Digital Counter (DIN 72 × 72)

H7AN

CSM_H7AN_DS_E_3_1

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.
- Complies with UL and CSA Marking.

⚠ **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.

123456
UP
RESET
COUNTS
omron H7AN
TIME

Ordering Information

Each model is sold together with a mounting bracket.

Preset Counter

		Incrementing (Up) or decrementing (Down) counter (not reversible)	
		One stage	Two stages
No. of digits	Backup function	With digital display	With digital display
2	No	H7AN-2D	---
	Yes	H7AN-2DM	---
4	No	H7AN-4D	H7AN-W4D
	Yes	H7AN-4DM	H7AN-W4DM

		Reversible counter (Up/Down)	
		One stage	Two stages
No. of digits	Backup function	With digital display	With digital display
2	No	H7AN-E2D	---
	Yes	H7AN-E2DM	---
4	No	H7AN-E4D	H7AN-WE4D
	Yes	H7AN-E4DM	H7AN-WE4DM

		Incrementing (Up), decrementing (Down), or reversible (Up/Down) counter	
		One stage	Two stages
No. of digits	Backup function	With digital display	With digital display
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	Incrementing (Up) or decrementing (Down) counter (not reversible)	Reversible counter (Up/Down)
4	No	H7AN-T4	H7AN-ET4
	Yes	H7AN-T4M	H7AN-ET4M

No. of digits	Backup function	Reversible counter (Up/Down)
6	No	H7AN-RT6
	Yes	H7AN-RT6M
8	No	H7AN-RT8
	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 solid-state input voltage (H and L)	
Control output			1-stage counters: Contact (SPDT) and solid-state output (H and L output switchable) 2-stage counters: Contact (SPST-NO) and solid-state 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 solid-state input voltage (H and L)	
Control output			1-stage counters: Contact (SPDT) and solid-state output (H and L output switchable) 2-stage counters: Contact (SPST-NO) and solid-state 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)	
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 solid-state input voltage (H and L)	
Control output			1-stage counters: Contact (SPDT) and solid-state output (H and L output switchable) 2-stage counters: Contact (SPST-NO) and solid-state 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 solid-state 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 solid-state 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-ET4	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 solid-state 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-RT8	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 (cosϕ = 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	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.

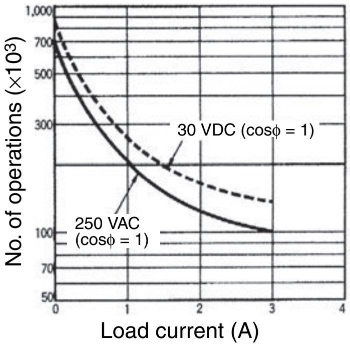
■ Characteristics

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) and ±500 V (between input terminals), square-wave noise by noise simulator
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)
Approved standards	UL508, CSA C22.2 No.14
Weight	Approx. 360 g

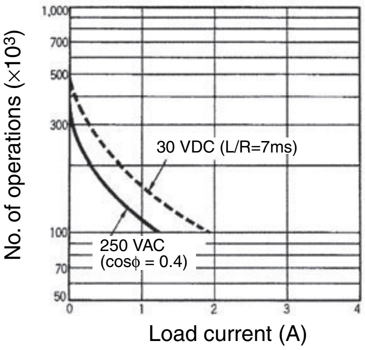
Engineering Data

Life of Contacts

Electric Life Expectancy (Resistive load)



Electric Life Expectancy (Inductive load)

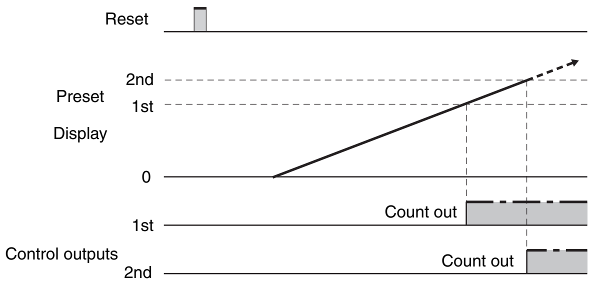
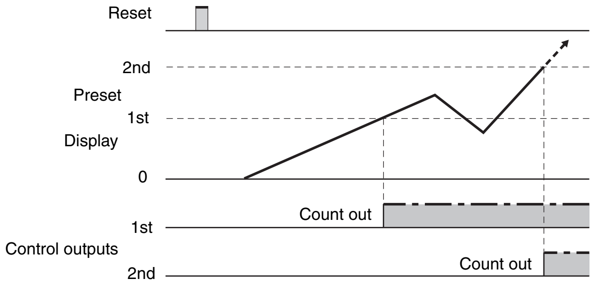
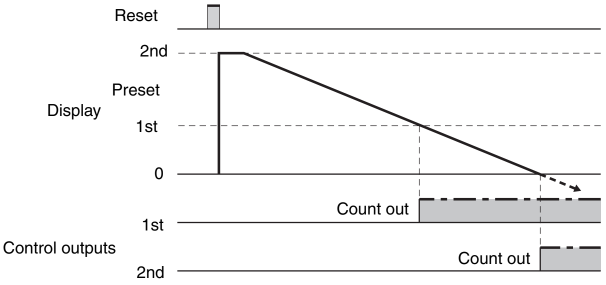
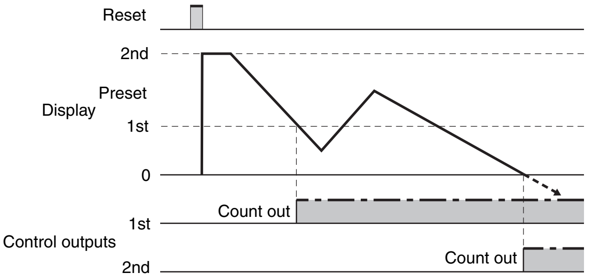


Reference: 0.15 A max. can be switched 100,000 times at 125 VDC (cosϕ = 1).
0.1 A max. can be switched 100,000 times when L/R = 7 ms.

Operation

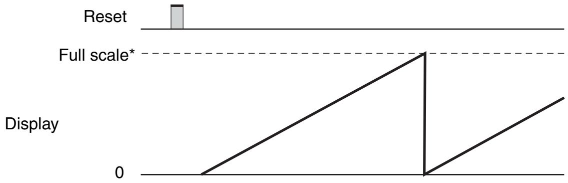
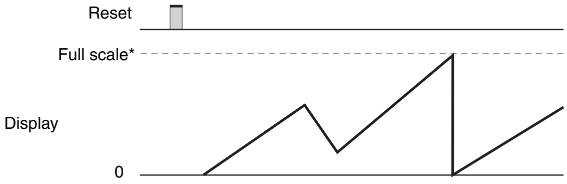
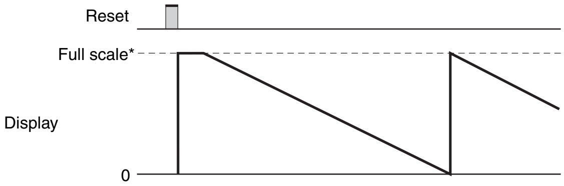
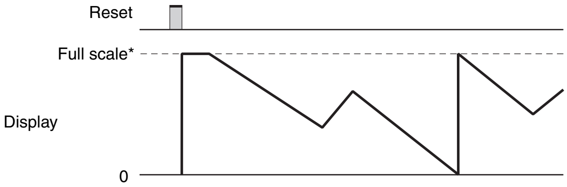
■ Count Operation

Preset Counters

Incrementing/Decrementing selectable mode	Reversible mode
Incrementing mode  Reset Preset Display 2nd 1st 0 Count out Control outputs 1st Count out 2nd	Incrementing/Decrementing A, B, C (incrementing) mode  Reset 2nd Preset 1st Display 0 Count out 1st Control outputs Count out 2nd
Decrementing mode  Reset 2nd Preset Display 1st 0 Count out 1st Control outputs Count out 2nd	Incrementing/Decrementing D, E, F (decrementing) mode  Reset 2nd Preset Display 1st 0 Count out 1st Control outputs Count out 2nd

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

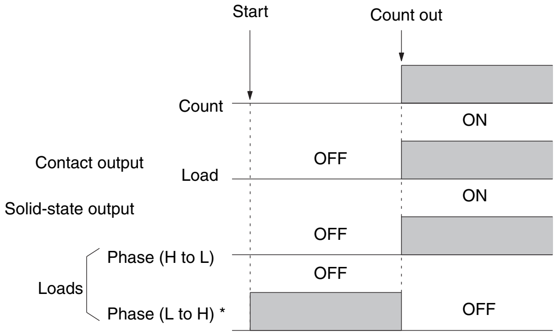
Incrementing/Decrementing selectable mode	Reversible mode
Incrementing mode  Reset Full scale* Display 0	Incrementing/Decrementing A, B, C (decrementing) mode  Reset Full scale* Display 0
Decrementing mode  Reset Full scale* Display 0	Incrementing/Decrementing D, E, F (decrementing) mode  Reset Full scale* Display 0

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.

