Digital Counter (DIN 72 × 72)
H7AN

CSM_H7AN_DS_E_4_6

A DIN 72 x 72 mm Best-selling Counter

- Easy setting with thumbwheel switches.
- A draw-out construction enables maintenance without rewiring.
- Models with 2-, 4-, 6-, or 8-digit displays are also available.
- Total Counter models are also Available..

⚠ **Refer to *Safety Precautions for All Counters* and *Safety Precautions* on page 17.**

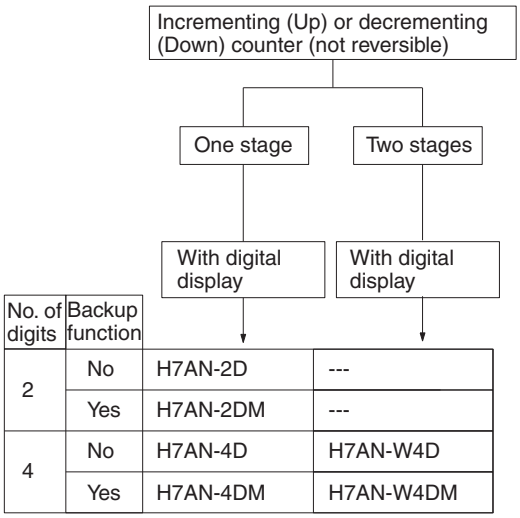
This product was upgraded in January 2006. Refer to *Changes in Specifications* on page 18 for details.

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

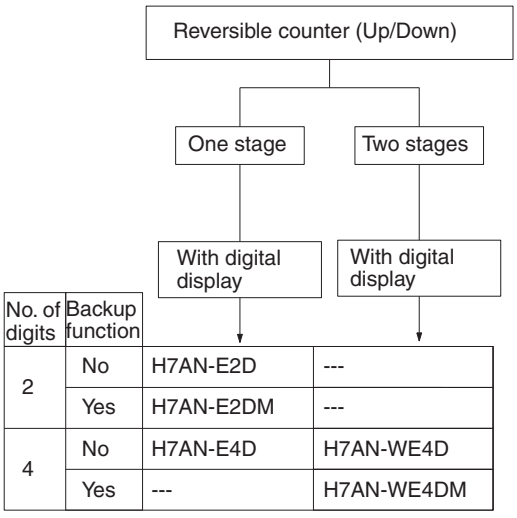
Ordering Information

Each model is sold together with a mounting bracket.

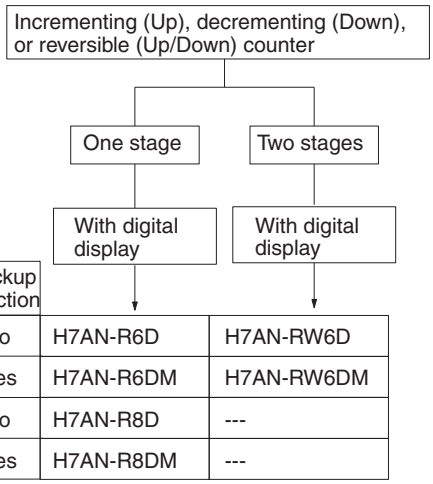
Preset Counter



No. of digits	Backup function		
2	No	H7AN-2D	---
	Yes	H7AN-2DM	---
4	No	H7AN-4D	H7AN-W4D
	Yes	H7AN-4DM	H7AN-W4DM

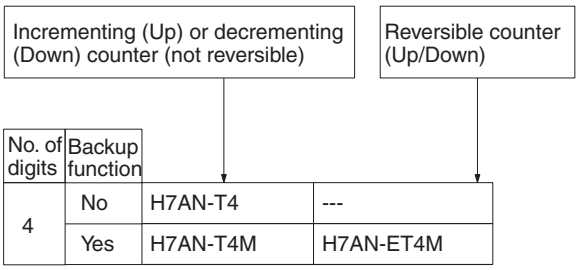


No. of digits	Backup function		
2	No	H7AN-E2D	---
	Yes	H7AN-E2DM	---
4	No	H7AN-E4D	H7AN-WE4D
	Yes	---	H7AN-WE4DM

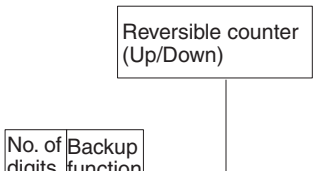


No. of digits	Backup function		
6	No	H7AN-R6D	H7AN-RW6D
	Yes	H7AN-R6DM	H7AN-RW6DM
8	No	H7AN-R8D	---
	Yes	H7AN-R8DM	---

Totalizing Counter



No. of digits	Backup function		
4	No	H7AN-T4	---
	Yes	H7AN-T4M	H7AN-ET4M



No. of digits	Backup function	
6	No	H7AN-RT6
	Yes	H7AN-RT6M
8	No	---
	Yes	H7AN-RT8M

Note: Specify the power supply voltage when ordering.

Specifications

Preset Counters

Incrementing/Decrementing Counters

Operating method			Incrementing and decrementing (selectable with DIP switch)	
Mounting method			Flush mounting	
Operation modes			N, F, C, R, K, P, Q (selectable with rotary DIP switch)	
Input signal method (Count and reset inputs)			Contact and transistor input voltage (H and L)	
Control output			1-stage counters: Contact (SPDT) and transistor output (H and L output switchable) 2-stage counters: Contact (SPST-NO) and transistor output (H and L output switchable)	
Set value read			Continuous mode	
Memory backup			No	Yes/No (Selectable using DIP switch)
Display			Yes (10-mm high 7-segment LED, Up indicator)	Yes (10-mm high 7-segment LED, Up indicator)
Models	**2 digits**	**1 stage**	H7AN-2D	H7AN-2DM
	4 digits	**1 stage**	H7AN-4D	H7AN-4DM
		2 stages	H7AN-W4D	H7AN-W4DM

Reversible Counters

Operating method			Reversible (selectable with rotary DIP switch) between 0 and the set value Incrementing/decrementing A/D (command inputs) Incrementing/decrementing B/E (individual inputs) Incrementing/decrementing C/F (phase difference inputs)	
Mounting method			Flush mounting	
Operation modes			N, F, C, R, K, P, Q (selectable with rotary DIP switch)	
Input signal method (Count, reset input)			Contact and transistor input voltage (H and L)	
Control output			1-stage counters: Contact (SPDT) and transistor output (H and L output switchable) 2-stage counters: Contact (SPST-NO) and transistor output (H and L output switchable)	
Set value read			Continuous mode	
Memory backup			No	Yes/No (Selectable using DIP switch)
Display			Yes (10-mm high 7-segment LED, Up indicator)	
Models	**2 digits**	**1 stage**	H7AN-E2D	H7AN-E2DM
	4 digits	**1 stage**	H7AN-E4D	H7AN-E4DM
		2 stages	H7AN-WE4D	H7AN-WE4DM

Incrementing, Decrementing, and Reversible Counters

Operating method			Incrementing, decrementing, and reversible (UP/DOWN A to F) (selectable with rotary DIP switch)	
Mounting method			Flush mounting	
Operation modes			N, F, C, R, K, P, Q (selectable with rotary DIP switch)	
Input signal method (Count, reset input)			Contact and transistor input voltage (H and L)	
Control output			1-stage counters: Contact (SPDT) and transistor output (H and L output switchable) 2-stage counters: Contact (SPST-NO) and transistor output (H and L output switchable)	
Set value read			Continuous mode, Reset mode (selectable)	
Memory backup			No	Yes/No (Selectable using DIP switch)
Display			Yes (8-mm high 7-segment LED, Up indicator)	
Models	**6 digits**	**1 stage**	H7AN-R6D	H7AN-R6DM
		2 stage	H7AN-RW6D	H7AN-RW6DM
	8 digits	**1 stages**	H7AN-R8D	H7AN-R8DM

Totalizing Counters

Incrementing/Decrementing Counters

Operating method		Incrementing and decrementing (selectable with DIP switch)	
Mounting method		Flush mounting	
Input signal method (Count, reset input)		Contact and transistor input voltage (H and L)	
Memory backup		No	Yes/No (Selectable using DIP switch)
Display		Yes (10-mm high 7-segment LED)	
Models	**4 digits**	H7AN-T4	H7AN-T4M

Reversible Counters

Operating method		Reversible (selectable with rotary DIP switch) between 0 and the full scale Incrementing/decrementing A/D (command inputs) Incrementing/decrementing B/E (individual inputs) Incrementing/decrementing C/F (phase difference inputs)
Mounting method		Flush mounting
Input signal method (Count, reset input)		Contact and transistor input voltage (H and L)
Memory backup		Yes/No (Selectable using DIP switch)
Display		Yes (10-mm high 7-segment LED)
Models	**4 digits**	H7AN-ET4M

Incrementing, Decrementing, and Reversible Counters

Operating method		Incrementing, decrementing, and reversible (UP/DOWN A to F)	
Mounting method		Flush mounting	
Input signal method (Count, reset input)		Contact and transistor input voltage (H and L)	
Memory backup		No	Yes/No (Selectable using DIP switch)
Display		Yes (8-mm high 7-segment LED)	
Models	**6 digits**	H7AN-RT6	H7AN-RT6M
	8 digits	---	H7AN-RT8M

