Digital Timer H5CN

91 (SP

Miniature DIN-sized (48 x 48 mm) Quartz Timer with Abundant Series Versions

- Series version cover a wide range of rated times; 9.999 s, 99.99 s, 999.9 s, 99 min 59 s, and 99 hrs 59 min.
- Selection of elapsed time indication, remaining time indication, contact output, and solid-state output types to suit requirements.
- Power supply freely selectable within a range of 100 to 240 VAC, as well as 12 to 48 VDC.
- Certified for UL and CSA safety standards.



Refer to Safety Precautions for All Timers. Refer to Safety Precautions on page 13

Model Number Structure

Model Number Legend

Note: This model number legend includes combinations that are not available. Before ordering, please check the List of Models on page 2 for availability.

H5CN-			Ν		
	1	2	3	4	5

1. Display

X:UP display (increments from 0 to the set time) Y: DOWN display (decrements from the set time to 0)

- 2. Rated time
 - Z: 0.001 to 9.999 s A: 0.001 to 99.99 s B: 0.1 to 999.9 s C: 1 s to 99 min 59 s D: 1 min to 99 h 59 min

3. Output mode

- N: N mode (Power ON-delay)
- 4. Backup power supply function for memory protection None: Not provided
- M: Provided **5. Output type**
- None: Contact output (SPDT)
 - S: Solid-state output

Ordering Information

■ List of Models

Display type		UP display timer (increments form 0 to the set time)		DOWN display timer (decre- ments form the set time to 0)	UP display timer (increments from 0 to the set time)	
Output type		Contact output (S	PDT)		Solid-state output	
Pin type		11-pin	8-pin			
Backup powe memory prot	er supply function for ection	Uses external battery (lithium). (See notes 2 and 3.)				
Supply voltag	ge	100 to 240 VAC	100 to 240 VAC, 12 to 48 VDC		12 to 48 VDC	
Rated time	0.001 to 9.999 s				H5CN-XZNS	
	0.001 to 99.99 s	H5CN-XANM	H5CN-XAN	H5CN-YAN	H5CN-XANS	
	0.1 to 999.9 s	H5CN-XBNM	H5CN-XBN	H5CN-YBN		
	1 s to 99 min 59 s	H5CN-XCNM	H5CN-XCN	H5CN-YCN		
	1 min to 99 h 59 min	H5CN-XDNM	H5CN-XDN H5CN-YDN			

Note: 1. Specify both the model number and supply voltage when ordering.

Example: H5CN-XAN 12 to 48 VDC

Supply voltage

- 2. The Y92S-20 Backup Battery (sold separately) provides power backup for memory protection during power failures for approximately 5 years (at 20°C). Always connect a battery to the H5CN-X MM. For details on connection methods, refer to page 5.
- **3.** The H5CN-X NM does not support power resetting.

■ Accessories (Order Separately)

Na	me	Models
Flush Mounting Adapter		Y92F-30
Backup Battery		Y92S-20
Track Mounting/Front	8-pin	P2CF-08
Connecting Socket	11-pin	P2CF-11
Back Connecting Socket	8-pin	P3G-08
	11-pin	P3GA-11
Protective Cover	Hard Cover	Y92A-48B
	Soft Cover	Y92A-48D
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

Specifications

■ Ratings

Item	Contact output	Solid-state output	
Rated supply voltage	100 to 240 VAC (50/60 Hz), 12 to 48 VDC (permissible rip- ple: 20% max.) (See note 1.)	12 to 48 VDC (permissible ripple: 20% max.)	
Operating voltage range	85% to 110% of rated supply voltage		
Power consumption	Approx. 12 VA at 240 VAC, 50 HzApprox. 2.5 W at 48 VDCApprox. 2.5 W at 48 VDCApprox. 2.5 W at 48 VDC		
Mounting method	Surface mounting or flush mounting		
Display	7-segment LEDs (8-mm-high characters), UP indicator		
Input method	Contact open and short-circuit input	Open-collector transistor ON/OFF input	
Resetting system and gate input	Reset by power-OFF (See note 2.): min. power OFF time: 0.5 s External reset or gate (common to contact and solid-state residual voltage: 2 V max.	inputs): min. reset input signal width: 0.02 s;	
Output mode	N mode (Power ON-delay)		
Control outputs	SPDT: 3 A at 250 VAC, resistive load ($\cos\phi = 1$)	Open collector: 100 mA max. at 30 VDC max.	
Ambient temperature	Operating:-10°C to 55°C (with no icing or condensation) Storage:-25°C to 65°C (with no icing or condensation)		
Ambient humidity	Operating: 35% to 85%		
Case color	Light gray (Munsell 5Y7/1)		

Note: 1. Models with memory backup function are available only for AC power.