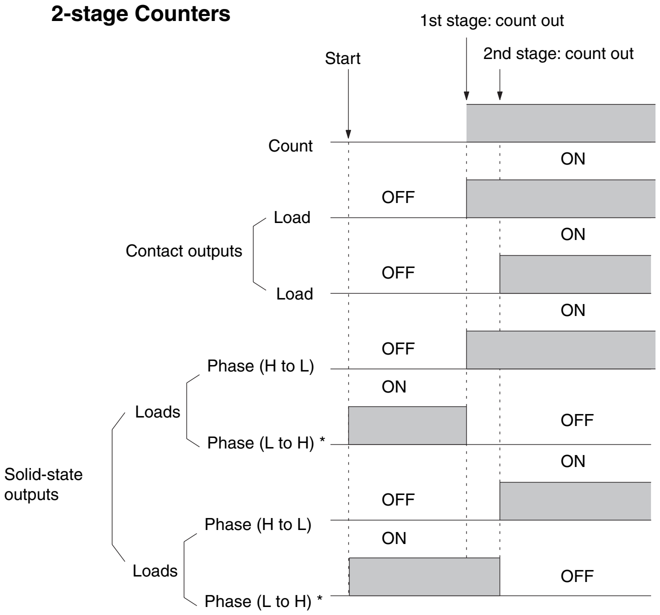
■ *Output Timing Charts

1-stage Counters


Start
Count out
Count
ON
Contact output
Load
OFF
ON
Solid-state output
OFF
Loads
Phase (H to L)
OFF
Phase (L to H) *
OFF

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

2-stage Counters


1st stage: count out
Start
2nd stage: count out
Count
ON
Contact outputs
Load
OFF
ON
Load
OFF
ON
Solid-state outputs
Loads
Phase (H to L)
OFF
ON
Phase (L to H) *
OFF
ON
Loads
Phase (H to L)
OFF
ON
Phase (L to H) *
OFF

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

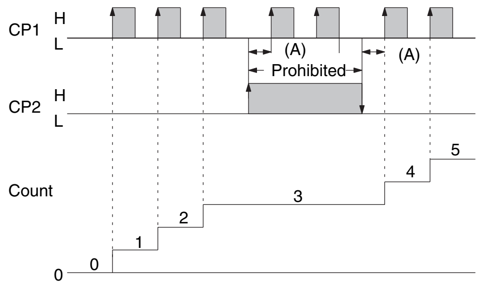
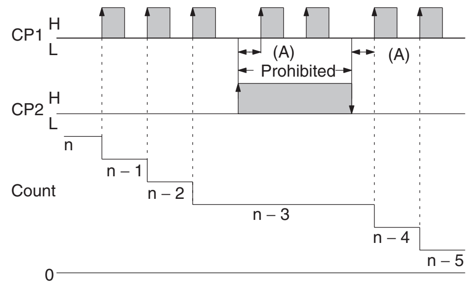
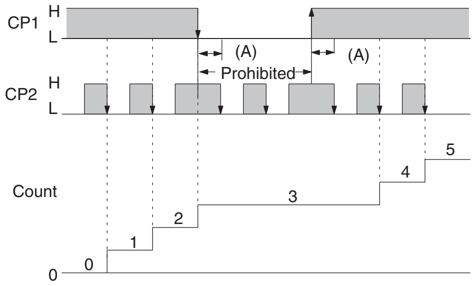
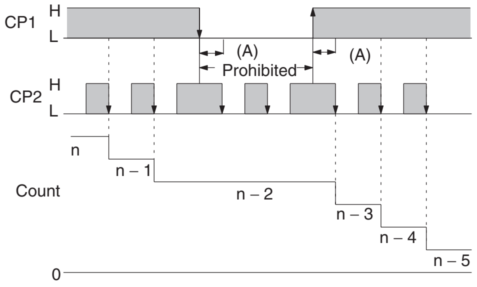
Output Delays

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
Solid-state 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

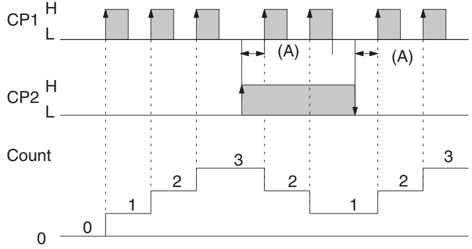
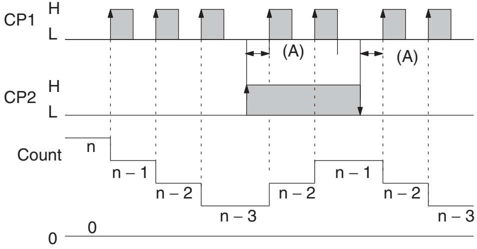
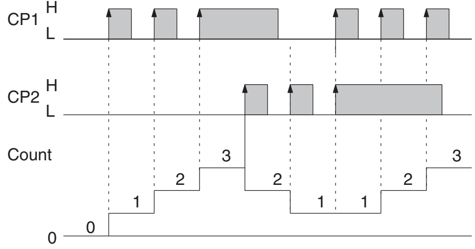
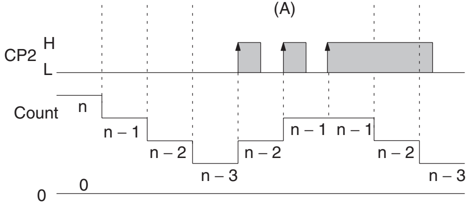
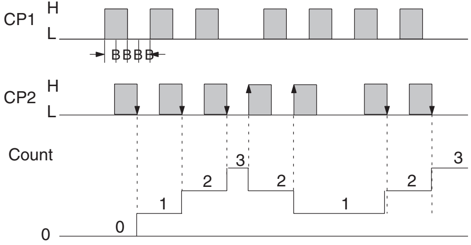
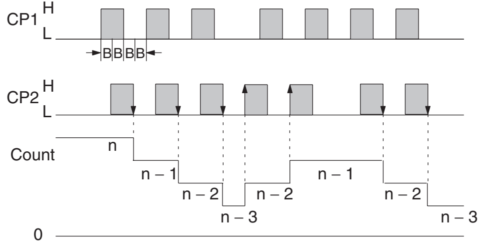
Note: The width of (A) must be the same as or lager than the minimum signal width, because an error of ±1 count may occur if the width of (A) is smaller than the minimum signal width.