■ Ratings

Rated supply voltage	100 to 240 VAC, 50/60 Hz (common use); 12 to 24, 48, 100 VDC*
Operating voltage range	85% to 110% of rated voltage
Power consumption	Approx. 10 VA (240 VAC at 50 Hz); Approx. 5 W (at 24 VDC)**
Max. counting speed of CP1 and CP2	2-digit counters: 30 Hz 4-digit counters: 30 Hz or 5 kHz 6- or 8-digit counters: 30 Hz or 5 kHz Minimum signal width (with ON/OFF ratio of 1:1): 30 Hz: 16.7 ms, 5 kHz: 0.1 ms H: 4.5 to 30 VDC, L: 0 to 2 VDC
Reset	Power supply reset (except for H7AN Counter with suffix “-M”): Minimum power-OFF time: 0.5 s with a reset time of 0.05 s after power-ON. External, manual, reset signal time: 0.02 s Reset time after completion of reset signal: 0.05 s Automatic reset***
Control output	Contacts: 3 A at 250 VAC, resistive load ($\cos\phi = 1$) No-contacts: 100 mA max. at 30 VDC max., open collector
Min. applicable load	10 mA at 5 VDC (p level reference value)
External power supply	80 mA, 12 VDC ±10% (contains 5% ripple max.)
Ambient temperature	Operating: –10°C to 55°C (with no icing) Storage: –25°C to 65°C (with no icing)
Ambient humidity	35% to 85%
Case color	Light gray (Munsell 5Y7/1)

*The ripple is 20% max.
**There is an inrush current of 14 A at 240 VAC for approximately 0.6 ms, 15 A at 12 to 24 VDC for 2 ms, 5 A at 48 VDC for 3 ms, or 8 A at 100 VDC for 2 ms immediately after power-ON.
***Only preset counters can be automatically reset.

■ Characteristics

Insulation resistance	100 MW 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 terminal and exposed non-current carrying metal parts) 750 VAC, 50/60 Hz for 1 min (between non-continuous contacts)
Impulse withstand voltage	6 kV (between power terminals), 6 kV (between current-carrying terminal and exposed non-current-carrying metal parts)
Noise immunity	±2 kV between power terminals (±480 V for models with 12 to 24 VDC) ±500 V between input terminals Square-wave noise by noise simulator (pulse width: 100 ns, 1-ns rise)
Vibration resistance	Destruction:10 to 55 Hz, 0.75-mm double amplitude Malfunction:10 to 55 Hz, 0.5-mm double amplitude
Shock resistance	Destruction: 300 m/s^2 Malfunction: 100 m/s^2
Life expectancy	Mechanical: 10,000,000 operations min. Electrical: 100,000 operations min. (3 A at 250 VAC, resistive load)
Memory backup storage method *	Non-volatile memory (Number of writes: 1 million times, Data retention: 10 years)
Weight	Approx. 360 g

* This applies only to the models ending with -M.

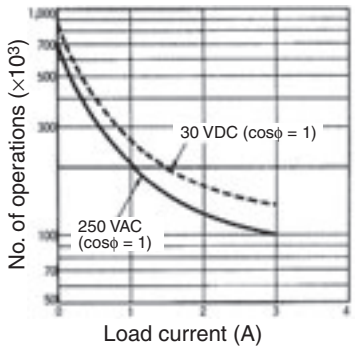
■ Applicable Standards

Approved safety standards	UL508/CSA C22.2 No. 14 EN 61010-1 (IEC 61010-1): Pollution degree 2/overvoltage category II	
EMC	(EMI)	EN61326
	Emission Enclosure:	EN 55011 Group 1 class A
	Emission AC mains:	EN 55011 Group 1 class A
	(EMS)	EN61326
	Immunity ESD:	EN 61000-4-2
	Immunity RF-interference:	EN 61000-4-3
	Immunity Conducted Disturbance:	EN 61000-4-6
	Immunity Burst:	EN 61000-4-4
	Immunity Surge:	EN 61000-4-5
	Immunity Voltage Dip/Interruption:	EN 61000-4-11

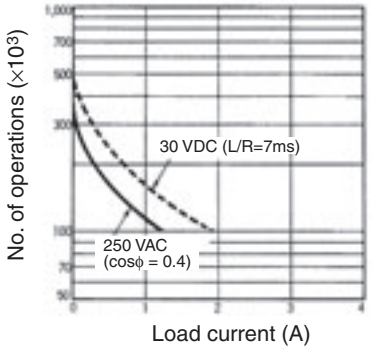
Engineering Data

Life of Contacts

Electric Life Expectancy (Resistive load)



Electric Life Expectancy (Inductive load)

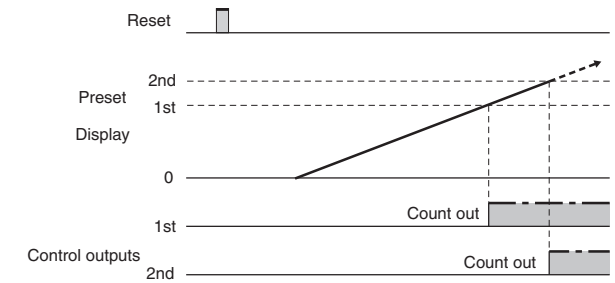
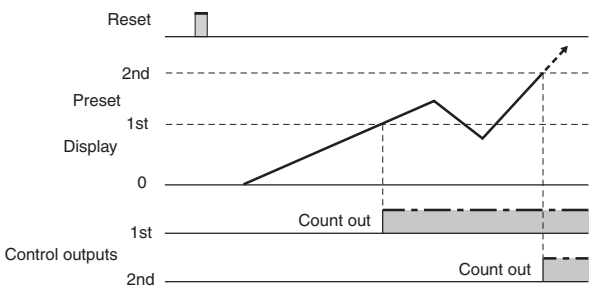
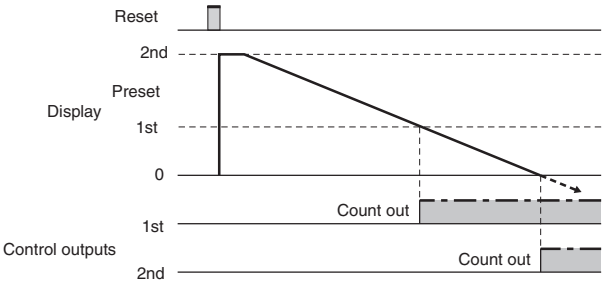
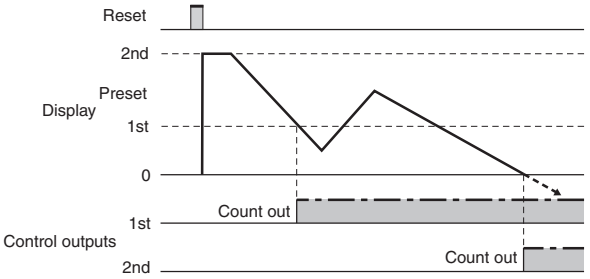


Reference: 0.15 A max. can be switched 100,000 times at 125 VDC (cosϕ = 1).
0.1 A max. can be switched 100,000 times when L/R = 7 ms.

Operation

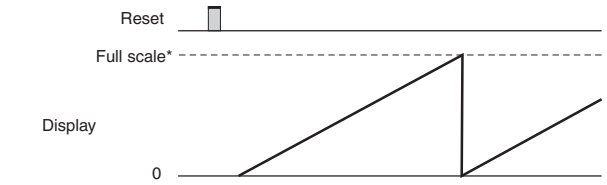
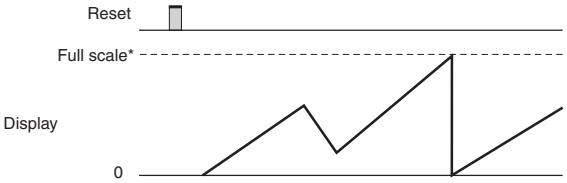
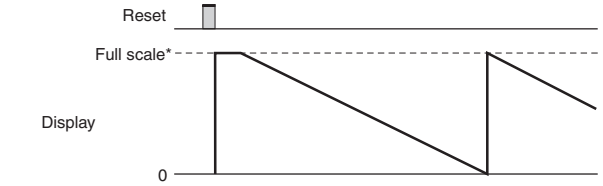
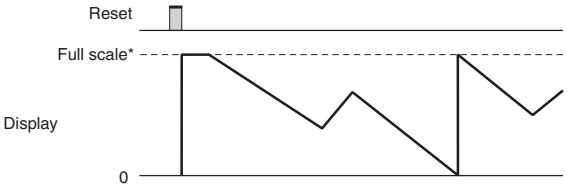
■ Count Operation

Preset Counters

Incrementing/Decrementing selectable mode	Reversible mode
Incrementing mode 	Incrementing/Decrementing A, B, C (incrementing) mode 
Decrementing mode 	Incrementing/Decrementing D, E, F (decrementing) mode 

Note: Two-stage counters, set the counters so that the interval between 1st and 2nd count out will be more than 5 ms. For Incrementing/Decrementing switchable counters, only the 2nd value will be effective if the 1st value is larger than the 2nd value.
The Incrementing/Decrementing Counters give outputs in the following order; 1st to 2nd to 1st to 2nd.

