	H7EC-N-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 H7EC. (Order additional Brackets separately as required.)
     2. Built into H7EC. Order replacements using the above model number before the service life expires.

Specifications

■ General

Item	H7EC-NV-□ H7EC-NV-□H	H7EC-NFV-□	H7EC-N-□
Operating mode	Up type		
Mounting method	Flush mounting		
External connections	Screw terminals, optional Wire-wrap Terminals (see note 1)		
Reset	External/Manual reset		
Number of digits	8		
Count input	PNP/NPN universal DC voltage input	AC/DC multi-voltage input	No-voltage input
Display	7-segment LCD with or without backlight, zero suppression (character height: 8.6 mm) (see note 2)		
Max. counting speed	30 Hz/1 kHz	20 Hz	30 Hz/1 kHz
Case color	Light gray or black (-B models)		
Attachment	Waterproof packing, Y92F-34 Flush Mounting Bracket		
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. Separately ordered Wire-wrap Terminals (Y92S-37) are required.

    2. Only PNP/NPN universal DC voltage input models (-H models) have a backlight.

■ Ratings

Item	H7EC-NV-□ H7EC-NV-□H	H7EC-NFV-□	H7EC-N-□
Supply voltage	Backlight model: 24 VDC (0.3 W max.) (only for backlight) No-backlight model: Not required (powered by built-in battery)	Not required (powered by built-in battery)	
Count 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.	
Max. counting speed (see note)	30 Hz or 1 KHz (Switchable with switch)	20 Hz	30 Hz or 1 KHz (Switchable with switch)
Minimum signal width	20 Hz: 25 ms 30 Hz: 16.7 ms 1 KHz: 0.5 ms		
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%		

Note: ON/OFF ratio 1:1

■ Characteristics

Item	H7EC-NV-☐ H7EC-NV-☐H	H7EC-NFV-☐	H7EC-N-☐
Insulation resistance	100 MΩ min. (at 500 VDC) between current-carrying metal parts and exposed non-current-carrying metal parts, and between the backlight power supply terminal and count 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 count input terminals and reset terminals	100 MΩ min. (at 500 VDC) between current-carrying metal parts and exposed non-current-carrying metal parts
Dielectric strength	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 terminal and count input terminals/reset terminals for backlight models	3,700 VAC, 50/60 Hz for 1 min between current-carrying metal parts 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 count 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
Impulse withstand voltage	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 input terminals and reset terminals	4.5 kV between current-carrying terminal and exposed non-current-carrying metal parts
Noise immunity	Square-wave noise generated by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise)		
	±600 V (Between count input terminals/Between reset terminals) ±480 V (Between the backlight power supply terminals for backlight models)	±1.5 kV (Between count input terminals) ±500 V (Between reset terminals)	±500 V (Between count input terminals/Between reset terminals)
Static immunity	±8 kV (malfunction)		
Vibration resistance	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		
Shock resistance	Malfunction: 200 m/s² 3 times each in 6 directions Destruction: 300 m/s² 3 times each in 6 directions		
EMC	(EMI) EN61326-1 (See note 1.) Emission Enclosure: EN55011 Group 1 class B (EMS) EN61326-1 (See note 1.) Immunity ESD: EN61000-4-2: 4 kV contact discharge (level 2) 8 kV air discharge (level 3) Immunity RF-interference from AM Radio Waves: EN61000-4-3: 10 V/m (80 MHz to 1 GHz) (level 3) Immunity RF-interference from Pulse-modulated Radio Waves: EN61000-4-3: 10 V/m (900 MHz ± 5 MHz) (level 3) Immunity Conducted Disturbance: EN61000-4-6: 10 V (0.15 to 80 MHz) (level 3) Immunity Burst: EN61000-4-4: 2 kV power line (level 3) 2 kV I/O signal line (level 4)		
Degree of protection	Front panel: IP66, NEMA4 Terminal block: IP20		
Weight (see note 2.)	No-backlight model: Approx. 60 g Backlight model: Approx. 65 g	Approx. 60 g	Approx. 60 g

Note: 1. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)
    2. Weight includes waterproof packing and flush mounting bracket.

■ Reference Value

| Item	Value	Note
Battery life	7 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 Total Counter rotated horizontally 180°
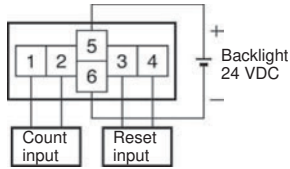
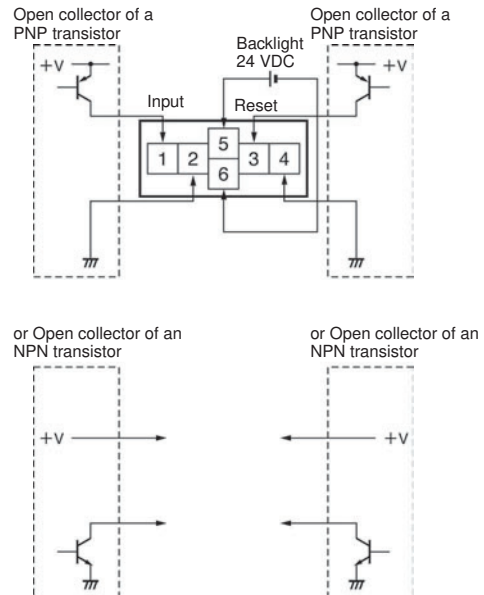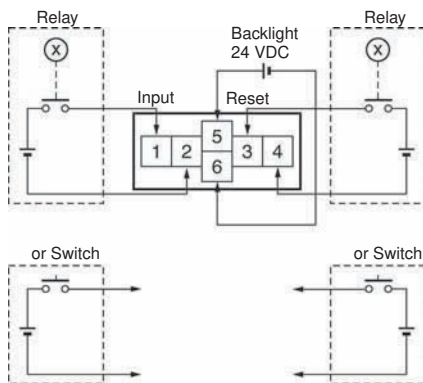**Backlight Model**   **No-backlight Model**
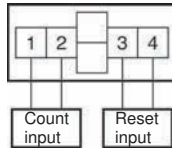
■ Connections

H7EC Total Counter
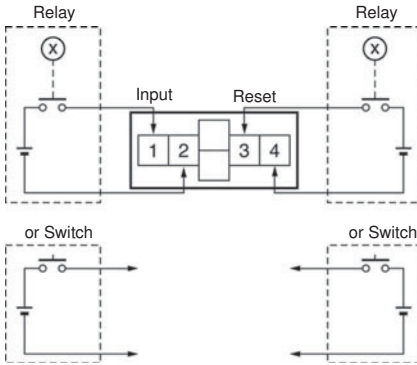**PNP/NPN Universal DC Voltage Input Model With Backlight**