Incrementing mode	Decrementing mode
CP1: Count input; CP2: prohibit (gate) input  CP1 H L (A) Prohibited (A) CP2 H L Count 0 1 2 3 4 5 0	CP1: Count input; CP2: prohibit (gate) input  CP1 H L (A) Prohibited (A) CP2 H L Count n n – 1 n – 2 n – 3 n – 4 n – 5 0
CP1: Prohibit (gate) input; CP2: count input  CP1 H L (A) Prohibited (A) CP2 H L Count 0 1 2 3 4 5 0	CP1: Prohibit (gate) input; CP2: count input  CP1 H L (A) Prohibited (A) CP2 H L Count n n – 1 n – 2 n – 3 n – 4 n – 5 0

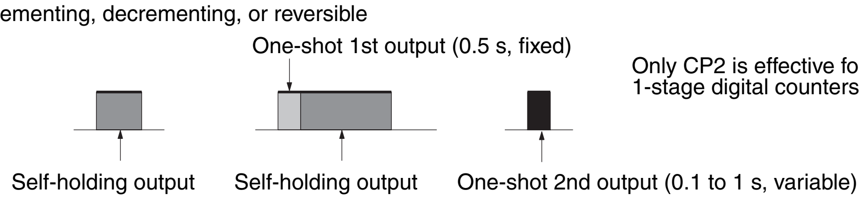
Reversible Mode

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  CP1 H L (A) (A) CP2 H L Count 0 0 1 2 3 2 1 2 3	Incrementing/Decrementing D command input mode  CP1 H L (A) (A) CP2 H L Count n n – 1 n – 2 n – 3 n – 2 n – 1 n – 2 n – 3 0 0
Incrementing/Decrementing B individual input mode  CP1 H L CP2 H L Count 0 0 1 2 3 2 1 1 2 3	Incrementing/Decrementing E individual input mode  CP1 H L (A) CP2 H L Count n n – 1 n – 2 n – 3 n – 2 n – 1 n – 1 n – 2 n – 3 0 0
Incrementing/Decrementing C phase difference input mode  CP1 H L BBBB CP2 H L Count 0 0 1 2 3 2 1 2 3	Incrementing/Decrementing F phase difference input mode  CP1 H L BBBB CP2 H L Count n n – 1 n – 2 n – 3 n – 2 n – 1 n – 2 n – 3 0

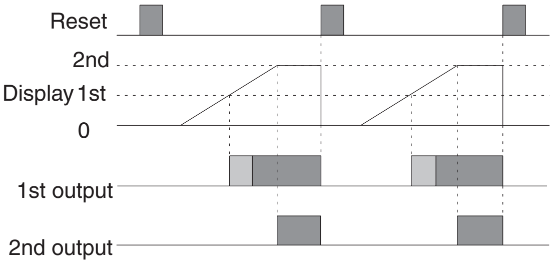
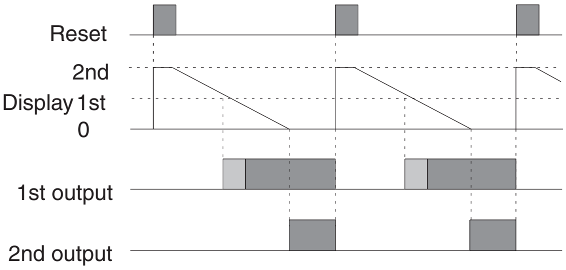
■ Output Modes

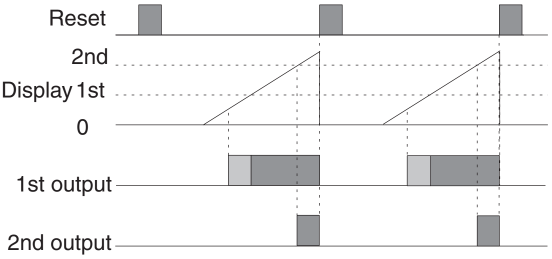
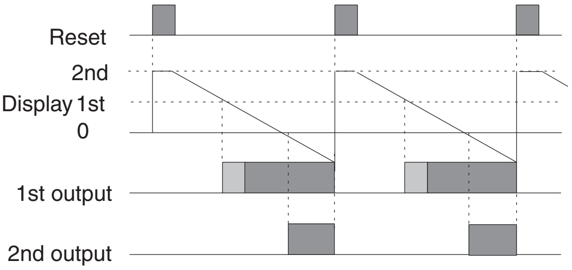
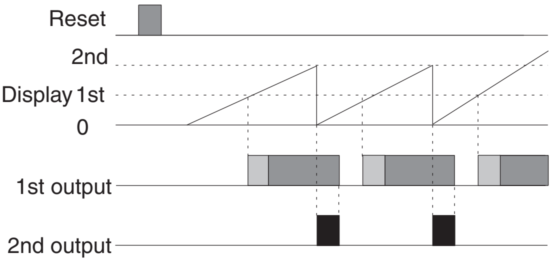
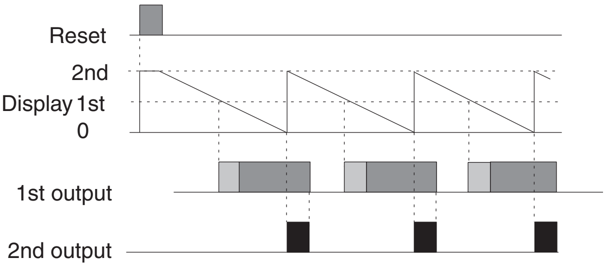
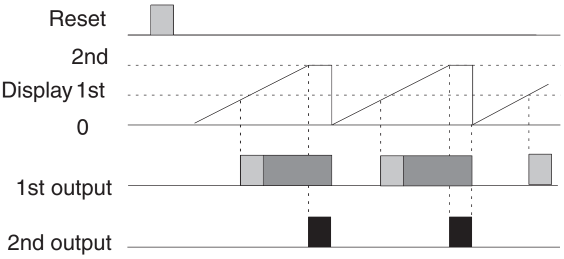
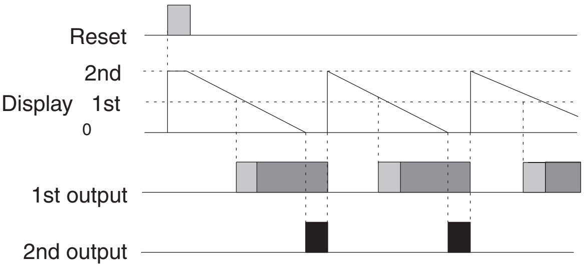
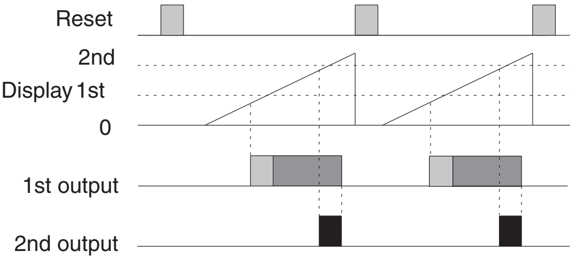
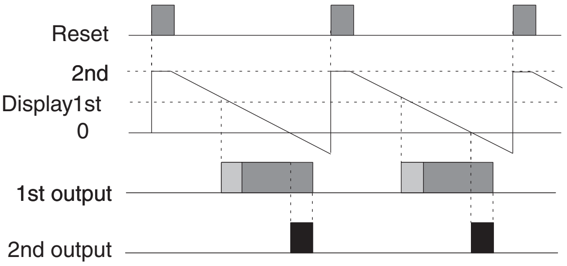
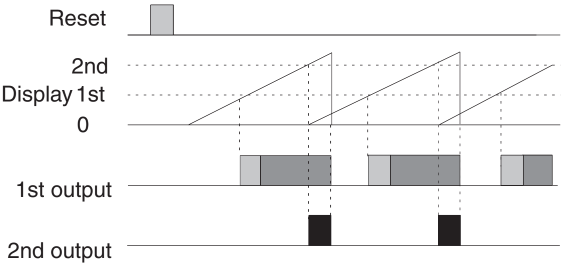
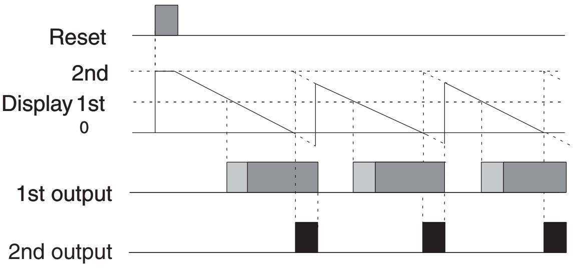
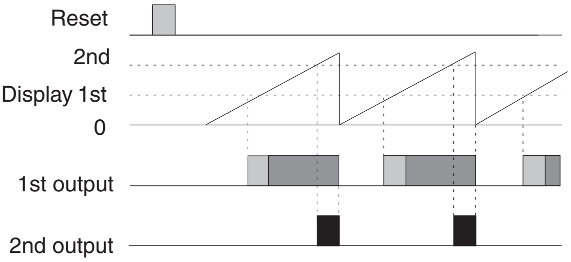
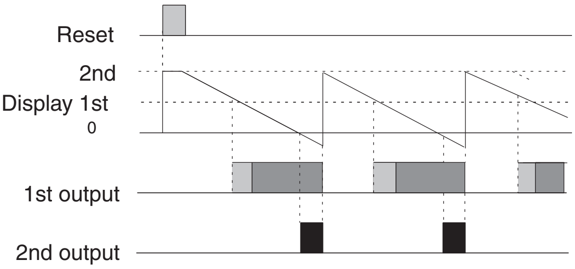

Incrementing, decrementing, or reversible
One-shot 1st output (0.5 s, fixed)
Self-holding output
Self-holding output
One-shot 2nd output (0.1 to 1 s, variable)

Only CP2 is effective for 1-stage digital counters.