Totalizing Counters

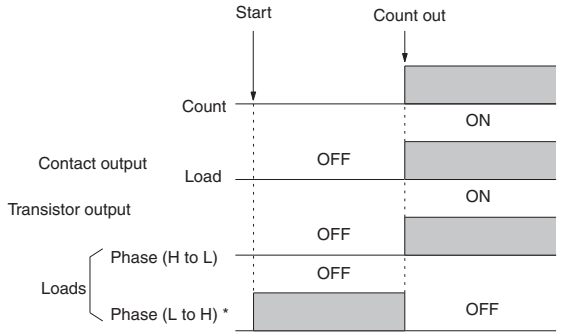
Incrementing/Decrementing selectable mode	Reversible mode
Incrementing mode 	Incrementing/Decrementing A, B, C (decrementing) mode 
Decrementing mode 	Incrementing/Decrementing D, E, F (decrementing) mode 

Note: The count value will return to “0” when it reaches the full scale limit.

* The full scale value is 9999 for the 4-digit counters, 999999 for the 6-digit counters, and 99999999 for the 8-digit counters.

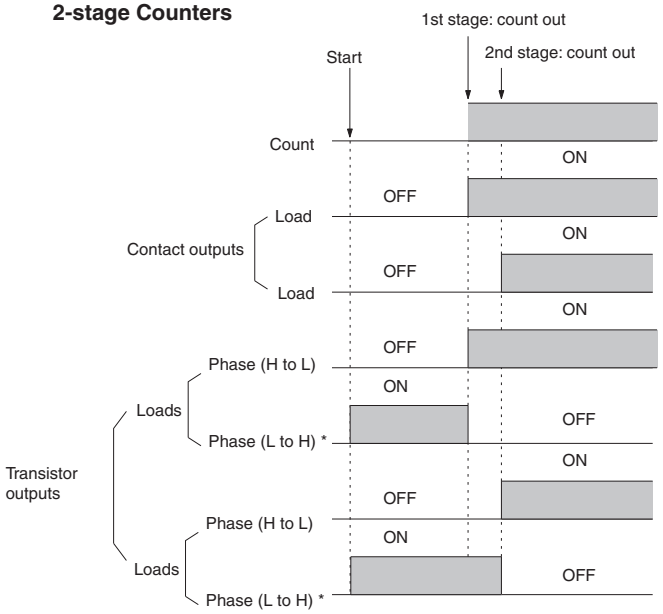
■ *Output Timing Charts

1-stage Counters



* The operation of the load when the phase has been reversed.

2-stage Counters



* The operation of the load when the phase has been reversed.

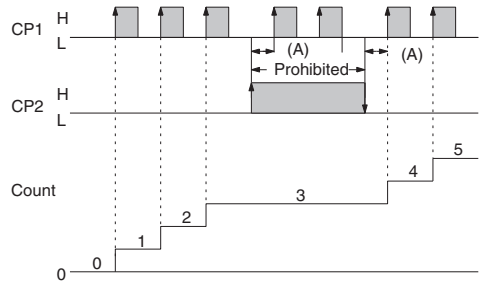
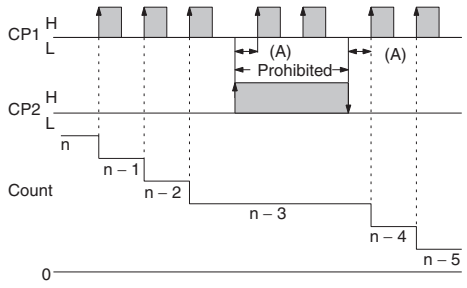
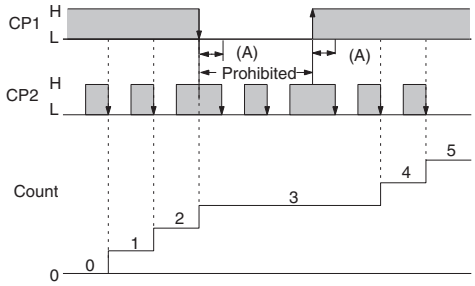
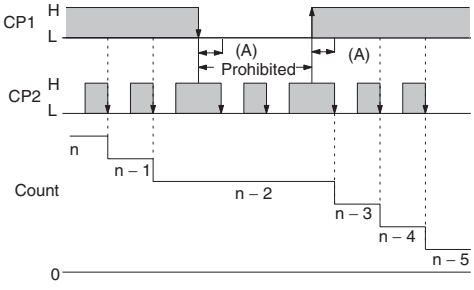
Output Delays

Control output	Max. counting speed	Output delay	
		2-, 4-digit counters	6-, 8-digit counters
Contact output	30 Hz	14.0 to 16.0 ms	14.0 to 18.0 ms
	5 kHz	6.0 to 8.0 ms	6.0 to 8.0 ms
Transistor output	30 Hz	8.0 to 10.0 ms	9.5 to 12.0 ms
	5 kHz	0.4 to 0.6 ms	0.3 to 0.5 ms

Input Mode Setting

Incrementing/Decrementing Selectable Mode

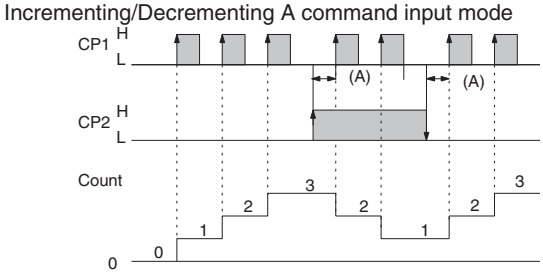
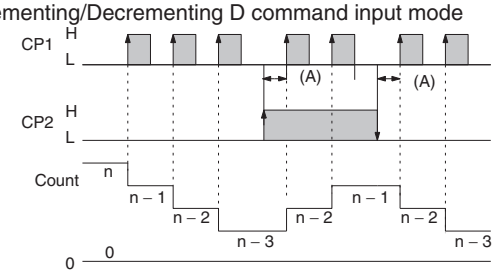
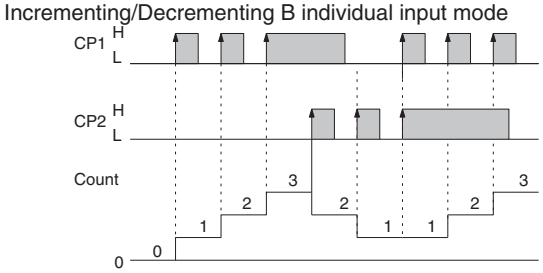
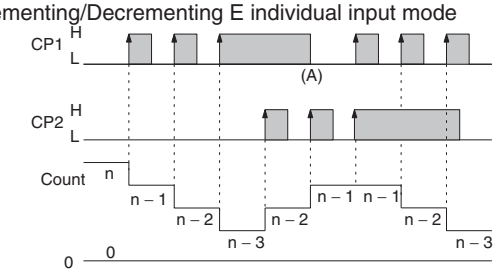
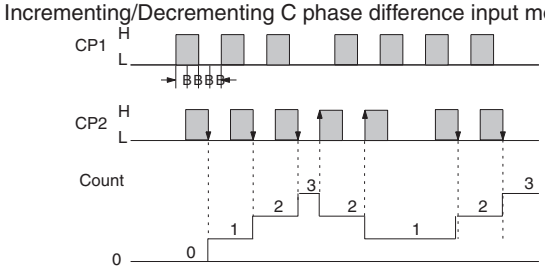
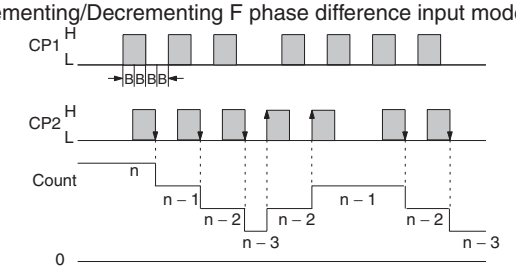
Note: The width of (A) must be the same as or lager than the minimum signal width, because an error of ±1 count may occur if the width of (A) is smaller than the minimum signal width.

Incrementing mode	Decrementing mode
CP1: Count input; CP2: prohibit (gate) input	CP1: Count input; CP2: prohibit (gate) input
	
CP1: Prohibit (gate) input; CP2: count input	CP1: Prohibit (gate) input; CP2: count input
	

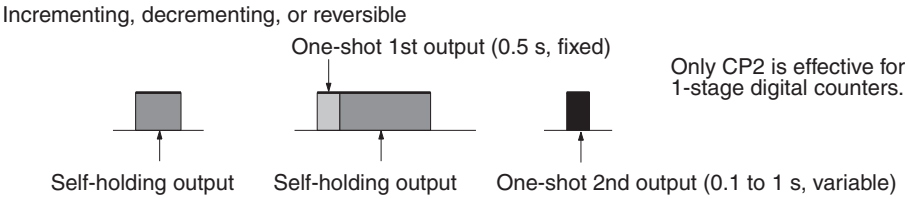
Reversible Mode

Note: 1. A: Minimum signal width; B: Must be at least 1/2 of minimum signal width. An error of ±1 count may occur if the width of (A) and (B) are smaller than the minimum signal width.

