Electronic Counters

KCV

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

KCN-S/KCN-W

Single/Dual Preset Counters for Addition and Subtraction

> **Maximum counting speed: 30cps, 1kcps, 2kcps or 5kcps (selected by digit keys)**

With the DIN standard size of only 48 mm by 48 mm, the full featured counter incorporates an easy to read LCD display.

Integrating the latest technologies, the counter can be used for many purposes as measuring quantities, length and time. Other options include single preset for general purpose models, and dual preset setting for multifunction counters.

Merits

●Small body and easy to see display

With its body of only 48 mm by 48 mm, the counter provides full screen display of either four-digit or six-digit numbers with the height of 13 mm or 10 mm.
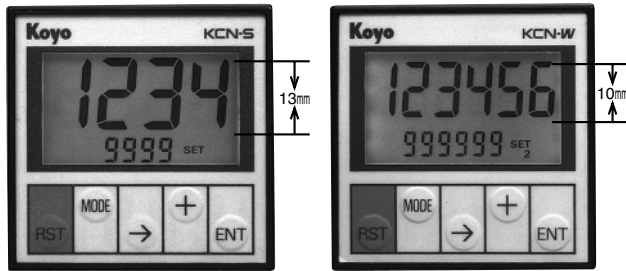
●Backlit LCD integrated in al models

Displayed values are backlit to facilitate reading in darkness.
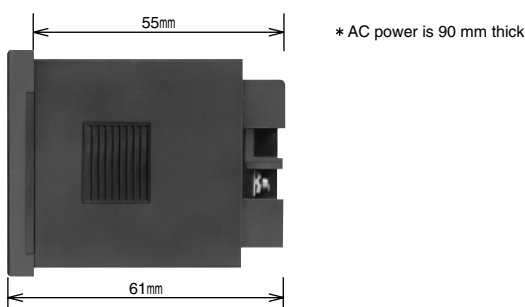

●Keypad protection cover

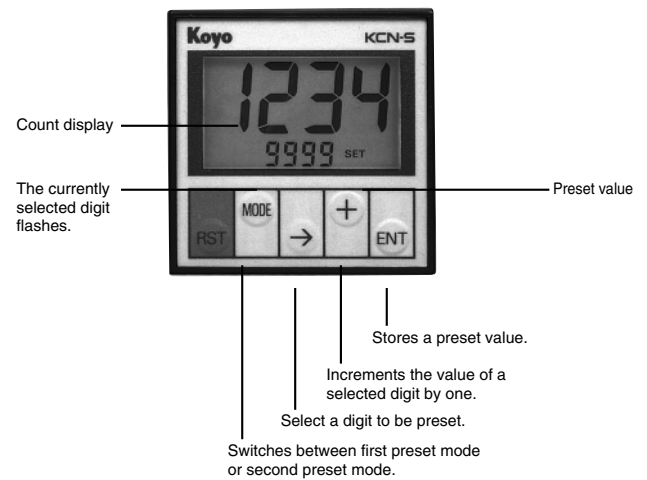A keypad cover is attached to prevent erroneous operation.

●DC power as thin as 55 mm

With minimum space requirement, the control board can be installed anywhere.

55mm
61mm

＊ AC power is 90 mm thick

●Easy operation

Countup values can be set or modified independently from initial settings. Changes can be made easily and quickly on site.

Count display

The currently selected digit flashes.

Preset value

Stores a preset value.

Increments the value of a selected digit by one.

Select a digit to be preset.

Switches between first preset mode or second preset mode.

●A series of models to meet all your needs

All 16 models include advanced functions such as prescaling and decimal display. These models can be combined appropriate to satisfy your requirements.

●Multifunction

A complete series of models provide advanced functions such as dual preset nine output modes, count disable, large capacity sensor power (DC24 V, 60 mA) and AC 100 to 240 V user-selectable power source.

●Timer option

The KCN-4S general purpose 4-digit counter can be used also as a precise digital timer.

●Addition,subtraction or both operations are available.

●Twelve error codes quickly report error status.

●EEPROM to avoid cell replacement

The counter uses an EEPROM to eliminate the use of cells. The memory can store all counts, preset values and mode settings.

●Water proofed front panel

The keypad on the front panel is completely coated (IP64) to insulate dust and water.
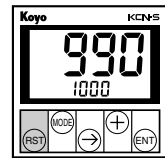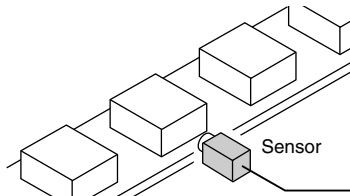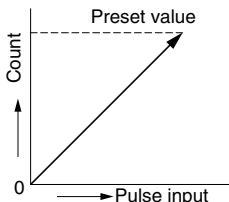
Mode options

●Addition, subtraction and concurrent

Addition mode and Subtraction mode

Addition mode

In the Addition mode, the count increments by one for each pulse input. When the value has reached a preset value, the counter generates a signal.

Count ↑

Preset value

0 → Pulse input

Sensor

990
1000

⇐ Incremented to 990

Subtraction mode

In the Subtraction mode, the count decrements by one for each pulse input. When the value has reached zero, the counter generates a signal.

Count ↑

Preset value

0 → Pulse input

Sensor

10
1000
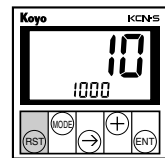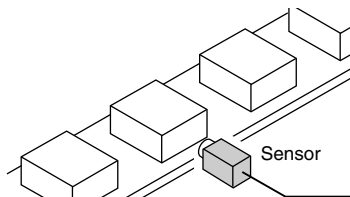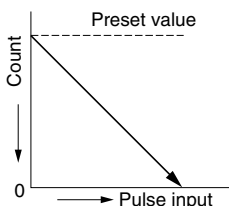
⇐ Decremented to 10

Addition and Subtraction

Counting operation is not affected by any deviation of roller movement.

Roller for length measurement

Deviation

Rotary encoder

Two-phase signal

30
2000
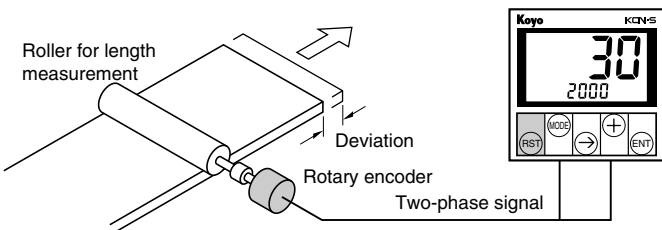
Addition pulse and subtraction pulse can be entered separately or simultaneously.

Addition

Subtration

50
2000
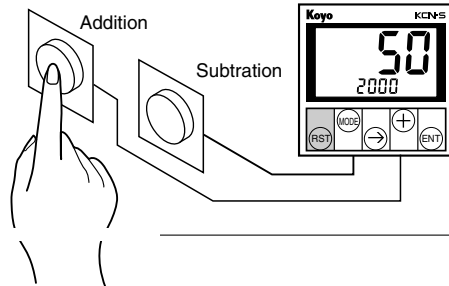
●Prescaling

Converting the number of pulses to quantity or dimension

Sensor

Four workpieces per pulse

Quantity

160
1000
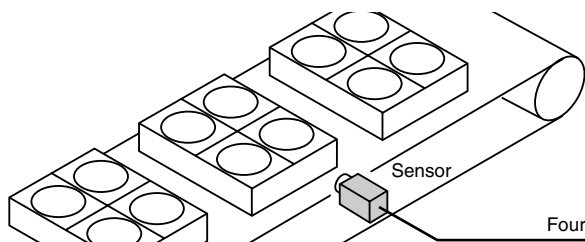
⇐ Multiplied by 4

Prescaled at 4

Roller for length measurement

Cutter

You need not consider the roller's diameter when setting the counter value

Rotary encoder

0.8 mm per pulse

Cut length (in mm)

251
1600
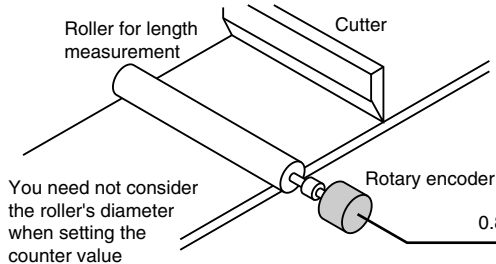
⇐ Can be set to a rounded integer.

Prescaled at 0.8

Setting in inches ← Either unit is selectable with the prescaling function → Setting in meters

Change in the mechanism are not required

KCN-A

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

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KCN-S/KCN-W

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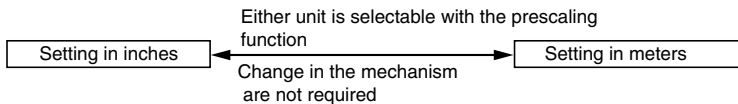
KCX-RN

KCH-B

KCM

●**Displaying a decimal point**
A decimal point can be displayed at a desired location.