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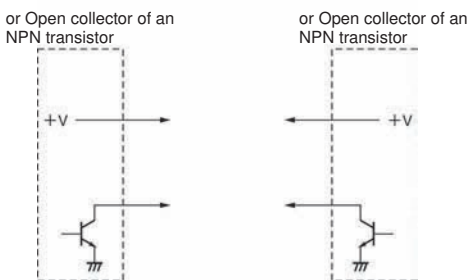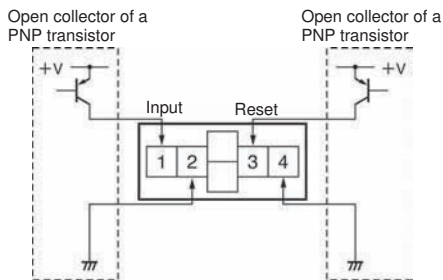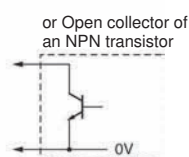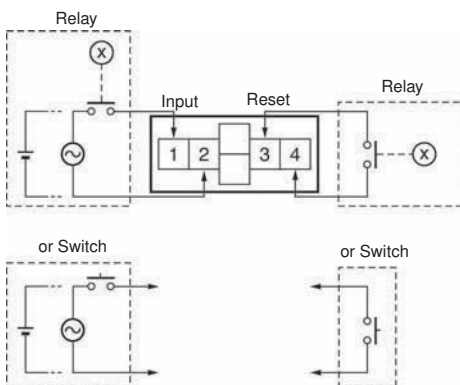

2. Solid-state Input

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 ≥ 50 V
Leakage current < 100 μA

PNP/NPN Universal DC Voltage Input Model Without 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 < 100 μA

AC/DC Multi-voltage Input Model

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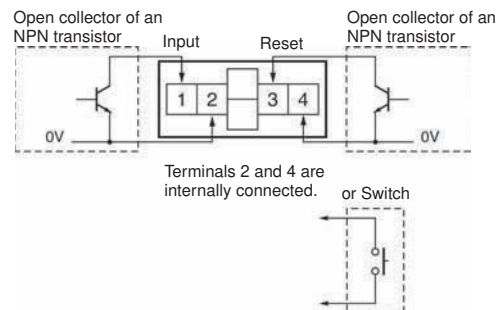Leakage current < 1 μA

No-voltage Input Model
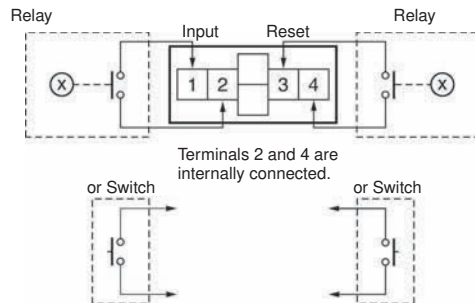
1. Contact Input (Input by a Relay or Switch Contact)

Terminals 2 and 4 are internally connected.

Note: Use Relays and Switches that have high contact reliability because the current flowing from terminals 1 or 3 is small. It is recommended that OMRON's G3TA-IA/ID be used as the SSR.

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

Terminals 2 and 4 are internally connected.

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 small thus allowing easy connection.
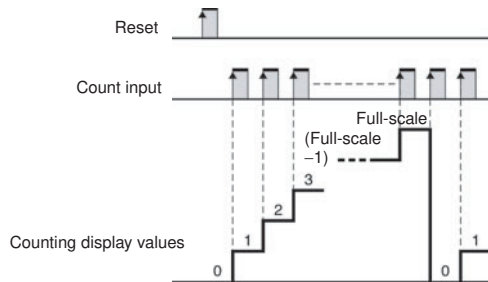**2.** Select input transistors according to the following:
Dielectric strength of the collector $\geq$ 50 V
Leakage current < 1 μA

Operation

■ Operating Modes

H7EC Total Counter

Incrementing Operation
(Up)

Nomenclature

Front view

Bottom view

Reset Key

Reset the count value. Not operable under key-protect.

Counting speed switch

For all models except for H7EC-NFV-□. If the counting speed setting is changed, the present value will not be held and so press the Reset Key on the front panel.

Setting (see note)	Counting speed
Front panel ↑ □ Concave side	30 Hz (default setting)
↓ □ Concave side Terminal block	1 kHz

Key-protect Switch

The Reset Key is not operable while the key-protect switch is set to ON.

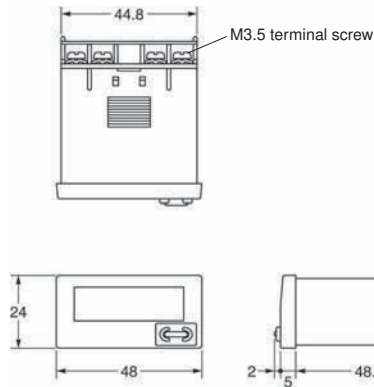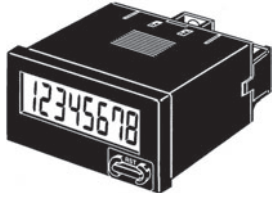| Setting (see note)	Key-protect
Front panel ↑ □ Concave side	OFF (default setting)
↓ □ Concave side Terminal block	ON

Note: 1. Perform switch setting before mounting to a control panel.
   2. If the counting speed setting is changed, the present value will not be held. Press the Reset Key on the front panel.
   3. Key protection is used to prohibit operating the Reset Key. The reset input terminals will still be functional.
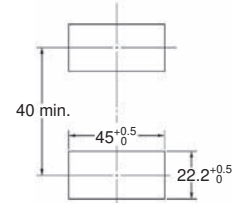
Dimensions

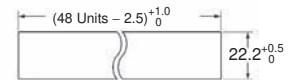**Note:** All units are in millimeters unless otherwise indicated.

