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

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

New Product

Multifunction Counter/Tachometer
H7CX-□-N

Ultra-compact Counter Provides More Complete Functionality.

Basic Features
- Short body with depth of only 59 mm (for 12 to 24-VDC Models with Screw Terminals).*1
- Better readability with character height of 12 mm on 4-digit models and 10 mm on 6-digit models.
- The present value display characters can be switched between red, green, and orange.*2

Safety and Reliability
- New set value limit and counter functions have been added.

Other Features
- Front Panel can be changed to white or light gray.*3
- New models with two tachometer inputs and two tachometer outputs have been added to the series.*4

*1.For 100 to 240-VAC Models with Screw Terminals: 78 mm, Models with Sockets: 63.7 mm (case dimension).
*2.The H7CX-A11 and H7CX-R11 have only red characters.
*3.The Front Panel can be replaced with an optional Front Panel (except for Tachometer-only Models).
*4.Only one prescale value provided.

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

Refer to *Safety Precautions* on page 52.

Features

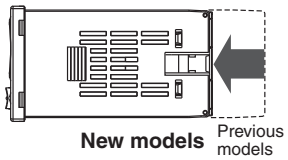
Basic Features

Ultra Short Body

The body depth has been greatly reduced. Helps in making thinner control panels.

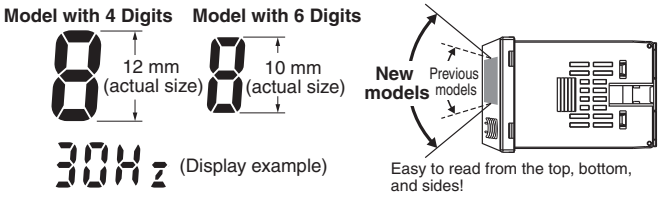
12 to 24-VDC Models with Screw Terminals: 59 mm
100 to 240-VAC Models with Screw Terminals: 78 mm*
Models with Sockets: 63.7 mm (case dimension)

* Power supply circuit and input circuits are isolated for safety and reliability.



Easier to Read

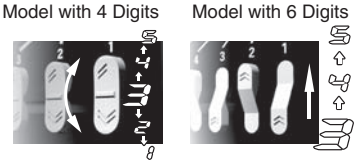
For better readability, the character height for the present value display is 12 mm on models with 4 digits, the largest class in the industry. The wide viewing angle and brightness provide excellent visibility. The number of display segments has also been increased to make settings easier to understand, and the present value display can be switched between red, green, and orange so that output status can be seen from a distance.



Note: The display color can be switched on all models except for the H7CX-A11 and H7CX-R11.

The Easiest Operation

Operation is simplified by the Up/Down Key for each digit on 4-digit models and Up Key for each digit on 6-digit models.



Safety and Reliability

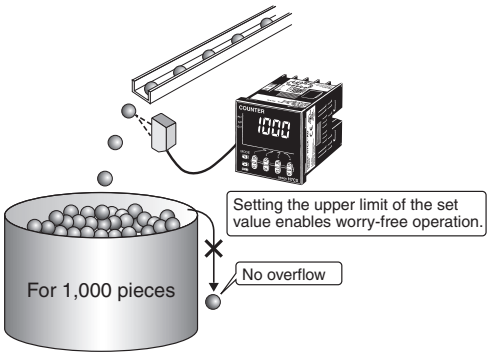
Isolated Power Supply and Input Circuits

Power supply circuit and input circuits are isolated inside the Counter/Tachometer. Previous non-isolated counters had wiring restrictions and could be damaged if wired incorrectly. The H7CX removes these worries.

Note: Except 12 to 24-VDC models.

Set Value Limit

You can set an upper limit for the set value to prevent unexpected operation of output devices caused by setting mistakes.



Output Counter

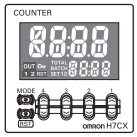
The output counter counts the number of times the output turns ON (alarms can be displayed and the count can be monitored in increments of 1,000 operations). This counter is useful in managing the service life of the Counter/Tachometer or the load.

Other Features

The front color can be changed simply by replacing the Front Panel.

The Front Panel can be replaced with an optional Front Panel (sold separately) with a different color to match the installation site. Select from black, white, and light gray (except for models with tachometer function only).


Black (Standard)


White


Light gray

Only the Front Panel can be replaced.

Universal NPN/PNP Input

DC 2-wire sensors can be connected for a wide range of input devices.

Waterproof, Dust-proof Structure (UL508 Type 4X and IP66)

Worry-free application is possible in locations subject to water.
Note: When the Y92S-29 Waterproof Packing is used.

Key Protection

Select from any of seven protection patterns. Use the best one for the application.

New Functions

Many useful functions have been added, including a Twin Counter Mode and many tachometer functions to handle even more applications.
New Tachometer Functions

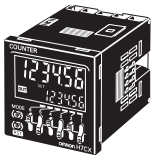
- Control with two independent inputs (independent measurements, differential, absolute ratio, and error ratio)
- Peak/bottom hold function
- Output hysteresis setting
- Output OFF delay
- Switching the measurement method (pulse cycle/pulse width)
- Startup time
- Auto-zero time
- Averaging method/Number of averaging times
- AMD-compatible Mode

Note: Refer to *"Model Configuration"* below, for details on applicable functions.

Model Number Structure

Model Configuration

H7CX Series

Model		H7CX-A-series Multifunction Preset Counter			H7CX-R-series Digital Tachometer	
						
Classification		Preset counter		Preset counter/tachometer	Tachometer	
Model		**H7CX-A□-N**	**H7CX-A4W□-N**	**H7CX-AW□-N/-AU□-N**	**H7CX-R11□-N**	**H7CX-R11W□-N**
Function	**1-stage preset counter**	Yes	Yes	Yes	No	
	2-stage preset counter	No	Yes	Yes	No	
	Total and preset counter	Yes	Yes	Yes	No	
	Batch counter	No	Yes	Yes	No	
	Dual counter	No	Yes	Yes	No	
	Twin counter	No	Yes	Yes	No	
	Tachometer	No	No	Yes*1	Yes	
Tachometer input		No	No	Yes 1 input or 2 inputs (independent measurements, differential, absolute ratio value, and error ratio value)	Yes 1 input	Yes 2 inputs (independent measurement) only
Settings		1-stage	2-stage		1-stage	
External connections		11-pin socket	Screw terminals		11-pin socket	
Display color of present value		Red	Red, green, or orange		Red	
Display digits		4 or 6 digits	4 digits	6 digits	6 digits	

*1. Set the tachometer input mode from the function setting mode to switch to the tachometer function.

Model Number Legend (Not all possible combinations of functions are available.)

H7CX-□□□□□□-N
1 2 3 4 5 6

1. Type

Symbol	Meaning
A	Standard type
R	Tachometer

2. External connections

Symbol	Meaning
None	Screw terminals
11	11-pin socket

3. Digits

Symbol	Meaning
None	6 digits
4	4 digits

4. Settings

Symbol	Meaning
None	1-stage setting
U	Factory-set to 1-stage setting
W	Factory-set to 2-stage setting*

* The H7CX-R11W□ is a 1-stage (2 inputs and outputs) rather than a 2-stage Counter.

5. Output type

Symbol	Meaning
None	Contact output or contact output + transistor output
S	Transistor output

6. Supply voltage

Symbol	Meaning
None	100 to 240 VAC at 50/60 Hz
D	12 to 24 VDC
D1	12 to 24 VDC/24 VAC at 50/60 Hz

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

List of Models

Type	Classification	Configuration	External connections	Settings	Display digits	Outputs	Power supply voltage	Model
H7CX-A Series	Preset counter	• 1-stage preset counter • Total and preset counter	11-pin socket	1-stage	4 digits	Contact output (SPDT)	100 to 240 VAC	**H7CX-A114-N**
						Transistor output (SPST)		**H7CX-A114S-N**
						Contact output (SPDT)	12 to 24 VDC/24 VAC	**H7CX-A114D1-N**
					6 digits	Contact output (SPDT)	100 to 240 VAC	**H7CX-A11-N**
						Transistor output (SPST)		**H7CX-A11S-N**
						Contact output (SPDT)	12 to 24 VDC/24 VAC	**H7CX-A11D1-N**
						Transistor output (SPST)		**H7CX-A11SD1-N**
			Screw terminals		4 digits	Contact output (SPDT)	100 to 240 VAC	**H7CX-A4-N**
						Transistor output (SPST)		**H7CX-A4S-N**
						Contact output (SPDT)	12 to 24 VDC	**H7CX-A4D-N**
						Transistor output (SPST)		**H7CX-A4SD-N**
					6 digits	Contact output (SPDT)	100 to 240 VAC	**H7CX-A-N**
						Transistor output (SPST)		**H7CX-AS-N**
						Contact output (SPDT)	12 to 24 VDC	**H7CX-AD-N**
						Transistor output (SPST)		**H7CX-ASD-N**
		• 1-stage preset counter • 2-stage preset counter • Total and preset counter • Batch counter • Dual counter • Twin counter		2-stage	4 digits	Contact output (SPST + SPDT)	100 to 240 VAC	**H7CX-A4W-N**
						Transistor output (DPST)	12 to 24 VDC	**H7CX-A4WSD-N**
	Preset counter/ Tachometer	• 1-stage preset counter • 2-stage preset counter • Total and preset counter • Batch counter • Dual counter • Twin counter • Tachometer			6 digits	Contact output (SPST + SPDT)	100 to 240 VAC	**H7CX-AW-N**
						Transistor output (DPST)		**H7CX-AWS-N**
						Contact output (SPST + SPDT)	12 to 24 VDC/24 VAC	**H7CX-AWD1-N**
						Transistor output (DPST)		**H7CX-AWSD1-N**
							12 to 24 VDC	**H7CX-AWSD-N**
						Contact output (SPDT) + Transistor output (SPST)	100 to 240 VAC	**H7CX-AU-N**
						Contact output (SPDT) + Transistor output (SPST)	12 to 24 VDC/24 VAC	**H7CX-AUD1-N**
						Transistor output (DPST)		**H7CX-AUSD1-N**
H7CX-R Series	Tachometer	• Tachometer	11-pin socket	1-stage (1 input and output)	6 digits	Contact output (SPDT)	100 to 240 VAC	**H7CX-R11-N**
							12 to 24 VDC/24 VAC	**H7CX-R11D1-N**
				1-stage (2 inputs and outputs)		Contact output (SPDT + SPST)	100 to 240 VAC	**H7CX-R11W-N**
							12 to 24 VDC/24 VAC	**H7CX-R11WD1-N**

Note: 1. The functions that are provided depend on the model. Check detailed specifications before ordering.
2. Refer to page page 37 and later for information on H7CX-R Tachometers.

Accessories (Order Separately)

Front Panels (Replacement Part)

Model	Color	Applicable Counters	Page
Y92P-CXC4G	Light gray (5Y7/1)	4-digit Counter	12
Y92P-CXC4S	White (5Y9.2/0.5)		
Y92P-CXC4B	Black (N1.5)		
Y92P-CXC6G	Light gray (5Y7/1)	6-digit Counter	
Y92P-CXC6S	White (5Y9.2/0.5)		
Y92P-CXC6B	Black (N1.5)		

Note: 1. You can change the color of the Front Panel when mounting the Counter. The Counter is shipped with a black (N1.5) Front Panel.
2. "COUNTER" is printed on the front of Replacement Front Panels.

Soft Cover

Model	Remarks	Page
Y92A-48F1	---	12

Hard Cover

Model	Remarks	Page
Y92A-48	---	12

Flush Mounting Adapter

Model	Remarks	Page
Y92F-30	Included with models with screw terminals.	12
Y92F-45	Use this Adapter to install the Counter/ Tachometer in a cutout previously made for a DIN 72 × 72 mm device (panel cutout: 68 × 68 mm).	

Waterproof Packing

Model	Remarks	Page
Y92S-29	Included with models with screw terminals.	12

Connection Sockets

Model	Classification	Connectable Counter/ Tachometers	Remarks	Page
P2CF-11	Front-connecting Socket	H7CX-□11□-N	---	13
P2CF-11-E	Front-connecting Socket (Finger-safe Type)		Round crimp terminals cannot be used on Finger-safe Sockets. Use forked crimp terminals.	
P3GA-11	Back-connecting Sockets		A Y92A-48G Terminal Cover can be used with the Socket to create a finger-safe construction.	

Terminal Covers for P3GA-11 Back-connecting Socket

Model	Remarks	Page
Y92A-48G	---	13

H7CX-A□-N Multifunction Preset Counter

- Easy to check the output status from a long distance with changing display colors*1 (red, green, and orange).
- Includes total and preset counter, batch counter, dual counter, twin counter, and tachometer.*2

*1. Not supported by the H7CX-A11□-N.
*2. The functions that can be selected depend on the model.