Decimal point
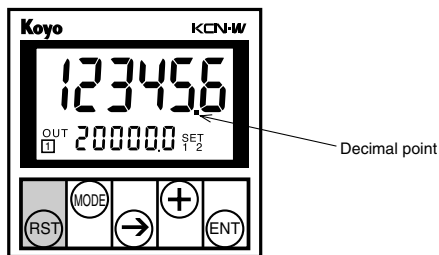
●**Switching the input logic between positive and negative**
Device choices are expanded by two input logics available for positive (voltage) input and negative (no voltage) input.

Relay

Proximity switch

Photoelectric sensor

Rotary encoder

Relay output
KCN-☐R
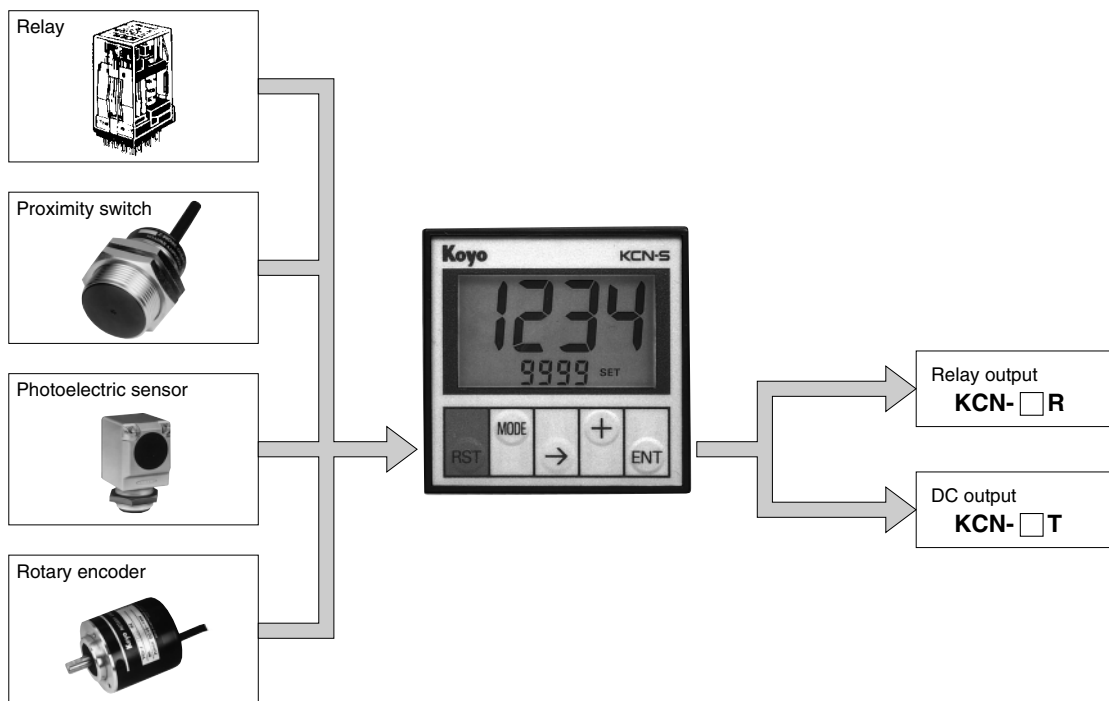
DC output
KCN-☐T

●**Nine operation modes**
The multifunction counter has nine operation modes, including Compare, Hold, Auto Reset and One shot Output.

Ex. Count of the number of workpieces (Compare mode)

Addition

Subtration

(Mode 7)
OUT1
C ≧ P1

Photoelectric sensor at entry

Photoelectric sensor at exit
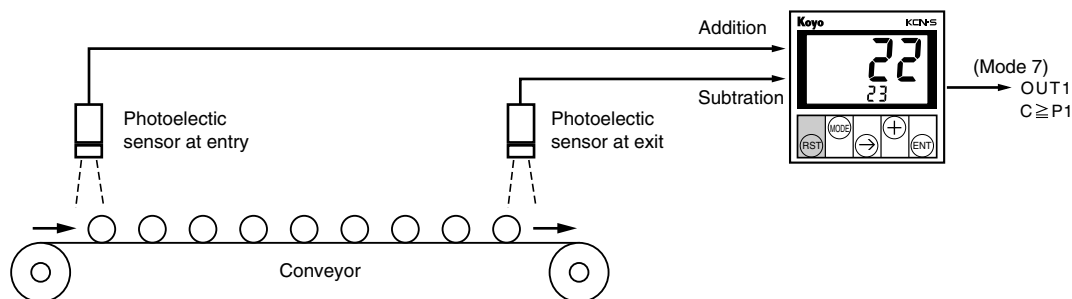
Conveyor

The counter counts and displays the number of workpieces on the conveyor. The count is added to by input pulse generated by the photoelectric sensor at the entry, and subtracted from by pulse generated by another sensor at the exit. Addition and subtraction can occur at the same time.

Electronic Counters

Timer option   KCN-4SR-C/4ST-C/4SR/4ST   General Purpose 4-digit Counters

These counters can be used also as timers from 0.01 second to 99 hours and 59 minutes

| 0.01s | 0.1s | 1s | 10s | 99.99s | 999.9s | 9999s |

| 1m | 99m59s | 99h59m |
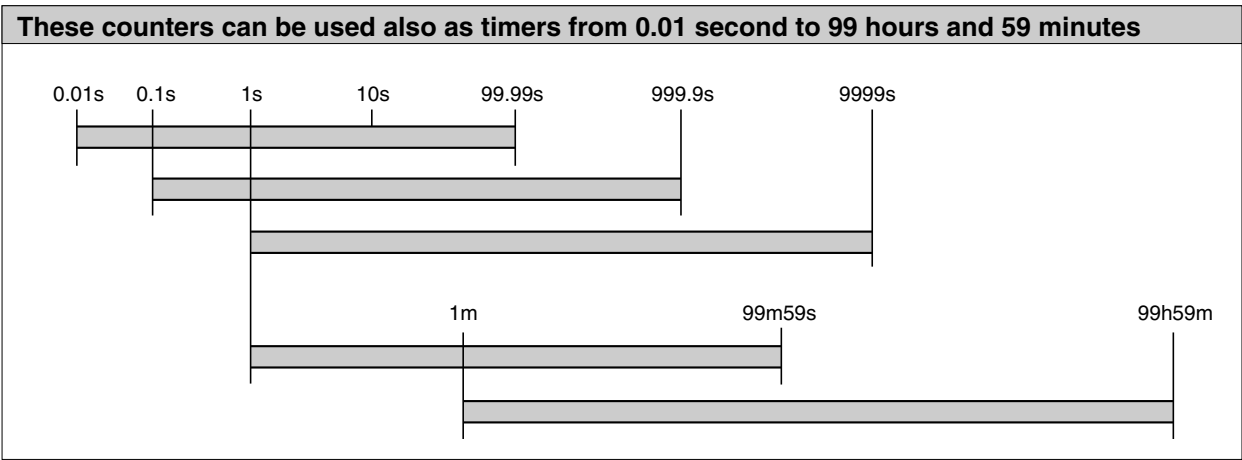
Digital clock for easy and error-free setting

Quartz crystal oscillator assures the clock precision.

Five output modes for wide applications

● On Delay
● Off Delay
● One Shot
● Flicker
● Accumulate

Either time elapsed or remaining can be displayed.

KCV

KCN-A

KCN-S/W

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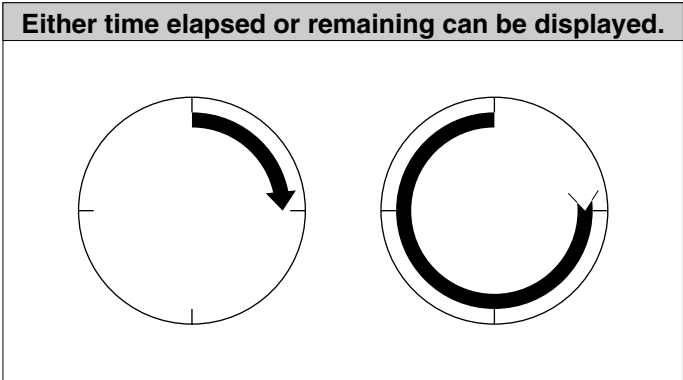
Two Categories of Models

■ General purpose counters

Single preset, One-Shot or Hold output, prescaling and decimal point display

Source voltage	Output type	Sensor source	4-digit(and timer)	6-digit
DC24V only	Relay output	None	**KCN-4SR-C**	**KCN-6SR-C**
	DC output		**KCN-4ST-C**	**KCN-6ST-C**
AC110V or AC220V	Relay output	DC24V 15mA	**KCN-4SR**	**KCN-6SR**
	DC output		**KCN-4ST**	**KCN-6ST**

■ Multifunction

Single or Dual preset setting, nine modes including One-Shot, Hold and Compare output, prescaling and decimal point display

Source voltage	Output type	Sensor source	4-digit	6-digit
DC12〜24V	Relay output	None	**KCN-4WR-C**	**KCN-6WR-C**
	DC output		**KCN-4WT-C**	**KCN-6WT-C**
AV100V〜240V	Relay output	DC24V 60mA	**KCN-4WR**	**KCN-6WR**
	DC output		**KCN-4WT**	**KCN-6WT**