H7EC-N

M3.5 terminal screw
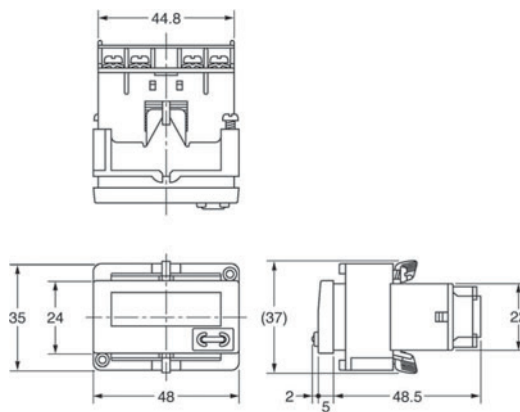
44.8

24

48

22

2 — 5 — 48.5

Panel Cutout
Separate mounting

40 min.

$45^{+0.5}_{0}$

$22.2^{+0.5}_{0}$

Dense mounting

$(48 \text{ Units} - 2.5)^{+1.0}_{0}$

$22.2^{+0.5}_{0}$

Waterproofing is not possible for dense mounting

Dimensions with Y92F-34 Flush Mounting Bracket
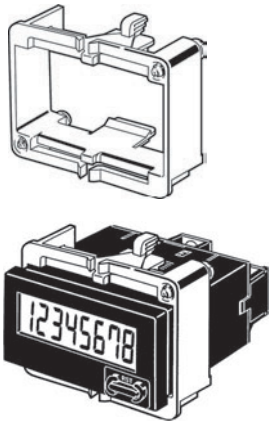
44.8

35 24

(37)

22

48

2 — 5 — 48.5

- 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.

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

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

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 |

Note: Estimates can be provided for coatings and other specifications that are not given in the datasheet. Ask your OMRON representative for details.

Ordering Information

■ Time Counters

Timer input	Display	Time range			
		999999.9h ←→ 3999d23.9h (switchable)		999h59min59s ←→ 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 back-light	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 (see note 2)	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 3)					
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. The frequency range for an AC voltage is 50 to 60 Hz.

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

     4. Zero suppression: Zeros are not displayed to increase readability. For example, "000008.2" is displayed as "8.2" if zero suppression is set. If the range is set to 3999d23.9h, the value is "008.2".

■ 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□-□
Time accuracy	±100 ppm (25°C)		
Insulation resistance	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
Dielectric strength	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
Impulse withstand voltage	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
Noise immunity	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)
Static immunity	±8 kV (malfunction)		
Vibration resistance	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		
Shock resistance	Malfunction: 200 m/s^2 3 times each in 6 directions Destruction: 300 m/s^2 3 times each in 6 directions		

EMC	(EMI) EN61326-1 (See note 1.)
	Emission Enclosure: EN55011 Group 1 class B
	(EMS) EN61326-1 (See note 1.)
	Immunity ESD: EN61000-4-2: 4 kV contact discharge (level 2)
	         8 kV air discharge (level 3)
	Immunity RF-interference from AM Radio Waves:
	      EN61000-4-3: 10 V/m (80 MHz to 1 GHz) (level 3)
	Immunity RF-interference from Pulse-modulated Radio Waves:
	      EN61000-4-3: 10 V/m (900 MHz ± 5 MHz) (level 3)
	Immunity Conducted Disturbance: EN61000-4-6: 10 V (0.15 to 80 MHz) (level 3)
	Immunity Burst: EN61000-4-4: 2 kV power line (level 3)
	         2 kV I/O signal line (level 4)		

Degree of protection	Front panel: IP66, NEMA4 with waterproof packing Terminal block: IP20		
Weight (see note 2.)	No-backlight model: Approx. 60 g Backlight model: Approx. 65 g	Approx. 60 g	Approx. 60 g

Note: 1. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)
   **2.** 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°
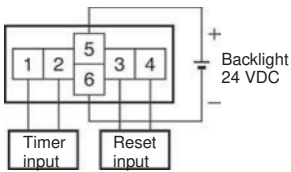
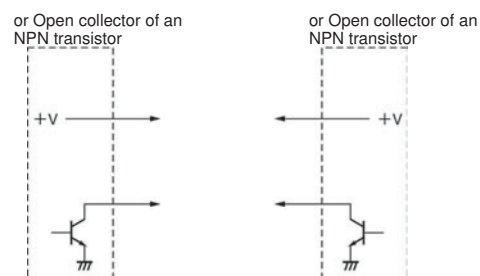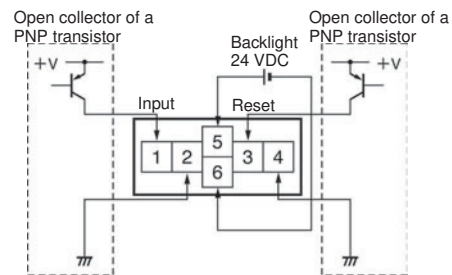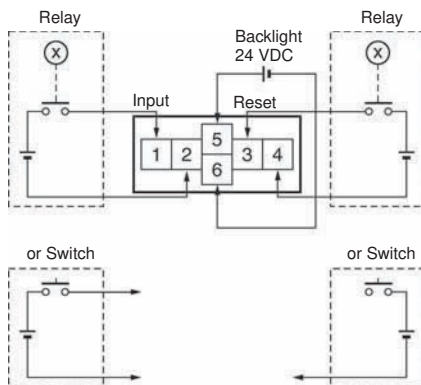**Backlight Model**   **No-backlight Model**
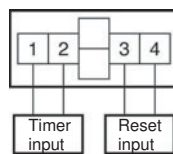
■ Connections

H7ET Time Counter

PNP/NPN Universal DC Voltage Input Model With Backlight
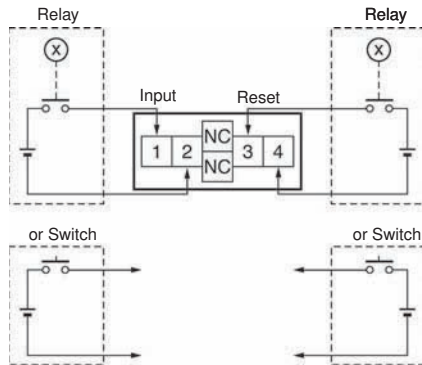
1. Contact Input (Input by a Relay or Switch Contact)

2. Solid-state Input

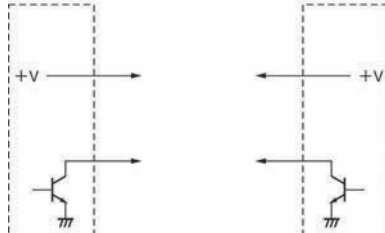**Note: 1.** Terminals 2 and 4 (input circuit and reset circuit) are functionally isolated.

