H7CX Series

Please read and understand this catalog before purchasing the products. Please consult your OMRON representative if you have any questions or comments. Refer to *Safety Precautions (Common)* on page 59.

DIN 48 × 48 mm Multifunction Counter/Tachometer Series

- Highly visible display with backlit negative transmissive LCD.
- Intuitive setting enabled using ergonomic up/down digit keys (4-digit models) and DIP switch.
- PNP/NPN switchable DC voltage input.
- Finger-safe terminals (screw terminal block models).
- Complies with IP66/NEMA4/UL Type 4X (when using the Y92S-29 Waterproof Packing and Y92F-30 Flush Mounting Adapter).

H7CX Series

H7CX-A

H7CX-R

Multifunction Counter
Preset Counter
Total Counter
Batch Counter
Dual Counter
Tachometer

Tachometer

Contents

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Multifunction Preset Counter
H7CX-A

DIN 48 × 48 mm Multifunction Preset Counter with a Bright, Easy-to-view, Negative Transmissive LCD

- Programmable PV color to visually alert when output status changes (screw terminal block models).
- Configurable as 1-stage counter, 2-stage counter, total and preset counter, batch counter, dual counter, or tachometer. (Configurability varies with model.)
- Meets a variety of mounting requirements: Screw terminal block models, and pin-style terminal models.
- Six-language instruction manual.

Contents

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Model Number Structure

■ Model Number Legend

H7CX-A☐☐☐☐☐☐
      1 2 3 4 5 6

1. **External connection**
   None: Screw terminals
   11:   11-pin socket
2. **No. of digits**
   None: 6 digits
   4:   4 digits
3. **Stage setting**
   None: 1-stage setting
   U: Factory-set to 1-stage setting
   W: Factory-set to 2-stage setting

4. **Output type**
   None: Contact output or contact and transistor in combination
   S: Transistor output
5. **Supply voltage/external power supply**
   None: 100 to 240 VAC at 50/60 Hz with 12 VDC power supply
   D: 12 to 24 VDC without external power supply
   D1:   12 to 24 VDC or 24 VAC at 50/60 Hz with 12 VDC power supply
6. **Case color**
   None: Black
   G: Light gray (Munsell 5Y7/1): Produced upon request.

Ordering Information

■ List of Models

Supported configurations			• 1-stage counter • 1-stage counter with total counter				• 1-stage counter • 2-stage counter • 1-stage counter with total counter • 1-stage counter with batch counter • Dual counter (addition/subtraction) • Tachometer		• 1-stage counter • 2-stage counter • 1-stage counter with total counter • 1-stage counter with batch counter • Dual counter (addition only)
Sensor power supply	**Output type**	**Supply voltage**	**11-pin socket**			**Screw terminal**			
			1-stage				**1-stage (See note.)**	**2-stage**	
			6 digits	**4 digits**	**6 digits**	**4 digits**	**6 digits**	**6 digits**	**4 digits**
			H7CX-A11☐	**H7CX-A114☐**	**H7CX-A☐**	**H7CX-A4☐**	**H7CX-AU☐**	**H7CX-AW☐**	**H7CX-A4W☐**
12 VDC	Contact output	100 to 240 VAC	H7CX-A11	H7CX-A114	H7CX-A	H7CX-A4	---	H7CX-AW	H7CX-A4W
		12 to 24 VDC/ 24 VAC	H7CX-A11D1	H7CX-A114D1	---	---	---	H7CX-AWD1	---
	Contact and transistor output	100 to 240 VAC	---	---	---	---	H7CX-AU	---	---
		12 to 24 VDC/ 24 VAC	---	---	---	---	H7CX-AUD1	---	---
	Transistor output	100 to 240 VAC	H7CX-A11S	H7CX-A114S	H7CX-AS	H7CX-A4S	---	H7CX-AWS	---
		12 to 24 VDC/ 24 VAC	H7CX-A11SD1	---	---	---	H7CX-AUSD1	H7CX-AWSD1	---
None	Contact output	12 to 24 VDC	---	---	H7CX-AD	H7CX-A4D	---	---	---
	Transistor output		---	---	H7CX-ASD	H7CX-A4SD	---	H7CX-AWSD	H7CX-A4WSD

Note: Can be used as a 2-stage counter. In this case, each output can be flexibly allocated to either stage 1 or 2.