Model number System

KCN-☐☐☐-☐

C : DC power
Blank : AC power

R : Relay output
T : DC output

S : Single preset
W : Dual preset

4 : 4-digit
6 : 6-digit
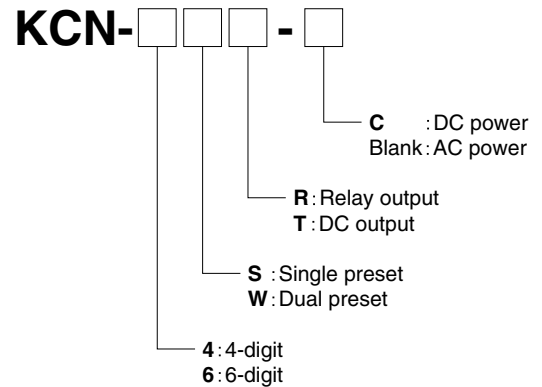
General Specifications

Item		General Purpose	Multifunction
Source voltage	AC	AC 85〜115V, or AC 180〜240V	AC90〜264V
	DC	DC 20〜28V (Max. 10% p-p ripple)	DC 10〜30V (Max. 10% p-p ripple)
Power consumption	AC	Approx. 5VA	Approx. 5VA
	DC	Approx. 2W	Approx. 2W
Sensor power	AC	DC 24V (20〜28V) 15mA (Max. 10% p-p ripple)	DC24V (20〜28V) 60mA (Max. 10% p-p ripple)
	DC	None	None
Memory backup at power failure		EEPROM (Up to 100,000 writes)	
Ambient temperature		−10〜+50℃	
Storage temperature		−25〜+70℃(with no freezing)	
Ambient/Storage humidity		35〜85%RH (with no dewing)	
Withstand voltage		AC 2kV for one minute (For each of AC input, 0V and relay output interconnection)	
Insulation resistan		20MΩ or more at DC 500V (AC: For each of AC input, 0V and relay output interconnection)	
Vibration resistance		Durable for one hour along three axes at 10 to 55 Hz with 0.5 mm amplitude No error for one hour along three axes at 10 to 55 Hz with 0.35 mm amplitude	
Shock resistance		Durable for 11 ms along three axes at 490 m/s² (50 G) No error for 11 ms along three axes at 98 m/s² (10 G)	
Noise resistance*		±1.5 kV between power terminals (square wave pulse with 1 μ s width and 1 ns rise time)	
Coating		IP64 for the keypad on the front panel against dust and splash.	
Installation		Flush mounting	
Connection		Terminal block	
Mass	AC	Approx. 220 g	Approx. 150 g
	DC	Approx. 110 g	Approx. 110 g

＊Noise tests also include static discharge test and NEMA compliance tests.

Performance Specification

Item	General Purpose (KCN-S)		Multifunction (KCN-W)
Operation	Addition and subtration		
Setting	Single preset		Single or Dual prest (selected by keys)
Number of digits	4 or 6 digits (depending on models)		
Setting range	4 digits: −999～＋9999　　6 digits: −99999～＋999999		
Counting speed	30cps, 1kcps, 2kcps, or 5kcps (selected by keys) For duty factors, see Counting Timing.		
Input mode	Addition and/or subtraction or two-phase (selected by keys)		
Input logic	Positive (voltage) or negative (no voltage) (selected by keys)		
Extermal reset input	Minimum pulse width: 5 ms		
Auto reset	Responded within 0.5 ms (2.5 ms at 5kcps)		
Manual reset	Responded within 0.1 s		
Power reset	Power shutdown: 1 s or more　　Reset duration: 1 s or less (until restart)		
Output	NPN open collector or relay contact 1a (depending on models)		
Output mode	One Shot (momentary output) or Hold (selected by keys)		One Shot (momentary output), Hold or Compare (selected by keys)
Output duration	0～9990 ms (selected by keys in 10 ms increments)		
I/O response	Maximum counting speed	Open collector output	Relay output
	30cps	14ms or less	19ms or less
	1kcps	1ms or less	6ms or less
	2kcps	0.5ms or less	5.5ms or less
	5kcps＊	2.5ms or less	7.5ms or less
Decimal point display	Any location (selected by keys)		
Prescaling	4 ditits: 0.001～9.999　　6 ditits: 0.001～99.999		
Count disable input	Not available		Responded within 2.5 ms

＊Output response delays only at 5k cps.

I/O Specifications

Pulse input	Input speed	30cps/ 1kcps/ 2kcps/ 5kcps
	Input resistance	Positive: 15kΩ Negative: 3.3kΩ (1.8kΩ for DC models)
	Input voltage	L : 0～3V H : 7～30V
Reset input	Input response	On delay: Max. 5ms Off delay: Max. 5ms
	Input resistance	Positive: 15kΩ Negative: 3.3kΩ (1.8kΩ for DC models)
	Input voltage	L : 0～3V H : 7～30V
Count disable input	Input response	On delay: Max. 2.5ms Off delay: Max. 2.5ms
	Input resistance	Positive: 15kΩ Negative: 3.3kΩ (1.8kΩ for DC models)
	Input voltage	L : 0～3V H : 7～30V
NPN open collector output	Withstand voltage	Max. 35V
	Current	Max. 100mA
	Residual voltage	Max. 2V

Relay output	Capacity	AC220V 2A (resistance load)	AC220V 0.5A (cos φ＝0.4)	DC30V 0.5A (L/R＝7ms)
	Durability	Min. 100,000 contacts	Min. 200,000 contacts	Min. 200,000 contacts

Electronic Counters

KCN-A

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

Output modes

■KCN-S

Mode No	Count	Signal output
1	Continued	Held
2	Reset	One shot ∗ 10〜9990ms

■KCN-W (single preset mode)

Mode No	Count	Signal output
1	Continued	Held
2	Reset	One shot* 10〜9990ms
3	Continued	
4	Held	Held
7	C≦P	
8	C≧P	

C: Count P: Setting

■KCN-W (dual preset mode)

Mode No	OUT1		OUT2	
	Count	Signal output	Count	Signal output
1	Continued	Held	Continued	Held
2			Reset	One shot* 10〜9990ms
3			Continued	
4			Held	Held
5		One shot ∗ 10〜9990ms	Continued	
6			Reset	One shot*
7	C≧P1		C≦P2	
8			C≧P2	
9	C<P1		P1≦C≦P2	

C: Count P1: First setting P2: Second setting

∗Can be set in 10 ms increments from 10 to 9990 ms.

Output mode diagrams
■KCN-S general purpose, single preset

Mode 1 (Hold)　　Out: Held　　Count: Continued

Mode 2 (One Shot)　　Out: One Shot　　Count: Reset
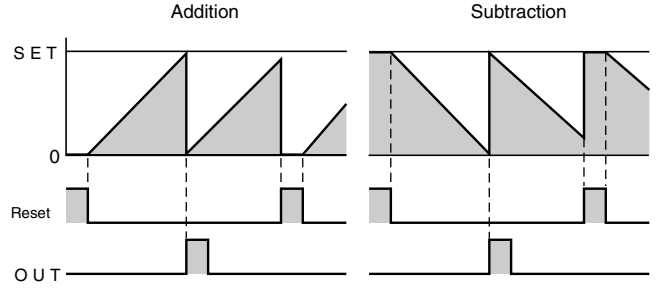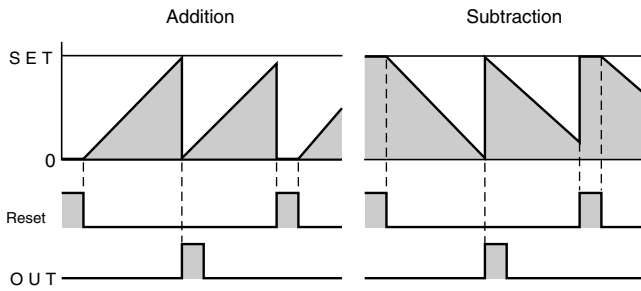
● ⊓ One Shot means signal output for short duration from 10 to 9990 ms

●Counting at 5kcps is disabled during reset in Mode 2 ,as 2.5 ms is required for auto reset.

■KCN-W Multifunction, single or dual preset

Mode 1　　OUT2: Held　　Count: Continued
　　　　　OUT1: Held

Mode 2　　OUT2: One Shot　　Count: Reset
　　　　　OUT1: Held

Mode 3   OUT2: One Shot   Count: Continued
         OUT1: Held

Addition   Subtraction

Mode 4   OUT2: Held   Count: Continued
         OUT1: Held

Addition   Subtraction

Mode 5   OUT2: Held   Count: Continued
         OUT1: One Shot

Addition   Subtraction

Mode 6   OUT2: One Shot   Count: Reset
         OUT1: One Shot

Addition   Subtraction

Mode 7   OUT2: When the count is equal to or smaller than SET2.

Mode 8   OUT2: When the count is equal to or larger than SET2.