2. Set the same counting speed for CP1 and CP2 when in Up/Down C, or F mode.

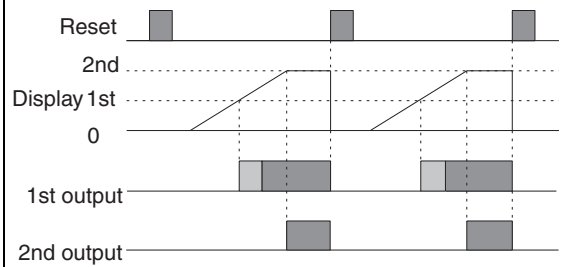
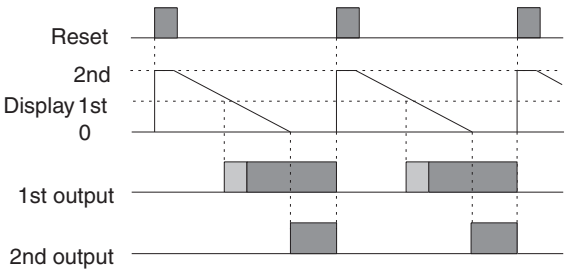
Incrementing mode	Decrementing mode
Incrementing/Decrementing A command input mode 	Incrementing/Decrementing D command input mode 
Incrementing/Decrementing B individual input mode 	Incrementing/Decrementing E individual input mode 
Incrementing/Decrementing C phase difference input mode 	Incrementing/Decrementing F phase difference input mode 

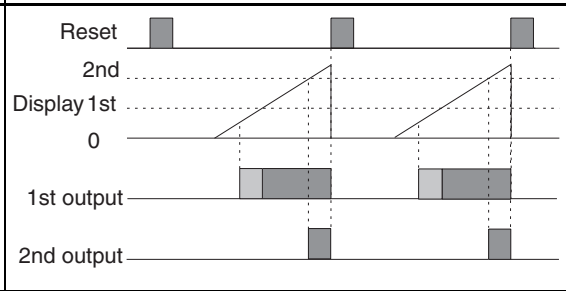
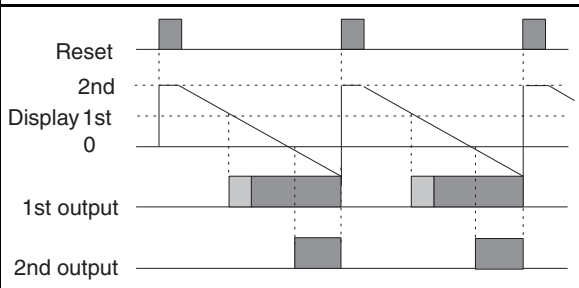
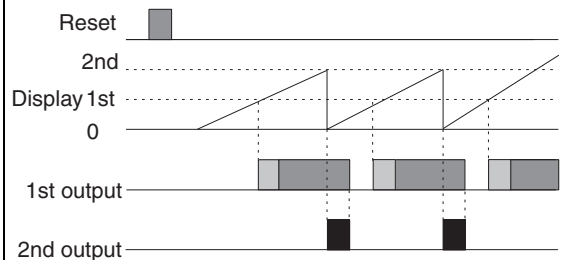
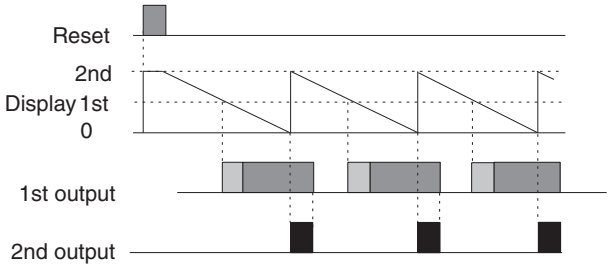
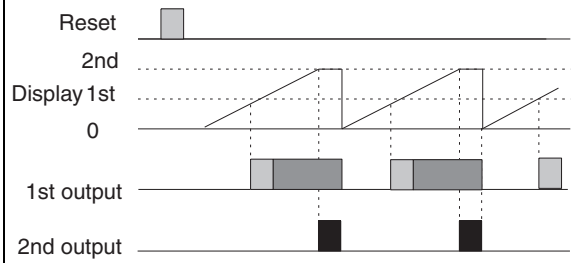
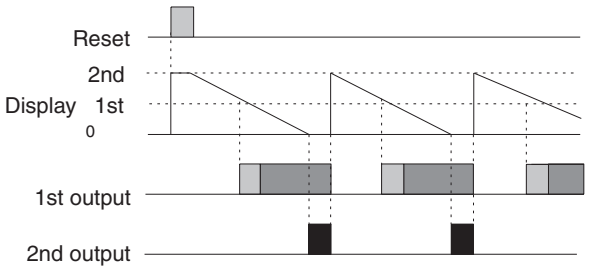
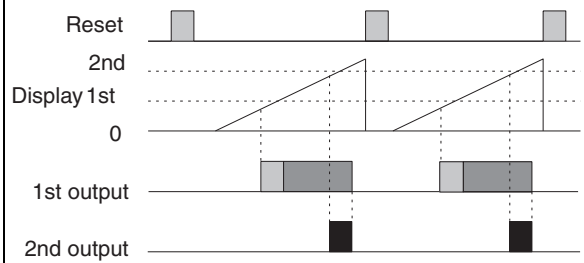
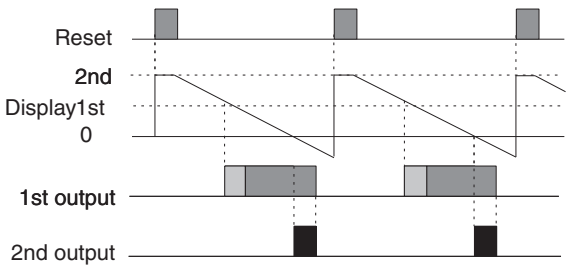
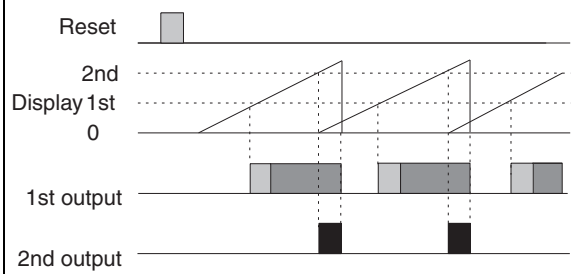
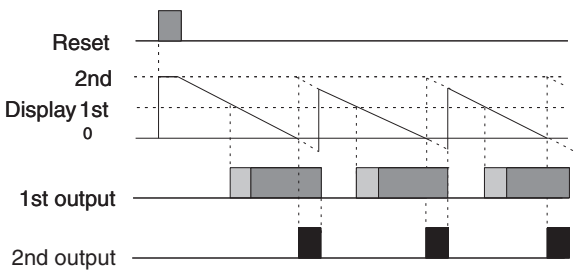
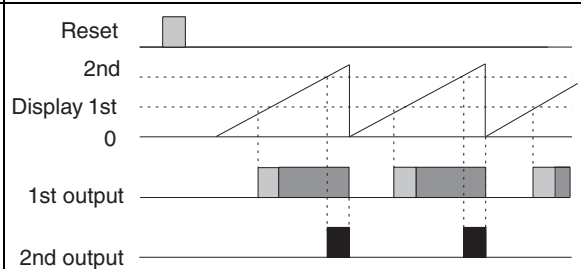
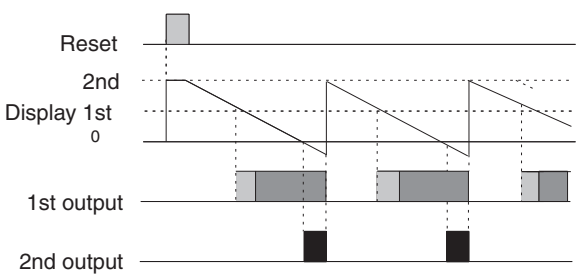
■ Output Modes



Note: 1. In the C, K, P, and Q modes, the counters must not count out again while the one-shot timer is working.

2. In the C mode, the present value is placed in reset start status as soon as the preset count is reached and the count-out status is not displayed.

Output mode	Incrementing, Incrementing/Decrementing A, B, C	Decrementing, Incrementing/Decrementing D, E, F
N		

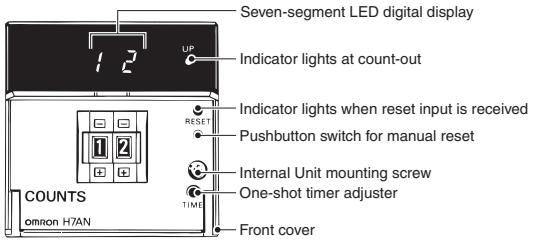
Output mode	Incrementing, Incrementing/Decrementing A, B, C	Decrementing, Incrementing/Decrementing D, E, F
F		
C		
R		
K		
P		
Q		

Nomenclature

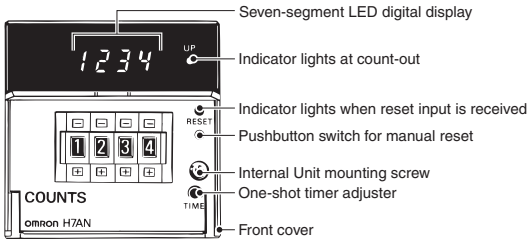
■ Nomenclature

Preset Counter

H7AN-2D, -2DM
H7AN-E2D, -E2DM

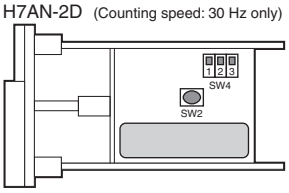


H7AN-4D, -4DM
H7AN-E4D, -E4DM



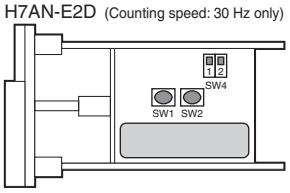
Arrangement and Functions of Specification Selection Switches

H7AN-2D (Counting speed: 30 Hz only)