■ Accessories (Order Separately)

Name		Models
Flush Mounting Adapter (See note 1.)		Y92F-30
Waterproof Packing (See note 1.)		Y92S-29
Track Mounting/Front Connecting Socket	11-pin	P2CF-11
	11-pin, finger-safe type	P2CF-11-E
Back Connecting Socket	11-pin	P3GA-11
	11-pin, finger-safe type	P3GA-11 with Y92A-48G (See note 2.)
Hard Cover		Y92A-48
Soft Cover		Y92A-48F1
Mounting Track	50 cm (l) × 7.3 mm (t)	PFP-50N
	1 m (l) × 7.3 mm (t)	PFP-100N
	1 m (l) × 16 mm (t)	PFP-100N2
End Plate		PFP-M
Spacer		PFP-S

Note: 1. Supplied with screw-terminal models (i.e., excluding H7CX-A11☐/-A114☐ models).
     2. Y92A-48G is a finger-safe terminal cover attached to the P3GA-11 Socket.

Specifications

■ Ratings

Item		H7CX-A4□	H7CX-A□	H7CX-A114□	H7CX-A11□
Classification		Preset counter			
Supported configurations		1-stage counter, 1-stage counter with total counter (selectable)			
Rated supply voltage (See note 1.)		100 to 240 VAC (50/60 Hz), 12 to 24 VDC		100 to 240 VAC (50/60 Hz) 24 VAC (50/60 Hz)/12 to 24 VDC	
Operating voltage range		85% to 110% of rated supply voltage (90% to 110% at 12 VDC)			
Power consumption		Approx. 9.2 VA at 264 VAC Approx. 7.2 VA at 26.4 VAC Approx. 3.7 W at 12 VDC			
Mounting method		Flush mounting		Flush mounting, surface mounting, or DIN track mounting	
External connections		Screw terminals		11-pin socket	
Terminal screw tightening torque		0.5 N·m max.		---	
Display (See note 2.)		7-segment, negative transmissive LCD			
	PV	11.5-mm-high characters, red or green (programmable)	9-mm-high characters, red or green (programmable)	11.5-mm-high characters, red	9-mm-high characters, red
	SV	6-mm-high characters, green			
Digits		4 digits (−999 to 9,999) SV range: 0 to 9,999	6 digits (−99,999 to 999,999) SV range: −99,999 to 999,999 (See note 3.) or 0 to 999,999	4 digits (−999 to 9,999) SV range: 0 to 9,999	6 digits (−99,999 to 999,999) SV range: −99,999 to 999,999 (See note 3.) or 0 to 999,999
Max. counting speed		30 Hz or 5 kHz (selectable, ON/OFF ratio 1:1), common setting for CP1 and CP2			
Input modes		Increment, decrement, command, individual, and quadrature			
Input signals		CP1, CP2, reset, and total reset			
Input method		No-voltage input/voltage input (switchable) No-voltage input ON impedance: 1 kΩ max. (Leakage current: 5 to 20 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)			
Reset input		Minimum reset input signal width: 1 or 20 ms (selectable), common setting for all inputs			
Reset system		External, manual, and automatic reset (internal according to C, R, P, and Q mode operation)			
Output modes		N, F, C, R, K-1, P, Q, A	N, F, C, R, K-1, P, Q, A, K-2, D, L	N, F, C, R, K-1, P, Q, A	N, F, C, R, K-1, P, Q, A, K-2, D, L
One-shot output time		0.01 to 99.99 s			
Output type		Contact type: SPDT Transistor type: 1 transistor			
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.			
		NEMA B300 Pilot Duty, 1/4 HP 3-A resistive load at 120 VAC, 1/3 HP 3-A resistive load at 240 VAC			
External power supply		12 VDC (±10%), 100 mA (except for H7CX-A□D models) Refer to *Safety Precautions (Common)* on page 59 for details.			
Key protection		Yes			
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)
Decimal point adjustment		Yes (rightmost 3 digits)			
Sensor waiting time		250 ms max. (Control output is turned OFF and no input is accepted during sensor waiting time.)			
Memory backup		EEPROM (overwrites: 100,000 times min.) that can store data for 10 years min.			
Ambient temperature		Operating: −10 to 55°C (−10 to 50°C if counters are mounted side by side) (with no icing or condensation) Storage: −25 to 65°C (with no icing or condensation)			
Ambient humidity		25% to 85%			
Case color		Black (N1.5), light gray (Munsell 5Y7/1, produced upon request)			
Attachments		Waterproof packing, flush mounting adapter		None	