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

Specifications

Ratings

Item	Models	H7CX-A114□-N	H7CX-A11□-N	H7CX-A4□-N	H7CX-A□-N	H7CX-A4W□-N	H7CX-AW□-N/-AU□-N
Classification		Preset counter					Preset counter/ tachometer
Configuration		1-stage preset counter, 1-stage preset counter with total counter (selectable)*1				1-stage/2-stage preset counter, total and preset counter*1, batch counter, dual counter, and twin counter (selectable)	1-stage/2-stage preset counter, total and preset counter*1, batch counter, dual counter, twin counter, and tachometer (selectable)
Ratings	Power supply voltage*2	• 100 to 240 VAC, 50/60 Hz • 24 VAC, 50/60 Hz or 12 to 24 VDC		• 100 to 240 VAC, 50/60 Hz • 12 to 24 VDC			• 100 to 240 VAC at 50/ 60 Hz • 24 VAC at 50/60 Hz or 12 to 24 VDC • 12 to 24 VDC
	Operating voltage fluctuation range	85% to 110% of rated supply voltage (12 to 24 VDC: 90% to 110%)					
	Power consumption	Approx. 9.4 VA at 100 to 240 VAC, Approx. 7.2 VA/4.7 W at 24 VAC/12 to 24 VDC, Approx. 3.7 W at 12 to 24 VDC					
Mounting method		Flush mounting or surface mounting		Flush mounting			
External connections		11-pin socket		Screw terminals			
Degree of protection		IEC IP66, UL508 Type 4X (indoors) for panel surface only and only when Y92S-29 Waterproof Packing is used.					
Input signals		CP1, CP2, reset, and total reset				CP1, CP2, reset 1, and reset 2	
Counter	Maximum counting speed	30 Hz (minimum pulse width: 16.7 ms) or 10 kHz (minimum pulse width: 0.05 ms) (selectable) (ON/OFF ratio 1:1) *Common setting for CP1 and CP2					
	Input mode	Increment, decrement, increment/decrement (UP/DOWN A (command input), UP/DOWN B (individual inputs), or UP/DOWN C (quadrature inputs))					
	Output mode	N, F, C, R, K-1, P, Q, A, K-2, D, and L.				N, F, C, R, K-1, P, Q, A, K-2, D, L, and H.	
	One-shot output time	0.01 to 99.99 s					
	Reset system	External (minimum reset signal width: 1 ms or 20 ms, selectable), manual, and automatic reset (internal according to C, R, P, and Q mode operation)					
Tachometer		Refer to the separate table for tachometer function ratings.					
Prescaling function		Yes (0.001 to 9.999)	Yes (0.001 to 99.999)	Yes (0.001 to 9.999)	Yes (0.001 to 99.999)	Yes (0.001 to 9.999)	Yes (0.001 to 99.999)
Decimal point adjustment		Yes (rightmost 3 digits)					
Sensor waiting time		290 ms max. (Control output is turned OFF and no input is accepted during sensor waiting time.)					
Input method		No-voltage inputs: ON impedance: 1 kΩ max. (Leakage current: 12 mA at 0 Ω) ON residual voltage: 3 V max. OFF impedance: 100 kΩ min. Voltage input: High (logic) level: 4.5 to 30 VDC Low (logic) level: 0 to 2 VDC (Input resistance: approx. 4.7 kΩ) No-voltage input/voltage input (selectable)					
External power supply		12 VDC (±10%), 100 mA (except for H7CX-A□D models) Refer to *Precautions for Correct Use* on page page 53 for details.					
Control output		• Contact output: 3 A at 250 VAC/30 VDC, resistive load (cosϕ=1), Minimum applied load: 10 mA at 5 VDC (failure level: P, reference value) • Transistor output: NPN open collector, 100 mA at 30 VDC, Residual voltage: 1.5 VDC max. (approx. 1 V), Leakage current: 0.1 mA max.					
Display*3		7-segment, negative transmissive LCD Character height Count value: 12 mm (red) Set value: 6 mm (green)	7-segment, negative transmissive LCD Character height Count value: 10 mm (red) Set value: 6 mm (green)	7-segment, negative transmissive LCD Character height Count value: 12 mm (red, green, or orange selectable) Set value: 6 mm (green)	7-segment, negative transmissive LCD Character height Count value: 10 mm (red, green, or orange selectable) Set value: 6 mm (green)	7-segment, negative transmissive LCD Character height Count value: 12 mm (red, green, or orange selectable) Set value: 6 mm (green)	7-segment, negative transmissive LCD Character height Count value: 10 mm (red, green, or orange selectable) Set value: 6 mm (green)
Digits		4 digits –999 to 9999 (–3 digits to +4 digits)	6 digits –99999 to 999999 (–5 digits to +6 digits)	4 digits –999 to 9999 (–3 digits to +4 digits)	6 digits –99999 to 999999 (–5 digits to +6 digits)	4 digits –999 to 9999 (–3 digits to +4 digits)	6 digits –99999 to 999999 (–5 digits to +6 digits), tachometer: 0 to 999999
Memory backup		EEPROM (overwrites: 100,000 times min.) that can store data for 10 years min.					
Operating temperature range		–10 to 55°C (–10 to 50°C if Counter/Tachometers are mounted side by side) (with no icing or condensation)					
Storage temperature range		–25 to 70°C (with no icing or condensation)					
Operating humidity range		25% to 85%					
Case color		Black (N1.5) (Optional Front Panels are available to change the Front Panel color to light gray or white.)					
Attachments		---		Flush mounting adapter, waterproof packing, terminal cover			Flush mounting adapter, waterproof packing, terminal cover, label for DIP switch settings

*1. 1-stage preset counter and total counter functionality.
*2. Do not use the output from an inverter as the power supply.The ripple must be 20% maximum for DC power.
*3. The display is lit only when the power is ON. Nothing is displayed when power is OFF.

Tachometer Function Ratings

Model / Item	H7CX-A114□-N H7CX-A11□-N H7CX-A4□-N H7CX-A□-N H7CX-A4W□-N	H7CX-AW□-N/-AU□-N			
Input mode	No tachometer functionality	Selectable from independent measurements for 1 or 2 inputs, differential input for 2 inputs, absolute ratio for 2 inputs, and error ratio for 2 inputs.			
Pulse measurement method		Periodic measurement		Pulse width measurement	
Maximum counting speed		30 Hz (minimum pulse width: 16.7 ms)	1-input mode: 10 kHz (minimum pulse width: 0.05 ms) Other modes: 5 kHz (minimum pulse width: 0.1 ms)	30 Hz (minimum pulse width: 16.7 ms)	1-input mode: 10 kHz (minimum pulse width: 0.05 ms) Other modes: 5 kHz (minimum pulse width: 0.1 ms)
Minimum input signal width		---	---	30 ms*1	1-input mode: 0.2 ms Other modes: 0.4 ms*
Measuring ranges		0.001 to 30.00 Hz	1-input mode: 0.001 to 10 kHz, Other modes: 0.01 to 5 kHz	0.030 to 999999 s	1-input mode: 0.0002 to 99999 s Other modes: 0.0004 to 99999 s
Sampling period		200 ms min.	200 ms min. or continuous selectable (minimum interval of 10 ms)	Continuous (minimum interval of 10 ms)	
Measuring accuracy		±0.1% FS ±1 digit max. (at 23 ±5°C)			
Output mode		Input mode: Not 2-input independent measurement: HI-LO, AREA, HI-HI, LO-LO 2-input independent measurement: HI-HI, LO-LO			
Auto-zero time		0.1 to 999.9s			
Startup time		0.0 to 99.9s			
Averaging		Simple averaging/moving averaging selectable, Processing: OFF, 2, 4, 8, or 16 times			
Hold input		Minimum input signal width: 20 ms			

* An input OFF time of at least 20 ms is required.

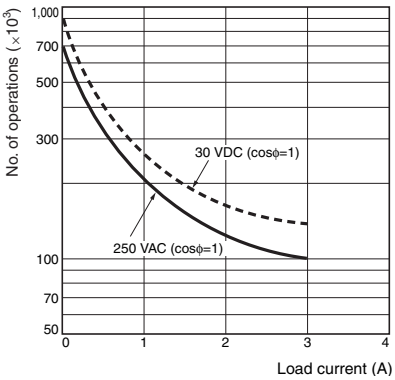
Characteristics

Insulation resistance		100 MΩ min. (at 500 VDC) between current-carrying terminals and exposed non-current-carrying metal parts, and between non-continuous contacts
Dielectric strength		2,000 VAC, 50/60 Hz for 1 min between current-carrying metal parts and non-current-carrying metal parts 2,000 VAC, 50/60 Hz for 1 min between power supply and input circuit for all models except H7CX-□D□ (1,000 VAC for 24 VAC/12 to 24 VDC) 1,000 VAC (for H7CX-□SD□), 50/60 Hz for 1 min between control output, power supply, and input circuit (2,000 VAC for models other than H7CX-□SD□) 1,000 VAC, 50/60 Hz for 1 min between non-continuous contacts
Impulse withstand voltage		3.0 kV between power terminals (1.0 kV for models with 24 VAC/12 to 24 VDC or 12 to 24 VDC) 4.5 kV between current-carrying terminals and exposed non-current-carrying metal parts (1.5 kV for models with 24 VAC/12 to 24 VDC or 12 to 24 VDC)
Noise immunity		±1.5 kV between power terminals (±480 V for models with 12 to 24 VDC) ±600 V between input terminals Square-wave noise by noise simulator (pulse width: 100 ns/1 μs, 1-ns rise)
Static immunity		Malfunction: 8 kV Destruction: 15 kV
Vibration resistance	Destruction	10 to 55 Hz with 0.75-mm single amplitude each in three directions for 2 h each
	Malfunction	10 to 55 Hz with 0.35-mm single amplitude each in three directions for 10 min each
Shock resistance	Destruction	300 m/s² each in three directions
	Malfunction	100 m/s² each in three directions
Life expectancy		Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min. (3 A at 250 VAC, resistive load, ambient temperature condition: 23°C)*
Weight		Approx. 130 g (Counter only)

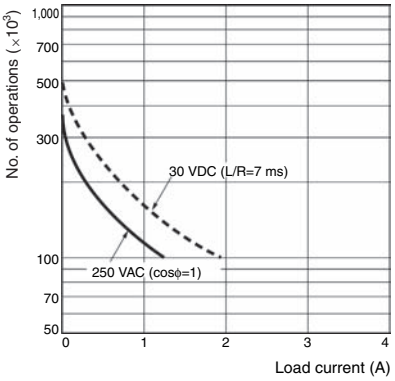
* Refer to the Life-test Curve.

Life-test Curve (Reference Values)

Resistive load



Inductive load



A current of 0.15 A max. can be switched at 125 VDC (cosϕ=1) and current of 0.1 A max. can be switched if L/R=7 ms. In both cases, a life of 100,000 operations can be expected.

Applicable Standards

Approved safety standards	cULus (or cURus): UL508/CSA C22.2 No. 14 *1 EN 61010-1 (IEC 61010-1): Pollution degree 2/overvoltage category II B300 PILOT DUTY 1/4 HP 120 VAC, 1/3 HP, 240 VAC, 3 A resistive load VDE0106/P100 (finger protection)		
EMC	(EMI)	EN61326-1 *2	
	Emission Enclosure:	EN 55011 Group 1 class A	
	Emission AC mains:	EN 55011 Group 1 class A	
	(EMS)	EN61326-1 *2	
	Immunity ESD:	EN 61000-4-2:	4 kV contact discharge; 8 kV air discharge
	Immunity RF-interference:	EN 61000-4-3:	10 V/m (Amplitude-modulated, 80 MHz to 1 GHz); 10 V/m (Pulse-modulated, 900 MHz ±5 MHz)
	Immunity Conducted Disturbance:	EN 61000-4-6:	10 V (0.15 to 80 MHz)
	Immunity Burst:	EN 61000-4-4:	2 kV power-line; 1 kV I/O signal-line
	Immunity Surge:	EN 61000-4-5:	1 kV line to lines (power and output lines); 2 kV line to ground (power and output lines)
	Immunity Voltage Dip/Interruption:	EN 61000-4-11:	0.5 cycle, 100% (rated voltage)

*1. The following safety standards apply to models with sockets (H7CX-A11□ or H7CX-A114□).
cUL (Listing): Applicable when an OMRON P2CF(-E) Socket is used.
cUR (Recognition): Applicable when any other socket is used.
*2. Industrial electromagnetic environment (EN/IEC 61326-1 Table 2)

I/O Functions

Using as a Counter*1

Inputs	**CP1, CP2**	(1) In general (except for Dual Counter Mode) • Reads counting signals. • Increment, decrement, command, individual, and quadrature inputs accepted. (2) When used as a dual counter or twin counter • Reads CP1 count signals with CP1 input and CP2 count signals with CP2 input. • Increment signals can be input.
	Reset/reset 1	(1) In general (except for Dual Counter Mode) • Resets present value and outputs (OUT2 when using the batch counter)*2. • Counting cannot be performed during reset/reset 1 input. • Reset indicator is lit while reset input is ON. (2) When used as a dual counter or twin counter. • Resets the CP1 present value (to 0). • Counting for CP1 input cannot be performed while the reset 1 input is ON. • The reset indicator is lit while the reset 1 input is ON.
	Total reset or reset 2	The reset function depends on the selected configuration*3.
Outputs	**OUT1, OUT2**	Outputs signals according to the specified output mode when a set value is reached.

*1. For information on operation of I/O functions, refer to pages page 22 to page 25.
*2. In increment mode or increment/decrement mode, the present value returns to 0; in decrement mode, the present value returns to the set value with 1-stage models, and returns to set value 2 with 2-stage models.
*3. Reset operates as described in the following table. (The reset indicator will not be lit.)

Configuration	Reset operation
1-stage/2-stage preset counter	Does not operate (not used).
Total and preset counter	• Resets the total count value. • The total count value is held at 0 while the total reset input is ON.
Batch counter	• Resets the batch count value and batch output (OUT1). • The batch count value is held at 0 while the reset 2 input is ON.
Dual counter	• Resets the CP2 present value. • Counting for CP2 input cannot be performed while the reset 2 input is ON.
Twin counter	• Resets the CP2 present value.

- The following table shows the delay from when the reset signal is input until the output is turned OFF. (Reference values)

Minimum reset signal width	Output delay time
1 ms	0.8 to 1.2 ms
20 ms	15 to 25 ms

Operating Procedures (Tachometer Function)

Inputs	**CP1, CP2**	Reads counting signals. (The CP2 input can be used when the input mode is not 1-input mode.)
	Reset/reset 1	• Holds the measurement value and outputs. (The reset 2 input can be used when the input mode is 2-input independent measurement.) • Functions as a hold input. The measurement value (displayed value) and the outputs are held while the RST Key on the front panel is pressed. • The reset indicator is lit when the value is being held.
Outputs	**OUT1, OUT2**	Outputs signals according to the specified output mode when a set value is reached.