2. The H5CN-X NM cannot be reset by turning OFF the power.

■ Characteristics

Accuracy of operating time	±0.01% ±0.05 s max. (see note 1), ±0.005% ±0.03 s max. (see note 2) (see note 3)
Setting error	
Influence of voltage	
Influence of temperature	
Insulation resistance	100 M Ω min. (at 500 VDC) (between current-carrying terminal and exposed non-current carrying metal parts, between power supply circuit and control output circuit)
Dielectric strength	2,000 VAC, 50/60 Hz for 1 min (between current-carrying terminal and exposed non-current-carrying metal parts, between power supply circuit and control output circuit)
Impulse withstand voltage	6 kV (between power supply terminal) 6 kV (between current-carrying terminal and exposed non-current carrying metal parts)
Noise immunity	Square-wave noise by noise simulator AC: ±2 kV (between power supply terminals) DC: ±480 V (between power supply terminals), ±500 V (between input terminals)
Static immunity	Malfunction: 8 kV
Vibration resistance	Destruction:10 to 55 Hz with 0.75-mm single amplitude each in 3 directions for 2 hours each Malfunction:10 to 55 Hz with 0.5-mm single amplitude each in 3 directions for 10 minutes each
Shock resistance	Destruction:300 m/s ² 3 times each in 6 directions Malfunction:100 m/s ² 3 times each in 6 directions
Life expectancy	Mechanical:10,000,000 operations min. Electrical:100,000 operations min. (3 A at 250 VAC, resistive load)
Approved standards	UL508, CSA C22.2 No. 14
Weight	Approx. 200 g

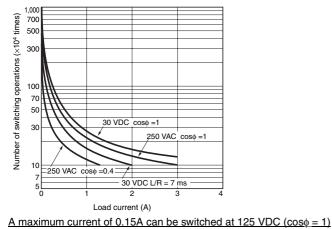
Note: 1. When timer operation is started by power application.

2. When timer operation is started after a reset input has been applied.

3. These values represent the total accuracy of the timer including the repeat accuracy, setting error, and variation due to voltage and temperature changes. Note that they also comprise errors due to the rise time of the power source and the operating times of the internal and output circuits.

H5CN

■ Life-test Curve (Reference Values)



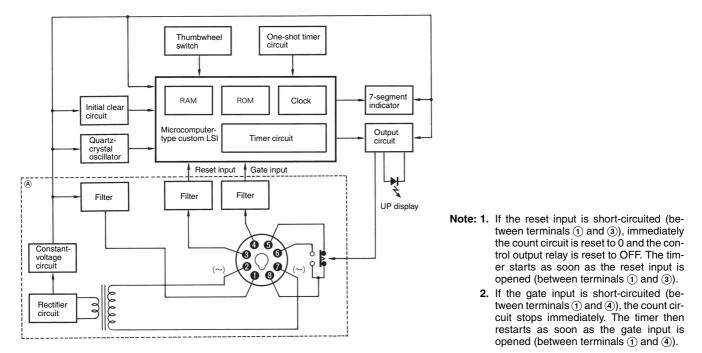
Maximum current of 0.1 A can be switched if L/R is 7 ms. In both cases, a life of 100,000 operations can be expected. The minimum applicable load is 10 mA at 5 VDC (failure level: P reference value).

Connections

Block Diagram

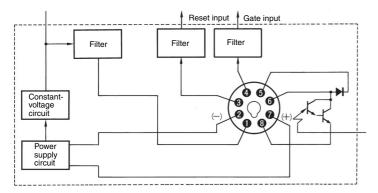
H5CN-DDN (without Backup Power for Memory Protection)

Using an AC Power Supply (Contact Outputs)



Using a DC Power Supply (Solid-state Outputs)

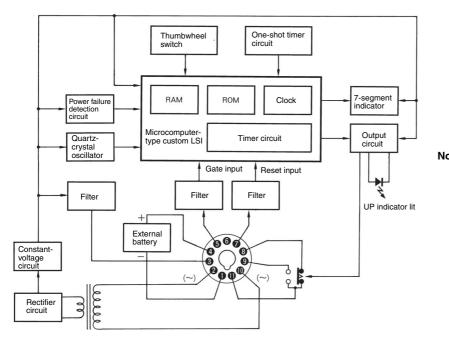
Note: The following block diagram shows the differences for the equivalent section indicated by "(A)" in the above block diagram.