Note: 1. Permissible ripple: 20% (p-p) max.

    2. The display is lit only when the power is ON.

    3. Only when the following modes are selected.
Input mode: command, individual, or quadrature; output mode: K-2, D, or L

■ Ratings (contd.)

Item		H7CX-A4W□	H7CX-AW□	H7CX-AU□
Classification		Preset counter	Preset counter/tachometer	
Supported configurations		1-stage counter, 2-stage counter, 1-stage counter with total counter, 1-stage counter with batch counter, dual counter (addition only) (selectable)	1-stage counter, 2-stage counter, 1-stage counter with total counter, 1-stage counter with batch counter, dual counter (addition/subtraction), tachometer (selectable)	
Rated supply voltage (See note 1.)		100 to 240 VAC (50/60 Hz), 12 to 24 VDC	100 to 240 VAC (50/60 Hz), 24 VAC (50/60 Hz)/12 to 24 VDC, 12 to 24 VDC	100 to 240 VAC (50/60 Hz), 24 VAC (50/60 Hz)/12 to 24 VDC
Operating voltage range		85% to 110% of rated supply voltage (90% to 110% at 12 VDC)		
Power consumption		Approx. 9.2 VA at 264 VAC Approx. 7.2 VA at 26.4 VAC Approx. 3.7 W at 12 VDC		
Mounting method		Flush mounting		
External connections		Screw terminals		
Terminal screw tightening torque		0.5 N·m max.		
Display (See note 2.)		7-segment, negative transmissive LCD		
	PV	11.5-mm-high characters, red or green (programmable)	9-mm-high characters, red or green (programmable)	
	SV	6-mm-high characters, green		
Digits		4 digits (–999 to 9,999) SV range: 0 to 9,999	6 digits (–99,999 to 999,999 or 0 to 999,999 when using as Tachometer) SV range: –99,999 to 999,999 (See note 3.) or 0 to 999,999	
Input signals		CP1, CP2, reset 1, and reset 2		
Input method		No-voltage input/voltage input (switchable) No-voltage input ON impedance: 1 kΩ max. (Leakage current: 5 to 20 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)		
Counter	Max. counting speed	30 Hz or 5 kHz (selectable, ON/OFF ratio 1:1), common setting for CP1 and CP2		
	Input mode	Increment, decrement, command, individual, and quadrature		
	Reset input	Minimum reset input signal width: 1 or 20 ms (selectable), common setting for all inputs		
	Reset system	External, manual, and automatic reset (internal according to C, R, P, and Q mode operation)		
	Output modes	N, F, C, R, K-1, P, Q, A	N, F, C, R, K-1, P, Q, A, K-2, D, L, H	
	One-shot output time	0.01 to 99.99 s		
Tachometer	Pulse measurement method	---	Periodic measurement (Sampling period: 200 ms)	
	Max. counting speed	---	30 Hz or 10 kHz (selectable)	
	Measuring ranges	---	30 Hz: 0.01 to 30.00 Hz 10 kHz: 0.01 Hz to 10 kHz	
	Measuring accuracy	---	±0.1% FS ±1 digit max. (at 23 ±5°C)	
	Output modes	---	HI-LO, AREA, HI-HI, LO-LO	
	Auto-zero time	---	0.1 to 99.9 s	
	Startup time	---	0.0 to 99.9 s	
	Average processing	---	OFF/2/4/8 times	
Output type		H7CX-A4W/-AW/-AWD1: SPDT (OUT2) and SPST-NO (OUT1) H7CX-A4WSD/-AWS/-AWSD/-AWSD1: 2 transistors		H7CX-AU/-AUD1: SPDT and 1 transistor H7CX-AUSD1: 2 transistors (Output allocation possible)
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.		
		NEMA B300 Pilot Duty, 1/4 HP 3-A resistive load at 120 VAC, 1/3 HP 3-A resistive load at 240 VAC		
External power supply		12 VDC (±10%), 100 mA (except for H7CX-A□D models) Refer to Safety Precautions (Common) on page 59 for details.		
Key protection		Yes		
Prescaling function		Yes (0.001 to 9.999)	Yes (0.001 to 99.999)	
Decimal point adjustment		Yes (rightmost 3 digits)		
Sensor waiting time		250 ms max. (Control output is turned OFF and no input is accepted during sensor waiting time.)		
Memory backup		EEPROM (overwrites: 100,000 times min.) that can store data for 10 years min.		
Ambient temperature		Operating: –10 to 55°C (–10 to 50°C if counters are mounted side by side) (with no icing or condensation) Storage: –25 to 65°C (with no icing or condensation)		
Ambient humidity		25% to 85%		
Case color		Black (N1.5), light gray (Munsell 5Y7/1, produced upon request)		
Attachments		Waterproof packing, flush mounting adapter	Waterproof packing, flush mounting adapter, labels for counter/tachometer DIP switch settings	