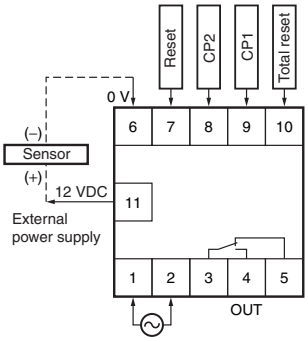
Connections

Terminal Arrangement

Confirm that the power supply meets specifications before use.

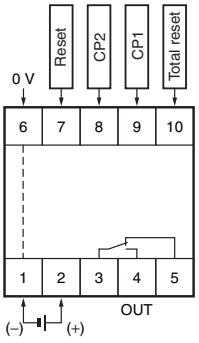
H7CX-A-N/-A4-N

1-stage Contact Output



H7CX-AD-N/-A4D-N

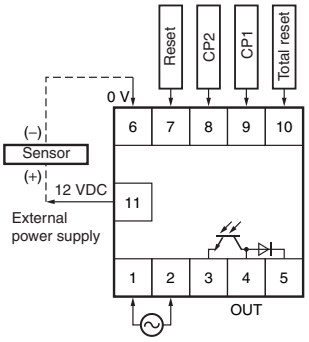
1-stage Contact Output



Terminals 1 and 6 are connected internally.

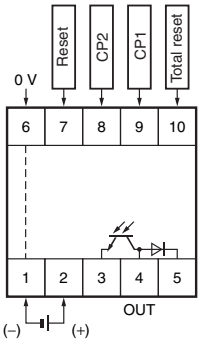
H7CX-AS-N/-A4S-N

1-stage Transistor Output



H7CX-ASD-N/-A4SD-N

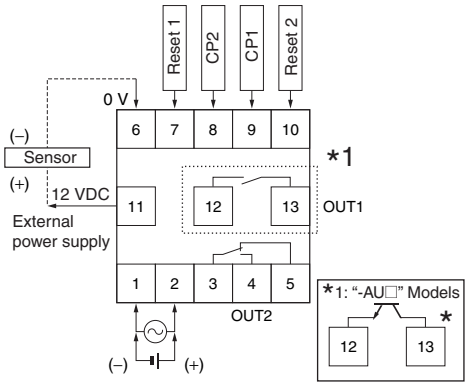
1-stage Transistor Output



Terminals 1 and 6 are connected internally.

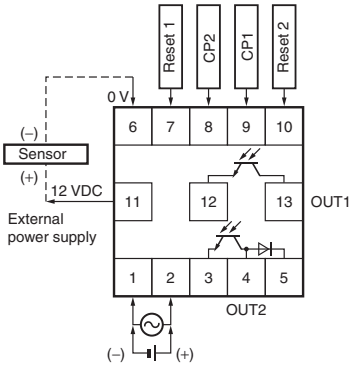
H7CX-AW-N/-A4W-N/-AWD1-N/-AU-N/-AUD1-N

2-stage Contact Output



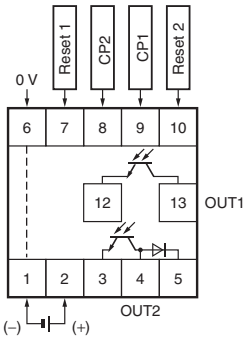
H7CX-AWS-N/-AWSD1-N/-AUSD1-N

2-stage Transistor Output



H7CX-AWSD-N/-A4WSD-N

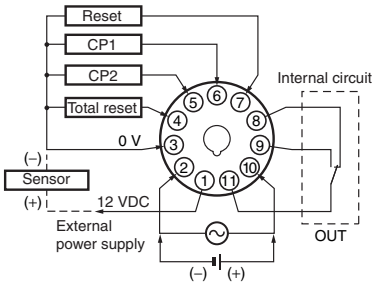
2-stage Transistor Output



Terminals 1 and 6 are connected internally.

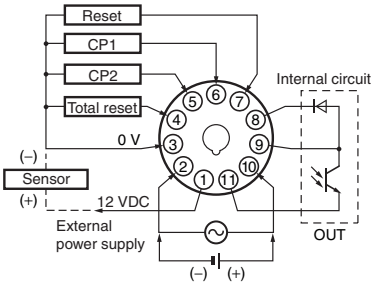
H7CX-A11-N/-A114-N/-A11D1-N/-A114D1-N

1-stage Contact Output



H7CX-A11S-N/-A114S-N/-A11SD1-N

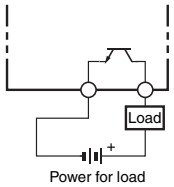
1-stage Transistor Output



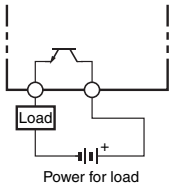
Transistor Output

- The transistor output of the H7CX is isolated from the internal circuitry by a photocoupler, so the transistor output can be used as both NPN and PNP output.

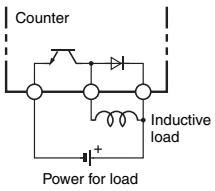
NPN Output



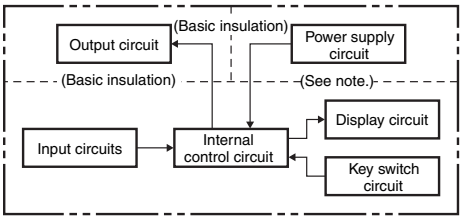
PNP Output



- The diode connected to the collector of the output transistor is used to absorb inverted voltage that is generated when an inductive load is connected to the H7CX.



Block Diagram

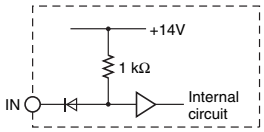


Note: All models except for H7CX-□D-N have basic insulation.

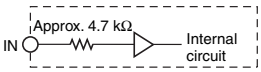
Input Circuits

CP1, CP2, Reset/Reset 1, and Total Reset/Reset 2 Input

No-voltage Inputs (NPN Inputs)



Voltage Inputs (PNP Inputs)

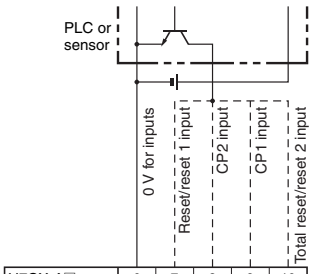


Input Connections

The inputs of the H7CX-□-N are no-voltage (short-circuit or open) inputs or voltage inputs.

No-voltage Inputs (NPN Inputs)

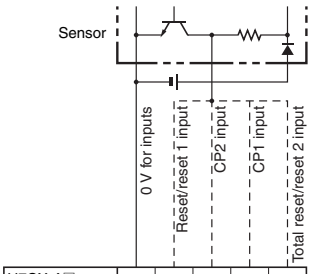
Open Collector



H7CX-A□	6	7	8	9	10
H7CX-A11□	3	7	5	6	4

Note: Operates with transistor ON.

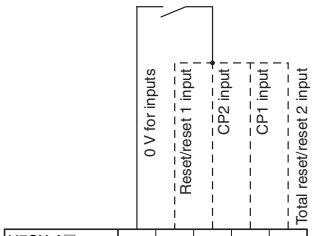
Voltage Output



H7CX-A□	6	7	8	9	10
H7CX-A11□	3	7	5	6	4

Note: Operates with transistor ON.

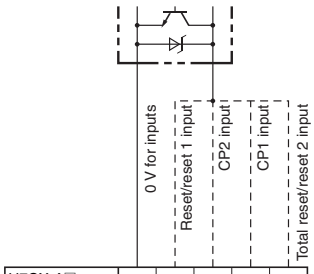
Contact Input



H7CX-A□	6	7	8	9	10
H7CX-A11□	3	7	5	6	4

Note: Operates with relay ON.

DC Two-wire Sensor



H7CX-A□	6	7	8	9	10
H7CX-A11□	3	7	5	6	4

Note: Operates with transistor ON.

No-voltage Input Signal Levels

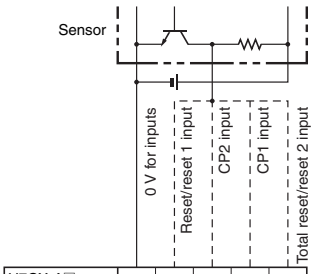
No-contact input	Short-circuit level (transistor ON) • Residual voltage: 3 V max. • Impedance when ON: 1 kΩ max. (The leakage current is approx. 12 mA when the impedance is 0 Ω.)
	Open level (transistor OFF) • Impedance when OFF: 100 kΩ min.
Contact input	Use contacts which can adequately switch 5 mA at 10 V.

Note: The DC voltage must be 30 VDC max.

Applicable Two-wire Sensor
• Leakage current: 1.5 mA max. • Switching capacity: 5 mA min. • Residual voltage: 3 VDC max. • Operating voltage: 10 VDC

Voltage Inputs (PNP Inputs)

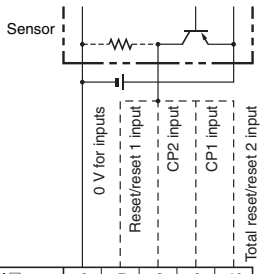
No-contact Input (NPN Transistor)



H7CX-A□	6	7	8	9	10
H7CX-A11□	3	7	5	6	4

Note: Operates with transistor OFF.

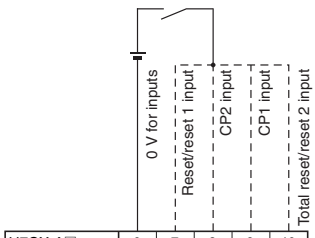
No-contact Input (PNP Transistor)



H7CX-A□	6	7	8	9	10
H7CX-A11□	3	7	5	6	4

Note: Operates with transistor ON.

Contact Input



H7CX-A□	6	7	8	9	10
H7CX-A11□	3	7	5	6	4

Note: Operates with relay ON.

Voltage Input Signal Levels

High level (input ON): 4.5 to 30 VDC
Low level (input OFF): 0 to 2 VDC

Note: 1. The DC voltage must be 30 VDC max.
2. Input resistance: Approx. 4.7 kΩ

Nomenclature

Display Section

1. Key Protect Indicator (orange)

2. Control Output Indicator (orange)
OUT: (One-stage)
OUT: 1 2 (Two-stage)

3. Reset Indicator (orange)
(Lit when the reset input (1) or Reset Key is ON.)
Displayed only when the configuration selection mode is not tachometer mode.

4. Total Count Indicator
(Lit when the total count value is displayed.)

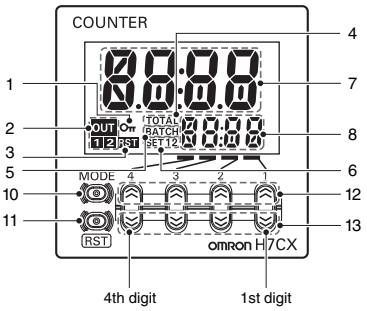
5. Batch Indicator
(Lit when the batch count value is displayed.)

6. Set Value 1, 2 Stage Indicator

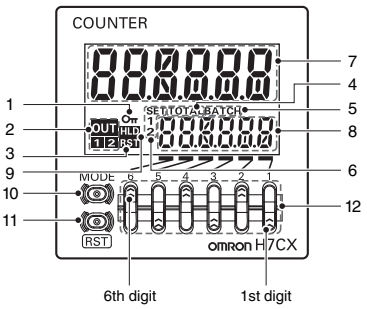
7. Present Value (Main Display)
(Character height: 12 mm (6-digit: 10 mm), red*)
* Characters on models with screw terminals (H7CX-A11□) can be switched between red, green, and orange.

8. Set value (Sub-display)
(Character height: 6 mm, green)

9. Hold Display (orange)
Displayed only when the configuration selection mode is not tachometer mode.



(Front view of 4-digit model)



(Front view of 6-digit model)

Operation Keys

10. Mode Key
(Changes modes and setting items.)

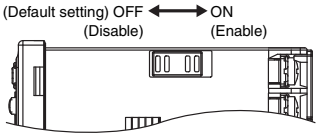
11. Reset Key (See note.)

12. Up Keys 1 to 4
(6-digit models: 1 to 6)

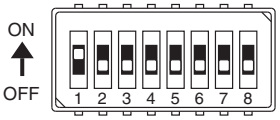
13. Down Keys 1 to 4

Switches

14. Key-protect Switch

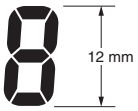


15. DIP Switch



Model with 4 Digits

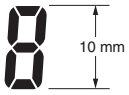
Character Size for Main Display



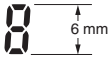
Character Size for Sub-display

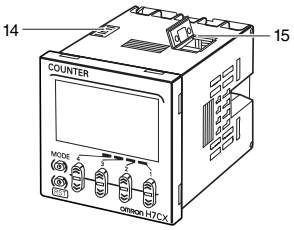
Model with 6 Digits

Character Size for Main Display



Character Size for Sub-display





Note: The reset functions depends on the selected configuration.

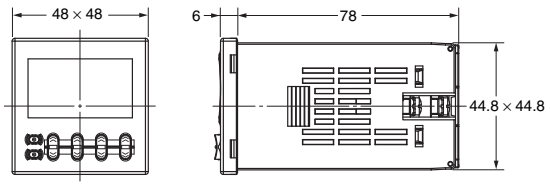
Configuration	Reset operation
1-stage/2-stage preset counter	Resets the present value and outputs.
Total and preset counter	• Resets the present value and outputs. • When the total count value is displayed, resets the present value, the total count value, and outputs.
Batch counter	• Resets the present value and OUT2. • When the batch count value is displayed, resets the present value, the batch count value, and outputs.
Dual counter	Resets the CP1 present value, CP2 present value, dual count value, and outputs.
Twin counter	Resets the CP1 present value and output 1 when the CP1 present value is displayed. Resets the CP2 present value and output 2 when the CP2 present value is displayed.
Tachometer	Holds the measurement value and outputs (hold function). (When the input mode is 2-input independent measurement, the CP1 measurement value display will hold the CP1 measurement value and output 1 and the CP2 measurement value display will hold the CP2 measurement value and output 2.)