Note: Terminals (1) and (2) are internally short-circuited.

H5CN-X M (with Backup Power for Memory Protection)

Note: Be sure to install a Backup Battery (sold separately).



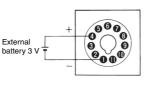
- Note: 1. If the reset input is short-circuited (between terminals ③ and ⑦), immediately the count circuit is initialized and the control output relay is reset to OFF. The timer starts as soon as the reset input is opened (between terminals ③ and ⑦).
 - If the gate input is short-circuited (between terminals (3) and (5)), the count circuit stops immediately. The timer then restarts as soon as the gate input is opened (between terminals (3) and (5)).

Installation

■ Connections

<u>1. Battery Connection (H5CN-X NM</u> Only)

Model with Backup Power for Memory Protection

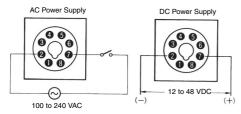


Connect the Y92S-20 Backup Battery between terminals (1) and (4), making sure the polarities are correct.

2. Power Supply Connection

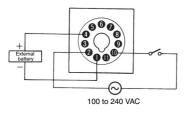
Model without Backup Power for Memory Protection

Connect the timer so that the required supply voltage can be applied across terminals (2) and (7). (Make sure that the polarity of the DC power supply is correct.)



Model with Backup Power for Memory Protection (H5CN-X□NM)

Connect the timer so that the required supply voltage can be applied across terminals (2) and (10).

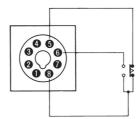


3. Connection of Load Circuit (Control Output)

Model without Backup Power for Memory Protection

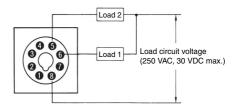
Contact Output Type

Internal Circuit of Control Output Contacts Terminals (5), (6), and (8) are for control output contacts.



Connecting of Load Circuit

Load 1 connected in series with NO contact (between terminals (a) and (a) is normally open, and the load circuit voltage will be applied after the lapse of the set time. The load circuit voltage is normally applied to load 2 connected in series with NC contact (between terminals (s) and (a)), which will be open after the lapse of the set time.

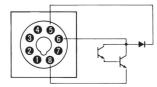


Note: The maximum load current is 3 A (resistive load).

Solid-state Output Type

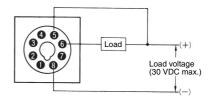
Internal Circuit of Control Output

Terminals (6) and (8) are an open collector output. A diode is internally connected between terminals (5) and (6) to absorb counterelectromotive force that occurs when an inductive load is connected.



Connection of Load Circuit

Voltage is applied to the load after the set time has lapsed.

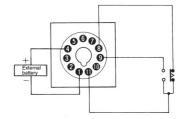


Note: The maximum load current is 100 mA.

Model with Backup Power for Memory Protection (H5CN-X□NM)

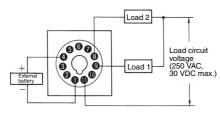
Contact Output Type

Internal Circuit of Control Output Contacts Terminal (\mathfrak{B} , \mathfrak{G} , and \mathfrak{T}) are for control output contacts.



Connection of Load Circuit

Load 1 connected in series with NO contact (between terminals (a) and (f)) is normally open, and the load circuit voltage will be applied to it after the lapse of the set time. The load circuit voltage is normally applied to load 2 connected in series with NC contact (between terminals (a) and (f)), which will be open after the lapse of the set time.



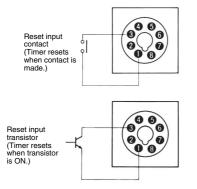
Note: The maximum load current is 3 A (resistive load).