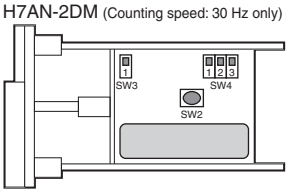
SW2: (A) Operating mode selector
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible
SW4-3: UP/DOWN selector
Up counting (incrementing) (See note.)
Down counting (decrementing)

H7AN-E2D (Counting speed: 30 Hz only)



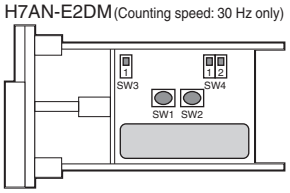
SW1: (A) Counting function selector
SW2: (A) Operating mode selector
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible

H7AN-2DM (Counting speed: 30 Hz only)



SW2: (A) Operating mode selector
SW3: Power failure memory backup
Memory backup (See note.)
No memory backup
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible
SW4-3: UP/DOWN selector
Up counting (incrementing) (See note.)
Down counting (decrementing)

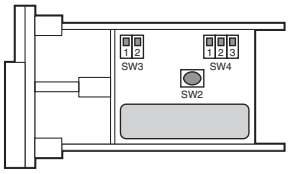
H7AN-E2DM (Counting speed: 30 Hz only)



SW1: (A) Counting function selector
SW2: (A) Operating mode selector
SW3: Power failure memory backup
Memory backup (See note.)
No memory backup
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible

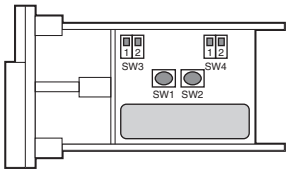
Arrangement and Functions of Specification Selection Switches

H7AN-4D



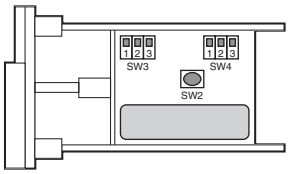
SW2: (A) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible
SW4-3: UP/DOWN selector
Up counting (incrementing) (See note.)
Down counting (decrementing)

H7AN-E4D



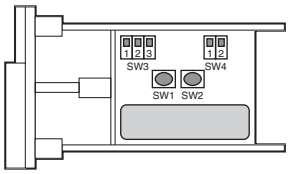
SW1: (A) Counting function selector
SW2: (A) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible

H7AN-4DM



SW2: (A) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-3: SW3-3: Power failure memory backup
Memory backup (See note.)
No memory backup
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible
SW4-3: UP/DOWN selector
Up counting (incrementing) (See note.)
Down counting (decrementing)

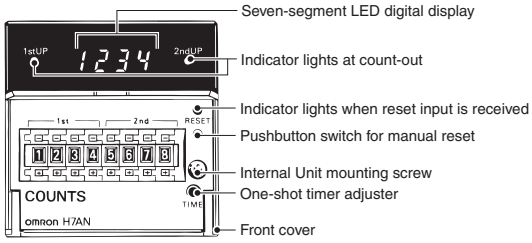
H7AN-E4DM



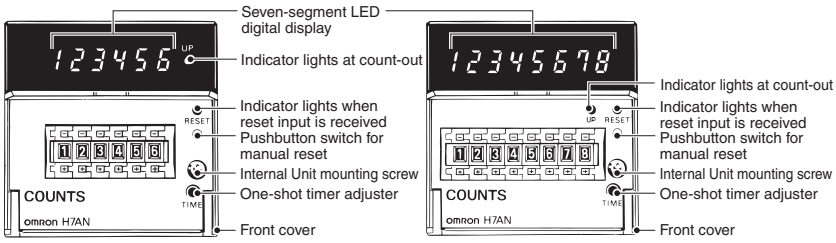
SW1: (A) Counting function selector
SW2: (A) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-3: Power failure memory backup
Memory backup (See note.)
No memory backup
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible

Note: These settings are the defaults for the specification selection switches.

H7AN-W4D, -W4DM
H7AN-WE4D, -WE4DM

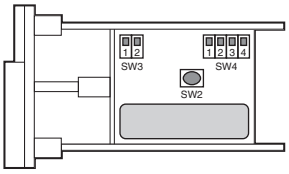


H7AN-R6D, -R6DM
H7AN-R8D, -R8DM



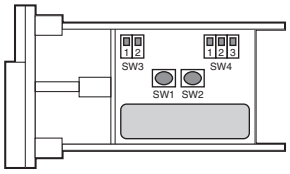
Arrangement and Functions of Specification Selection Switches

H7AN-W4D



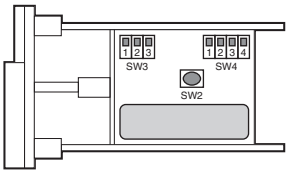
SW2: (B) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW4-1: Output phase selector for first transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Output phase selector for second transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-3: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible
SW4-4: UP/DOWN selector
Up counting (incrementing) (See note.)
Down counting (decrementing)

H7AN-WE4D



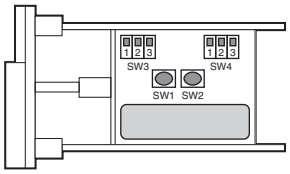
SW1: (A) Counting function selector
SW2: (B) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW4-1: Output phase selector for first transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Output phase selector for second transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-3: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible

H7AN-W4DM



SW2: (B) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-3: Power failure memory backup
Memory backup (See note.)
No memory backup
SW4-1: Output phase selector for first transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Output phase selector for second transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-3: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible
SW4-4: UP/DOWN selector
Up counting (incrementing) (See note.)
Down counting (decrementing)

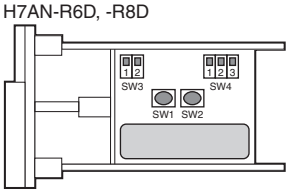
H7AN-WE4DM



SW1: (A) Counting function selector
SW2: (B) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-3: Power failure memory backup
Memory backup (See note.)
No memory backup
SW4-1: Output phase selector for first transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Output phase selector for second transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-3: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible

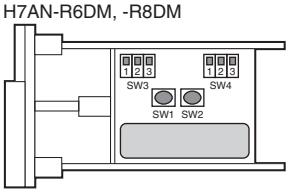
Arrangement and Functions of Specification Selection Switches

H7AN-R6D, -R8D



SW1: (B) Counting function selector
SW2: (A) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Set value read selector
Always read (See note.)
Read only at reset
SW4-3: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible

H7AN-R6DM, -R8DM

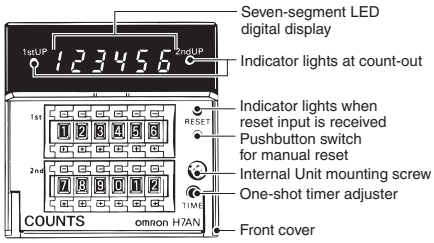


SW1: (B) Counting function selector
SW2: (A) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-3: Power failure memory backup
Memory backup (See note.)
No memory backup
SW4-1: Output phase selector for transistor output section
L→H (at count-out) (See note.)
H→L (at count-out)
SW4-2: Set value read selector
Always read (See note.)
Read only at reset
SW4-3: Manual reset selector
Manual reset possible (See note.)
Manual reset not possible

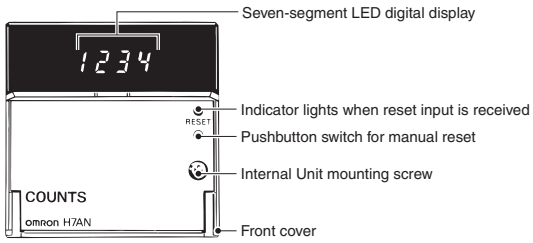
Note: These settings are the defaults for the specification selection switches.

Totalizing Counter

H7AN-RW6D, -RW6DM

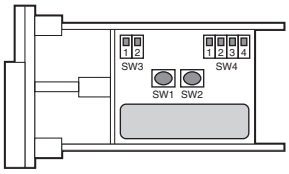


H7AN-T4, -T4M, -ET4M
H7AN-RT6, -RT8M



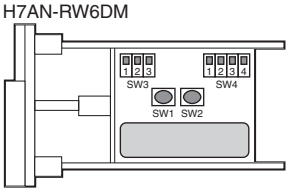
Arrangement and Functions of Specification Selection Switches

H7AN-RW6D



SW1: (B) Counting function selector
SW2: (B) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-2: SW3-2: CP2 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW4-1: Output phase selector for first transistor output section
L→H (at count-out) (See note 1.)
H→L (at count-out)
SW4-2: Output phase selector for second transistor output section
L→H (at count-out) (See note 1.)
H→L (at count-out)
SW4-3: Set value read selector
Always read (See note 1.)
Read only at reset
SW4-4: Manual reset selector
Manual reset possible (See note 1.)
Manual reset not possible

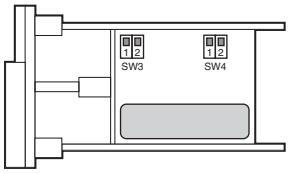
H7AN-RW6DM



SW1: (B) Counting function selector
SW2: (B) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-3: Power failure memory backup
Memory backup (See note 1.)
No memory backup
SW4-1: Output phase selector for first transistor output section
L→H (at count-out) (See note 1.)
H→L (at count-out)
SW4-2: Output phase selector for second transistor output section
L→H (at count-out) (See note 1.)
H→L (at count-out)
SW4-3: Set value read selector
Always read (See note 1.)
Read only at reset
SW4-4: Manual reset selector
Manual reset possible (See note 1.)
Manual reset not possible