2. Select input transistors according to the following:
Dielectric strength of the collector ≥ 50 V
Leakage current < 1 μA

PNP/NPN Universal DC Voltage Input Model Without Backlight

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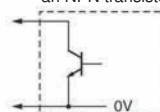

2. Solid-state Input

    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 μA

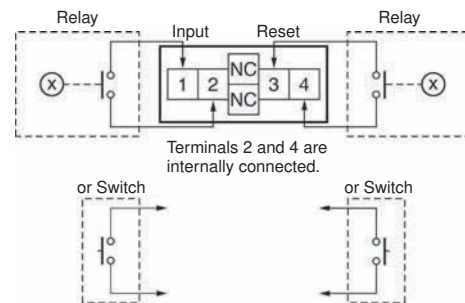**AC/DC Multi-voltage Input Model**

No-voltage Input Model

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

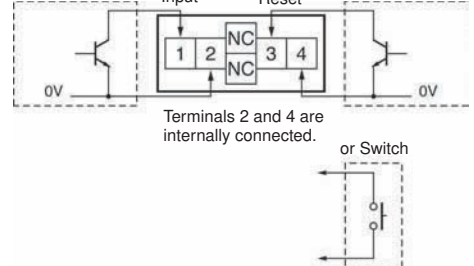**Note:** Use Relays and Switches that have high contact reliability because the current flowing from terminals 1 or 3 is as small as approx. 10 μA. It is recommended that OMRON's G3TA-IA/ID be used as the SSR.

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 μA, thus allowing easy connection.
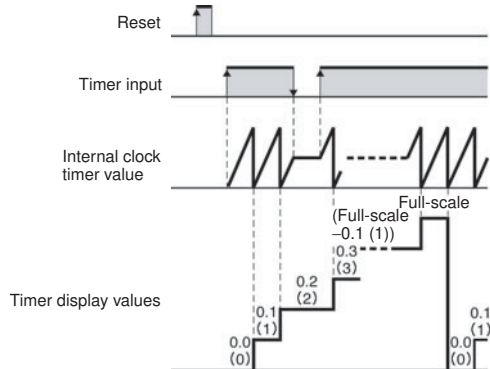   **2.** Select input transistors according to the following:
         Dielectric strength of the collector $\geq$ 50 V
         Leakage current < 1 μA
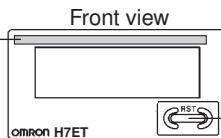
Operation

■ Operating Modes

H7ET Time Counter

Incrementing Operation
(Up)

Reset

Timer input

Internal clock
timer value

Full-scale
(Full-scale
−0.1 (1))
0.3
(3)
0.2
(2)
0.1
(1)
0.0
(0)

Timer display values

Full-scale

0.1
(1)
0.0
(0)

Nomenclature

Front view

**Location to Attach
Unit Label**

Attach the correct unit
label for the time range
that is set.

omron H7ET

Reset Key

Reset the count value. Not operable
under key-protect.

Bottom view

Time-range switch

If the time-range setting is
changed, the present
value will not be held and
so press the Reset Key on
the front panel.

Key-protect Switch

The Reset Key is not operable while the
key-protect switch is set to ON.
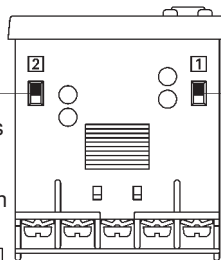
Setting (see note)	Key-protect
Front panel ↑ Concave side	OFF (default setting)
↓ Concave side Terminal block	ON

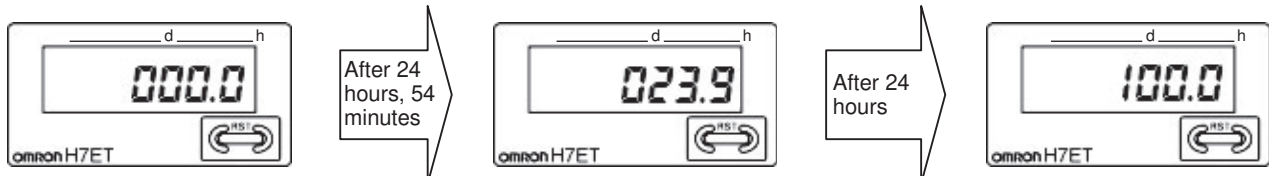| Setting (see note)	Time range	
	H7ET-N□□-□□	**H7ET-N□□1-□□**
Front panel ↑ Concave side	0.0h to 3999d23.9h	0s to 999h59min59s (default setting)
↓ Concave side Terminal block	0.0h to 999999.9h (default setting)	0.0min to 9999h59.9min

● **Display Values for a Time Range of "0.0h to 3999d23.9h"**

If the time-range switch is set to "0.0h to 3999d23.9h," the four leftmost digits are the number of days and the three rightmost digits are the number of hours.
The initial value after resetting is 000.00 (0 days, 00.0 hours).
After "023.9" (0 days, 23.9 hours), the display will change to "100.0" (1 days, 00.0 hours).
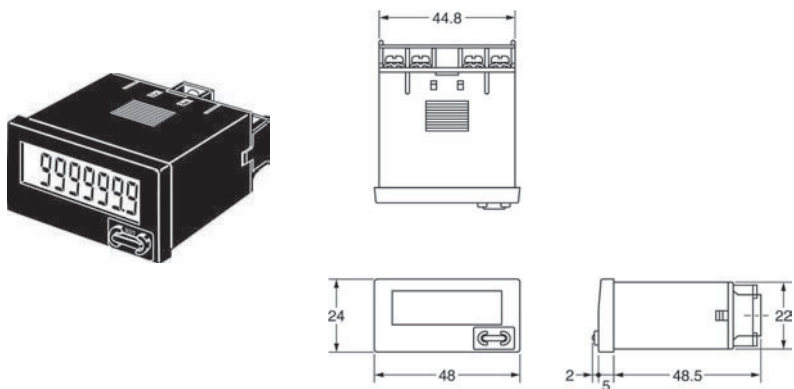
LCD Examples for "0.0h to 3999d23.9h" Range

| d | h |

000.0
omron H7ET

After 24
hours, 54
minutes

| d | h |

023.9
omron H7ET

After 24
hours

| d | h |

100.0
omron H7ET

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

Dimensions

Note: All units are in millimeters unless otherwise indicated.
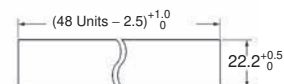
H7ET-N

44.8

24

48

2

5

48.5

22

Dimensions with Y92F-34 Flush Mounting Bracket

44.8

35 24

48

2

5

48.5

22

(37)

Panel Cutout

Separate mounting

40 min.