Dimensions

(Unit: mm)

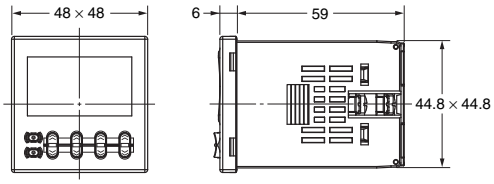
Counters

H7CX-A-N/-AS-N/-AW-N/-AWS-N/-AWD1-N/-AWSD1-N/-A4-N/-A4S-N/-A4W-N/-AU-N/-AUD1-N/-AUSD1-N
(Flush Mounting Models)



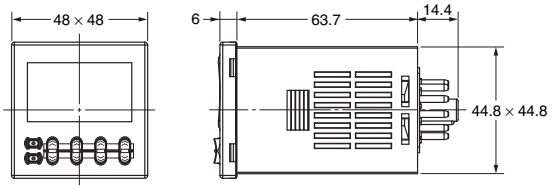
Note: M3.5 terminal screw (effective length: 6 mm)

H7CX-AD-N/-ASD-N/-AWSD-N/-A4D-N/-A4SD-N/-A4WSD-N (Flush Mounting Models)



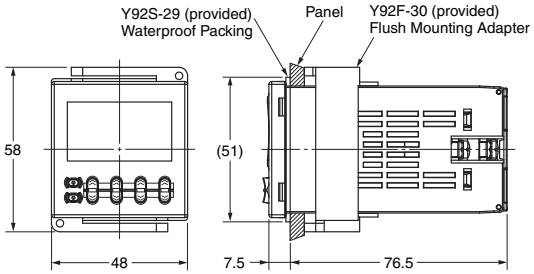
Note: M3.5 terminal screw (effective length: 6 mm)

H7CX-A11-N/-A11S-N/-A11D1-N/-A11SD1-N/-A114-N/-A114S-N/-A114D1-N (Flush Mounting/Surface Mounting Models)

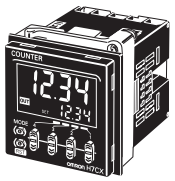


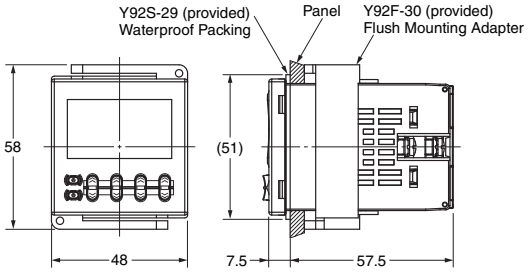
Dimensions with Flush Mounting Adapter

H7CX-A-N/-AS-N/-AW-N/-AWS-N/-AWD1-N/-AWSD1-N/-A4-N/-A4S-N/-A4W-N (Provided with Adapter and Waterproof Packing)

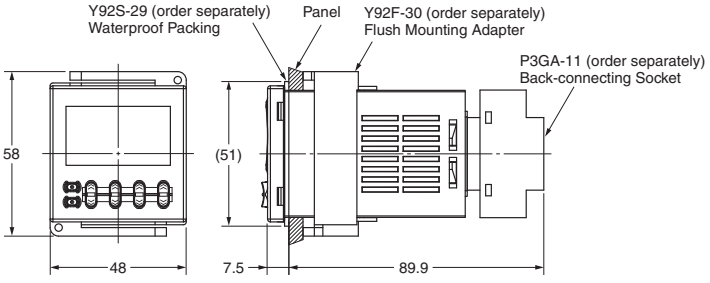


H7CX-AD-N/-ASD-N/-AWSD-N/-A4D-N/-A4SD-N/-A4WSD-N (Provided with Adapter and Waterproof Packing)



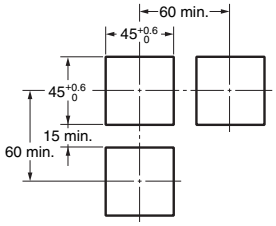


H7CX-A11-N/-A11S-N/-A11D1-N/-A11SD1-N/-A114-N/-A114S-N/-A114D1-N (Adapter and Waterproof Packing Ordered Separately)



Panel Cutouts

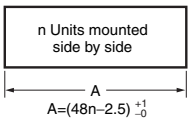
Panel cutouts are as shown below. (according to DIN43700).



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

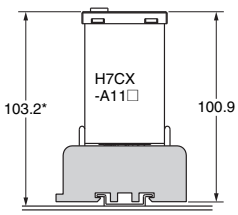
2. To allow easier operation, it is recommended that Adapters be mounted so that the gap between sides with hooks is at least 15 mm (i.e., with the panel cutouts separated by at least 60 mm).

3. It is possible to horizontally mount Timers side by side. Attach the Flush Mounting Adapters so that the surfaces without hooks are on the sides of the Timers. If they are mounted side-by-side, water-resistance will be lost.



With Y92A-48F1 attached.
A={48n–2.5+(n–1)×4} +1 –0
With Y92A-48 attached.
A=(51n–5.5) +1 –0

Dimensions with Front Connecting Socket



P2CF-11(-E) Front Connecting Socket
(order separately)

* These dimensions depend on the kind of DIN Track. (Reference value)

Accessories (Order Separately)

Note: Depending on the operating environment, the condition of resin products may deteriorate, and may shrink or become harder. Therefore, it is recommended that resin products are replaced regularly.

Front Panel (Replacement Part)

You can change the color of the Front Panel when mounting the Counter/Tachometer. The Counter/Tachometer is shipped with a black (N1.5) Front Panel. "COUNTER" is printed on the front of Replacement Front Panels.

Y92P-CXC4G

4-digit Counter
Light gray (5Y7/1)

Y92P-CXC4S

4-digit Counter
White (5Y9.2/0.5)

Y92P-CXT4B

4-digit Counter
Black (N1.5)

Y92P-CXT6G

6-digit Counter
Light gray (5Y7/1)

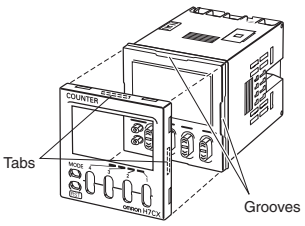
Y92P-CXT6S

6-digit Counter
White (5Y9.2/0.5)

Y92P-CXT6B

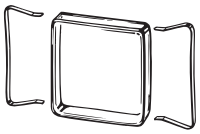
6-digit Counter
Black (N1.5)

Replacement Method

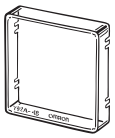


The Front Panel is attached to the Counter/Tachometer with tabs in four locations. To remove the Front Panel, open the tabs and pull the Front Panel forward. To attach the Front Panel, press it onto the Counter/Tachometer so that all four tabs lodge into the grooves on the body of the Counter/Tachometer.

Soft Cover
Y92A-48F1



Hard Cover
Y92A-48



Protecting the Counter/Tachometer in Environments Subject to Oil

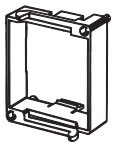
The H7CX's panel surface is water-resistive (conforming to IP□6, UL Type 4X) and so even if drops of water penetrate the gaps between the keys, there will be no adverse effect on internal circuits. If, however, there is a possibility of oil being present on the operator's hands, use the Soft Cover. The Soft Cover ensures protection equivalent to IP54F against oil. Do not, however, use the H7CX in locations where it would come in direct contact with oil.

Flush Mounting Adapter

Y92F-30

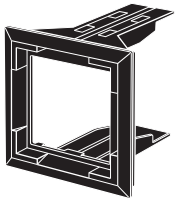
Order the Flush Mounting Adapter with the following model number separately if it is lost or damaged.

Note: The Waterproof Packing is included with models with screw terminals.



Y92F-45

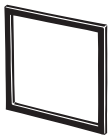
Use this Adapter to install the Counter/Tachometer in a cutout previously made for a DIN 72 × 72 mm device (panel cutout: 68 × 68 mm).



Waterproof Packing

Y92S-29

Note: The Waterproof Packing is included with models with screw terminals.

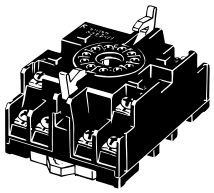
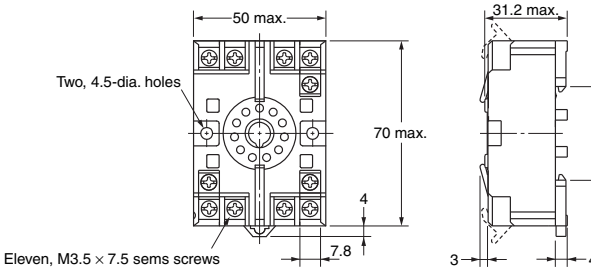
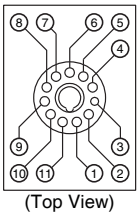
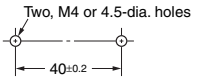
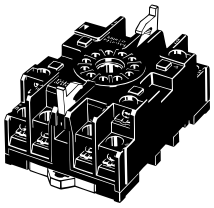
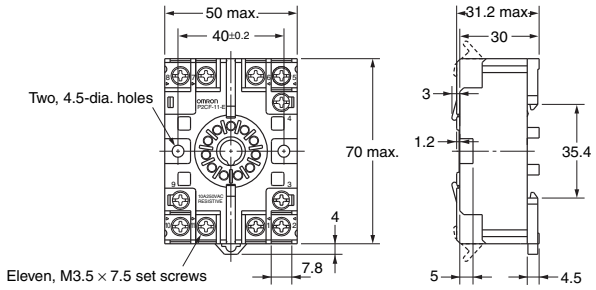


Order the Waterproof Packing separately if it is lost or damaged. The Waterproof Packing can be used to achieve IP66 protection.

The Waterproof Packing will deteriorate, harden, and shrink depending on the application environment. To ensure maintaining the IP□6, UL Type 4X waterproof level, periodically replace the Waterproof Packing. The periodic replacement period will depend on the application environment. You must confirm the proper replacement period. Use 1 year or less as a guideline. If the Waterproof Packing is not replaced periodically, the waterproof level will not be maintained. It is not necessary to mount the Waterproof Packing if waterproof construction is not required.

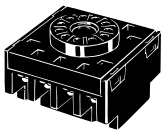
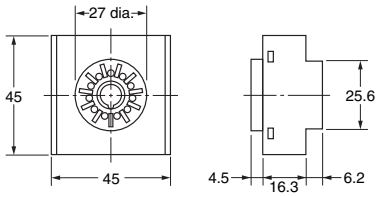
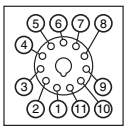
Connection Sockets

Front Connecting Socket

Model	Dimensions	Terminal arrangement and internal connections	Mounting hole dimensions
P2CF-11 		 (Top View)	 **Note:** The Socket can also be mounted to DIN track.
P2CF-11-E **(Finger-safe Type)** 			

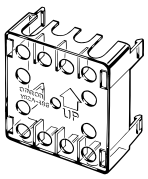
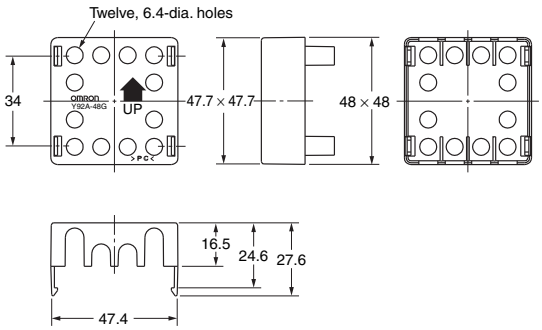
Note: Round crimp terminals cannot be used on Finger-safe Sockets. Use forked crimp terminals.

Back-connecting Sockets

Model	Dimensions	Terminal arrangement and internal connections
P3GA-11 		 (Bottom View)

Note: A Y92A-48G Terminal Cover can be used with the Socket to create a finger-safe construction.

Terminal Covers for P3GA-11 Back-connecting Socket

Model	Dimensions
Y92A-48G 	

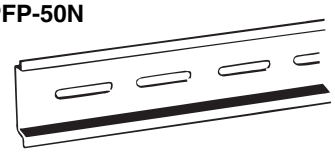
Note: The Terminal Cover can be used with a Back-mounting Socket (P3GA-11) to create a finger-safe construction.

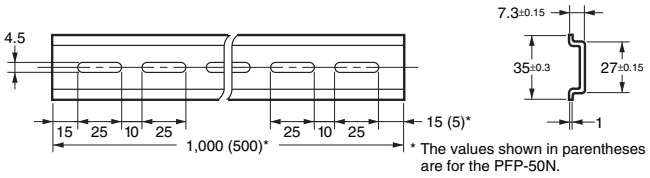
Optional Products for Track Mounting

Mounting Track

PFP-100N

PFP-50N

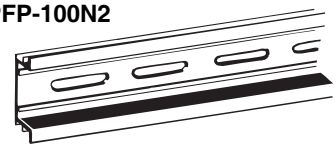


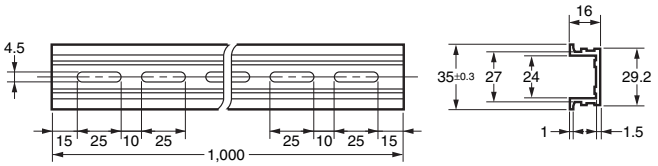


* The values shown in parentheses are for the PFP-50N.

Mounting Track

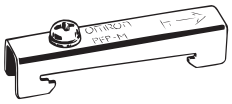
PFP-100N2

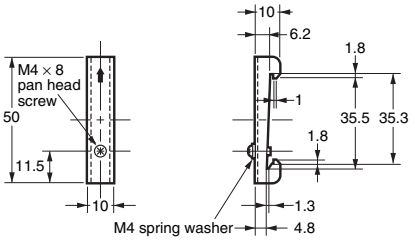




End Plate

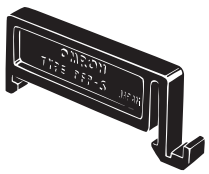
PFP-M

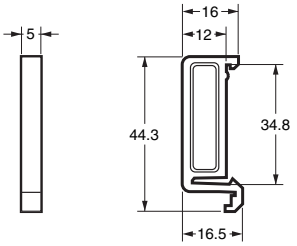




Spacer

PFP-S





Note: Order Spacers in increments of 10.