Mode9   OUT2: When the count is equal to or larger than SET1, and when it is equal to or smaller than SET2.

- Mode 5 . Mode 6 . Mode 9 are available only on dual preset mode.
- Single preset mode operate as described under SET2, OUT2.
- In One Shot mode, output duration ranges from 10 to 9990 ms.
- One Shot output turns off when reset signal is entered.
- In One Shot mode, another countup causes signal output for a set duration.
- In Mode 2 . Mode 6 , counting at 5k cps is interrupted for 0.5 to 2.5 ms between countup and next pulse input.
  In both modes, counting at 2k cps is not affected by countup.
- Signal output is controlled as follows regardless of the magnitudes and the signs of SET1 and SET2:
  - In Hold mode, it generates and hold signal when the count equals preset value.
  - In One Shot mode, it generates signal momentarily when the count equals preset value.
  - In Compare mode, it generates signal when the count is equal to or larger (or smaller) than the preset value.

KCN-A

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

Counting timing

■ Addition and Subtraction mode

●Positive (voltage) input

Addition

I N A "H" / "L"

I N B   Pulse can be counted either at rising edge or falling edge.

Subtraction

Pulse can be counted either at rising edge or falling edge.

"H" / "L"

●Negative (no voltage) input

Addition

I N A "H" / "L"

I N B   Pulse can be counted either at rising edge or falling edge.

Subtraction

Pulse can be counted either at rising edge or falling edge.

"H" / "L"
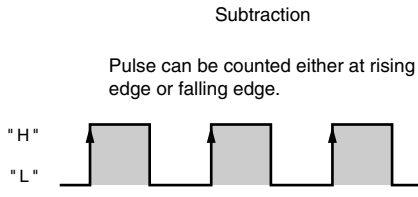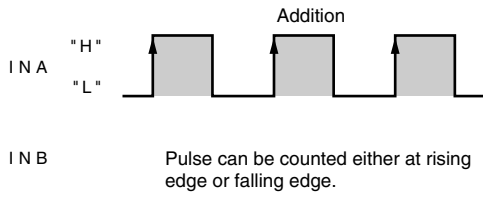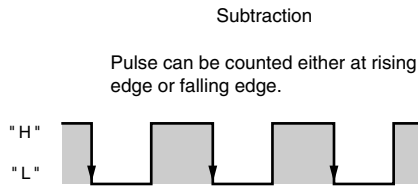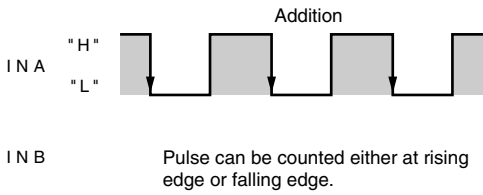
Note: Counting occurs at the rising edge or falling edge.

■ Two-Phase mode

Addition

I N A "H" / "L"

I N B "H" / "L"

Subtraction

"H" / "L"

"H" / "L"
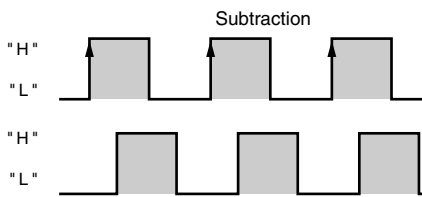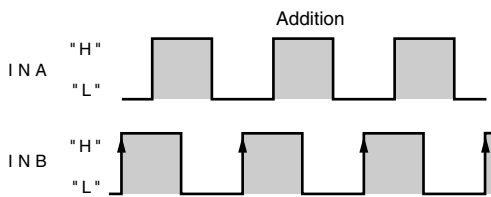
Note: Counting always occurs at rising edge.

Duty factors

INA and INB in Two-Phase mode: 50% at 5kcps

$T(200 \mu s)$

I N A "H" / "L"

I N B "H" / "L"

$\frac{T}{4}$ $\frac{T}{4}$ $\frac{T}{4}$ $\frac{T}{4}$

(50 μ s or more) (50 μ s or more)※
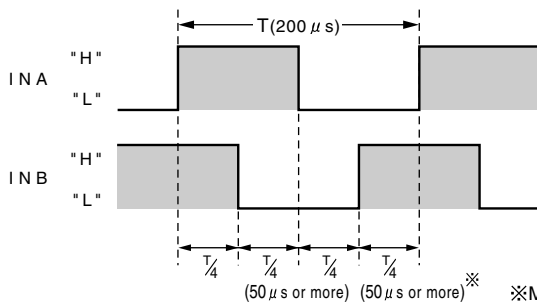
※Minimum width that enables counting.

Counting speed (cps) $= \dfrac{1}{T}$ (s)

KCN-S/KCN-W

Wiring Diagrams

General purpose (KCN-S)	Multifunction (KCN-W)

KCN-4／6SR

Sensor power DC24V 15mA | IN-A | IN-B | Sensor power 0V

R Reset input
AC 100V / AC 200V
OUT Relay output

KCN-4／6WR

Sensor power DC24V 60mA | IN-A | IN-B | Sensor power 0V | Count disable input INH

R Reset input
AC100V ～240V
OUT1 Relay output 1
OUT2 Relay output2

KCN-4／6ST

Sensor power DC24V 15mA | IN-A | IN-B | Sensor power 0V

R Reset input
AC 100V / AC 200V
OUT DC output
0V Common output

KCN-4／6WT

Sensor power DC24V 60mA | IN-A | IN-B | Sensor power 0V | Count disable input INH

R Reset input
AC100V ～240V
OUT1 DC output 1
OUT2 DC output 2
0V Common output

KCN-4／6SR-C

IN-A | IN-B | Common input 0V

R Reset input
OUT Relay output
+ − DC power DC24V

KCN-4／6WR-C

IN-A | IN-B | Common input 0V | Count disable input INH

R Reset input
OUT1 Relay output 1
OUT2 Relay output2
+ − DC power DC12～24V

KCN-4／6ST-C

IN-A | IN-B | Common input 0V

R Reset input
OUT DC output
0V Common output
+ − DC power DC24V

KCN-4／6WT-C

IN-A | IN-B | Common input 0V | Count disable input INH

R Reset input
OUT1 DC output 1
OUT2 DC output 2
0V Common output
+ − DC power DC12～24V

Dimensions of Terminal Block

6.3
8.5
17
10.55
5.2
7.62
1.32 6.3 1.32
M3 screw

Wire section: 0.25 to 1.65mm²
Conforming crimped contact: 1.25-3

KCN-A
KCN-A
KCN-S/W
KCN-B
KCN-T
KCY
KCX
KCX-RN
KCH-B
KCM

Electronic Counters

KCV

KCN-A

KCN-S/W

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KCN-T

KCY

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KCX-RN

KCH-B

KCM

I/O Circuit Diagrams

AC Power	DC Power

Sensor power source DC24V — source 24VV — ON for negative input — For relay output

IN A ③ — 5V 3.3k — 15k — OUT1 ⑧⑨
IN B ④ — 5V 3.3k — 15k — OUT2 ⑩⑪
Reset ⑦ — 5V 3.3k — 15k — OUT1 ⑧
Count disable input ⑥ — 5V 3.3k — 15k — OUT2 ⑩
0V ⑤ — 0V ⑪

DC24V ⑫ — Internal circuit — ON for negative input — For relay output

IN A ③ — 5V *3.3k — 15k — OUT1 ⑧⑨
IN B ④ — 5V *3.3k — 15k — OUT2 ⑩⑪
Reset ⑦ — 5V *3.3k — 15k — OUT1 ⑧
Count disable input ⑥ — 5V *3.3k — 15k — OUT2 ⑩
0V ⑤ — 0V ⑪

＊ For general purpose counters. 1.8 k for multifunction models.

Input Wiring Examples (count, reset and count disable)

Proximity switch with voltage output or PNP open collector output	Proximity switch with NPN open collector output

● Input logic: Positive (voltege) input (P_o5)
● Input mode: Addition and Subtraction separate inputs ($Rd.\ 5b.$)

Addition — Black (White) — ③ IN A
Subtraction — Black (White) — ④ IN B
Black (White) — ⑦ Reset
Black (White) — ⑥ Count disable input
Brown (Red) — ② 24V sensor power
Blue (Black) — ⑤ 0V

Recommended proximity swith: APS□-□-T／E2

● Input logic: Negative (no voltage) input (nEL)
● Input mode: Addition and Subtraction separate inputs ($Rd.\ 5b.$)

Addition — Black (White) — ③ IN A
Subtraction — Black (White) — ④ IN B
Black (White) — ⑦ Reset
Black (White) — ⑥ Count disable input
Brown (Red) — ② 24V sensor power
Blue (Black) — ⑤ 0V

Recommended proximity swith: APS□-□-N／E

DC 2-wire proximity switch

● Input logic: Negative (no voltage) input (nEG)
● Input mode: Addition and Subtraction separate inputs (Ad. Sb.)

- ② 24 V sensor power
- Addition — White — ③ IN A
- Black
- Subtraction — ④ IN B
- ⑦ Reset
- ⑥ Count disable inpurt
- ⑤ 0V

Recommended proximity switch: APS□-□-Z
20V or more is required for multifunction DC source voltage.