$45_0^{+0.5}$

$22.2_0^{+0.5}$
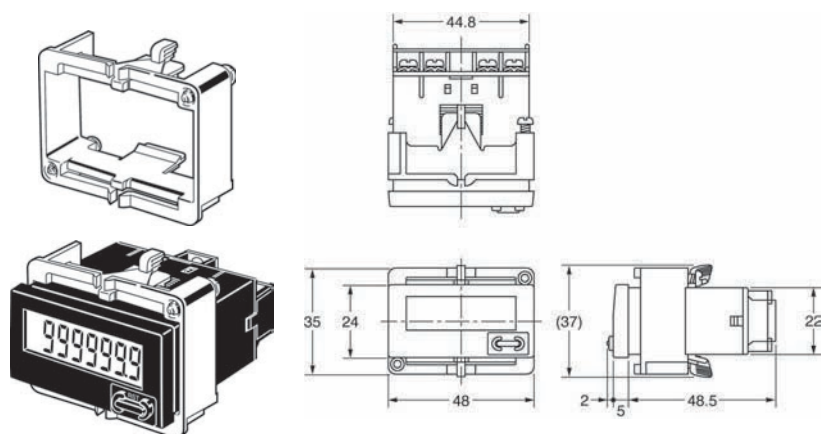
Dense mounting

$(48 \text{ Units} - 2.5)_0^{+1.0}$

$22.2_0^{+0.5}$

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.

- Revolutions displayed up to five digits.
- Dual revolution display according to encoder resolution used; 1000 s^{-1}/1000 min^{-1} or 1000.0 s^{-1} /1000.0 min^{-1}
- Switchable dual revolution display type available (-NV1 models); extended up to 10000 min^{-1}

CE $\text{U}_L^{\text{®}}$ (SP) LR

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Model Number Structure

■ Model Number Legend

Note: Some configurations are not available.

H7ER - N ☐ ☐ - ☐ ☐
    　　 1 **2**　 **3** **4**

1. Count Input
  None: No-voltage input
  V: PNP/NPN universal DC voltage input

2. Number of Digits
  None: 4 digits
  1:        5 digits

3. Case Color
  None: Light gray
  B: Black

4. Display
  None: 7-segment LCD without backlight
  H: 7-segment LCD with backlight

Note: Estimates can be provided for coatings and other specifications that are not given in the datasheet. Ask your OMRON representative for details.

Ordering Information

■ Tachometers

Count input	Display	Max. revolutions displayed (applicable encoder resolution)			
		1000 s^{-1} (1 pulse/rev.), 1000 min^{-1} (60 pulse/rev.)		1000.0 s^{-1} (10 pulse/rev.), 1000.0 min^{-1} (600 pulse/rev.) $\leftarrow\rightarrow$ 10000 min^{-1} (60 pulse/rev.) (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	H7ER-NV-H	H7ER-NV-BH	H7ER-NV1-H	H7ER-NV1-BH
	7-segment LCD	H7ER-NV	H7ER-NV-B	H7ER-NV1	H7ER-NV1-B
No-voltage input	7-segment LCD	H7ER-N	H7ER-N-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 H7ER. (Order additional Brackets separately as required.)
　　　　2. Built into H7ER. Order replacements using the above model number before the service life expires.

Specifications

■ General

Item	H7ER-NV-□ H7ER-NV-□H	H7ER-N-□	H7ER-NV1-□ H7ER-NV1-□H
Operating mode	Up type		
Mounting method	Flush mounting		
External connections	Screw terminals, Wire-wrap Terminals (see note 3)		
Display	7-segment LCD with or without backlight, zero suppression (character height: 8.6 mm) (see note 4)		
Number of digits	4		5
Count input	PNP/NPN universal DC voltage input	No-voltage input	PNP/NPN universal DC voltage input
Max. counting speed	1 kHz		10 kHz
Max. revolutions displayed (see note 5, 6)	1,000 s^{-1} (When encoder resolution of 1 pulse/rev is used.) 1,000 min^{-1} (When encoder resolution of 60 pulse/rev is used.)		1,000.0 s^{-1} (When encoder resolution of 10 pulse/rev is used.) 1,000.0 min^{-1} (When encoder resolution of 600 pulse/rev is used.) ←→ 10,000 min^{-1} (When encoder resolution of 60 pulse/rev is used.) (Switchable with switch)
Attachment	Waterproof packing, Y92F-34 Flush Mounting Bracket, revolution unit labels (see note 5)		
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. Reset is not available.
2. When there is no input, the display will be 0.0 or 0.
3. Separately ordered Wire-wrap Terminals (Y92S-37) are required.
4. Only PNP/NPN Universal DC voltage input models have a backlight.
5. "rpm", "rps", "s^{-1}" and "min^{-1}" labels are included.
6. "s^{-1}" in "1,000 s^{-1}" means the same thing as RPS. "min^{-1}" means the same thing as RPM.

■ Ratings

Item	H7ER-NV□-□ H7ER-NV□-□H	H7ER-N-□
Supply voltage	Backlight model: 24 VDC (0.3 W max.) (for backlight lit) No-backlight model: Not required (powered by built-in battery)	Not required (powered by built-in battery)
Count input	High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input impedance: Approx. 4.7 kΩ)	No voltage input Maximum short-circuit impedance: 10 kΩ max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 kΩ min.
Max. counting speed	4-digit models:1 kHz 5-digit models:10 kHz	1 kHz
Minimum signal width	10 kHz: 0.05 ms 1 kHz: 0.5 ms (See note.)	
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%	

Note: 5-digit models :1 kHz/10 kHz switchable.