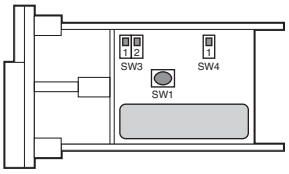
Arrangement and Functions of Specification Selection Switches

H7AN-T4



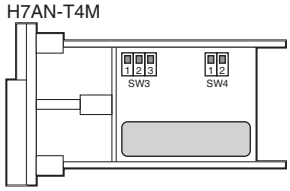
SW3-1: CP1 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW4-1: Manual reset selector
Manual reset possible (See note 1.)
Manual reset not possible
SW4-2: UP/DOWN selector
Up counting (incrementing) (See note 1.)
Down counting (decrementing)

H7AN-RT6



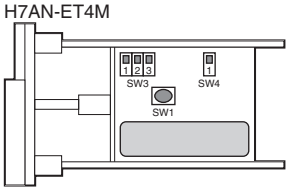
SW1: (B) Counting function selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW4: Manual reset selector
Manual reset possible (See note 1.)
Manual reset not possible

H7AN-T4M



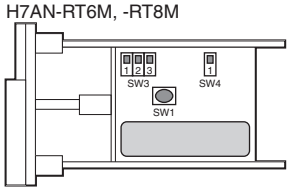
SW3-1: CP1 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-3: Power failure memory backup
Memory backup (See note 1.)
No memory backup
SW4-1: Manual reset selector
Manual reset possible (See note 1.)
Manual reset not possible
SW4-2: UP/DOWN selector
Up counting (incrementing) (See note 1.)
Down counting (decrementing)

H7AN-ET4M



SW1: (A) Counting function selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-3: Power failure memory backup
Memory backup (See note 1.)
No memory backup
SW4: Manual reset selector
Manual reset possible (See note 1.)
Manual reset not possible

H7AN-RT6M, -RT8M



SW1: (B) Counting function selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note 1.)
5 kHz
SW3-3: Power failure memory backup
Memory backup (See note 1.)
No memory backup
SW4: Manual reset selector
Manual reset possible (See note 1.)
Manual reset not possible

Note: 1. These settings are the defaults for the specification selection switches.

2. Specifications selected using the internal specification selection switches become after switching once a reset has been performed (e.g., power supply reset, external reset, or manual reset, but not automatic reset).
If a reset is not performed, operation will continue with the specifications before switching.

SW1 (A) Counting function selector

Switch position	Function
0, 1, 8, 9 (See note.)	Up/Down A (command inputs)
2	Up/Down B (individual inputs)
3	Up/Down C (differential phase inputs)
4, 5	Up/Down D (command inputs)
6	Up/Down E (individual inputs)
7	Up/Down F (differential phase inputs)

Note: These settings are the defaults.

SW1 (B) Counting function selector

Switch position	Function
0, 1	Up/Down A (command inputs)
2	Up/Down B (individual inputs)
3	Up/Down C (differential phase inputs)
4, 5	Up/Down D (command inputs)
6	Up/Down E (individual inputs)
7	Up/Down F (differential phase inputs)
8	DOWN
9 (See note.)	UP

Note: These settings are the defaults.

SW2 (A) Operating mode selector (1-stage preset models)

Switch position	Function
0, 7, 8, F (See note.)	N (count stop, output hold)
1, 9	F (overcount, output hold)
2, A	C (automatic reset, one-shot output)
3, B	R (automatic reset, one-shot output 1)
4, C	K (overcount reset, one-shot output)
5, D	P (automatic reset, one-shot output 2)
6, E	Q (automatic reset, one-shot output 3)

Note: These settings are the defaults.

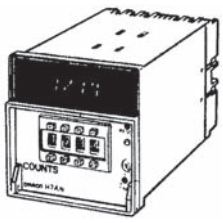
SW2 (B) Operating mode selector (2-stage preset models)

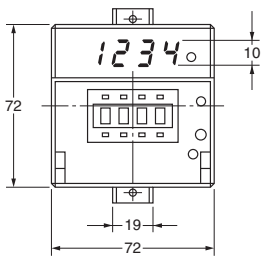
Switch position	Second-stage function	
0, 7 (See note.)	First-stage output hold	N (count stop, output hold)
1		F (overcount, output hold)
2		C (automatic reset, one-shot output)
3		R (automatic reset, one-shot output 1)
4		K (overcount reset, one-shot output)
5		P (automatic reset, one-shot output 2)
6		Q (automatic reset, one-shot output 3)
8, F	First-stage one-shot output	N (count stop, output hold)
9		F (overcount, output hold)
A		C (automatic reset, one-shot output)
B		R (automatic reset, one-shot output 1)
C		K (overcount reset, one-shot output)
D		P (automatic reset, one-shot output 2)
E		Q (automatic reset, one-shot output 3)

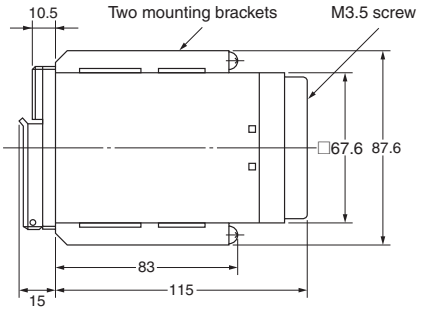
Note: These settings are the defaults.

Dimensions

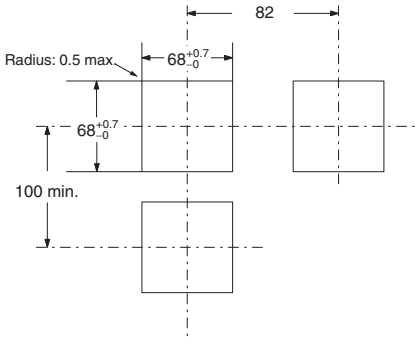
Note: All units are in millimeters unless otherwise indicated.



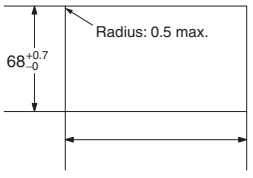




Panel Cutouts



(When N units are flush-mounted horizontally.)

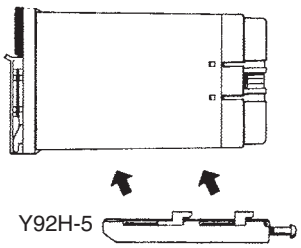


(n-1) × 72 + 70 min.
(including a tolerance of 2 mm)

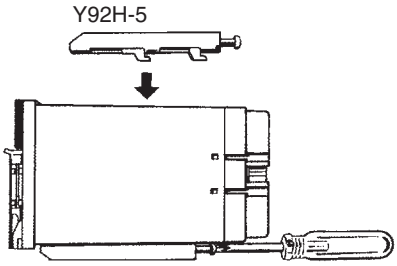
Note: 1. The panel cutouts for the H7AN are as shown (according to DIN437000).
2. The recommended mounting panel thickness is from 1 to 5 mm.
3. Use the mounting bracket (sold together) to mount the digital counter. Use model number Y92H-5 (2 pcs) to order additional brackets.

Mounting

Mounting brackets are included with the H7AN. Use these brackets to mount the H7AN securely so that there is no play.



Turn the screws on the mounting brackets counterclockwise to loosen them sufficiently. Attach the bottom mounting bracket first.

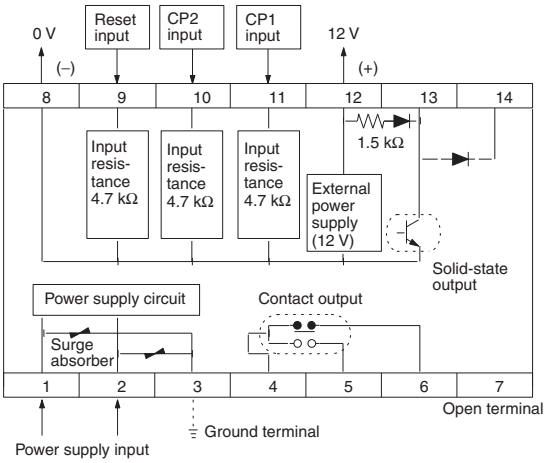


After attaching the mounting brackets, turn the screws clockwise to tighten them sufficiently. When the screws are completely tightened, you will hear the threads disengage.

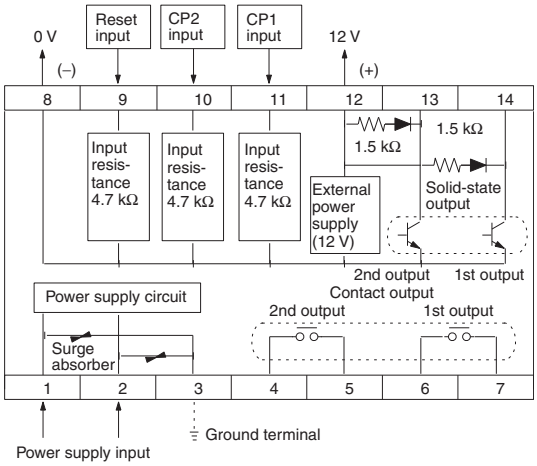
Installation

■ Terminal Arrangement

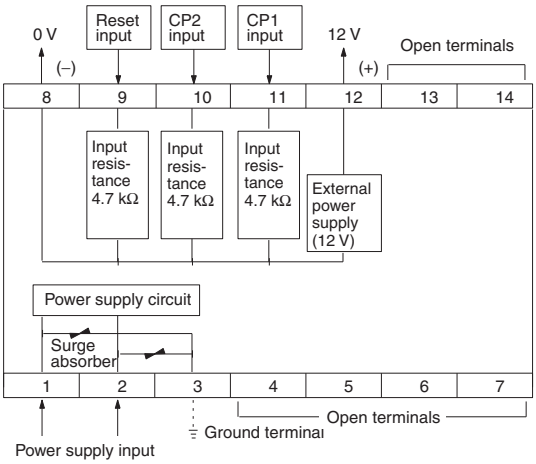
1-stage Preset Counters



2-stage Preset Counters



Total Counters



Note:
1. The polarities of the DC power supply terminals are as follows:
   Terminal 1: negative; terminal 2: positive
2. If there is excessive external noise, terminal 3 must be grounded to an appropriate place where the grounding resistance is 100 Ω max. There will be a current leakage of 0.2 mA each from terminals 1 and 2 to terminal 3.
3. The open terminals cannot be used as relay terminals.
4. Insert surge absorbers between each of the power supply terminals and the ground terminal. If the ground terminal is not used, insert the surge absorbers between terminal 1 and terminal 2.