Operating Procedures

Setting Procedure Guide

Setting for Counter Operation *

Use the following settings.

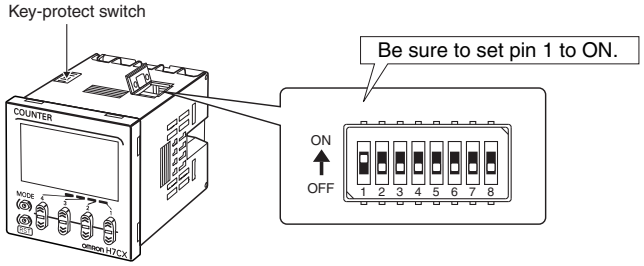
Setting for Tachometer Operation *

Refer to page page 27.

* At the time of delivery, the H7CX is set to the 1-stage preset counter configuration. (2-stage models are set to the 2-stage preset counter configuration.) Refer to page page 35 for information on switching models.

I/O Functions for Counter Operation

Step1 Set the basic parameters.
(If the desired I/O mode is not listed below or to set all parameters using the front panel keys, perform **Step3**, below.)



	Item	OFF	ON
1	DIP switch settings	Disabled	Enabled
2	Counting speed	30 Hz	5 kHz
3	Input mode	UP	DOWN
4	Output mode	Refer to the table on the right.	
5			
6	Output time	0.5 s	0.05 s
7	Minimum reset signal	20 ms	1 ms
8	Input selection	NPN	PNP

Pin 4	Pin 5	Output mode
OFF	OFF	N
ON	OFF	F
OFF	ON	C
ON	ON	K-1

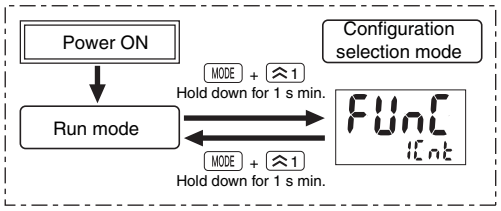
Note: All pins are factory-set to OFF.

- When setting functions using the DIP switch, be sure to set pin 1 of the DIP switch to ON.
- DIP switch settings are effective when the power is turned ON again. (Perform DIP switch settings while the power is OFF.)

Step2 The H7CX-A□-N is a Counter that contains more than one functional counter.
When using the Counter in any mode other than the default mode*, use the following chart to enter Configuration Selection Mode and set the functions that are suitable to the application.

* The default mode is 1-stage preset counter configuration (2-stage preset counter configuration for 2-stage models).

Note: **Step2** can be performed first, followed by **Step1** .



Select the function from Table 1 using the ↑ (↓) Key.

1Cnt ↔ 2Cnt ↔ tCnt ↔ bCnt ↔ dCnt ↔ twn ↔ tAcō

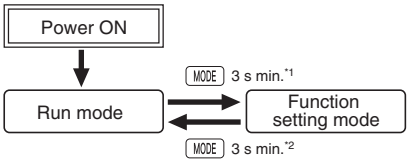
(1-stage preset counter) (2-stage preset counter) (Total and preset counter) (Batch counter) (Dual counter) (Twin counter) (Tachometer)

Note: The configuration that can be selected depends on the model.

After making DIP switch settings for basic operations, advanced functions can be added using the operation keys.
For details, refer to page page 16.

Step3 Parameters that cannot be set with the DIP switch are set with the operation keys on the front panel.

Change to Function Setting Mode.



For details on operations and display in run mode, refer to page page 20.
The display depends on the selected configuration.

*1 If the mode is switched to the function setting mode during operation, operation will continue.
*2 Changes made to settings in function setting mode are enabled for the first time when the mode is changed to run mode. Also, when settings are changed, the counter is reset (present value initialized and output turned OFF) on returning to run mode.

The characters displayed in reverse video are the default settings.
When performing settings with operation keys only, set pin1 of the DIP switch to OFF (factory setting).
If pin 1 of the DIP switch is set to ON, the setting items indicated by ▭ will not be displayed.
For 6-digit models, only ▲ Keys are provided.
Displays for 6-digit models are given in parentheses.

Function Setting Mode

*3

Input mode (CNTM) — display: CNTM / UP

- Set the input mode using the ▲ (▼) Keys.

*5 *5
UP (UP) ↔ dOWN (DOWN) ↔ Ud-A (UP/DOWN A) ↔ Ud-b (UP/DOWN B) ↔ Ud-C (UP/DOWN C)

Note: Displayed only when Twin Counter Mode is not selected.
*5 Displayed for output modes other than K-2, D, L, and H only.

MODE

Output mode (OUTM) — display: OUTM / n

- Set the output mode using the ▲ (▼) Keys.

n (N) ↔ F (F) ↔ C (C) ↔ r (R) ↔ K-1 (K-1) ↔ P (P) ↔ Q (Q) ↔ A (A) ↔ K-2 (K-2)*6 ↔ d (D)*6 ↔ L (L)*6 ↔ H (H)*6

*6 Displayed only when the input mode is Ud-A, Ud-b, or Ud-C. (Not displayed when the function is set to EXn.)

MODE

*7

Output time (OTIM) — display: OTIM / 0.50

- Set each digit using the individual ▲ (▼) Keys.

0.01 ~ 0.50 ~ 99.99
(0.01 s) (0.50 s) (99.99 s)

Note: Displayed only when the output mode is C, R, K-1, P, Q, A, or K-2.

MODE

Counting speed (CNTS) — display: CNTS / 30Hz

- Set the counting speed using the ▲ (▼) Keys.

30Hz ↔ 5kHz
(30 Hz) (5 kHz) *

* The display shows 5 kHz, but the maximum counting speed is 10 kHz.

MODE

Reset input signal width (IFLT) — display: IFLT / 20mS

- Set the Reset input signal width using the ▲ (▼) Keys.

20mS ↔ 1mS
(20 ms) (1 ms)

MODE

Decimal point position (DP) — display: dP / ----

- Set the decimal point position using the ▲ (▼) Keys.

----[------] ↔ ---.-[-----.-] ↔ --.--[----.--] ↔ -.---[---.---]
(No decimal point) (One digit after decimal point) (Two digits after decimal point) (Three digits after decimal point)

MODE

Prescale value (PSCL) — display: PSCL / 1.000

- Set each digit using the individual ▲ (▼) Keys.

0.001 ~ 1.000 ~ 9.999 [99.999]
(0.001) (1.000) (9.999) (99.999)

MODE

NPN/PNP input mode (IMOD) — display: IMOD / nPn

- Set the NPN/PNP input mode using the ▲ (▼) Keys.

nPn ↔ PnP
(NPN input) (PNP input)

MODE

Display color (COLR) — display: COLR / rEd

- Set the display color using the ▲ (▼) Keys.

rEd ↔ Grn ↔ orG ↔ r-G ↔ G-r ↔ r-o ↔ o-r ↔ G-o ↔ o-G
(Red) (Green) (Orange) (Red-green) (Green-red) (Red-orange) (Orange-red) (Green-orange) (Orange-green)

Note: Displayed for terminal-block models (except H7CX-A11□) only.

MODE

From next page To next page

*3 When Using Dual Counter Operation

CALm / Add — Dual count calculating mode (ADD)

- Set the dual count calculating mode using the ▲▼ Keys.

*4
Add ↔ Sub
(Addition) (Subtraction)

*4 Displayed only when the output mode is K-2, D, L, or H.

Usage as a Decrementing Counter (Sub)

The Sub parameter is normally not displayed. You must set the oUtn parameter shown below in advance to *6 (K-2, d, L, or H) to display it.

*7 Set each digit using the individual ▲ (▼) Keys.

When using as a 2-stage preset counter

One-shot output 2 time (OTM2) — display: OTM2 / 0.50

0.01 ~ 0.50 ~ 99.99
(0.01 s) (0.50 s) (99.99 s)

Note: Displayed only when the output mode is C, R, K-1, P, Q, A, or K-2.

MODE

One-shot output 1 time (OTM1) — display: OTM1 / HoLd

HoLd / 0.01 ~ 99.99
(Outputs held) (0.01 s) (99.99 s)

If the output time is 0.00, HoLd is displayed.

Note: Displayed for output modes other than D, L, and H. HOLD cannot be set when the output mode is K-2.

When using as a batch counter

One-shot output 2 time (OTM2) — display: OTM2 / 0.50

0.01 ~ 0.50 ~ 99.99
(0.01 s) (0.50 s) (99.99 s)

Note: Displayed only when the output mode is C, R, K-1, P, Q, A, or K-2.

*7 Set each digit using the individual ▲ (▼) Keys.

Twin Counter

Output 2 output time (OTM2) — display: OTM2 / 0.50

0.01 ~ 0.50 ~ 99.99
(0.01 s) (0.50 s) (99.99 s)

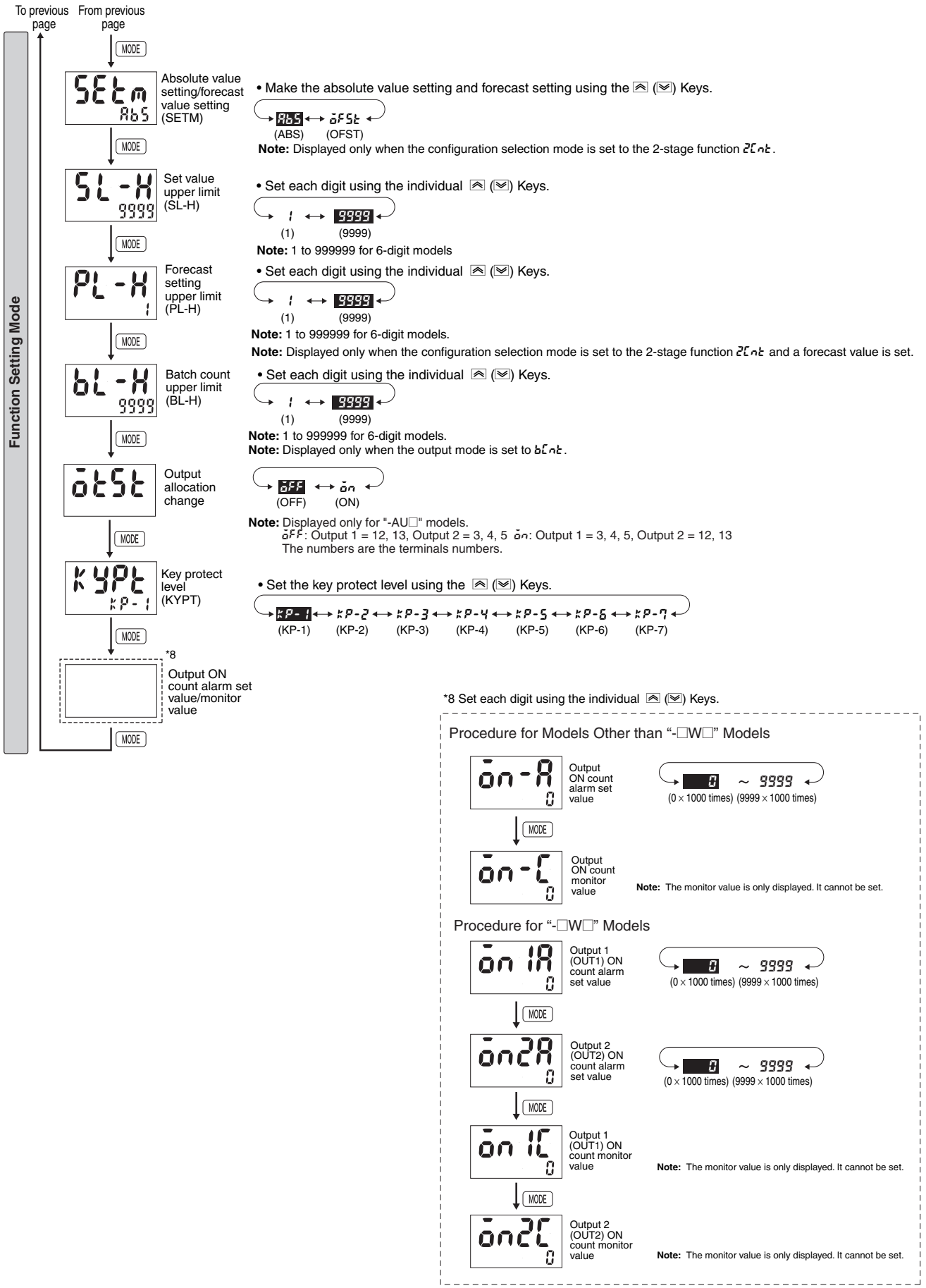
Note: Displayed only when the output mode is C, R, K-1, P, Q, or A.

MODE

Output 1 output time (OTM1) — display: OTM1 / HoLd

0.01 ~ 0.50 ~ 99.99
(0.01 s) (0.50 s) (99.99 s)

Note: Displayed only when the output mode is C, R, K-1, P, Q, or A.