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	 Reset 2nd Display 1st 0 1st output 2nd output	 Reset 2nd Display 1st 0 1st output 2nd output

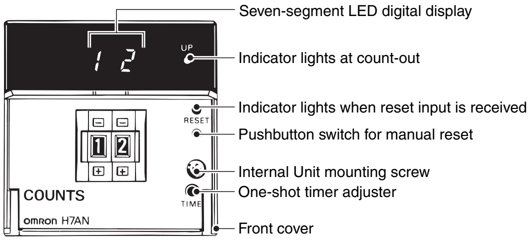
Output mode	Incrementing, Incrementing/Decrementing A, B, C	Decrementing, Incrementing/Decrementing D, E, F
F	 Reset 2nd Display 1st 0 1st output 2nd output	 Reset 2nd Display 1st 0 1st output 2nd output
C	 Reset 2nd Display 1st 0 1st output 2nd output	 Reset 2nd Display 1st 0 1st output 2nd output
R	 Reset 2nd Display 1st 0 1st output 2nd output	 Reset 2nd Display 1st 0 1st output 2nd output
K	 Reset 2nd Display 1st 0 1st output 2nd output	 Reset 2nd Display1st 0 1st output 2nd output
P	 Reset 2nd Display 1st 0 1st output 2nd output	 Reset 2nd Display 1st 0 1st output 2nd output
Q	 Reset 2nd Display 1st 0 1st output 2nd output	 Reset 2nd Display 1st 0 1st output 2nd output

Nomenclature

Nomenclature

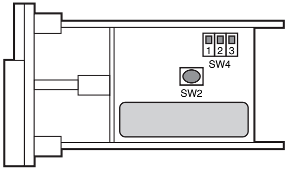
Preset Counter

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


Seven-segment LED digital display
Indicator lights at count-out
UP
1 2
Indicator lights when reset input is received
RESET
Pushbutton switch for manual reset
Internal Unit mounting screw
One-shot timer adjuster
TIME
COUNTS
OMRON H7AN
Front cover

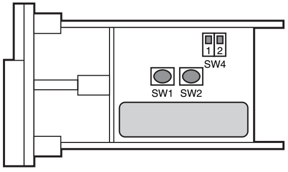
Arrangement and Functions of Specification Selection Switches

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



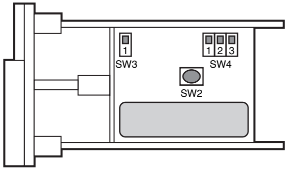
SW2: (A) Operating mode selector
SW4-1: Output phase selector for transistor output section
L→H (at count-out)
(See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible
(See note.)
Manual reset not possible
SW4-3: UP/DOWN selector
Up counting (incrementing)
(See note.)
Down counting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

H7AN-E2D (Counting speed: 30 Hz only)


1 2
SW4
SW1 SW2

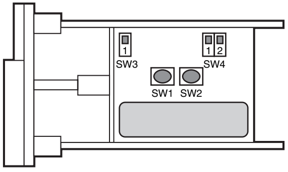
SW1: (A) Counting function selector
SW2: (A) Operating mode selector
SW4-1: Output phase selector for transistor output section
L→H (at count-out)
(See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible
(See note.)
Manual reset not possible

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


1
SW3
1 2 3
SW4
SW2

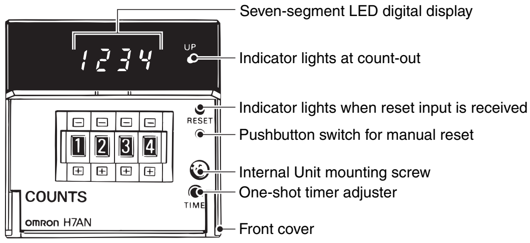
SW2: (A) Operating mode selector
SW3: Power failure memory backup
Memory backup
(See note.)
No memory backup
SW4-1: Output phase selector for transistor output section
L→H (at count-out)
(See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible
(See note.)
Manual reset not possible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

H7AN-E2DM (Counting speed: 30 Hz only)


1
SW3
1 2
SW4
SW1 SW2

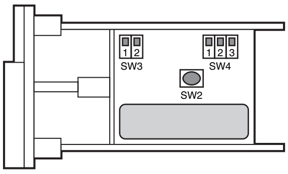
SW1: (A) Counting function selector
SW2: (A) Operating mode selector
SW3: Power failure memory backup
Memory backup
(See note.)
No memory backup
SW4-1: Output phase selector for transistor output section
L→H (at count-out)
(See note.)
H→L (at count-out)
SW4-2: Manual reset selector
Manual reset possible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

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


Seven-segment LED digital display
Indicator lights at count-out
UP
1 2 3 4
Indicator lights when reset input is received
RESET
Pushbutton switch for manual reset
Internal Unit mounting screw
One-shot timer adjuster
TIME
COUNTS
OMRON H7AN
Front cover

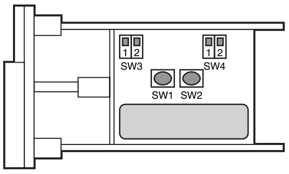
Arrangement and Functions of Specification Selection Switches

H7AN-4D


1 2
SW3
1 2 3
SW4
SW2

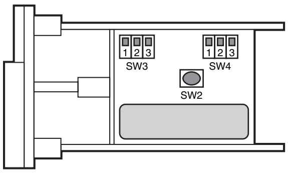
SW2: (A) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW4-1: Output phase selector for transistor output section
L→H (at count-out)
(See note.)
H→L (at count-out)
SW4-2: Manual reset selector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

H7AN-E4D


1 2
SW3
1 2
SW4
SW1 SW2

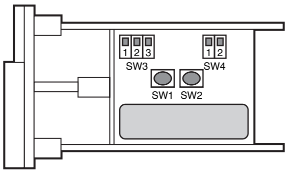
SW1: (A) Counting function selector
SW2: (A) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW4-1: Output phase selector for transistor output section
L→H (at count-out)
(See note.)
H→L (at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

H7AN-4DM


1 2 3
SW3
1 2 3
SW4
SW2

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)

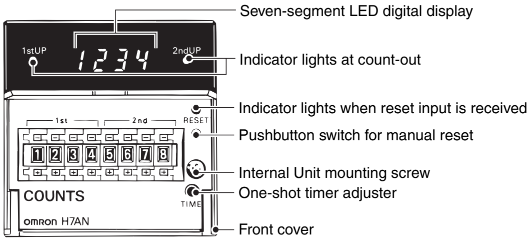
H7AN-E4DM


1 2 3
SW3
1 2
SW4
SW1 SW2

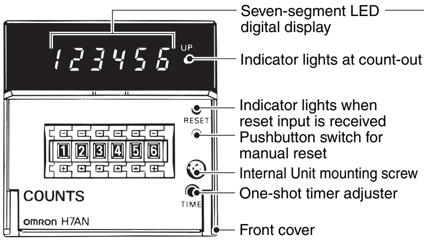
SW1: (A) Counting function selector
SW2: (A) Operating mode selector
SW3-1: CP1 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-2: CP2 maximum counting speed selector
30 Hz (See note.)
5 kHz
SW3-3: Power failure memory backup
Memory backup
(See note.)
No memory backup
SW4-1: Output phase 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

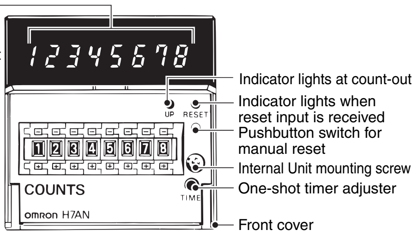
Note: These settings are the defaults for the specification selection switches.