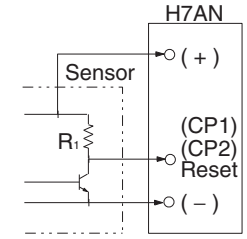
■ Connections

Transistor Inputs (NPN Transistors)

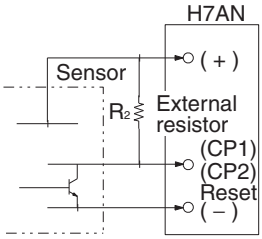
The CP1, CP2, and reset inputs of the H7AN must be voltage inputs.

Transistor Contact Input Signal Levels

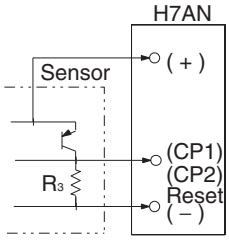
1. High level: 4.5 V min.
   4.7 kΩ × E/(4.7 kΩ + R1 or R2) must satisfy the above level.E: 30 VDC max.
   (12 VDC if power is supplied from the external power supply.)
2. Low level: 2 V max.



High level: Transistor: OFF



High level: Transistor: OFF



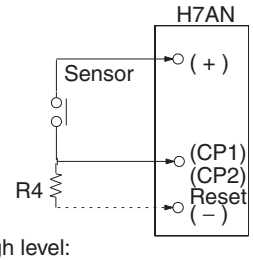
High level: PNP Transistor: ON;
R3 is optional.

Contact Inputs

For contact inputs, the contact must have a switching capacity of 2.5 mA min. at 12 V. If a 680-W resistor (1/2 W) is used for R4, reliability will be improved.

Input Conditions of the H7AN

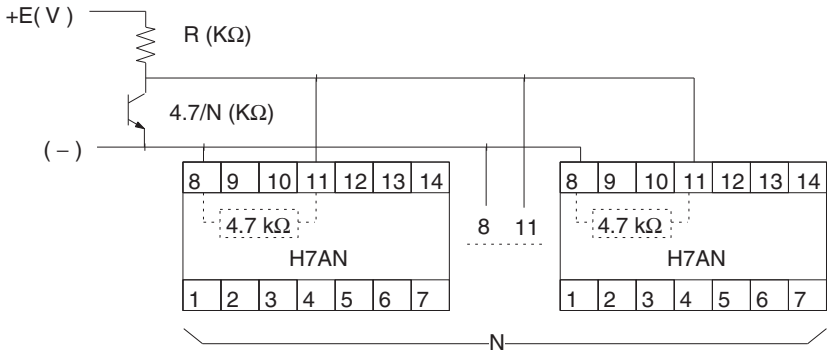
H: 5 to 30 V
L: 0 to 2 V



High level:
Contact: ON

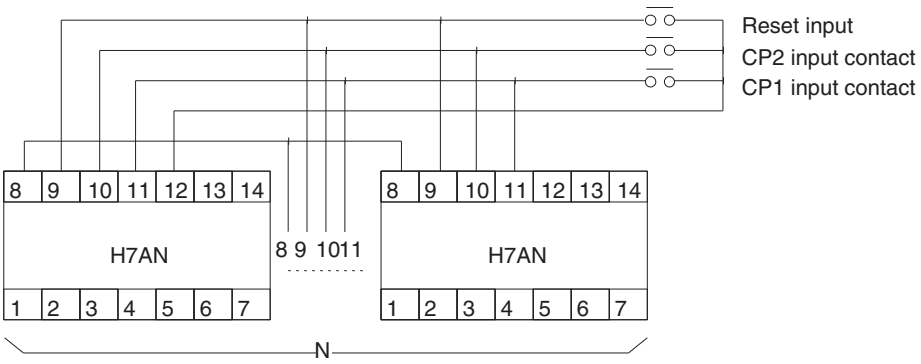
Connections of Single Transistor Inputs

The following illustrations show how to connect a single transistor input to digital counters connected in parallel. The H7AN has an input resistance of 4.7 kW. If the number of counters is N, the total input resistance will be 4.7/N kW. In this case, the high level input signal voltage can be calculated as follows:
(4.7/N) x E/(4.7/N + R)
Determine the value of E (V) and R (kW) so that the high level input signal voltage will be 5 to 30 VDC.



Connections of Single Contact Inputs

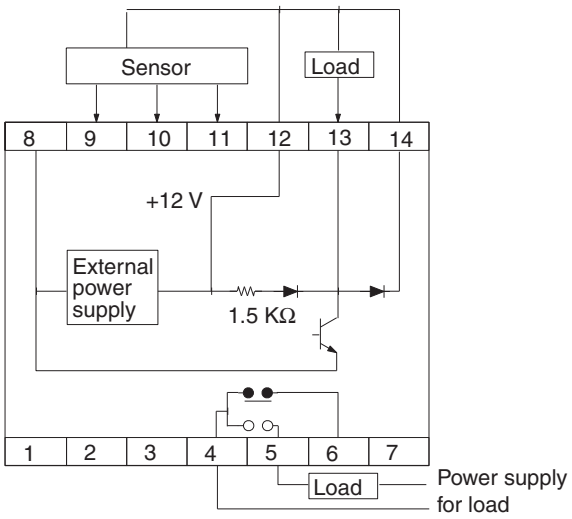
The following illustrations show how to connect a single contact input to digital counters connected in parallel. If the number of digital counters is N, the total contact input current will be 2.5 x N (mA) at 12 VDC.



Transistor Outputs (One-stage Counters)

Load Operation when Transistor is ON

External power supply for Load

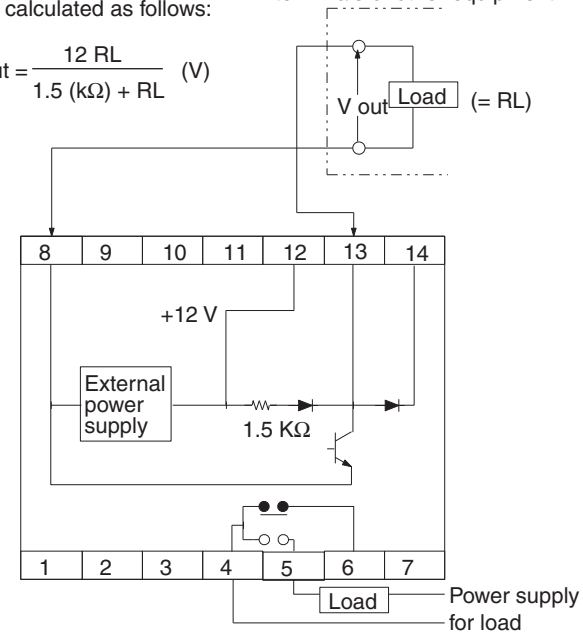


Load Operation when Transistor is OFF

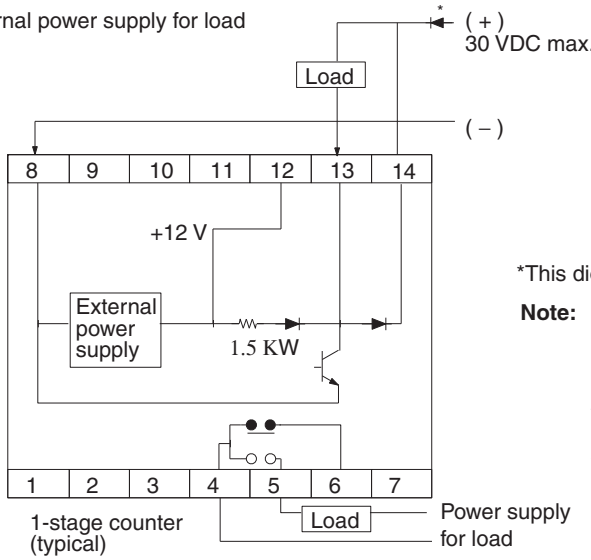
The output voltage (V out) is calculated as follows:

$$Vout = \frac{12\ RL}{1.5\ (k\Omega) + RL}\ (V)$$

Connected to the input terminals of other equipment



External power supply for load



*This diode is necessary if the supply voltage is below 12 V.

Note:
1. The total current consumption of the sensor and load must not exceed the capacity of the external power supply (80 mA).
2. The capacity of the load must not exceed the switching capacity of the transistor (100 mA).
3. The polarities of the power supply terminals are not reversible. Check connections before applying voltage to the power supply terminals to avoid damaging the Counter.