To previous page
From previous page
Function Setting Mode
MODE
SETm
Abs
Absolute value setting/forecast value setting (SETM)
• Make the absolute value setting and forecast setting using the ▲ (▼) Keys.
Abs ↔ oFSt
(ABS) (OFST)
Note: Displayed only when the configuration selection mode is set to the 2-stage function 2Lnk.
SL-H
9999
Set value upper limit (SL-H)
• Set each digit using the individual ▲ (▼) Keys.
1 ↔ 9999
(1) (9999)
Note: 1 to 999999 for 6-digit models
PL-H
1
Forecast setting upper limit (PL-H)
• Set each digit using the individual ▲ (▼) Keys.
1 ↔ 9999
(1) (9999)
Note: 1 to 999999 for 6-digit models.
Note: Displayed only when the configuration selection mode is set to the 2-stage function 2Lnk and a forecast value is set.
bL-H
9999
Batch count upper limit (BL-H)
• Set each digit using the individual ▲ (▼) Keys.
1 ↔ 9999
(1) (9999)
Note: 1 to 999999 for 6-digit models.
Note: Displayed only when the output mode is set to bLnk.
otSt
Output allocation change
oFF ↔ on
(OFF) (ON)
Note: Displayed only for "-AU□" models.
oFF: Output 1 = 12, 13, Output 2 = 3, 4, 5 on: Output 1 = 3, 4, 5, Output 2 = 12, 13
The numbers are the terminals numbers.
KYPt
kP-1
Key protect level (KYPT)
• Set the key protect level using the ▲ (▼) Keys.
kP-1 ↔ kP-2 ↔ kP-3 ↔ kP-4 ↔ kP-5 ↔ kP-6 ↔ kP-7
(KP-1) (KP-2) (KP-3) (KP-4) (KP-5) (KP-6) (KP-7)
*8
Output ON count alarm set value/monitor value
*8 Set each digit using the individual ▲ (▼) Keys.
Procedure for Models Other than "-□W□" Models
on-A
0
Output ON count alarm set value
0 ~ 9999
(0 × 1000 times) (9999 × 1000 times)
on-C
0
Output ON count monitor value
Note: The monitor value is only displayed. It cannot be set.
Procedure for "-□W□" Models
on1A
0
Output 1 (OUT1) ON count alarm set value
0 ~ 9999
(0 × 1000 times) (9999 × 1000 times)
on2A
0
Output 2 (OUT2) ON count alarm set value
0 ~ 9999
(0 × 1000 times) (9999 × 1000 times)
on1C
0
Output 1 (OUT1) ON count monitor value
Note: The monitor value is only displayed. It cannot be set.
on2C
0
Output 2 (OUT2) ON count monitor value
Note: The monitor value is only displayed. It cannot be set.

Explanation of Functions

Items marked with stars ★ can be set using the DIP switch.

Input Mode (Cntm)★

Set increment mode (UP), decrement mode (DOWN), or one of the increment/decrement modes (UP/DOWN A, UP/DOWN B, or UP/DOWN C) as the input mode.
Input modes other than UP or DOWN modes cannot be set using the DIP switch and so use the operation keys if other modes are required.
(For details on the operation of the input modes, refer to *Input Modes and Present Value* on page page 21.)

Dual Count Calculating Mode (CALm)

When using as a dual counter, select either ADD (addition) or SUB (subtraction) as the calculation method for the dual count value.
ADD: Dual count value = CP1 PV + CP2 PV
SUB: Dual count value = CP1 PV − CP2 PV

Output Mode (oUtm)★

Set the way that control output for the present value is output. The possible settings are N, F, C, R, K-1, P, Q, A, K-2, D, L, and H.
Output modes other than N, F, C, or K-1 cannot be set using the DIP switch and so use the operation keys if other modes are required. The output modes that can be set vary with the model.
(For details on the operation of the output modes, refer to *Input/Output Mode Settings* on page page 22.)

One-shot Output Time (otim)★

Set the one-shot output time (0.01 to 99.99 s) for control output.
One-shot output can be used only when C, R, K-1, P, Q, A, or K-2 is selected as the output mode. Output times other than 0.5 s or 0.05 s cannot be set with the DIP switch and so use the operation keys if other settings are required.

One-shot Output 2 Time (otm2)★

Set the one-shot output time (0.01 to 99.99 s) for control output (OUT2).
One-shot output can be used only when C, R, K-1, P, Q, A, or K-2 is selected as the output mode. Output times other than 0.5 s or 0.05 s cannot be set with the DIP switch and so use the operation keys if other settings are required.

One-shot Output 1 Time (otm1)

Set the one-shot output time (0.01 to 99.99 s) for control output (OUT1).
One-shot output can be used only when D, L, or H is selected as the output mode.
If the output time is set to 0.00, Hold is displayed, and outputs are held.

Counting Speed (Cnt5)★

Set the maximum counting speed (30 Hz/5 kHz) for CP1 and CP2 inputs together.
If contacts are used for input signals, set the counting speed to 30 Hz. Processing to eliminate chattering is performed for this setting.

Reset Input Signal Width (rSt)★

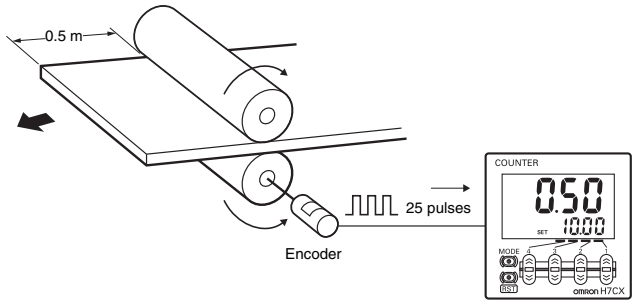
Set the reset input signal width (20 ms/1 ms) for reset/reset 1 and total reset/reset 2 inputs together.
If contacts are used for the input signal, set the input signal width to 20 ms. Processing to eliminate chattering is performed for this setting.

Decimal Point Position (dP)

Decide the decimal point position for the present value, CP1/CP2 present values, set value (SV1, SV2), total count value, and dual count set value.

Prescale Value (PSCL)

Pulses input to the counter are converted according to the specified prescale value.
(Setting range: 0.001 to 99.999 for 6-digit models and 0.001 to 9.999 for 4-digit models.)
Example: To display the feed distance for systems that output 25 pulses for a feed length of 0.5 m in the form □□.□□ m:
1. Set the decimal point position to 2 decimal places.
2. Set the prescale value to 0.02 (0.5 ÷ 25).



- Observe the following points when setting a prescale value.
  Set the set value to a value less than {Maximum countable value − Prescale value}.
  Example: If the prescale value is 1.25 and the counting range is 0.000 to 999.999, set the set value to a value less than 998.749 (= 999.999 − 1.25).
  If the set value is set to a value greater than this, output will not turn ON.
- Output will turn ON, however, if a present value overflow occurs (FFFFFF or FFFF).

Note: If the prescale value setting is incorrect, a counting error will occur. Check that the settings are correct before using this function.

NPN/PNP Input Mode (Imod)

Select either NPN input (no-voltage input) or PNP input (voltage input) as the input format. When using a two-wire sensor, select NPN input.
The same setting is used for all external inputs.
For details on input connections, refer to *Input Connections* on page page 9.

Display Color (Colr) (Displayed for terminal block models (except H7CX-A11□) only.)

Set the color used for the present value.

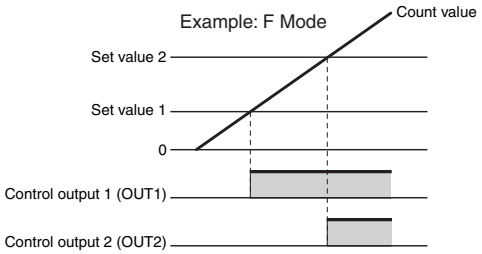
	Output OFF*	Output ON*
rEd	Red (fixed)	
Grn	Green (fixed)	
orG	Orange (fixed)	
r-G	Red	Green
G-r	Green	Red
r-o	Red	Orange
o-r	Orange	Red
G-o	Green	Orange
o-G	Orange	Green

* Output 2 for 2-stage models.

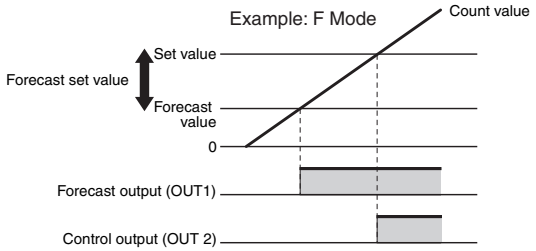
With the twin counter, output 1 and output 2 will both turn OFF when the output status is OFF. Either output 1 or output 2 will turn ON when the output status is ON.

Absolute Value Setting/Forecast Value Setting (SEtm)

For the 2 count output mode, an absolute value setting (Abs) or forecast value setting (dFSt) can be set for set value 1.
When a forecast value is set, specify the forecast value set value (i.e., the deviation for the set value).
The forecast output (output 1) turns ON when the present value reaches the forecast value.
If the forecast set value is greater than or equal to the set value, the forecast output (output 1) will turn ON as soon as counting starts.



If the forecast value setting is used, specify the set value 2 minus the forecast value setting for set value 1.



Set Value Upper Limit (SL-H)

Set the upper limit for the set value when it is set in run mode.
The setting can be made from 1 to 9999 for 4-digit models and from 1 to 999999 for 6-digit models.

Forecast Set Upper Limit (PL-H)

Set the upper limit for the forecast set value.
The setting can be made from 1 to 9999 for 4-digit models and from 1 to 999999 for 6-digit models.

Batch Count Upper Limit (bL-H)

Set the upper limit for the batch count value. The setting can be made from 1 to 9999 for 4-digit models and from 1 to 999999 for 6-digit models.

Output Allocation (oAtSt)

When using an H7CX-AU□-N model as a 2-stage counter, the output can be flexibly allocated to either stage 1 or 2.
The transistor output can be allocated to SV1 and the contact output to SV2 or vice verse, as in the following tables.

H7CX-AU-N/-AUD1-N

	Output 1	Output 2
oFF	Transistor (12-13)	Contact (3, 4, 5)
on	Contact (3, 4, 5)	Transistor (12-13)

H7CX-AUSD1-N

	Output 1	Output 2
oFF	Transistor (12-13)	Transistor with diode (3, 4, 5)
on	Transistor with diode (3, 4, 5)	Transistor (12-13)

Key Protect Level (KYPt)

Set the key protect level.
Refer to *Key Protect Level* on page page 36.

Output ON Count Alarm Set Value (on-A)

Set the alarm value for the output ON count.
The limit can be set to between 0 × 1000 (0 times) and 9999 × 1000 (9,999,000 times). Only the underlined values are set. The alarm will be disabled if 0 is set.
If the total ON count of the output exceeds the alarm set value, E3 will be displayed on the Timer to indicate that the output ON count alarm value was exceeded. Refer to *Self-diagnostic Function* on page page 36 for information on the E3 display.

ON Count Alarm Set Values for Outputs 1 and 2 (OUT1 and OUT2) (on 1A and on2A)

Set the ON count alarm values for the outputs 1 and 2.
The limit can be set to between 0 × 1000 (0 times) and 9999 × 1000 (9,999,000 times). Only the underlined values are set. The alarm will be disabled if 0 is set.
If the total ON count of instantaneous output 1 or 2 exceeds the alarm set value, E3 will be displayed on the Timer to indicate that the output ON count alarm value was exceeded. Refer to *Self-diagnostic Function* on page page 36 for information on the E3 display.

Output ON Count Monitor Value (on-C)

The monitor value is only displayed. It cannot be set.
The output ON count will be 1,000 times the displayed value.

ON Count Monitor Values for Outputs 1 and 2 (OUT1 and OUT2) (on 1C and on2C)

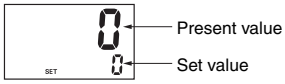
The monitor value for output 1 or 2 is only displayed. It cannot be set.
The output ON count will be 1,000 times the displayed value.

Operation in Run Mode

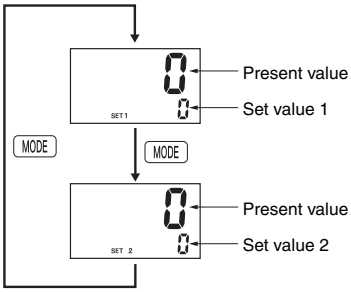
I/O Functions for Counter Operation

• Set values for each digit as required using the ▲ (▼) Keys. (▲ Key only for 6-digit models.)

1-stage Preset Counter

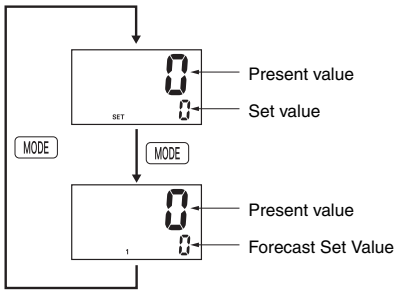


2-stage Preset Counter with Absolute Value Setting



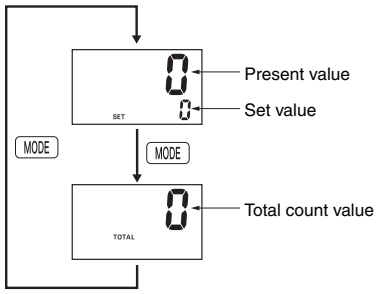
- **Present Value**
  Shows the present count value.
- **Set Values (Set Value 1 and Set Value 2)**
  Set the set values.
  When the present value reaches the set value (set value 1 or set value 2), a signal is output according to the specified output mode.

2-stage Preset Counter with Forecast Value Setting



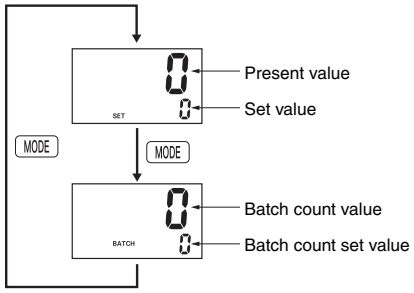
- **Present Value**
  Shows the present count value.
- **Set Values**
  Set the set values.
- **Forecast Set Value**
  Set the deviation for the set value.

Total and Preset Counter



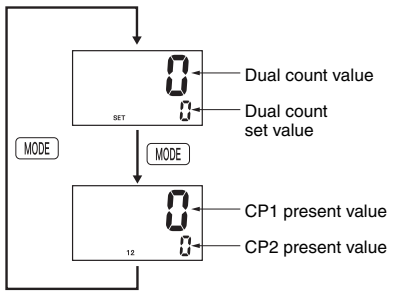
- **Present Value/Set Value**
  Same as 1-stage preset counter.
- **Total Count Value**
  Shows the present total count value.