4. Connection of Reset Input

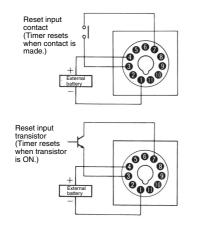
Connection of the reset input contact or an open collector transistor between terminals (1) and (3) (between terminals (3) and (7) for models with backup power for memory protection) permits the timer to reset when contact is made or the transistor turns ON. Use of a high-reliability gold-plated contact is recommended for the reset input. For the reset input transistor, select the one satisfying the following electrical ratings:

$$\begin{split} &V_{\text{CEO}} = 20\,\overline{\text{V}}\text{ min.}\\ &IC = 50\,\text{ mA min.}\\ &I_{\text{CEO}}\left(\text{leakage current}\right) = 0.5\,\mu\text{A max.}\\ &V_{\text{CE(sat)}}\left(\text{residual voltage}\right) = 2\,\text{V}\text{ max.} \end{split}$$

Model without Backup Power for Memory Protection



Model with Backup Power for Memory Protection (H5CN-X NM)



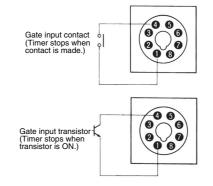
5. Connection of Gate Input

Connection of the gate input contact or an open collector transistor between terminals (1) and (4) (between terminals (3) and (5) for models with backup power for memory protection) permits the timer to stop operation while contact is made or the transistor turns ON. Use of a high-reliability gold-plated contact is recommended for the gate input. For the gate input transistor, select the one satisfying the following electrical ratings:

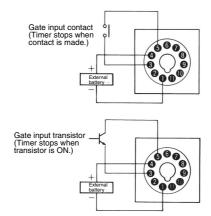
$$\begin{split} V_{\text{CEO}} &= 20 \text{ V min.} \\ IC &= 50 \text{ mA min.} \\ I_{\text{CEO}} \left(\text{leakage current} \right) &= 0.1 \text{ mA max.} \\ V_{\text{CE(sat)}} \left(\text{residual voltage} \right) &= 2 \text{ V max.} \end{split}$$

Use a gate input contact with a short bounce time because the contact bounce time causes an error in the operate time of the timer for a period equalling the bounce time.

Model without Backup Power for Memory Protection



Model with Backup Power for Memory Protection (H5CN-X NM)



6. Battery Connections when Using Backup Power for Memory Protection

Always connect a battery when using models with backup power for memory protection (H5CN-X \square NM). Any 3-V battery can be used, but the backup time will depend on the capacity of the battery.

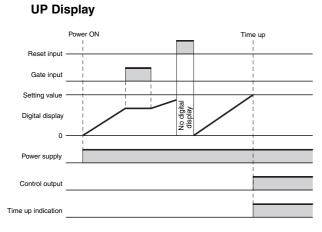
When using the Unit for the first time after purchase, apply power and reset the Unit once before using it. When power is turned ON for the first time, outputs may be produced at the same time, so do not connect the output terminals.

When connecting the battery using a Socket (P2CF-11 or P3GA-11), check the terminal numbers on the Socket and connect the positive side of the battery to terminal ④ and the negative side to terminal ①.

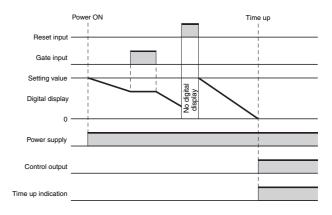
Operation

■ Timing Chart

Digital Display



DOWN Display

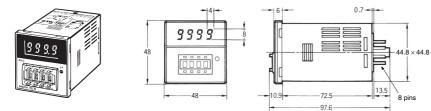


Dimensions

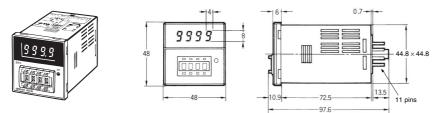
Note: All units are in millimeters unless otherwise indicated.

Dimensions without Flush Mounting Adapter

H5CN-X N/-Y N/-X NS (Flush Mounting/Surface Mounting Models)



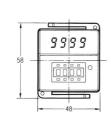
H5CN-X NM (Flush Mounting/Surface Mounting Models)

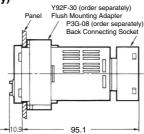


Dimensions with Flush Mounting Adapter

H5CN-X N/-Y N/-X NS (Adapter Ordered Separately)

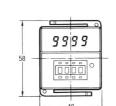


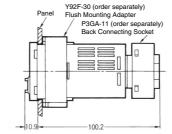




H5CN-X M (Adapter Ordered Separately)





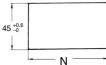


Panel Cutout

The standard panel cutout is as below. (Panel cutout conforms to DIN 43700.)