Note: 1. Permissible ripple: 20% (p-p) max.

   2. The display is lit only when the power is ON.

   3. Only when the following modes are selected.
   - Input mode: command, individual, or quadrature; output mode: K-2, D, L, or H
   - Dual count calculating mode: SUB; output mode: K-2, D, L, or H in dual counter operation

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■ Characteristics

item	H7CX
Insulation resistance	100 MΩ min. (at 500 VDC) between current-carrying terminal 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 (for 100 to 240 VAC), 50/60 Hz for 1 min between power supply and input circuit (1,000 VAC for 24 VAC/12 to 24 VDC) 1,000 VAC (for H7CX-□SD/-□SD1), 50/60 Hz for 1 min between control output, power supply, and input circuit (2,000 VAC for models other than H7CX-□SD/-□SD1) 1,000 VAC, 50/60 Hz for 1 min between non-continuous contacts
Impulse withstand voltage	3 kV (between power terminals) for 100 to 240 VAC, 1 kV for 24 VAC/12 to 24 VDC and 12 to 24 VDC 4.5 kV (between current-carrying terminal and exposed non-current-carrying metal parts) for 100 to 240 VAC, 1.5 kV for 24 VAC/12 to 24 VDC and 12 to 24 VDC
Noise immunity	±1.5 kV (between power terminals) for 100 to 240 VAC and 24 VAC/12 to 24 VDC, ±480 V for 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	Destruction: 15 kV Malfunction: 8 kV
Vibration resistance	Destruction: 10 to 55 Hz with 0.75-mm single amplitude, 2 hours each in three directions Malfunction: 10 to 55 Hz with 0.35-mm single amplitude, 10 min each in three directions
Shock resistance	Destruction: 294 m/s^2 each in three directions Malfunction: 196 m/s^2 each in three directions
Life expectancy	Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min. (3 A at 250 VAC, resistive load) See *Life-test Curve* on page 7.
Approved safety standards (See notes 1 and 2.)	UL508/Listing, UL 50 Type 4X for indoor use (enclosure rating) CSA C22.2 No. 14, conforms to EN61010-1 (Pollution degree 2/overvoltage category II) Conforms to VDE0106/P100 (finger protection).
EMC	(EMI) EN61326 Emission Enclosure: EN55011 Group 1 class A Emission AC mains: EN55011 Group 1 class A (EMS) EN61326 Immunity ESD: EN61000-4-2: 4 kV contact discharge (level 2); 8 kV air discharge (level 3) Immunity RF-interference: EN61000-4-3: 10 V/m (Amplitude-modulated, 80 MHz to 1 GHz) (level 3); 10 V/m (Pulse-modulated, 900 MHz ±5 MHz) (level 3) Immunity Conducted Disturbance: EN61000-4-6: 10 V (0.15 to 80 MHz) (level 3) Immunity Burst: EN61000-4-4: 2 kV power-line (level 3); 1 kV I/O signal-line (level 4) Immunity Surge: EN61000-4-5: 1 kV line to lines (power and output lines) (level 2); 2 kV line to ground (power and output lines) (level 3) Immunity Voltage Dip/Interruption: EN61000-4-11: 0.5 cycle, 100% (rated voltage)
Degree of protection	Panel surface: IP66, NEMA 4 (indoors), and UL Type 4X (indoors) (See note 2.)
Weight	Approx. 140 g