Batch Counter



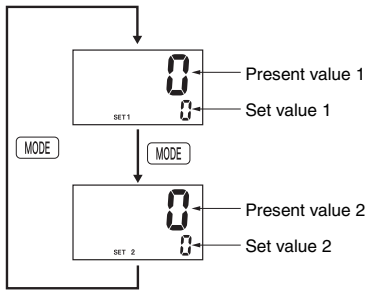
- **Present Value/Set Value**
  Same as 1-stage preset counter.
- **Batch Count Value**
  Shows the number of times the count has been completed for the present value.
- **Batch Count Set Value**
  Set the batch count set value.
  When the batch count value reaches the batch count set value, batch output (OUT1) turns ON.

Dual Counter



- **Dual Count Value**
  Shows the sum of the CP1 present value and CP2 present value when the dual count calculating mode is ADD and shows the value obtained by subtracting the CP2 present value from the CP1 present value when the dual count calculating mode is SUB.
- **Dual Count Set Value**
  Set the dual count set value.
  When the dual count value reaches the dual count set value, signals are output according to the specified output mode.
- **CP1/CP2 Present Value**
  Show the present count values for CP1 and CP2 present values respectively.

Twin Counter



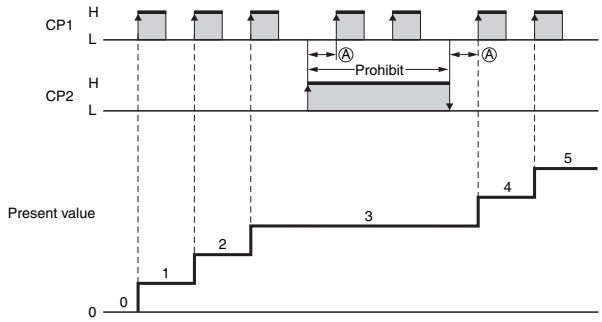
- **Present Values 1 and 2**
  Shows the present count value 1 or 2.
- **Set Values 1 and 2**
  Setting for present value 1 or 2.

Input Modes and Present Value (See note 1.)

I/O Functions for Counter Operation

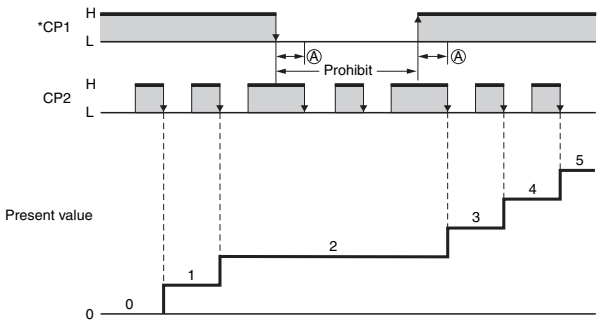
UP (Increment) Mode

CP1: Count input; CP2: Prohibit (gate) input



Ⓐ must be greater than the minimum signal width. (See note 2.)

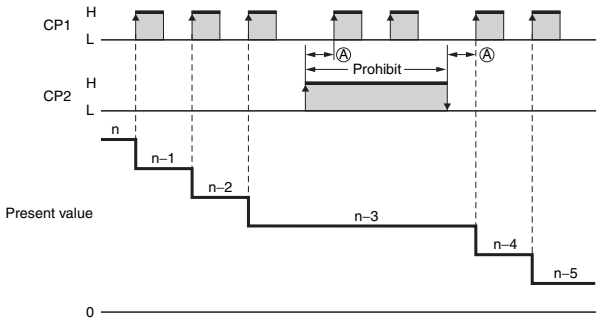
CP1: Prohibit (gate) input; CP2: Count input



Ⓐ must be greater than the minimum signal width. (See note 2.)

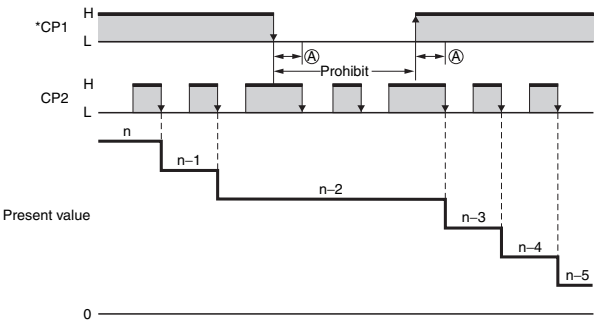
DOWN (Decrement) Mode

CP1: Count input; CP2: Prohibit (gate) input



Ⓐ must be greater than the minimum signal width. (See note 2.)

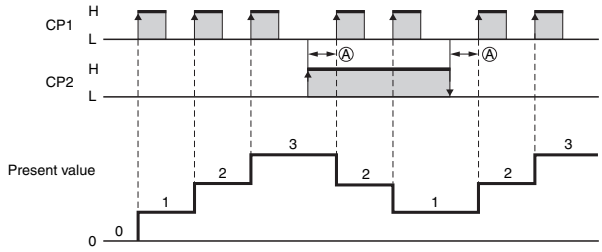
CP1: Prohibit (gate) input; CP2: Count input



Ⓐ must be greater than the minimum signal width. (See note 2.)

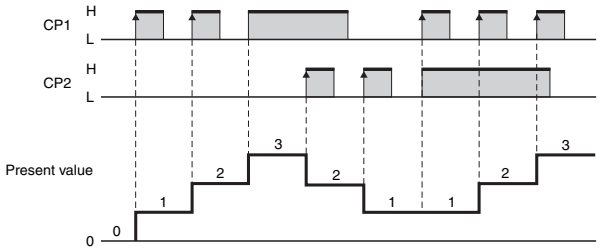
* Counting starts when the CP1 is turned ON after turning ON the power.

UP/DOWN A Command Input Mode

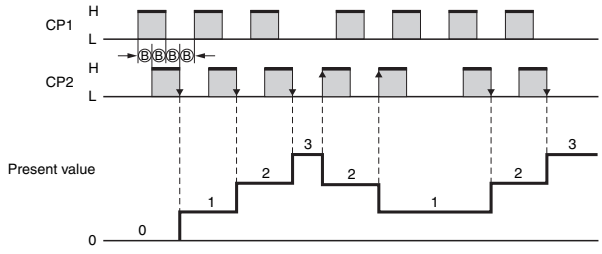


Ⓐ must be greater than the minimum signal width. (See note 2.)

UP/DOWN B Individual Input Mode



UP/DOWN C Quadrature Input Mode



Ⓑ must be at least 1/2 the minimum signal width. (See note 2.)

Note: 1. If the configuration selection is set to dual counter, CP1 and CP2 input will operate in the same way as the count input (CP1) of UP (increment) mode.

2. Ⓐ must be greater than the minimum signal width and Ⓑ must be at least 1/2 the minimum signal width.
If they are less, a count error of ±1 may occur.
Minimum signal width: 16.7 ms (when maximum counting speed = 30 Hz)
100 μs (when maximum counting speed = 5 kHz)

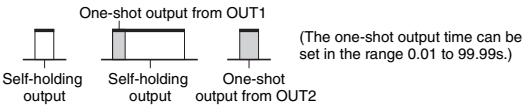
3. The meaning of the H and L symbols in the tables is explained below.

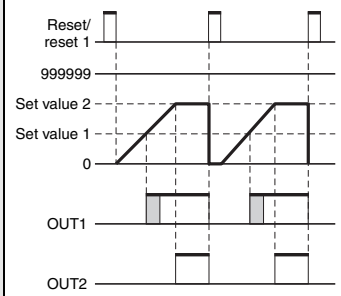
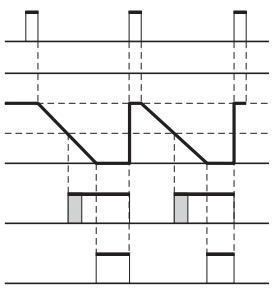
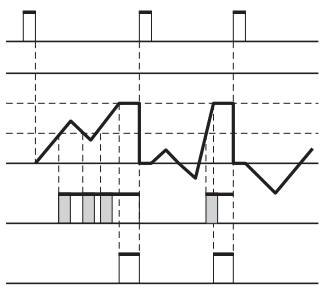
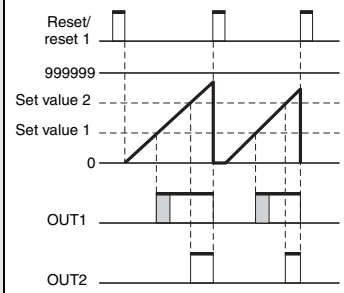
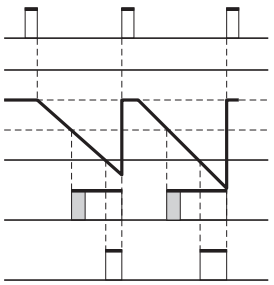
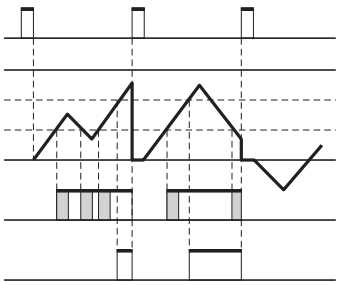
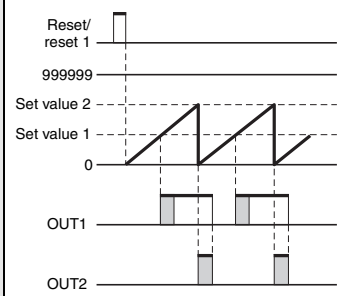
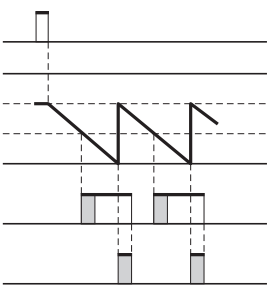
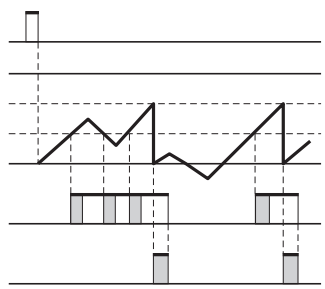
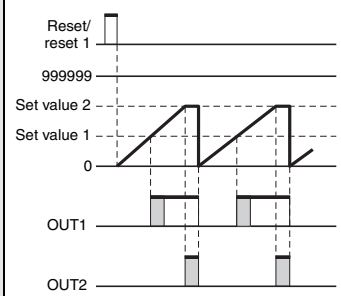
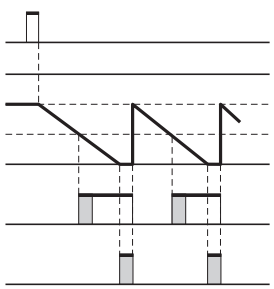
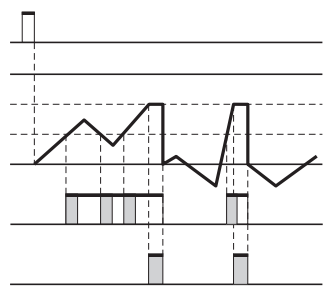
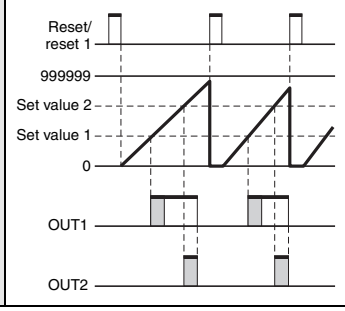
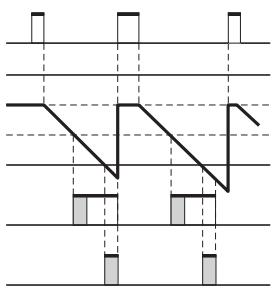
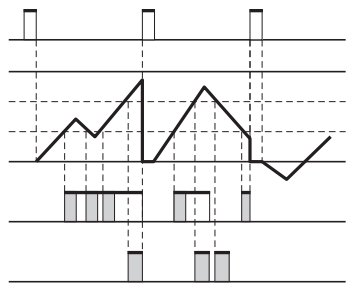
Symbol Input method	No-voltage input (NPN input)	Voltage input (PNP input)
H	Short-circuit	4.5 to 30 VDC
L	Open	0 to 2 VDC

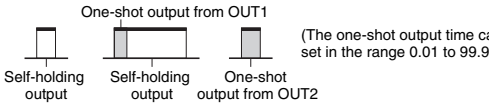
Input/Output Mode Settings

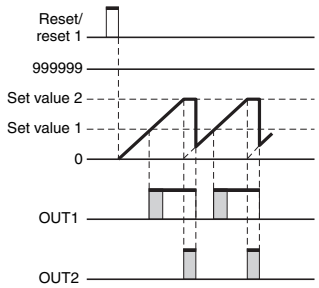
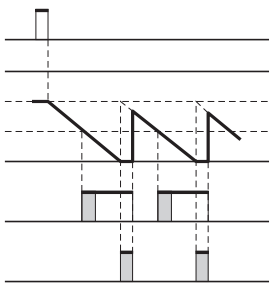
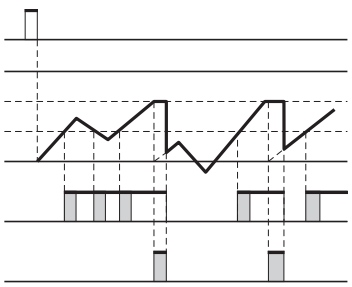
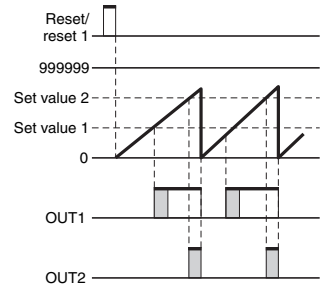
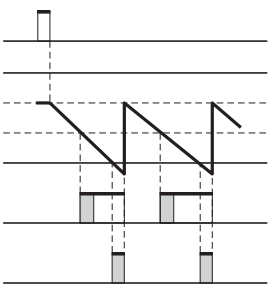
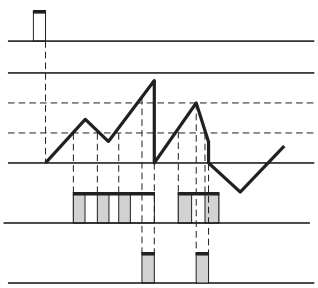
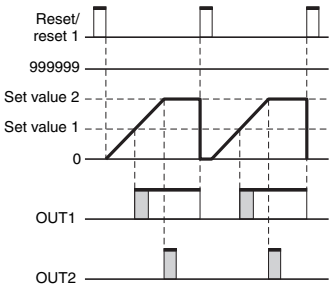
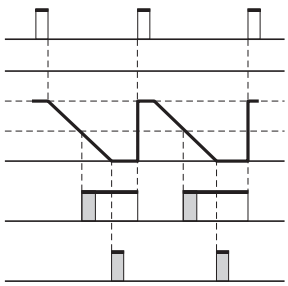
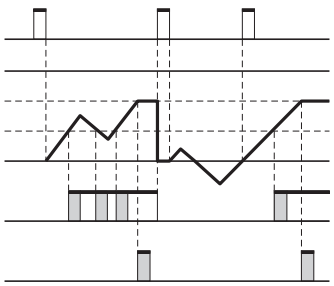
I/O Functions for Counter Operation

If a 1-stage model or 2-stage model is incorrectly used as twin counter, the operation for output 2 will be performed. When using a 2-stage model as a 1-stage preset counter, total and preset counter, or dual counter, OUT1 and OUT2 turn ON and OFF simultaneously.