Rotary encoder

● Input logic: Positive or negative to be set according to encoder output
● Input mode: Two-phase (quAd)

- Red — ② 24 V sensor power
- Green (Blue) — ③ IN A
- ④ IN B
- White
- ⑤ 0V
- Black

Recommended proximity switch: TRD-J□-RZ／S
TRD-GK□-RZ／R

Switch or relay

● Input logic: Positive (voltage) input (PoS)
● Input mode: Addition and Subtraction separate inputs (Ad. Sb.)
● Counting speed: 30cps

- ② 24V sensor power
- Addition — ③ IN A
- Subtraction — ④ IN B
- ⑦ Reset
- ⑥ Count disable input
- ⑤ 0V

● Input logic: Negative (no voltage) input (nEG)
● Input mode: Addition and Subtraction separate inputs (Ad. Sb.)
● Counting speed: 30cps

- ② 24V sensor power
- Addition — ③ IN A
- Subtraction — ④ IN B
- ⑦ Reset
- ⑥ Count disable input
- ⑤ 0V

＊This connection is preferable to accommodate high input current.

Output Wiring Examples

NPN open collector output

May be driven by relay.

- OUT1 ⑧ — Load
- MAX.100mA
- OUT2 ⑩ — Load
- 0V ⑪
- Load power rated at 24 V

Relay output

- ⑧ — Load
- OUT1
- ⑨ — ～
- ⑩ — Load
- OUT2
- ⑪ — ～

Electronic
Counters

KCN-A

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

Front Panel Layout and Description

■Front panel

Count (zero-suppressed)
Character height: 13 mm for 4-digit display
10 mm for 6-digit display
Initial settings are displayed in the Setup mode.

Koyo

KCN·W

Preset value
Initial settings are displayed in the
Setup mode.

Output status
OUT1: First preset output
OUT2: Second preset output

OUT 1 2   SET 1 2   mS **Hz**

Measurement unit
Hz: counts per second
ms: output duratuin in the One Shot
mode

Reset key
Resets initial settings in the Setup
mode. Response time: 0.1 second

Single/dual-preset mode display
SET1: First setting
SET2: Second setting.

RST   MODE   →   +   ENT

ENTER key:
Used to write settings.

MODE key:
Used to change display mode or operation
mode. Press this key and the + key at the
same time to change operation mode
between Run and Setup.

+ key:
Used to select a digit or set its
value.

Right arrow key:
Press this key to shift one digit to the right.

KCV

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

■ Operating procedures

1. KCN-S General purpose counters

● Switching between Setup mode and Run mode
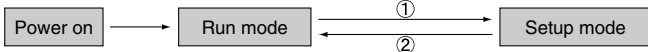
| Power on | → | Run mode | ① → | Setup mode |
| | | | ← ② | |

① Press the (MODE) key and the (+) key at the same time for at least 0.5 second.

② Press the (MODE) key and the (+) key at the same time for at least 0.5 second, or leave the system in the Setup mode for one minute.

● Changing a preset value

Go to the Run mode screen, and change the value as

(→) Select digit

(+) Select new value

    0 1 2 3 4 5 6 7 8 9 (-)

The minus sigh (-) can be selected only for the highest digit.
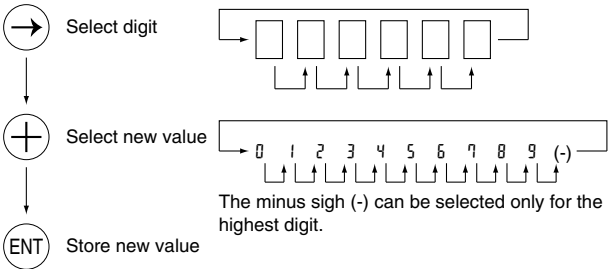
(ENT) Store new value

follows:

● Initializing the counter

Counting speed
SPEEd
(MODE)

(+) Select counting speed

    5000 2000 1000 30* (CPS)

Input mode
ın
(MODE)

(+) Select input mode

    9uAd → Ad. 5b.*
    (two-phase) (addition or subtraction)

Count memory
Count
(MODE)

(+) Select count memory

    CLEr* → rEtn
    (power-on reset) (memory backup)

Operation mode
C-dtr
(MODE)

(+) Select operation mode

    uP* → dn
    (addition) (subtraction)

Input logic
SıGnL
(MODE)

(+) Select input logic

    PoS → nEG*
    positive   negative
    (voltage input) (no voltage input)

Output mode
C-oP
(MODE)

(+) Select output mode

    1* → 2
    (Mode 1) (Mode 2)

Output duration
out

Output duration can be set or changed only in Output Mode 2.

(→) Select digit: 0 1 0 0 ms*

The lowest digitl is fixed at "0", and cannot be changed.
Setting at "0" cannot be made.

(MODE)

(+) Select number

    0 1 2 3 4 5 6 7 8 9

Prescale
SCALE
(MODE)

(→) Select digit: 0 1. 0 0 0*

Setting at "0" cannot be made.

(+) Select number

    0 1 2 3 4 5 6 7 8 9

Decimal point
Poınt
(MODE)

(→) Select display range.   n n n n n H.*

H denotes the ones' digit before the decimal point is set.

    H H H H H H

(+) Select decimal point setting mode

(→) Select decimal point position

    n. n. n. n. n. n.

Reset key mode
rESEt
(MODE)

(+) Select reset key mode

    EnAb* → dıSA
    (enable reset key) (disable reset key)

Notes:

1. After you change a current setting, always press the (ENT) key to store the new value.
2. * indicates a value set at delivery.
3. After you change an initial setting, always press the (RST) key to reset the count.
4. The displayed count is determined by the prescale and the decimal point location. For example, if the prescale is set to 1.200 and the decimal point is set as nnn.nHn, each pulse input increments the count as follows:

   0.012→0.024→0.036→0.048→0.060...

● The following table lists the KCN series models and their initial settings:

Item \ Model	KCN-6SR-1879	KCN-6SR-C-1770	KCN-6ST-C-1865
Counting speed	30cps	←	1kcps
Input mode	Addition or subtraction	←	←
Count memory	Backup at power failure	←	Backup at power failure
Operation mode	Addition	←	←
Input logic	Positive	Negative	←
Output mode	Mode 1	←	←
Prescale	1,000	←	←
Decimal point	No	←	←
Reset key	Enabled	←	←

Electronic Counters

KCN-A

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

Electronic Counters

KCV

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

2. KCN-W Multifunction Single Preset Mode

●Switching between Setup mode and Run mode

Power on → Run mode ⇄ Setup mode
(① / ②)

① Press the (MODE) key and the (+) key at the same time for at least 0.5 second.

② Press the (MODE) key and the (+) key at the same time for at least 0.5 second, or leave the system in the Setup mode for one minute.
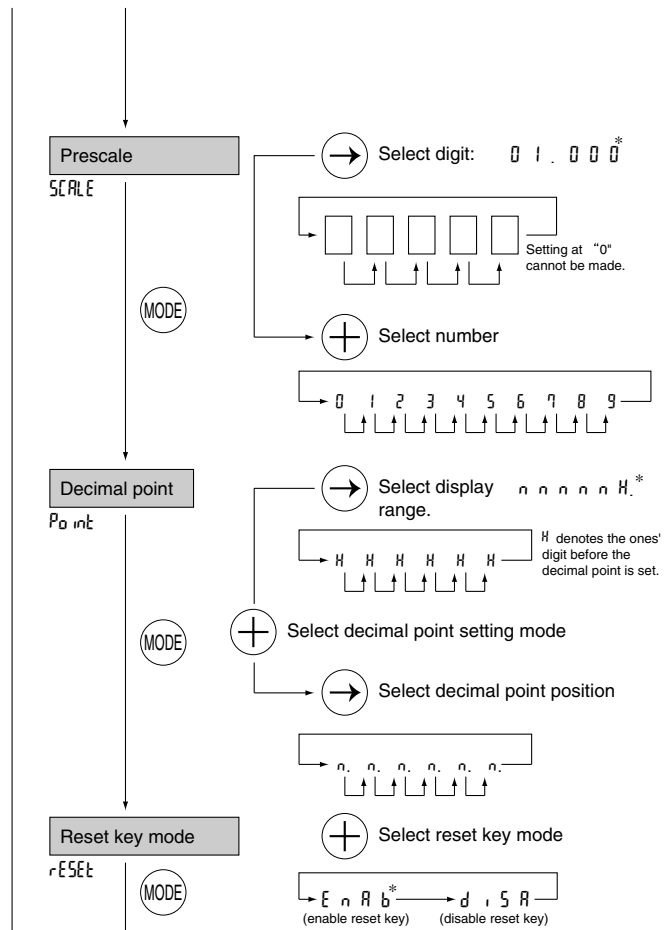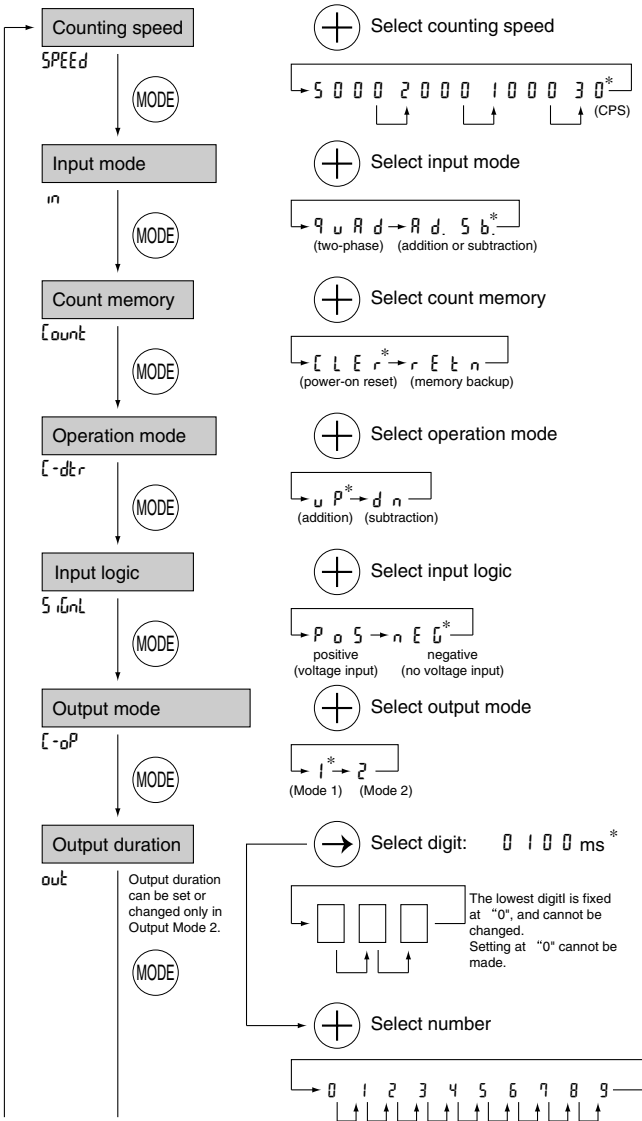
●Changing a preset value