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


Seven-segment LED digital display
1stUP
1234
2ndUP
Indicator lights at count-out
Indicator lights when reset input is received
1st
2nd
RESET
Pushbutton switch for manual reset
Internal Unit mounting screw
COUNTS
TIME
One-shot timer adjuster
omron H7AN
Front cover

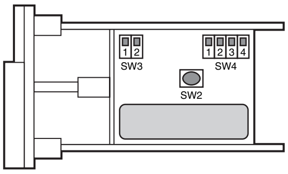
H7AN-R6D, -R6DM
H7AN-R8D, -R8DM


Seven-segment LED digital display
123456
UP
Indicator lights at count-out
RESET
Indicator lights when reset input is received
Pushbutton switch for manual reset
Internal Unit mounting screw
COUNTS
TIME
One-shot timer adjuster
omron H7AN
Front cover


12345678
Indicator lights at count-out
UP
RESET
Indicator lights when reset input is received
Pushbutton switch for manual reset
Internal Unit mounting screw
COUNTS
TIME
One-shot timer adjuster
omron H7AN
Front cover

Arrangement and Functions of Specification Selection Switches

H7AN-W4D


1 2
SW3
1 2 3 4
SW4
SW2

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

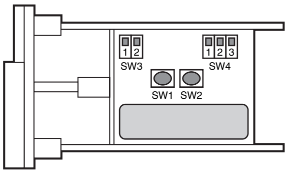
SW4-1: Output phase selector for first transistor output section
- ↑ L→H (at count-out) (See note.)
- ↓ H→L (at count-out)

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


1 2
SW3
1 2 3
SW4
SW1 SW2

SW1: (A) Counting function selector

SW2: (B) Operating mode selector

SW3-1: CP1 maximum counting speed selector
- ↑ 30 Hz (See note.)
- ↓ 5 kHz

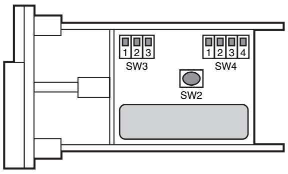
SW3-2: CP2 maximum counting speed selector
- ↑ 30 Hz (See note.)
- ↓ 5 kHz

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


1 2 3
SW3
1 2 3 4
SW4
SW2

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

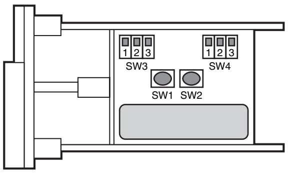
SW4-1: Output phase selector for first transistor output section
- ↑ L→H (at count-out) (See note.)
- ↓ H→L (at count-out)

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


1 2 3
SW3
1 2 3
SW4
SW1 SW2

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

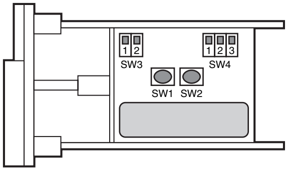
SW4-1: Output phase selector for first transistor output section
- ↑ L→H (at count-out) (See note.)
- ↓ H→L (at count-out)

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


1 2
SW3
1 2 3
SW4
SW1 SW2

SW1: (B) Counting function selector

SW2: (A) Operating mode selector

SW3-1: CP1 maximum counting speed selector
- ↑ 30 Hz (See note.)
- ↓ 5 kHz

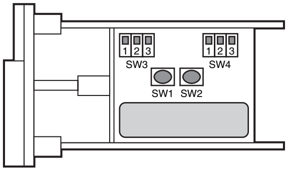
SW3-2: CP2 maximum counting speed selector
- ↑ 30 Hz (See note.)
- ↓ 5 kHz

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


1 2 3
SW3
1 2 3
SW4
SW1 SW2

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)

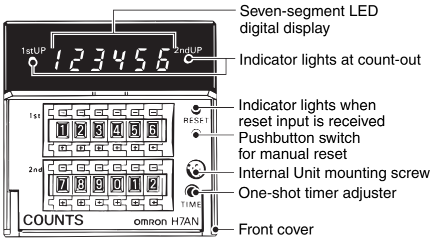
SW4-2: Set value read selector
- ↑ Always read (See note.)
- ↓ Read only at reset

SW4-3: Manual reset selector
- ↑ Manual reset possible (See note.)
- ↓ Manual reset not possible

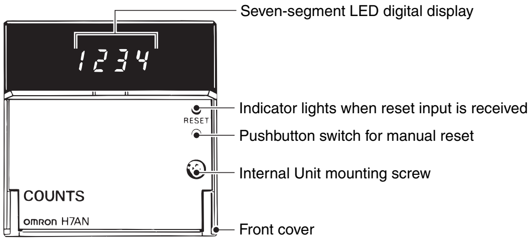
Note: These settings are the defaults for the specification selection switches.

Totalizing Counter

H7AN-RW6D, -RW6DM

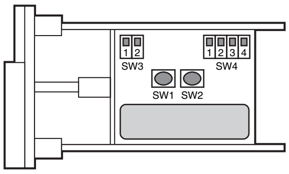

1stUP
123456
2ndUP
1st
123456
2nd
789012
RESET
TIME
COUNTS
omron H7AN
Seven-segment LED digital display
Indicator lights at count-out
Indicator lights when reset input is received
Pushbutton switch for manual reset
Internal Unit mounting screw
One-shot timer adjuster
Front cover

H7AN-T4, -T4M, -ET4, -ET4M
H7AN-RT6, -RT6M, -RT8, -RT8M


1234
RESET
COUNTS
omron H7AN
Seven-segment LED digital display
Indicator lights when reset input is received
Pushbutton switch for manual reset
Internal Unit mounting screw
Front cover

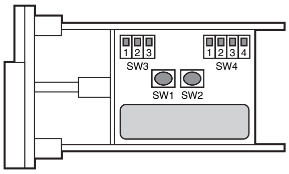
Arrangement and Functions of Specification Selection Switches

H7AN-RW6D


1 2
SW3
1 2 3 4
SW4
SW1 SW2

- 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

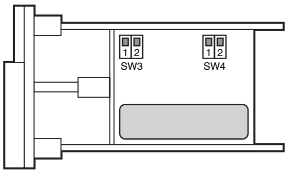
H7AN-RW6DM


1 2 3
SW3
1 2 3 4
SW4
SW1 SW2

- 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

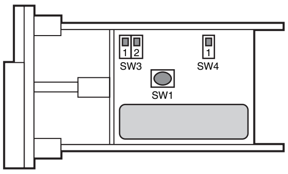
Arrangement and Functions of Specification Selection Switches

H7AN-T4


1 2
SW3
1 2
SW4

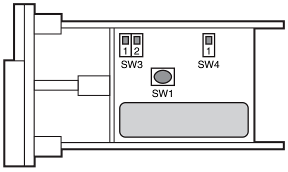
- SW3-1: CP1 maximum counting speed selector
  - 30 Hz (See note 1.)
  - 5 kHz
- SW3-2: CP2 maximum counting speed selector
  - 30 Hz (See note 1.)
  - 5 kHz
- SW4-1: Manual reset selector
  - Manual reset possible (See note 1.)
  - Manual reset not possible
- SW4-2: UP/DOWN selector
  - Up counting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