■ Characteristics

Item	H7ER-NV□-□ H7ER-NV□-□H	H7ER-N-□
Insulation resistance	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 count 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
Dielectric strength	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 count input terminals/reset terminals for backlight models	1,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts 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 noise generated by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise)	
	±600 V (Between count input terminals)	±500 V (Between count input terminals)
	±480 V (Between the backlight power supply terminals for backlight models)	
Static immunity	±8 kV (malfunction)	
Vibration resistance	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	
Shock resistance	Malfunction: 200 m/s^2 3 times each in 6 directions Destruction: 300 m/s^2 3 times each in 6 directions	

EMC	(EMI) EN61326-1 (See note 1.)
	Emission Enclosure: EN55011 Group 1 class B
	(EMS) EN61326-1 (See note 1.)
	Immunity ESD: EN61000-4-2: 4 kV contact discharge (level 2)
	                                    8 kV air discharge (level 3)
	Immunity RF-interference from AM Radio Waves:
	                            EN61000-4-3: 10 V/m (80 MHz to 1 GHz) (level 3)
	Immunity RF-interference from Pulse-modulated Radio Waves:
	                            EN61000-4-3: 10 V/m (900 MHz ± 5 MHz) (level 3)
	Immunity Conducted Disturbance: EN61000-4-6: 10 V (0.15 to 80 MHz) (level 3)
	Immunity Burst: EN61000-4-4: 2 kV power line (level 3)
	                                    2 kV I/O signal line (level 4)	

Degree of protection	Front panel: IP66, NEMA4 with waterproof packing Terminal block: IP20	
Weight (see note 2.)	No-backlight model:Approx. 60 g Backlight model: Approx. 65 g	

Note: 1. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)
   **2.** Weight includes waterproof packing and flush mounting bracket.

■ Reference Value

Item	Value	Note
Battery life	7 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 Tachometer rotated horizontally 180°

Backlight Model

Backlight
24 VDC

Pulse
input

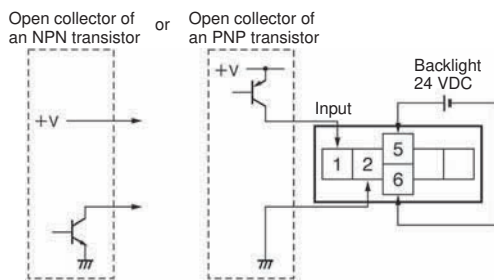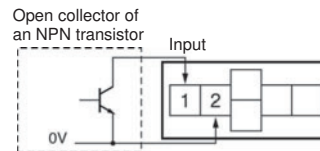**No-backlight Model**

Pulse
input
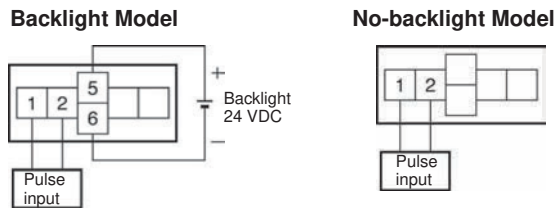
■ Connections

H7ER Tachometer

Note: Select input transistors according to the following:
Dielectric strength of the collector ≥ 50 V
Leakage current < 100 μA (1 μA for no-voltage input model)

PNP/NPN Universal DC Voltage Input Models With Backlight
Transistor Input

No-voltage Input Model
Transistor Input (Open Collector of an NPN Transistor)

PNP/NPN Universal DC Voltage Input Models Without Backlight
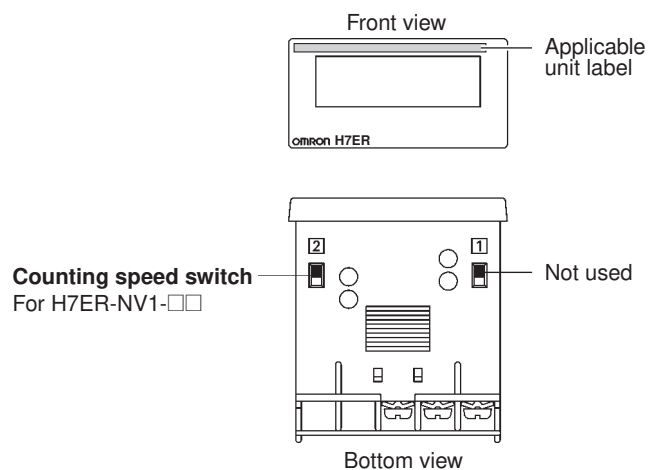Transistor Input
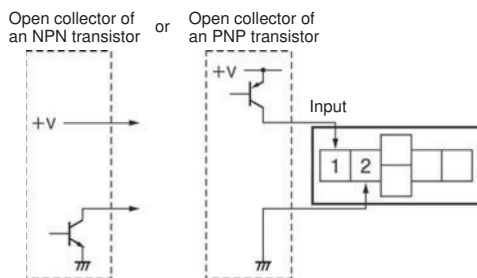
Operation

■ Operating Modes

H7ER Tachometer

Incrementing Operation
Within Unit Time (Up)
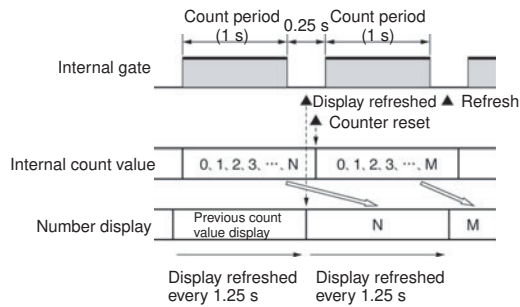
Nomenclature

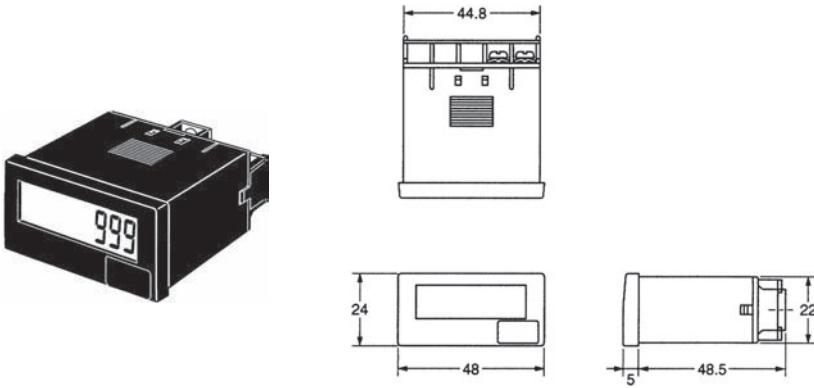## Counting Speed Switch Settings and Unit Label Application

Model	Counting speed switch setting (see note)	Max. revolutions displayed	Applicable encoder resolution	Applicable unit label
H7ER-NV1-□□	Front panel ↑ Concave side	10000 min⁻¹ (default setting)	60 pulse/rev.	"min⁻¹" or "rpm"
	↓ Concave side Terminal block	1000.0 min⁻¹	600 pulse/rev.	"min⁻¹" or "rpm"
		1000.0 s⁻¹	10 pulse/rev.	"s⁻¹" or "rps"
H7ER-N-□ **H7ER-NV-□□**	No setting is required	1000 min⁻¹	60 pulse/rev.	"min⁻¹" or "rpm"
		1000 s⁻¹	1 pulse/rev.	"s⁻¹" or "rps"

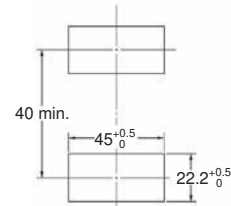**Note:** Perform switch setting before mounting to a control panel.