Go to the Run mode screen, and change the value as follows:

(→) Select digit

(+) Select new value

0 1 2 3 4 5 6 7 8 9 (-)

The minus sigh (-) can be selected only for the highest digit.

(ENT) Store new value

●Initializing the counter

In the Setup mode, the counter can be initialized using the menu as

Counting speed
SPEEd
(MODE)

(+) Select counting speed

5000 2000 1000 30* (CPS)

Input mode
in
(MODE)

(+) Select input mode

quAd → Ad.5b.*
(two-phase) (addition or subtraction)

Count memory
Count
(MODE)

(+) Select count memory

CLEr* → rEtn
(power-on reset) (memory backup)

Operation mode
C-dtr
(MODE)

(+) Select operation mode

uP* → dn
(addition) (subtraction)

The operation mode can be changed in the Output Modes 1 to 4.

Input logic
SiGnL
(MODE)

(+) Select input logic

PoS → nEG*
positive   negative
(voltage input)) (no voltage input)

Setmode
PrSEt
(MODE)

(+) Select set mode between single and dual preset

2* → 1
(dual preset) (single preset)

Output mode
C-oP
(MODE)

(+) Select output mode

1* 2 3 4   7 8

Selecting Mode 7 or 8 changes the operation mode to Addition.

OUT2 Output duration
out-t

Output duration can be set or changed only in Output Mode 2 or 3.
(MODE)

(→) Select digit   100 ms*

The lowest digit fixed at "0", and cannot be changed. Setting at "0" cannot be made.

(+) Select number

0 1 2 3 4 5 6 7 8 9

Prescale
SCALE
(MODE)

(→) Select digit   01.000*

Setting at "0" cannot be made.

(+) Select number

0 1 2 3 4 5 6 7 8 9

Decimal point
Point
(MODE)

(→) Select display range.   nnnnnH.*

H denotes the ones' digit before the decimal point is set.

H H H H H H

(+) Select decimal point setting mode

(→) Select decimal point position

n. n. n. n. n. n.

Reset key
rESEt
(MODE)

(+) Select reset key mode

EnAb* → diSA
enable   disable
reset key   reset key

Notes:

1. After you change a current setting, always press the (ENT) key to store the new value.

2. * indicates a value set at delivery.

3. After you change an initial setting, always press the (RST) key to reset the count.

4. The displayed count is determined by the prescale and the decimal point location. For example, if the prescale is set to 1.200 and the decimal point is set as nnn.nHn, each pulse input increments the count as follows:
0.012→0.024→0.036→0.048→0.060...

Electronic
Counters

KCN-A

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

3. KCN-W Multifunction Dual Preset Mode
●Switching between Setup mode and Run mode

Power on → Run mode ⇄ Setup mode
(① →, ② ←)

① Press the (MODE) key and the (+) key at the same time for at least
0.5 second.