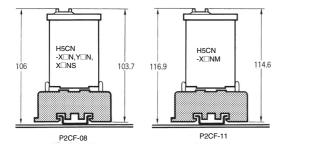


Gang-mounting of more than 2 units (horizontally)



- Note: 1. Panel thickness: 1 to 5 mm
 - When gang-mounting the Unit, the orientation of the Adapter must be changed depending on whether Units are mounted horizontally or vertically.
 No ensure
 - 3. No cover: $N = (48n - 2.5)^{+1/-0}$ With hard cover: $N = \{48n - 2.5 + (n - 1) \times 3\}^{+1/-0}$

Dimensions with Front Connecting Socket





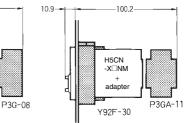
H5CN

X⊡NŚ

adapt

Y92F-30

-XON. YON



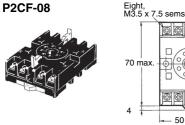
Note: These dimensions vary with the kind of DIN track (reference value).

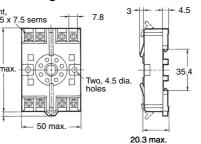
H₅CN

■ Accessories (Order Separately)

Note: All units are in millimeters unless otherwise indicated.

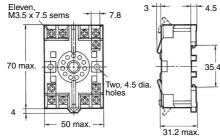
Track Mounting/Front Connecting Socket





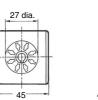
Track Mounting/Front Connecting Socket P2CF-11





Back Connecting Socket P3G-08







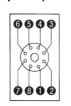
P3GA-11







Terminal Arrangement/ Internal Connections (Top View)



Terminal Arrangement/ Internal Connections (Top View)





Terminal Arrangement/ Internal Connections (Bottom View)



Terminal Arrangement/ Internal Connections (Bottom View)



Two, 4.5 dia. or two, M4

Surface Mounting Holes

Surface Mounting Holes

Two, 4.5 dia. or two, M4

_ · _ · . 40±0.2 →

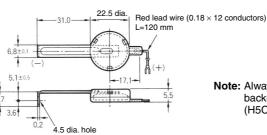


OMRON

H₅CN

Backup Battery Y92S-20





Hard Cover

99

Y92A-48B (See note 2.)

Note: Always connect a battery to models with backup power for memory protection (H5CN- \Box M).

Note: 1. The soft protective cover allows the set value to be set by

2. The hard protective cover prevents the set value from being altered due to accidental contact with the push

depressing the thumbwheel switches through it. It may be, however, difficult to make setting changes of the Timer

with the Y92A-48D Protective Cover attached, which must be taken into consideration before using the Y92A-48D

29.2

1.5

27 24

Soft Cover Y92A-48D (See note 1.)

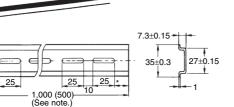


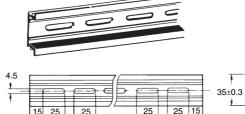
Flush Mounting Adapter Y92F-30



Mounting Track PFP-100N, PFP-50N







1,000

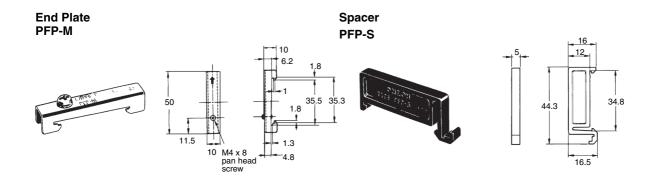
10

25

Protective Cover.

type thumbwheel switch.

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



PFP-100N2

15

Safety Precautions

Refer to Safety Precautions for All Timers.

/!\ WARNING

The Y92S-20 Backup Battery used for the H5CN-X NM is a lithium battery (non-explosion-proof). Do not short-circuit the positive and negative sides of the battery, recharge or disassemble the battery, deform the battery under pressure, or dispose of the battery in fire. Doing so may occasionally cause the battery to burst, ignite, or leak. Use only the specified battery. Otherwise, the battery may leak or burst, occasionally causing damage to the equipment or minor injury.