Dimensions

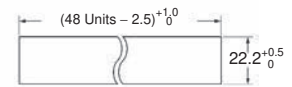**Note:** All units are in millimeters unless otherwise indicated.

H7ER-N

44.8

24
48
22
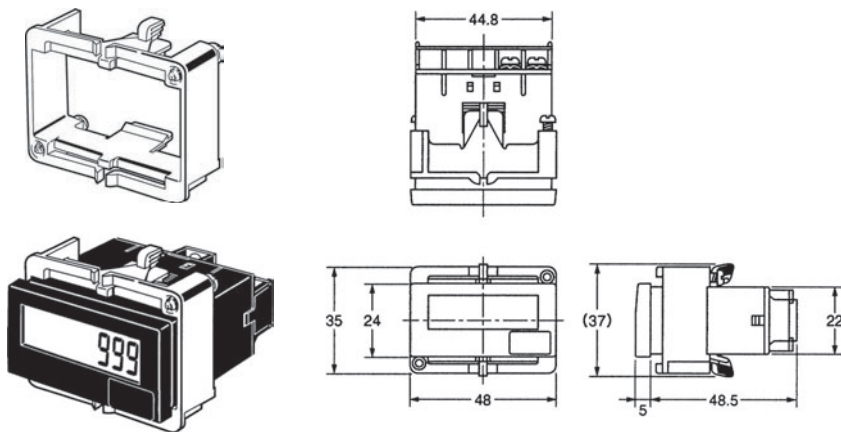5   48.5

Dimensions with Y92F-34 Flush Mounting Bracket

44.8

35 24 (37)
48
22
5   48.5

Panel Cutout
Separate mounting

40 min.

$45^{+0.5}_{0}$

$22.2^{+0.5}_{0}$

Dense mounting

$(48 \text{ Units} - 2.5)^{+1}_{0}$

$22.2^{+0.5}_{0}$

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.

H7E□-N□P

- Dedicated for use on PCB.
- Total Counters and Time Counter available.

$\mathsf{C}\ \mathsf{E}$ ℝ𝕌 ℂ𝕊𝔸

For the most recent information on models that have been certified for safety standards, refer to your OMRON website.

Model Number Structure

■ Model Number Legend

H7E □ **- N** □ **P**
　　　　1　　　2

1. Function

C:	Total Counter
T:	Time Counter

2. Max. Counting Speed for H7EC Models

None:	1 kHz
L:	30 Hz

Ordering Information

■ PC Board-use Counters

Count input	Display	Total counter		Time counter
		Max. counting speed		
		1 kHz	**30 Hz**	
No-voltage input	7-segment LCD	H7EC-NP	H7EC-NLP	H7ET-NP

■ Accessory (Order Separately)

Connecting Socket (28-pin)	XR2A-2801-N

Specifications

■ General

Item	Total Counter		Time Counter
	H7EC-NP	**H7EC-NLP**	**H7ET-NP**
Operating mode	Up type		
Mounting method	Direct mounting on PC Board or mounting on 28-pin socket		
Reset	External reset, Power-OFF reset		
Number of digits	8		7
Time range	---		0.0h to 999999.9h
Max. counting speed	1 kHz	30 Hz	---
Count/Timer input	No-voltage input		
Display	7-segment LCD (character height: 8.6 mm)		
Case color	Transparent		
Approved standard	UL863, CSA C22.2 No.14		

■ Ratings

| Item	H7EC-NP H7EC-NLP	H7ET-NP
Supply voltage	3 VDC (2.7 to 3.3 VDC)	
Count/Timer 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.	
Reset input		
Max. counting speed (see note)	1 kHz: Minimum signal width of 0.5 ms 30 Hz: Minimum signal width of 16.7 ms	---
Minimum signal input width	---	1 s
Reset system	External reset: Minimum signal width of 20 ms Power-OFF reset: Minimum power OFF time of 500 ms	
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%	

Note: ON/OFF ratio 1:1

■ Characteristics

Item	H7EC-NP H7EC-NLP	H7ET-NP
Time accuracy	---	±100 ppm (25°C)
Noise immunity	Square-wave noise generated by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise) ±500 V (Between count or timer input terminals/Between reset terminals)	
Static immunity	±8 kV (malfunction)	
Vibration resistance	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	
Shock resistance	Malfunction:200 m/s^2 3 times each in 6 directions Destruction:300 m/s^2 3 times each in 6 directions	
EMC	(EMI) EN61326-1 (See note 1.) Emission Enclosure: EN55011 Group 1 class B (EMS) EN61326-1 (See note 1.) Immunity ESD: EN61000-4-2: 4-kV contact discharge (level 2) 8-kV air discharge (level 3) Immunity RF-interference from AM Radio Waves: EN61000-4-3: 10 V/m (80 MHz to 1 GHz) (level 3) Immunity RF-interference from Pulse-modulated Radio Waves: EN61000-4-3: 10 V/m (900 MHz ± 5 MHz) (level 3) Immunity Conducted Disturbance (see note):EN61000-4-6: 10 V (0.15 to 80 MHz) (level 3) Immunity Burst (see note 2.): EN61000-4-4: 2-kV I/O signal line (level 4)	
Weight	Approx. 20 g	

Note: 1. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

     2. The power supply terminals of the H7E□-N□P are considered as 3-VDC control terminals.
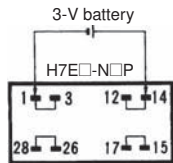
Connections

■ Terminal Arrangement

H7EC-N□P

H7ET-NP
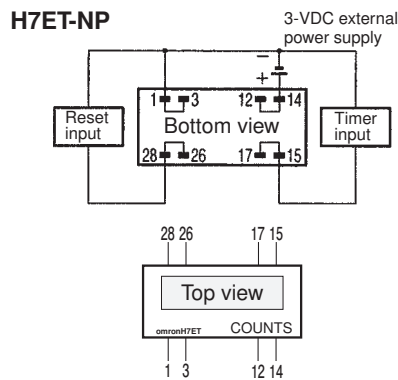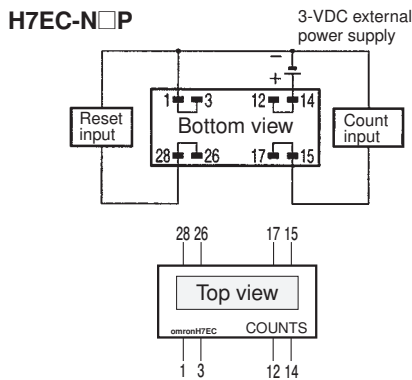
■ Connections

Power Supply and Battery Connections

Battery Connections

When designing a circuit, keep the power wiring connections shorter than 50 mm. Refer to the connection diagram above for the proper wiring polarity.