Note: 1. To meet UL listing requirements with the H7CX-A11□ models, an OMRON P2CF-11-□ or P3GA-11 Socket must be mounted on the H7CX. Otherwise, H7CX-A11□ models are considered to meet UL508 recognition requirements.

2. The Y92S-29 Waterproof Packing and Y92F-30 Flush Mounting Adapter are necessary to ensure IP66, NEMA4, and UL Type 4X waterproofing between the H7CX and installation panel.
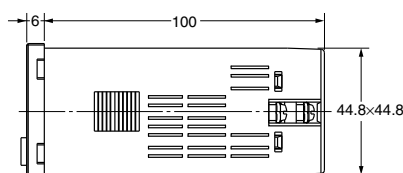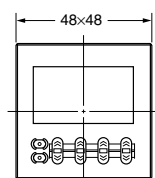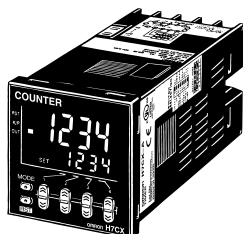
Dimensions

Note: All units are in millimeters unless otherwise indicated.

■ Counter (without Flush Mounting Adapter)

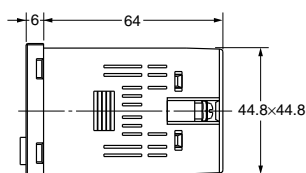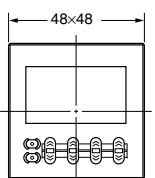### Screw-terminal Models with External Power Supplies (Flush Mounting)

- H7CX-A
- H7CX-AS
- H7CX-A4
- H7CX-A4S
- H7CX-AW
- H7CX-AWS
- H7CX-A4W
- H7CX-AWD1
- H7CX-AWSD1
- H7CX-AU
- H7CX-AUD1
- H7CX-AUSD1

48×48   6   100   44.8×44.8

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

Screw-terminal Models without External Power Supplies (Flush Mounting)

- H7CX-AD
- H7CX-ASD
- H7CX-A4D
- H7CX-A4SD
- H7CX-AWSD
- H7CX-AWSD

48×48   6   64   44.8×44.8

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

11-pin Socket Models (Flush Mounting/Surface Mounting)

- H7CX-A11
- H7CX-A11S
- H7CX-A11D1
- H7CX-A11SD1
- H7CX-A114
- H7CX-A114S
- H7CX-A114D1

48×48   6   72.5   14.4   44.8×44.8

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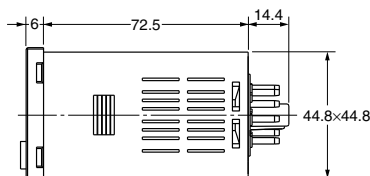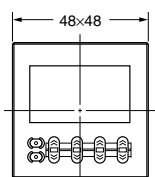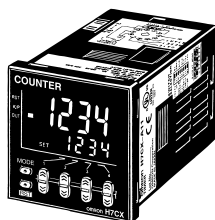
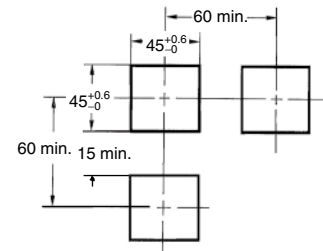# ■ Dimensions with Flush Mounting Adapter