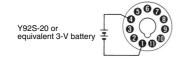
Precautions for Correct Use

Battery Connections when Using Backup Power for Memory Protection

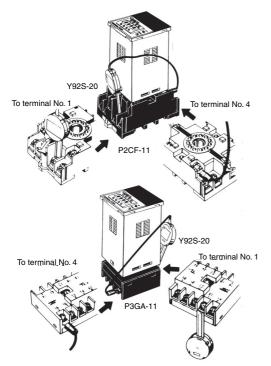
Always connect a battery when using models with backup power for memory protection. Any 3-V battery can be used, but the backup time will depend on the capacity of the battery. When using the Unit for the first time after purchase, apply power and reset the Unit once before using it. When power is turned ON for the first time, outputs may be produced at the same time, so do not connect the output terminals.

If a power interruption continues for 10 minutes or more when a battery is not connected, the count value and displays may be meaningless, and outputs may be produced unpredictably even if the power supply recovers. If this happens, apply power to the reset input once before using the Unit further. (The Unit can be used after turning ON the reset input, regardless of whether a battery is connected or not.)

Regular battery replacement (every 4 to 5 years) is recommended. The life of the battery depends on the frequency of power failures.



Connection Methods



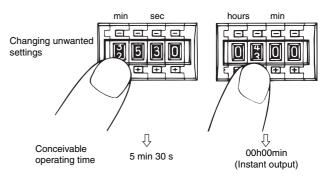
Setting of Operating Time

Time Setting Range

Setting range	Models
0.001 to 9.999 s	H5CN-□Z□
0.01 to 99.99 s	H5CN-□A□
0.1 to 999.9 s	H5CN-□B□
1 s to 99 min 59 s	H5CN-□C□
1 min to 99 h 59 min	H5CN-□D□

- 2. When the set time is all zeroes (e.g., 000.0 s or 00 h 00 min), there will be a momentary control output upon power application, which can be used to check normal output. When changing the set time during normal operation, pay special attention not to alter the set value to this all zeroes.
- 3. When changing the set time while power is being supplied, <u>an</u> <u>inadequate push of the thumbwheel switches will display two</u> <u>numbers in one digital display window</u>, causing the operating time to drift widely. Therefore, press the thumb-wheel switches surely. Take particular care when the other three digits are all zeroes, because the improper setting of the fourth switch to create four zeroes will cause an instantaneous output.

Undesirable Setting



 Take particular care with the H5CN-□Z□, which is capable of setting in 1/1000th of a second because there is an error of between 0.03 to 0.05 ms. (Repeat accuracy is 1 to 2 ms.)

Operation Examples

- During Incremental Operation
 If the set value is changed to a value higher than the currently
 displayed present value, the timer will time out for the new set
 value.
- During Decremental Operation
- When the set value changes, the difference between the new set value and old set value will be added or subtracted from the present value.

Example:

Old set value		New set value
200 s	->	100 s
Present value (before changing setting)		Present set value (after changing setting)
160 s	->	60 s

H5CN

Power Supply

Leave the power supply OFF for at least 0.5 s before turning it back ON (power supply reset).

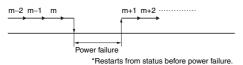
Inputs and Outputs

- Do not apply voltage externally to input terminals (1), (3), and (4).
- When using contacts for the reset input and gate input, use goldplated contacts with good contact reliability. Use gate input contacts with short contact bounce (chattering).

Operation during Power Failures

• When Units without backup power for memory protection are used, the timer status during momentary power failures is as shown in the following diagrams.

A. Power Failure of 0.01 s Max.

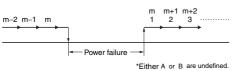


B. Power Failure of 0.5 s Min.



*Restarts from initial status after power reset

C. Power Failure of 0.01 to 0.5 s Max.



• Units with backup power for memory protection will restart from the status before the power failure as shown in example A, regardless of the length of time of the power failure.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.

To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

Read and Understand This Catalog

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- · Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this catalog.
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Disclaimers

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DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

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Performance data given in this catalog is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

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- При необходимости вся продукция военного и аэрокосмического назначения проходит испытания и сертификацию в лаборатории (по согласованию с заказчиком):

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ВЧ соединители, коаксиальные кабели, кабельные сборки и микроволновые компоненты:

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