The life expectancy of a battery power supply can be calculated by the following formula:

$t = A/I_c$

Where,
t: Life expectancy of battery (h)
A: Battery capacity (mAh)
I_c: H7E□-N□P current consumption (mA)

Example:
Battery life when using a 3-V lithium battery with a capacity of 1,200 mAh for the H7E□-N□P.

$t = 1,200 \text{ [mAh]}/20 \times 10^{-3} \text{ [mA]} = 60,000$ hours (approx. 6.8 years)

The battery capacity varies depending on the type of battery used; oxidized silver, mercury, or lithium battery.

Voltage Division of Power Supply Circuit

When necessary, the voltage from the battery may be divided by resistances:
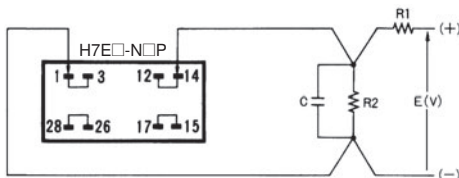
When doing so, however, ensure that the following equation balances:

$E \text{ (V)} \times R_2 / (R_1 + R_2) = 3 \text{ V}$

R	E		
	5 V	**12 V**	**24 V**
R_1	2 kΩ	9.1 kΩ	33 kΩ
R_2	3 kΩ	3 kΩ	4.7 kΩ

Allow a current high enough to flow through R_1 so that the H7E□-N□P receives sufficient current.

C is a film capacitor, of about 0.1 µF, and is intended to absorb noise induced by the power lines.

Keep the wiring between the H7E□-N□P and R_2 or C as short as possible (within 50 mm).

Backup Circuit for Protection Against Power Failure
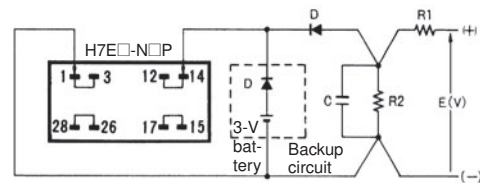
Use a diode (D) having a forward voltage as small as possible (0.1 V max. at I_F of 20 µA).

Determine the ratio of R_1 to R_2 in accordance with the forward voltage of the diode to be used. Be aware that when the power supplied to the H7E□-N□P has dropped to less than the voltage of the backup circuit, the battery will discharge.

To protect the circuit against a momentary power failure, an aluminum electrolyte capacitor can be used in place of a battery, as shown below:
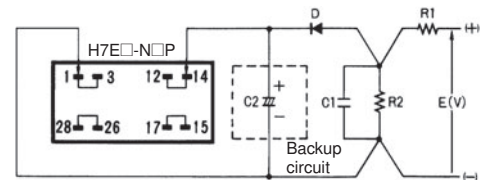
When a capacitor is used, its backup time can be calculated by the following formula:

$t = C (V_1 - V_2) / I_c$

Where,
t: Backup time (s)
C: Capacitance (µF)
V_1: Supply voltage before power failure (V)
V_2: Minimum operating voltage of H7E□-N□P (V)
I_c: H7E□-N□P current consumption (µA)

Example:
Backup time by an aluminum electrolytic capacitor of 100 µF. (Minimum operating voltage of H7E□-N□P is 2.6 V.)

$t = 100 \text{ µF} \times (3-2.6 \text{ V})/20 \text{ µA} = 100 \times 0.40/20 = 2.0$ seconds

Note that the above calculation provides an approximate value, which varies depending on the environment under which the Counter is used and also on the type of capacitors used. Provide some allowance in selecting capacitors.

Keep the wiring between the H7E□-N□P and R_2 or C as short as possible (within 50 mm).
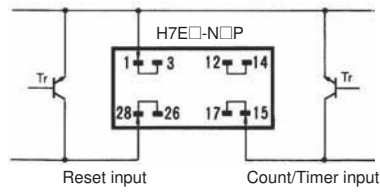
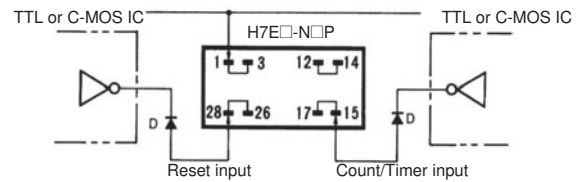## Input Connections

Input Connection Contact Input
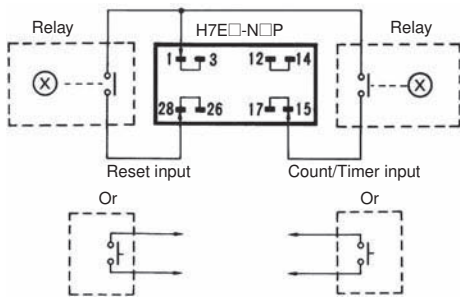
When the H7EC-NP is used, relay chattering may be counted. Use the H7EC-NLP, one of the low-speed input models.

Solid State Input

Open-collector Transistor Input

TTL or C-MOS IC Input

Use a transistor for input that satisfies the following conditions:
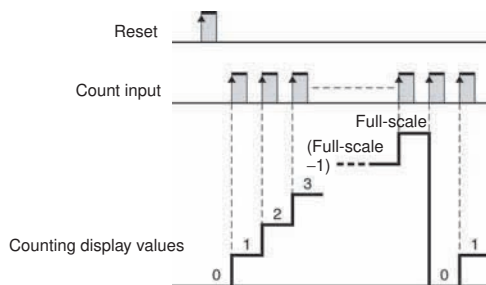Collector breakdown voltage ≥ 50 V
Leakage current < 1 μA
Use a diode (D) having a forward voltage as small as possible (0.1 V max. at I$_F$ of 20 μA).

Operation

■ Operating Modes

H7EC Total Counter

Incrementing Operation (Up)

H7ET Time Counter

Incrementing Operation (Up)