Screw-terminal Models with External Power Supplies
(Provided with Adapter and Waterproof Packing)

- H7CX-A
- H7CX-AS
- H7CX-A4
- H7CX-A4S

- H7CX-AW
- H7CX-AWS
- H7CX-A4W
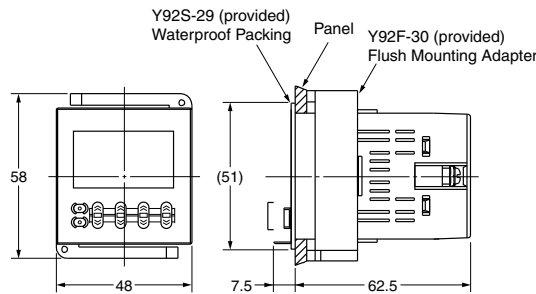- H7CX-AWD1
- H7CX-AWSD1

- H7CX-AU
- H7CX-AUD1
- H7CX-AUSD1

Y92S-29 (provided) Waterproof Packing
Panel
Y92F-30 (provided) Flush Mounting Adapter

58
(51)
48
7.5
98.5

Screw-terminal Models without External Power Supplies
(Provided with Adapter and Waterproof Packing)

- H7CX-AD
- H7CX-ASD
- H7CX-A4D
- H7CX-A4SD

- H7CX-AWSD
- H7CX-A4WSD

Y92S-29 (provided) Waterproof Packing
Panel
Y92F-30 (provided) Flush Mounting Adapter

58
(51)
48
7.5
62.5

11-pin Socket Models
(Adapter and Waterproof Packing Ordered Separately)

- H7CX-A11
- H7CX-A11S
- H7CX-A11D1
- H7CX-A11SD1

- H7CX-A114
- H7CX-A114S
- H7CX-A114D1

Y92S-29 (order separately) Waterproof Packing
Panel
Y92F-30 (order separately) Flush Mounting Adapter

P3GA-11 (order separately) Back Connecting Socket

58
(51)
48
7.5
98.7

■ Dimensions with Front Connecting Socket

H7CX -A11□

112
109.7

P2CF-11

Note: These dimensions vary with the kind of DIN track (reference value).

Panel Cutouts

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

60 min.
$45^{+0.6}_{-0}$
$45^{+0.6}_{-0}$
60 min. 15 min.

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

2. To allow easier operability, it is recommended that Adapters are mounted so that the gap between sides with hooks is at least 15 mm (i.e., so that the panel cutout interval is at least 60 mm).

3. It is possible to mount counters side by side, but only in the direction without the hooks.
If they are mounted side-by-side, water-resistant specifications cannot be ensured.
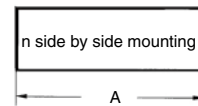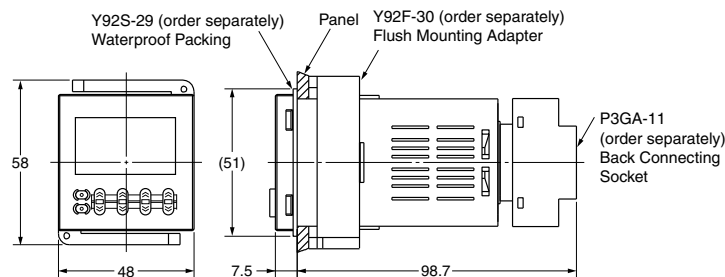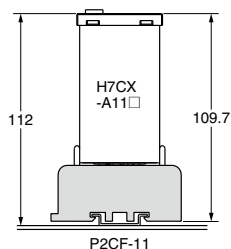
n side by side mounting

A

$A = (48n - 2.5)^{+1}_{0}$

With Y92A-48F1 attached.
$A = \{48n - 2.5 + (n-1) \times 4\}^{+1}_{0}$

With Y92A-48 attached.
$A = (51n - 5.5)^{+1}_{0}$

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