② Press the (MODE) key and the (+) key at the same time for at least
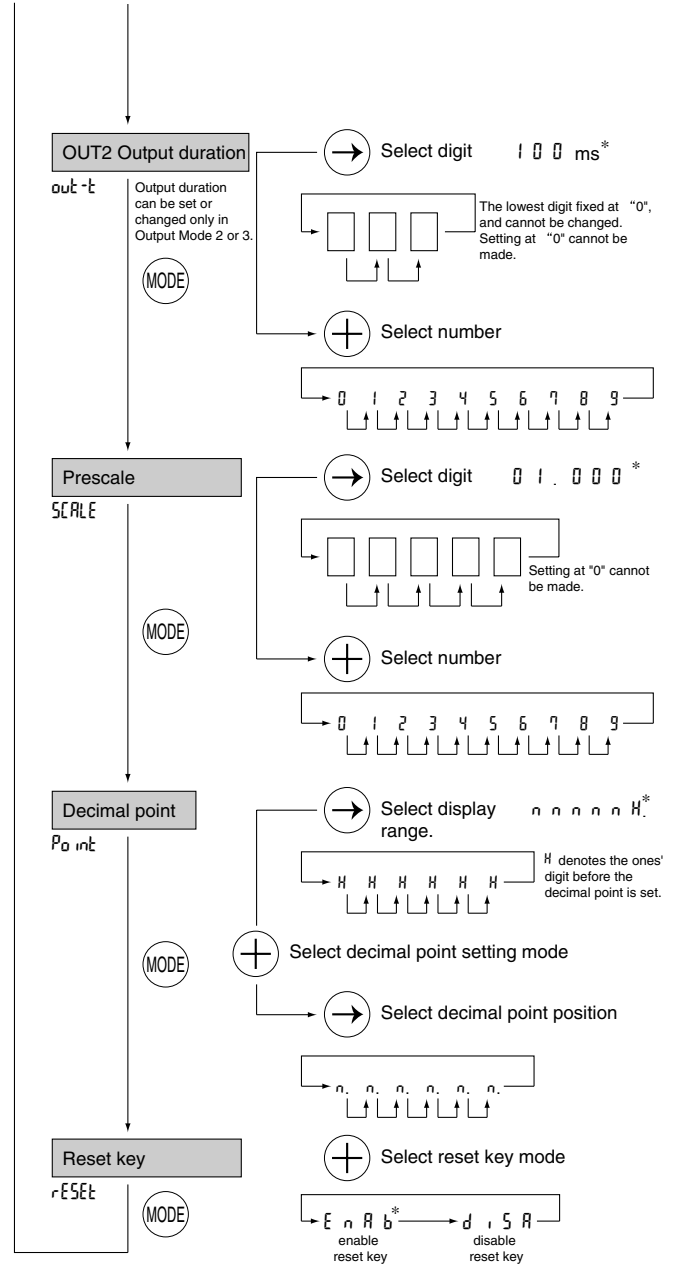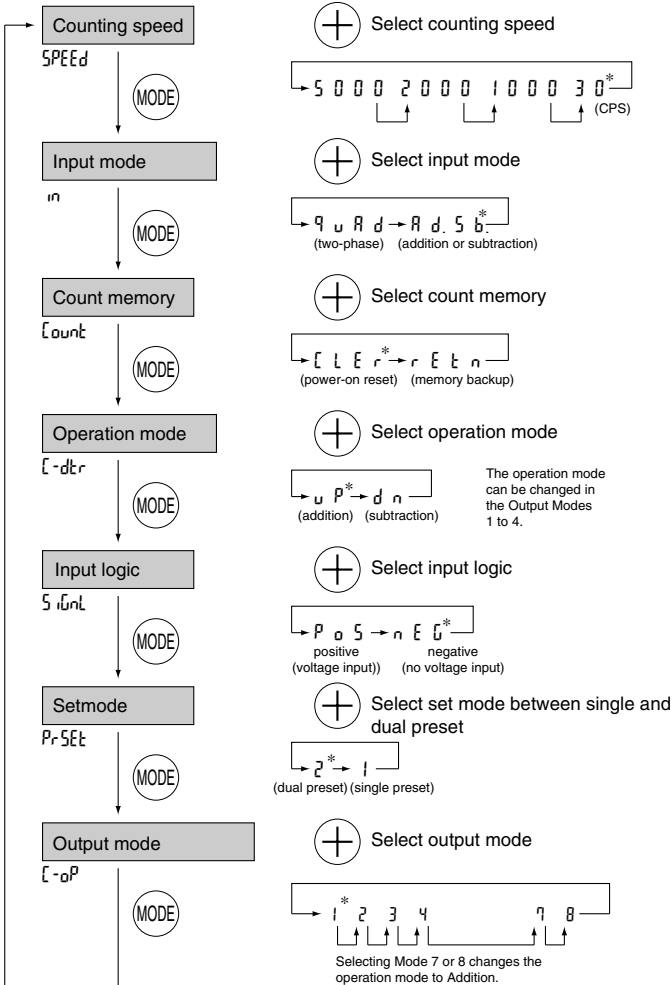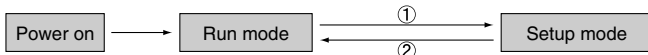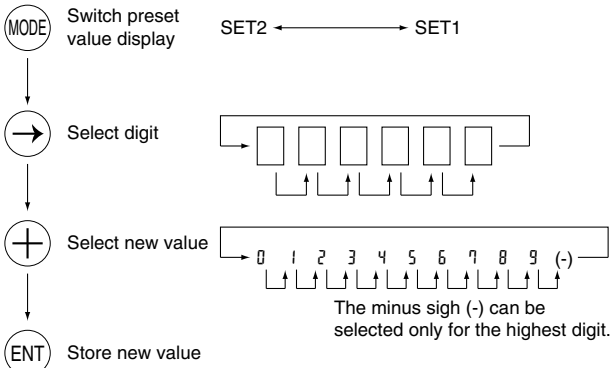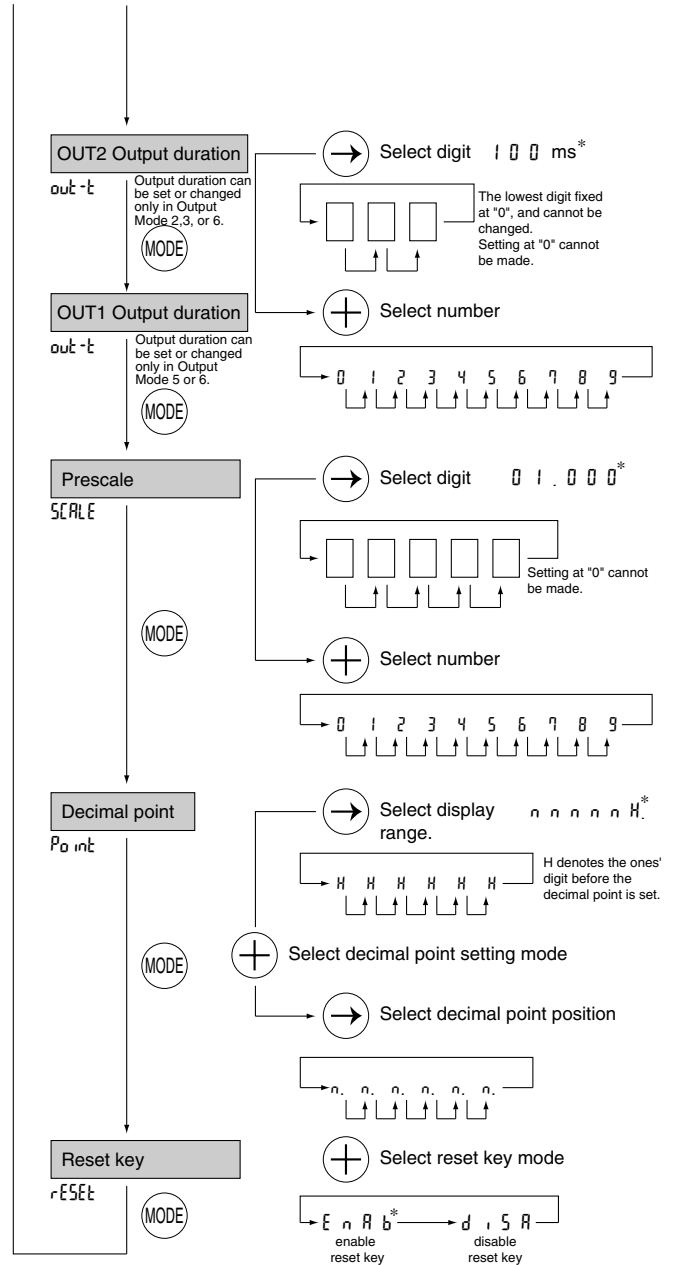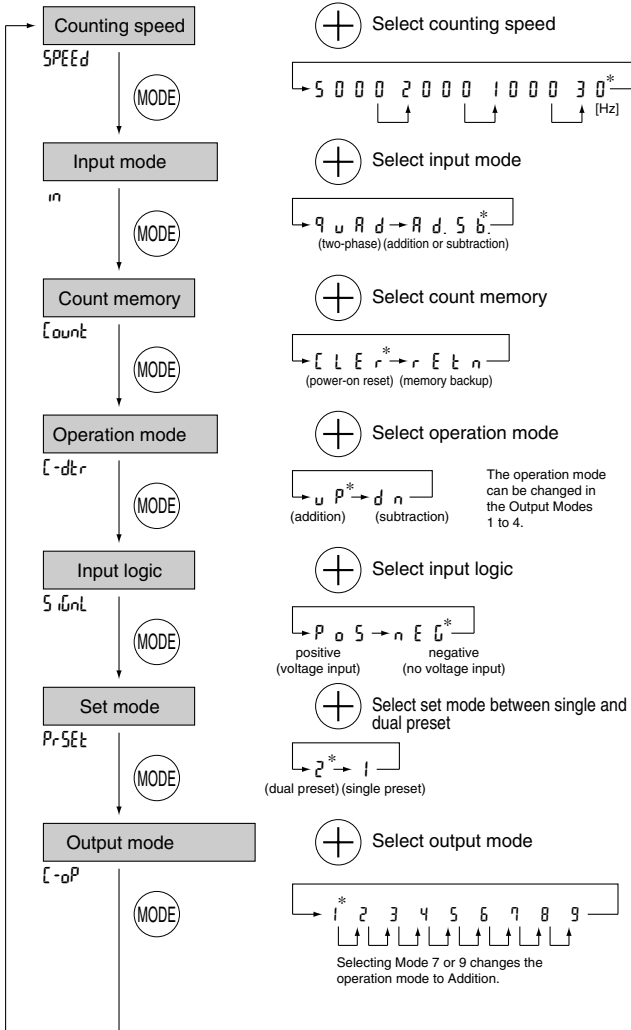0.5 second, or leave the system in the Setup mode for one minute.

●Changing a preset value

Select Dual preset in the Setup mode, then switch to the Run mode to change the value as follows:

(MODE) Switch preset value display   SET2 ←→ SET1

(→) Select digit

(+) Select new value   0 1 2 3 4 5 6 7 8 9 (-)

The minus sigh (-) can be selected only for the highest digit.

(ENT) Store new value

●Initializing the counter

In the Setup mode, the counter can be initialized using the menu as follows:

Counting speed
SPEEd
(MODE)

(+) Select counting speed
5 0 0 0 2 0 0 0 1 0 0 0 3 0 * [Hz]

Input mode
in
(MODE)

(+) Select input mode
9 u A d → A d . 5 b *
(two-phase) (addition or subtraction)

Count memory
Count
(MODE)

(+) Select count memory
C L E r * → r E t n
(power-on reset) (memory backup)

Operation mode
C-dtr
(MODE)

(+) Select operation mode
u P * → d n
(addition) (subtraction)
The operation mode can be changed in the Output Modes 1 to 4.

Input logic
S iGnL
(MODE)

(+) Select input logic
P o S → n E G *
positive (voltage input)   negative (no voltage input)

Set mode
Pr5Et
(MODE)

(+) Select set mode between single and dual preset
2 * → 1
(dual preset) (single preset)

Output mode
C-oP
(MODE)

(+) Select output mode
1 * 2 3 4 5 6 7 8 9
Selecting Mode 7 or 9 changes the operation mode to Addition.

OUT2 Output duration
out-t
(MODE)
Output duration can be set or changed only in Output Mode 2,3, or 6.

(→) Select digit 1 0 0 ms *
The lowest digit fixed at "0", and cannot be changed. Setting at "0" cannot be made.

OUT1 Output duration
out-t
(MODE)
Output duration can be set or changed only in Output Mode 5 or 6.

(+) Select number
0 1 2 3 4 5 6 7 8 9

Prescale
SCALE
(MODE)

(→) Select digit 0 1 . 0 0 0 *
Setting at "0" cannot be made.