Safety Precautions

● Be sure to read the precautions for all Counters in the website at: http://www.ia.omron.com/.

Warning Indications

⚠ CAUTION	**Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury or in property damage.**
Precautions for Safe Use	**Supplementary comments on what to do or avoid doing, to use the product safely.**
Precautions for Correct Use	**Supplementary comments on what to do or avoid doing, to prevent failure to operate, malfunction or undesirable effect on product performance.**

Meaning of Product Safety Symbols

	Used to warn of the risk of electric shock under specific conditions.
	Used for general prohibitions for which there is no specific symbol.
	Used for general mandatory action precautions for which there is no specified symbol.

⚠ CAUTION

Do not touch the terminals while power is being supplied. Doing so many occasionally result in minor injury due to electric shock.

Do not use the product where subject to flammable or explosive gas.

Otherwise, minor injury from explosion may occasionally occur.

Never disassemble, modify or repair the product or touch any of the internal parts. Minor electric shock, fire, or malfunction may occasionally occur.

The life expectancy of output relays varies considerably with the output load and switching conditions. Always consider the application conditions and use the output relays within their rated load and electrical life expectancy. If the output relays are used past their life expectancy, contact fusing or burning may occasionally occur. Also, never exceed the rated load current. When using a heater, surely use a thermo switch in the load circuit.

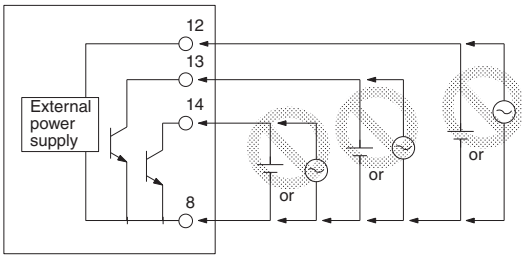
Tighten the terminal screws to between 0.74 and 0.90 N·m.

Loose screws may occasionally result in fire.

Do not allow pieces of metal, wire clippings, or fine metallic shavings or filings from installation to enter the product. Doing so may occasionally result in electric shock, fire, or malfunction.

Precautions for Safe Use

- Make sure the proper product is specified for the application.
- For correct use, do not subject the timer to the following conditions.
  - Dramatic temperature fluctuations
  - High humidity or where condensation may occur
  - Severe vibration and shock
  - Where excessive dust, corrosive gas, or direct sunlight may be present
- This product is not waterproof or oil resistance. Do not use the product in any of the places subject to splashing liquid or oil atmosphere.
- Use and store the product within the rated ranges given for the product model you are using. If necessary, use forced cooling. If the product is stored below −10°C, allow it to warm up for three hours at room temperature before turning On the power supply.
- Do not cover the vent holes on the products and the area around the product in order to ensure thermal dissipation.
- Wiring all terminals correctly.
- Do not wire the terminals which are not used.
- Use specified size crimped terminals (M3.5, thickness 7.2 mm max.) for wiring with a gage of AWG 24 to AWG 18 (equal to a cross section area of 0.205 to 0.823 mm^2).
  (The wiring stripping length is 5 to 6 mm.) Up to two wires of same size and type, or two crimped terminals can be inserted into a single terminal.
- Use this product within the rated power supply voltage and control output.
- Use a switch, relay, or other contact to turn the power supply ON instantaneously. If the voltage is applied gradually, the power may not be reset or output malfunctions may occur.
- Interlock the power to the product with a relay so that the product will not be left in an output on condition for long periods. Leaving the product in an output-on condition for a month or longer, especially in places with high temperatures, may result in deterioration to internal parts, such as an electrolytic capacitor.
- Do not apply the supply voltage directly from external to transistor output.

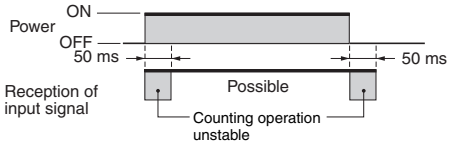


- A constant reading system is used in the present counter, so settings can be changed while power is being supplied, but the output will turn ON if the set value is set to the current measurement value. (If a setting switch is accidentally touched during operation, the set value will be changed and the new set value will be used for operation. Always leave the front panel cover closed unless you are changing a setting.)
- When changing the set count while power is being supplied, an inadequate push of the thumb wheel switches will display two numbers in one display window, causing the operating count to drift widely.
  Therefore, press the thumb wheel switches surely.
- Turn the power OFF first when removing the body from the case, never touch the terminals or electronic components with your hands or subject them to shock. When inserting the body, do not allow electronic components to come in contact with the case.
- Static electricity may destroy internal components. When removing the body form the case, do not touch an electronic components other than the setting switches with your hands.

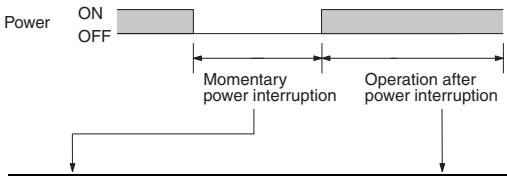
- Check that the LED indicators are operating normally. Depending on the operating environment, the indicators and plastic parts may deteriorate faster than expected, causing the indicators to fail. Periodically perform inspections and replacements.
- Use tools when separating parts for disposal.
- When disposing of the product, observer all local ordinances as they apply.

Precautions for Correct Use

- Inrush current will be carried when turning on the power. If the capacity of the power for the product is insufficient, the product cannot start. Use a power supply, breakers, contacts which sufficient capacity.
  100 to 240 VAC specifications Approx.23 A for 264 VAC
  12 to 24 VDC specifications Approx.15 A for 26.4 VDC
- After turning ON the power supply, 50 ms is required for the internal circuits to reach the operating voltage. Operation for input signals may not be correctly during this time.
- After turning OFF the power supply, 50 ms is required for voltage in the internal circuits to drop. Operation may be performed for input signals during this time.



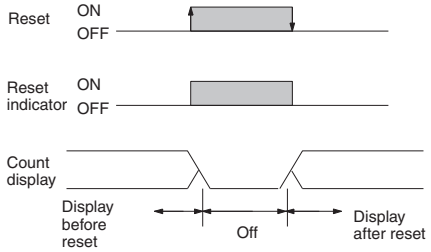
- Models without power failure memory backup or models ending with "-M" (when memory backup is disabled) will operate as shown in the following figure if the power supply is momentarily interrupted.



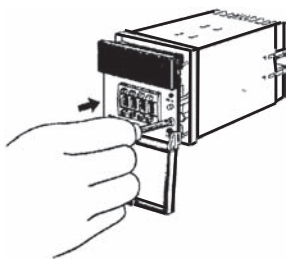
0.5 s min.	Displays and outputs will be reset.
0.01 s max.	The status before the power interruption will be held.
0.01 to 0.5 s	Operation will be unstable, i.e., one of the above operations will be performed.

Note: Use a Counter with power failure backup memory (models ending with -M) and enable memory backup if holding the status before the power failure is required when the power is interrupted.

- The following timing chart shows how the H7AN indicates when there is an external or manual reset input.



- To mount the casing on the digital counter, insert the digital counter body into the casing by hand as far as possible and then tighten the mounting screw. Press by the hand the front panel as indicated by the arrow so that the screw will tighten securely.



Retaining Data during Power Interruptions

- The product memorizes the status just before occurring the electric failure memory with non-volatile memory.
  The rewriting lifespan of the non-volatile memory is 1,000,000 or more. The non-volatile memory rewrites the setting condition into the initial setting one when the power OFF and reset input. (-M type only)

■ Self-diagnostic Function

When an error has occurred, the bellow error codes are shown.

7 segment display	Reset display	Count up display	Description	Output
E1	OFF	OFF	CPU error	OFF
E2	OFF	OFF	Memory error (RAM)	OFF
E3	OFF	OFF	Memory error (non-volatile memory)*	OFF

* Including the case when the rewriting lifespan of the nonvolatile memory is reached.

Recovery method

As an action, turn the power OFF then back ON again. If the display restored to normal, then a probable cause can be external noise affecting the system. Check for external noise. In the case of E3, if the display remains the same even when turn power ON again, input reset. After that, if it still remains the same, the product must be repaired.

■ Changes in Specifications

This product was upgraded in January 2006. The main changes are described below.

1. Maximum Counting Speeds
   A DIP switch on models with 4, 6, or 8 digits could be used to set the maximum counting speed to 3 kHz, 5 kHz, or 30 kHz. The upgraded models have been changed so the maximum counting speed can be set to 5 kHz or 30 kHz.
2. Addition of Setting to Enable/Disable Data Backup for Power Interruptions
   On models that back up data when power is turned OFF (models with model numbers ending in "-M"), a DIP switch setting has been provided to enable or disable backup.
3. Changes in Functions Allocated to Function Setting Switches
   Some of the functions allocated to the DIP switches have been changed to allow for the changes described in 1 and 2, above.

⚠Conformance to EN/IEC Standards

- When conforming to EMC standards, refer to the information provided in datasheet for cable selection and other conditions.
- This is a class A product. In residential areas it may cause radio interference, in which case the user may be required to take adequate measures to reduce interference.
- There is basic insulation between the power supply terminals and input terminals, and between power supply terminals and output terminals, and between input and output terminals.
- If double or reinforced insulation is required, use the double or reinforced insulation defined in IEC 60664 that is suitable for the maximum applied voltage for the clearance, solid insulation, and other factors.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

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