H7AN-ET4


1 2
SW3
1
SW4
SW1

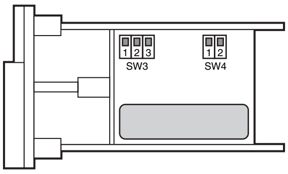
- SW1: (A) Counting function selector
- SW3-1: CP1 maximum counting speed selector
  - 30 Hz (See note 1.)
  - 5 kHz
- SW3-2: CP2 maximum counting speed selector
  - 30 Hz (See note 1.)
  - 5 kHz
- SW4: Manual reset selector
  - Manual reset possible (See note 1.)
  - Manual reset not possible

H7AN-RT6, -RT8


1 2
SW3
1
SW4
SW1

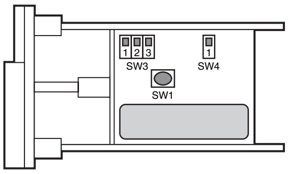
- SW1: (B) Counting function selector
- SW3-1: CP1 maximum counting speed selector
  - 30 Hz (See note 1.)
  - 5 kHz
- SW3-2: CP2 maximum counting speed selector
  - 30 Hz (See note 1.)
  - 5 kHz
- SW4: Manual reset selector
  - Manual reset possible (See note 1.)
  - Manual reset not possible

H7AN-T4M


1 2 3
SW3
1 2
SW4

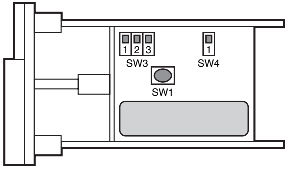
- SW3-1: CP1 maximum counting speed selector
  - 30 Hz (See note 1.)
  - 5 kHz
- SW3-2: CP2 maximum counting speed selector
  - 30 Hz (See note 1.)
  - 5 kHz
- SW3-3: Power failure memory backup
  - Memory backup (See note 1.)
  - No memory backup
- SW4-1: Manual reset selector
  - Manual reset possible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

H7AN-ET4M


1 2 3
SW3
1
SW4
SW1

- 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


1 2 3
SW3
1
SW4
SW1

- 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.

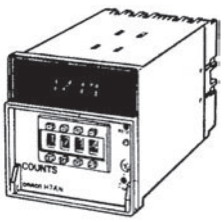
SW2 (B) Operating mode selector (2-stage preset models)

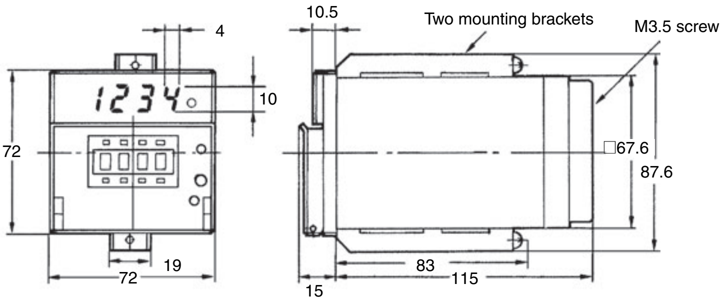
Switch position	Second-stage function	
0, 7 (See note.)	First-stage output hold	N (count stop, output hold)
1		F (overcount, output hold)
2		C (automatic reset, one-shot output)
3		R (automatic reset, one-shot output 1)
4		K (overcount reset, one-shot output)
5		P (automatic reset, one-shot output 2)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

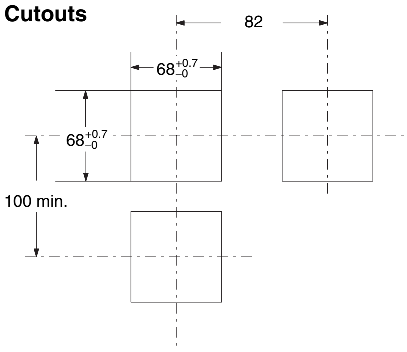
Note: All units are in millimeters unless otherwise indicated.



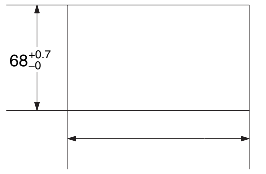


Note:
1. The panel cutouts for the H7AN are as shown (according to DIN437000).
2. The recommended mounting panel thickness is from 1 to 5 mm.
3. Use the mounting bracket (sold together) to mount the digital counter.

Panel Cutouts



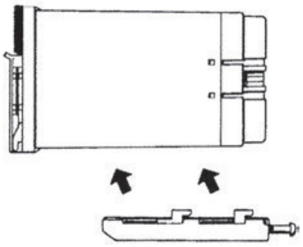
(When N units are flush-mounted horizontally.)



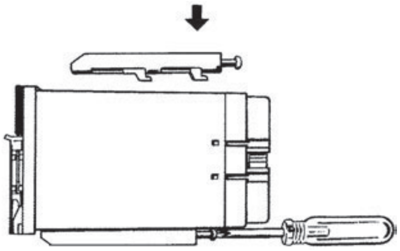
(n-1) × 72 + 70 min.
(including a tolerance of 2 mm)

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.

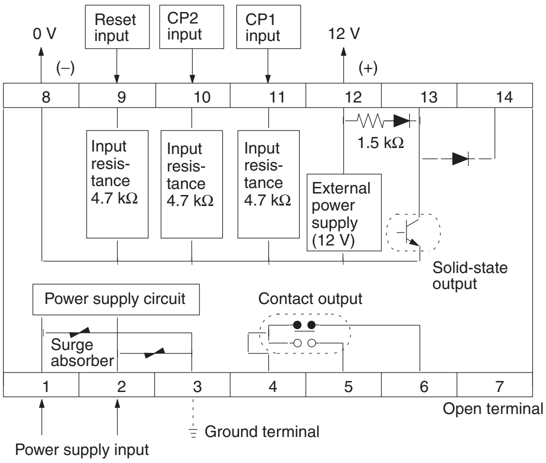


After attaching the mounting brackets, turn the screws clockwise to tighten them sufficiently. When the screws are completely tightened, you will hear the threads disengage.

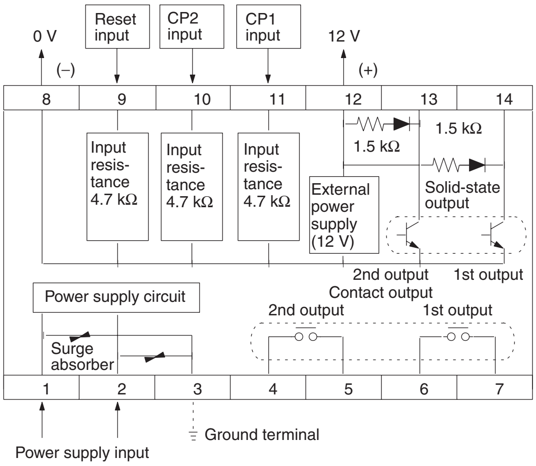
Installation

■ Terminal Arrangement

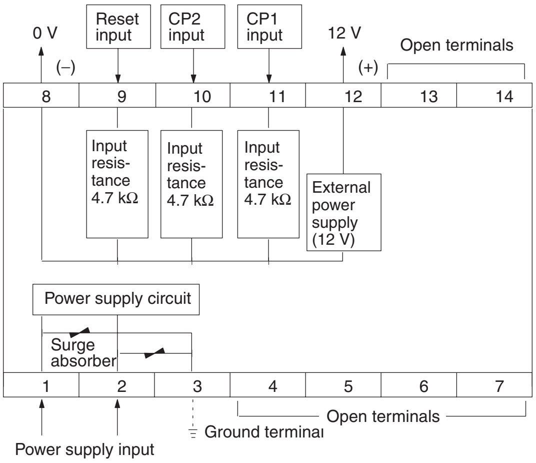
1-stage Preset Counters


0 V
(–)
Reset input
CP2 input
CP1 input
12 V
(+)
8
9
10
11
12
13
14
1.5 kΩ
Input resis-tance 4.7 kΩ
Input resis-tance 4.7 kΩ
Input resis-tance 4.7 kΩ
External power supply (12 V)
Solid-state output
Power supply circuit
Contact output
Surge absorber
1
2
3
4
5
6
7
Open terminal
Ground terminal
Power supply input

2-stage Preset Counters


0 V
(–)
Reset input
CP2 input
CP1 input
12 V
(+)
8
9
10
11
12
13
14
1.5 kΩ
1.5 kΩ
Input resis-tance 4.7 kΩ
Input resis-tance 4.7 kΩ
Input resis-tance 4.7 kΩ
External power supply (12 V)
Solid-state output
2nd output
1st output
Power supply circuit
Contact output
2nd output
1st output
Surge absorber
1
2
3
4
5
6
7
Ground terminal
Power supply input

Total Counters


0 V
(–)
Reset input
CP2 input
CP1 input
12 V
(+)
Open terminals
8
9
10
11
12
13
14
Input resis-tance 4.7 kΩ
Input resis-tance 4.7 kΩ
Input resis-tance 4.7 kΩ
External power supply (12 V)
Power supply circuit
Surge absorber
1
2
3
4
5
6
7
Open terminals
Ground terminal
Power supply input

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.

