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



Self-powered Total Counter

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



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Model Number Structure

Model Number Legend

Note: Some configurations are not available.



1. Count Input

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

Ordering Information

Total Counters

Count input	Max. counting speed	Display	Model	
			Light-gray body	Black body
PNP/NPN universal DC voltage input	30 Hz $\leftarrow \rightarrow$ 1 kHz (switchable)	7-segment LCD with backlight	H7EC-NV-H	H7EC-NV-BH
(4.5 to 30 VDC)		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 $\leftarrow \rightarrow$ 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	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 in- put	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		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 k Ω)	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.
Reset input		No voltage input Maximum short-circuit impedance: 10 k Ω max. Short-circuit residual voltage: 0.5 V max. Minimum open impedance: 750 k Ω min.	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: Minimu	um signal width of 20 ms	
Terminal screw tightening torque	0.98 N·m max.		
Ambient tempera- ture	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

New H7EC

■ Characteristics

ltem	H7EC-NV-□ H7EC-NV-□H	H7EC-NFV-	H7EC-N-□
Insulation resistance	100 M Ω min. (at 500 VDC) between current-carrying metal parts and ex- posed non-current-carrying metal parts, and between the backlight power supply terminal and count input termi- nals/reset terminals for backlight mod- els	100 $M\Omega$ min. (at 500 VDC) between current-carrying metal parts and ex- posed non-current-carrying metal parts and between count input terminals and reset terminals	100 M Ω min. (at 500 VDC) between current-carrying metal parts and ex- posed non-current-carrying metal parts
Dielectric strength	1,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ex- posed non-current-carrying metal parts and between the backlight power sup- ply 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 ex- posed non-current-carrying metal parts 2,200 VAC, 50/60 Hz for 1 min between reset terminals and exposed non-cur- rent-carrying metal parts and between count input terminals and reset termi- nals	1,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and ex- posed non-current-carrying metal parts
Impulse withstand voltage	4.5 kV between current-carrying termi- nal and exposed non-current-carrying metal parts	 4.5 kV between current-carrying termi- nal and exposed non-current-carrying metal parts 3 kV between input terminals and reset terminals 	4.5 kV between current-carrying termi- nal 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)	\pm 1.5 kV (Between count input terminals)	±500 V (Between count input terminals/ Between reset terminals)
	±480 V (Between the backlight power supply terminals for backlight models)	±500 V (Between reset terminals)	
Static immunity	±8 kV (malfunction)		
Vibration resistance	Malfunction: 0.15-mm single amplitude Destruction: 0.375-mm single amplitude	at 10 to 55 Hz for 10 min each in 3 direct at 10 to 55 Hz for 2 hrs each in 3 direct	ions ions
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 Emission Enclosure: EN55011 Group 1 class B (EMS) EN61326 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 Rest EN61000-4-6: 0 V (0.15 to 80 MHz) (level 3)		
	Immunity Burst: EN	61000-4-4: 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)	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	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 μ A

New H7EC

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 ≥ 50 V Leakage current < 100 μ A

- 0V

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 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)



- 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 ≥ 50 V Leakage current < 1 μ A

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

Operation

■ Operating Modes

H7EC Total Counter



Nomenclature



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

Dimensions

Note: All units are in millimeters unless otherwise indicated.

H7EC-N



Dimensions with Y92F-34 Flush Mounting Bracket



Panel Cutout Separate 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





Y92F-35 >POM

Panel Cutout



Note: An interval of 40 mm is recommended for easier wiring.

Mounting is possible onto panels with a thickness of 1 to 5 mm.

• Do not allow the ambient temperature of the H7E -N to exceed the

Degree of protection (front): IP40 (not waterproof) • The minimum mounting interval is 30 mm.

The DIP switch of the H7ED-N can be operated in mounted condition. Vibration resistance and shock resistant are the same level as the H7E -N series.

192F-/5 Flush Mounting Adapter

Use mounting bracket supplied with the Counter







specifications (55°C).

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





(Color: light gray) 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



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(Color: light gray)







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



H7E -N P

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







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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.)

Y92S-36 Lithium Battery (3 V)





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

H7E□-N□P

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.

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



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.

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)

At reset input: 240 VDC 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 \Box -N,-N1, H7E \Box -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 \Box -NV \Box -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.

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