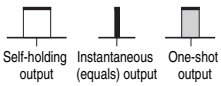


		Input mode			Operation after count completion
		UP	DOWN	UP/DOWN A, B, C	
Output mode setting	N				The outputs and present value display are held until reset/reset 1 is input.
	F				The present value display continues to increase/decrease. The outputs are held until reset/reset 1 is input.
	C				As soon as the count reaches SV, the present value display returns to the reset start status. The present value display does not show the present value upon count-up. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2.
	R				The present value display returns to the reset start status after the one-shot output time. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2.
	K-1				The present value display continues to increase/decrease. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2.

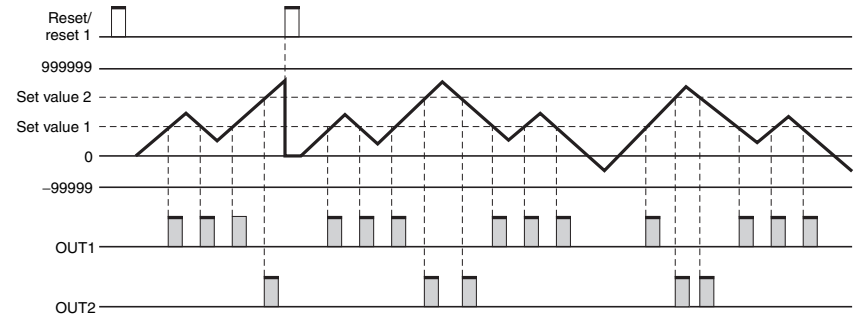
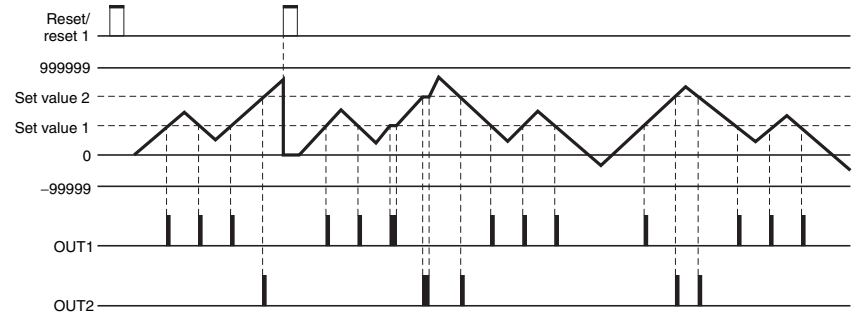
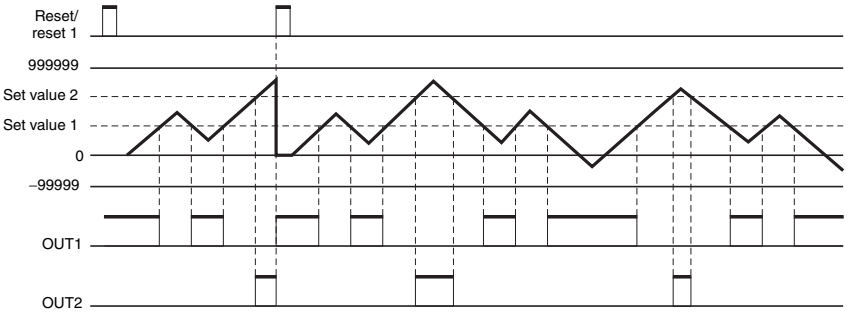
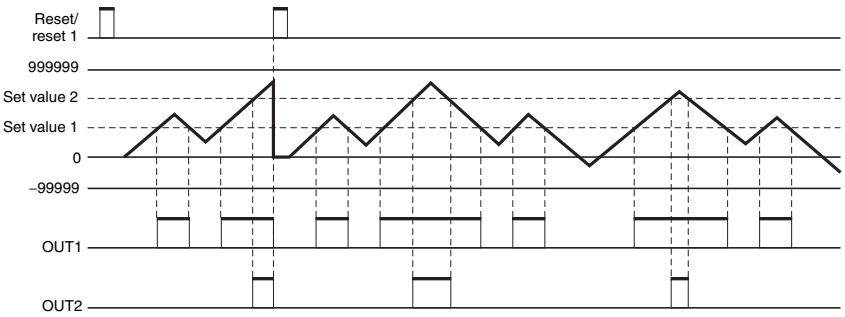


		Input mode			Operation after count completion
		UP	DOWN	UP/DOWN A, B, C	
Output mode setting	P				The present value display does not change during the one-shot output time period, but the actual count returns to the reset start status. The output will return to one-shot mode. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2.
	Q				The present value continues to increase/decrease for the one-shot output time, but returns to the reset start status after the one-shot output time has elapsed. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2.
	A				The present value display and OUT1 self-holding output is held until reset/reset 1 is input. OUT1 and OUT2 are independent.

Note: 1. The full scale (FS) for H7CX 4-digit models is 9999.
2. When the present value reaches 999999, it returns to 0.
3. Counting cannot be performed during reset/reset 1 input.
4. If reset/reset 1 is input while one-shot output is ON, one-shot output turns OFF.
5. If there is power failure while output is ON, output will turn ON again when the power supply has recovered.
For one-shot output, output will turn ON again for the duration of the output time setting once the power supply has recovered.
6. Do not use the counter function in applications where the count may be completed (again) while one-shot output is ON.
7. The setting range is 0 to 999999 (0 to 9999 for 4-digit models).



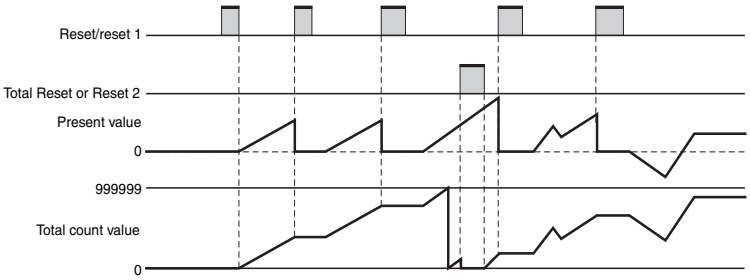
(The one-shot output time can be set in the range 0.01 to 99.99s.)

		Input mode	Operation after count completion
		UP/DOWN A, B, C	
Output mode setting	K-2		The display continues to increase/decrease until the overflow or underflow value is reached. One-shot output only.
	D		The display continues to increase/decrease until the overflow or underflow value is reached. The outputs are ON while the count is equal.
	L		The display continues to increase/decrease until the overflow or underflow value is reached. OUT1 is held while the present value is less than or equal to set value 1. OUT2 is held while the present value is greater than or equal to set value 2.
	H		The display continues to increase/decrease until the overflow or underflow value is reached. OUT1 is held while the present value is greater than or equal to set value 1. OUT2 is held while the present value is greater than or equal to set value 2. * H mode is available only when using a model as a 2-stage counter.

Note: 1. Counting cannot be performed during reset/reset 1 input.
2. If reset/reset 1 is input while one-shot output is ON, one-shot output turns OFF.
3. If there is power failure while output is ON, output will turn ON again when the power supply has recovered.
For one-shot output, output will turn ON again for the duration of the output time setting once the power supply has recovered.
4. Do not use the counter function in applications where the count may be completed (again) while one-shot output is ON.
5. The set value is from −99999 to 999999 (−999 to 9999 for 4-digit models).

Total and Preset Counter Operation

The H7CX has a total counter, separate from the 1-stage preset counter, for counting the total accumulated value.

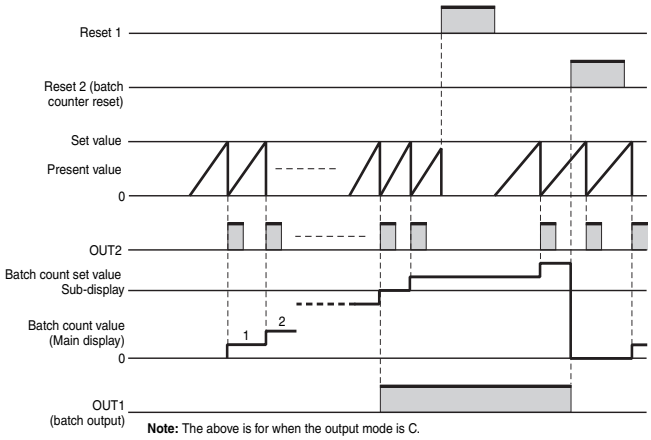


Note: The full scale (FS) for H7CX 4-digit models is 9999.

- The total counter continues to count the total accumulated value when the present value is reset using reset/reset 1 input (Reset Key).
- The total count value is reset when the total reset/reset 2 input is turned ON.
  If the Reset Key is pressed while the total count value is displayed, the total count value is reset. The present value is also reset at this time.
- The counting range of the total counter is −99,999 to 999,999 (−999 to 9,999). The total count value returns to 0 when it reaches the full scale limit.

Batch Counter Operation

The H7CX has a batch counter, separate from the 1-stage preset counter, for counting the number of times the count has been completed.



Note: The above is for when the output mode is C.

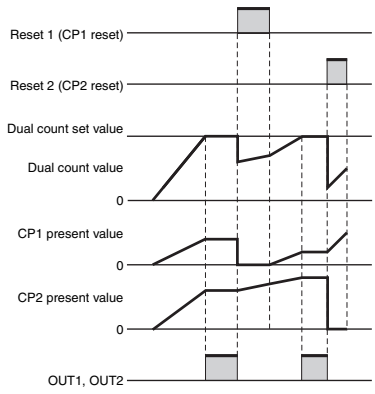
- The batch counter continues after count completion.
- Batch output is held until batch counter reset is input.
- When the batch counter reset input is turned ON, the batch count value is reset, and batch output turns OFF.
- If the Reset Key is pressed while the batch count value is displayed, the batch count value is reset and batch output turns OFF. The present value is also reset at this time.
- The count value can be incremented and decremented.
  The batch count is only incremented.
- The maximum counting speed for batch counter operation is 5 kHz. The batch counter counts the number of times the count reaches the set value.

Note: **1.** The batch count value is held at 0 during batch counter reset input.
2. If the batch count set value is 0, batch count will be performed but there will be no batch output.
3. The batch count value returns to 0 when it reaches 999,999 (9,999 for 4-digit models).
4. Once batch input has been turned ON, it will return to the ON state after power interruptions.
5. If the batch count set value is changed from a value that is greater than the batch count value to one that is less, batch output will turn ON.
6. After batch output turns ON, the ON state will be held even if the batch count set value is changed to a value greater than the batch count value.

Dual Counter Operation

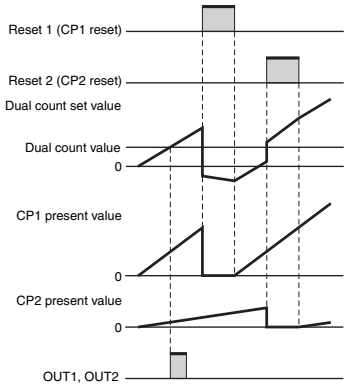
Using the dual counter allows the count from 2 inputs to be added or subtracted and the result displayed. It is possible to specify a set value for which output turns ON when the set value matches the added or subtracted result.

(1) Dual Count Calculating Mode = ADD
Dual count value = CP1 PV + CP2 PV



Note: The above is for when the output mode is N.

(2) Dual Count Calculating Mode = SUB
Dual count value = CP1 PV − CP2 PV



Note: The above is for when the output mode is K-2. SUB mode can be used only when K-2, D, L, or H is selected as the output mode with 6-digit models.

- The operation after count completion for the dual counter value is determined by the output mode.
- The CP1 present value is reset when reset 1 input is turned ON.
  The CP2 present value is reset when reset 2 input is turned ON.
- If the Reset Key is pressed while the dual count value, CP1 present value, or CP2 present value is displayed, all of the present values are reset and outputs turn OFF. At this time, counting is not possible for CP1 or CP2 inputs.

Note: **1.** Counting is not possible for CP1 during reset 1 input. CP2 will not be affected. The dual count value will be calculated based on a CP1 present value of 0.
2. Counting is not possible for CP2 during reset 2 input. CP1 will not be affected. The dual count value will be calculated based on a CP2 present value of 0.
3. The counting range for the dual count value is −99,999 to 999,999 (0 to 9,999 for 4-digit models).
The counting ranges for the CP1 present value and CP2 present value are 0 to 999,999 (0 to 9,999 for 4-digit models).
If a present value exceeds 999,999 (9,999 for 4-digit models), FFFFFF (FFFF for 4-digit models) will be displayed to indicate an overflow, and all counting will stop.