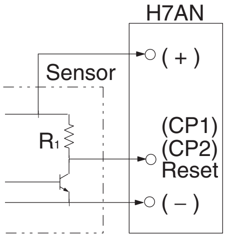
■ Connections

Solid-state Inputs (NPN Transistors)

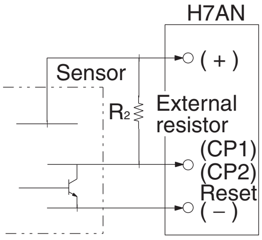
The CP1, CP2, and reset inputs of the H7AN must be voltage inputs.

Solid-state Contact Input Signal Levels

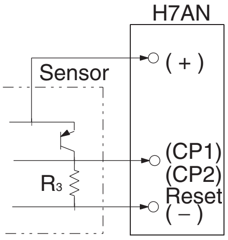
1. High level: 4.5 V min.
   4.7 kΩ × E/(4.7 kΩ + R1 or R2) must satisfy the above level.E: 30 VDC max.
   (12 VDC if power is supplied from the external power supply.)
2. Low level: 2 V max.


H7AN
Sensor
(+)
R_1
(CP1)
(CP2)
Reset
(−)

High level: Transistor: OFF


H7AN
Sensor
(+)
R_2
External resistor
(CP1)
(CP2)
Reset
(−)

High level: Transistor: OFF


H7AN
Sensor
(+)
R_3
(CP1)
(CP2)
Reset
(−)

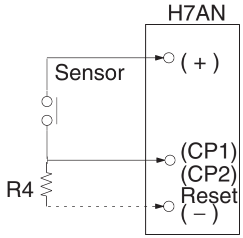
High level: PNP Transistor: ON;
R3 is optional.

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

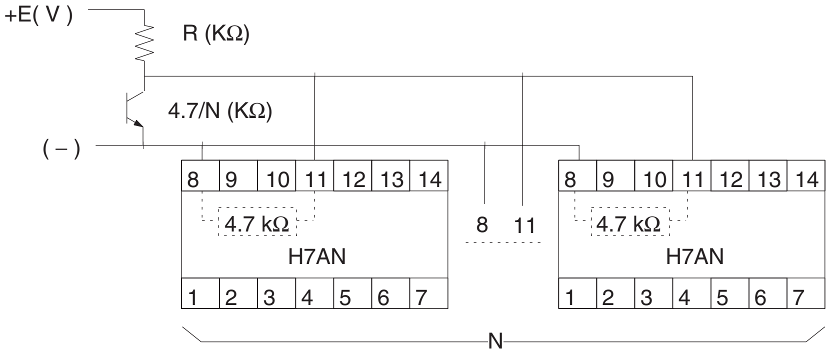
H: 5 to 30 V
L: 0 to 2 V


H7AN
Sensor
(+)
(CP1)
(CP2)
Reset
(−)
R4

High level:
Contact: ON

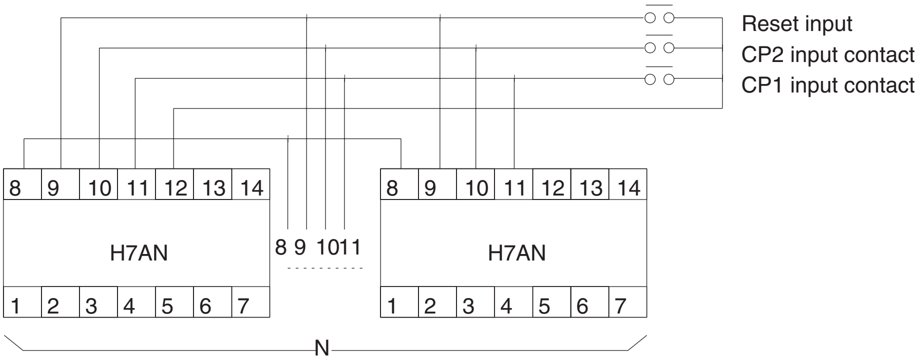
Connections of Single Solid-state Inputs

The following illustrations show how to connect a single solid-state 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.


+E(V)
R (KΩ)
4.7/N (KΩ)
(−)
8
9
10
11
12
13
14
4.7 kΩ
H7AN
1
2
3
4
5
6
7
8 11
8
9
10
11
12
13
14
4.7 kΩ
H7AN
1
2
3
4
5
6
7
N

Connections of Single Contact Inputs

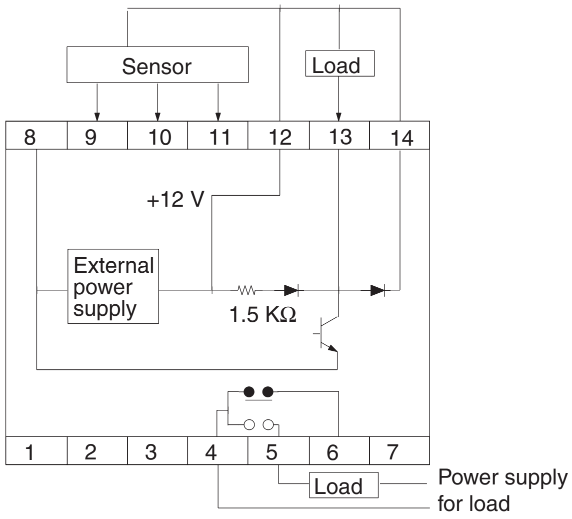
The following illustrations show how to connect a single contact input to digital counters connected in parallel. If the number of digital counters is N, the total contact input current will be 2.5 x N (mA) at 12 VDC.


Reset input
CP2 input contact
CP1 input contact
8
9
10
11
12
13
14
H7AN
1
2
3
4
5
6
7
8 9 1011
8
9
10
11
12
13
14
H7AN
1
2
3
4
5
6
7
N

Solid-state Outputs (One-stage Counters)

Load Operation when Transistor is ON

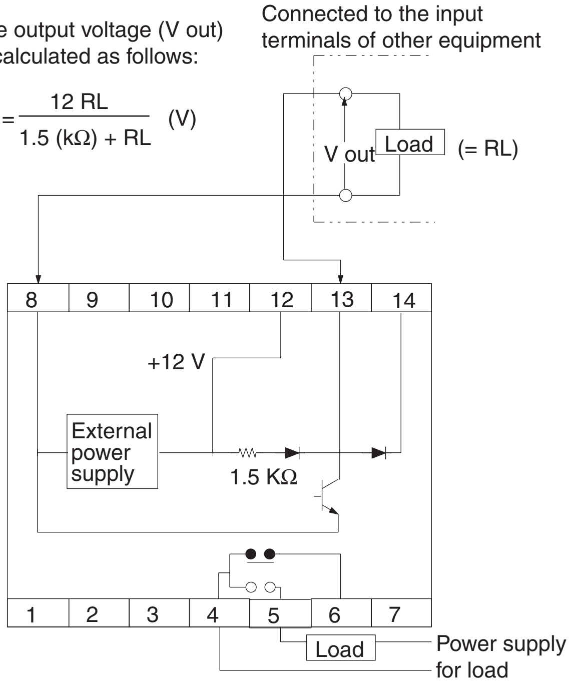
External power supply for Load


Sensor
Load
8
9
10
11
12
13
14
+12 V
External power supply
1.5 KΩ
1
2
3
4
5
6
7
Load
Power supply for load

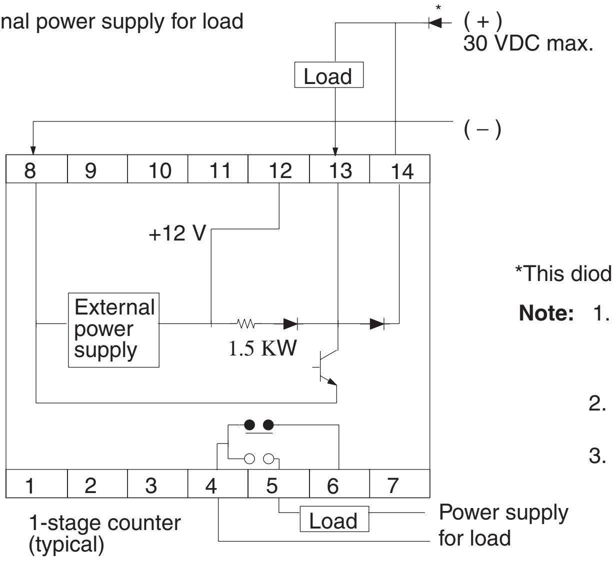
Load Operation when Transistor is OFF

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

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


Connected to the input terminals of other equipment
V out
Load
(= RL)
8
9
10
11
12
13
14
+12 V
External power supply
1.5 KΩ
1
2
3
4
5
6
7
Load
Power supply for load

External power supply for load


*
(+)
30 VDC max.
Load
(–)
8
9
10
11
12
13
14
+12 V
External power supply
1.5 KW
1
2
3
4
5
6
7
Load
Power supply for load
1-stage counter (typical)

*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

Refer to *Safety Precautions for All Counters*.

⚠ CAUTION

Minor injury due to electric shock may occasionally occur. Do not touch any of the terminals while power is being supplied.

Minor injury due to electric shock may occasionally occur. Do not touch the terminals for at least 1 minute after turning OFF the power supply.

Minor injury due to explosion may occasionally occur. Do not use the H7AN where subject to flammable or explosive gas.

Minor electric shock, fire, or malfunction may occasionally occur. Never attempt to disassemble, modify, or repair the H7AN or touch any of the internal parts.

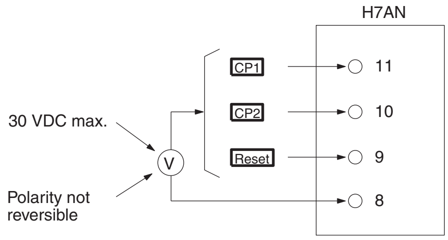
If the output relay is used beyond its life expectancy, its contacts may become fused or there may be a risk of fire.
Use the output relay within its rated load and electrical life expectancy. The life expectancy of the output relay varies considerably according to its usage.

Fire may occasionally occur. Tighten the terminal screws to a torque of 0.74 to 0.90 N·m.

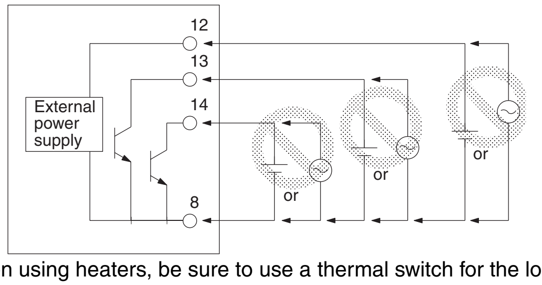
Do not allow metal fragments, lead wire scraps, or chips from processing during installation to fall inside the H7AN. Otherwise, minor electric shock, fire or malfunction may occasionally occur.

■ Precautions for Safe Use

- The H7AN is not waterproof or oil resistant. Do not use it in locations subject to water or oil.
- The load current must be within the rated current.
- Pay careful attention to polarity to avoid wrong connections when wiring the counter input terminals and reset input terminal.



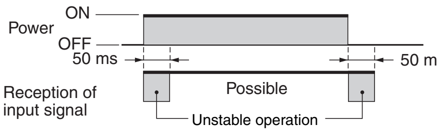
- Do not apply directly apply an external voltage to either the transistor output terminals or external power supply terminals.



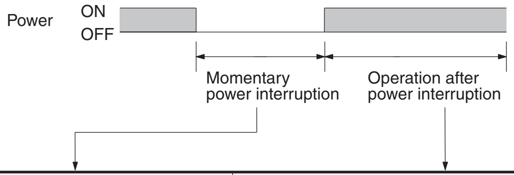
- When using heaters, be sure to use a thermal switch for the load circuit.
- Use a switch, relay, or other contact device so that the power is turned ON or OFF quickly. If the power supply voltage is not reached quickly enough, the H7AN may malfunction.
- Use the specified wires for wiring.
  Applicable Wires:
  AWG24 to AWG18 (cross-sectional area of 0.205 to 0.823 mm^2)
- Do not connect more than two crimp terminals to the same terminal.
- Do not connect anything to unused terminals.
- Leaving the H7AN with outputs ON at a high temperature for a long time may hasten the degradation of internal parts (such as electrolytic capacitors). Therefore, use the product in combination with relays and avoid leaving the product with the output turned ON for a long period of time (e.g., a month or more).
- The set value of the Preset Counter can be changed at any time during operation and the new set value will be used immediately. The output will turn ON whenever the set value equals the current count, so change the set value with care. (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 removing the Counter 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 Counter body from the case, do not touch an electronic components other than the setting switches with your hands.
- When changing the set value during operation, do not leave a switch set so that two numbers are visible at the same time. The set value will not be accurate. Push the buttons on the thumbwheel switches firmly.

■ Precautions for Correct Use

- Inrush current of approximately 23 A will flow for a short period of time when the power supply is turned ON. If the capacity of the power supply is insufficient, the H7AN may not start. Use a power supply, breakers, an contacts with sufficient capacity.
- 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.



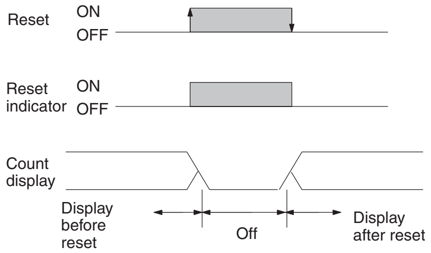
- Operation after the power supply is interrupted with be as shown below for models without data backup and for models that back up data for power interruptions (models with model numbers ending in "-M").


Power
ON
OFF
Momentary power interruption
Operation after power interruption

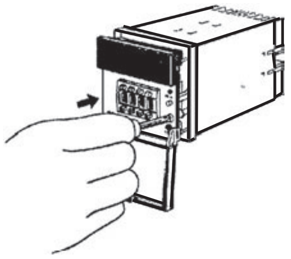
0.5 s or more	All reset
0.01 s or less	The counter continues normal operation same as before the power failure.
More than 0.01 and less than 0.5 s	The counter may reset or continue operating.

Note: Use a model with a backup function (models ending in "-M") to maintain the settings even for power interruptions. Be sure to enable the backup function.

- 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

Data is written to EEPROM when the power is turned OFF. The write life is 1,000,000 writes min.

Self-diagnosis

The following indications will be made when an error occurs.

7-segment display	Reset indicator	Count-out indicator	Error	Output status
E1	OFF	OFF	CPU error	OFF
E2	OFF	OFF	RAM memory error	OFF
E3	OFF	OFF	EEPROM memory error	OFF

Try correcting the error by cycling the power supply. If the indications do not change, try inputting the reset signal. If that does not work, the Counter will need to be repaired. If normal operation is recovered, it might have been caused by noise. Check for noise generation.

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.

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.

Read and Understand This Catalog

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