(+) Select number
0 1 2 3 4 5 6 7 8 9

Decimal point
Po int
(MODE)

(→) Select display range. n n n n n H. *
H denotes the ones' digit before the decimal point is set.
H H H H H H

(+) Select decimal point setting mode

(→) Select decimal point position
n. n. n. n. n. n.

Reset key
rESEt
(MODE)

(+) Select reset key mode
E n A b * ←→ d i S A
enable reset key   disable reset key

Notes:
1. After you change a current setting, always press the (ENT) key to store the new value.
2. ＊ indicates a value set at delivery.
3. After you change an initial setting, always press the (RST) key to reset the count.
4. The displayed count is determined by the prescale and the decimal point location. For example, if the prescale is set to 1.200 and the decimal point is set as nnn.nHn, each pulse input increments the count as follows:
0.012→0.024→0.036→0.048→0.060...

Electronic Counters

KCV

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

Timer option

KCN-4S Series General Purpose 4-digit Counters can be used also as high-precision timers.

To use the timer option, connect the pins 5 and 6 before turning the power on.

Performance Specifications

| Item	Specification
Mode	On Delay, Off Delay, One Shot, Flicker or Accumulate (Use keys to select one of these modes.)
Timer range	0.01~99.99 seconds 0.1~999.9 seconds 1~9999 seconds 1 second~99 minutes and 59 seconds 1 minute~99 hours and 59 minutes (Use keys to select one of these modes.)
Display	Either time elapsed or remaining (Use keys to select either mode.)
Error caused by voltage or temperature variation	0.005% or ±15ms, whichever is larger
Start	On Delay: Max. 15ms Off Delay: Max. 15ms
Reset	On Delay: Max. 5ms Off Delay: Max. 5ms
Output	NPN open collector or 1a contact (depending on the model)

I/O Specifications

|				
Start signal input	Response	On Delay: Max. 15ms Off Delay: Max. 15ms		
	Input resistance	Positive: 15kΩ Negative: 3.3kΩ		
	Input voltage	L: 0~3V H:7~30V		
Reset input	Response	On Delay: Max. 5ms Off Delay: Max. 5ms		
	Input resistance	Positive: 15kΩ Negative: 3.3kΩ		
	Input voltage	L : 0~3V H : 7~30V		
Open collector output	Withstand voltage	Max. 35V		
	Current	Max. 100mA		
	Residual voltage	Max. 2V		
Relay output	Capacity	AC220V 2A (resistance load)	AC220V 0.5A (cosφ=0.4)	DC30V 0.5A (L/R=7ms)
	Durability	Min. 100,000 contacts	Max. 200,000 contacts	Max. 200,000 contacts

Notes:
1. Start signal is required for the timer to be activated.
2. The timer starts with a delay of up to one second when activated by power input.
3. The timer value is written to the internal EEPROM when the power is turned off of the ENT key is pressed. The EEPROM allows up to 100,000 writes. Avoid turning the power off more than necessary.
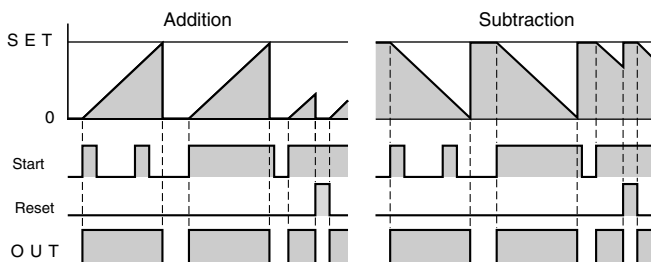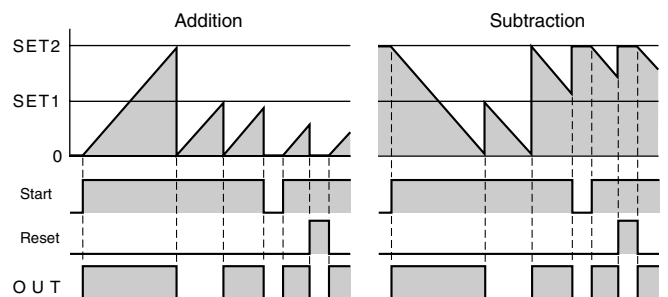
Output mode diagrams

Mode A   **On Delay**
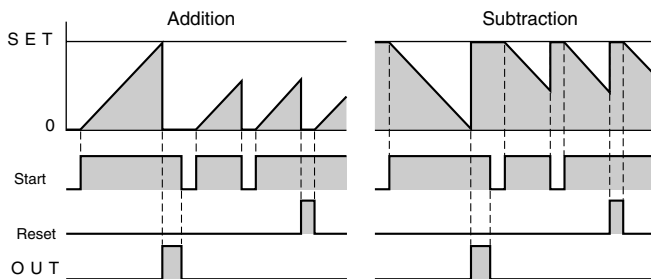
Mode B   **Off Delay**
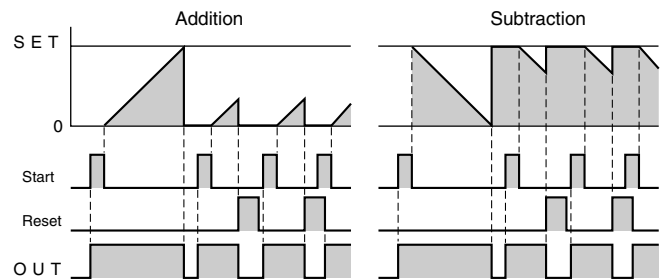
Mode C   **One Shot**

Mode D   **Flicker**

Mode E   **Accumulation**

Wiring Diagrams

KCN-4SR

KCN-4ST

KCN-4SR-C

KCN-4ST-C
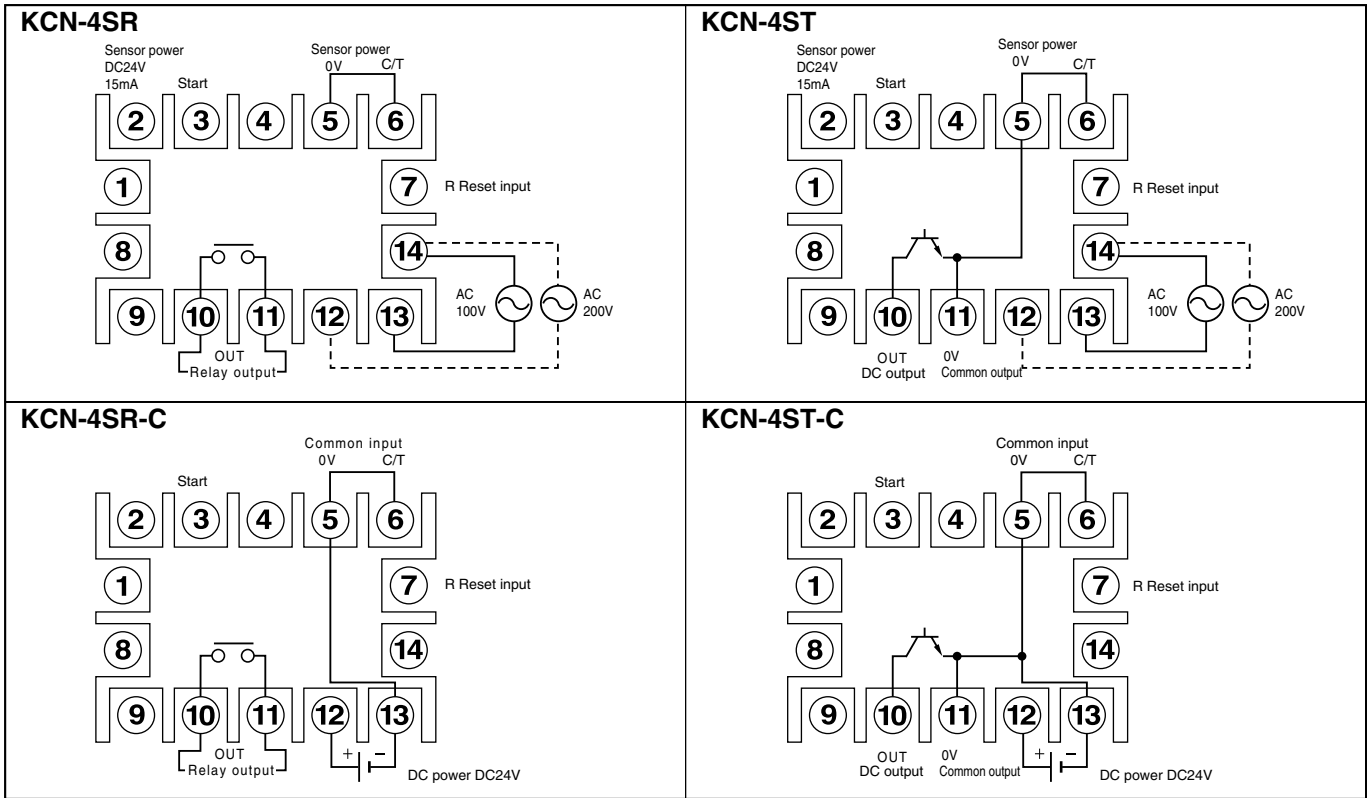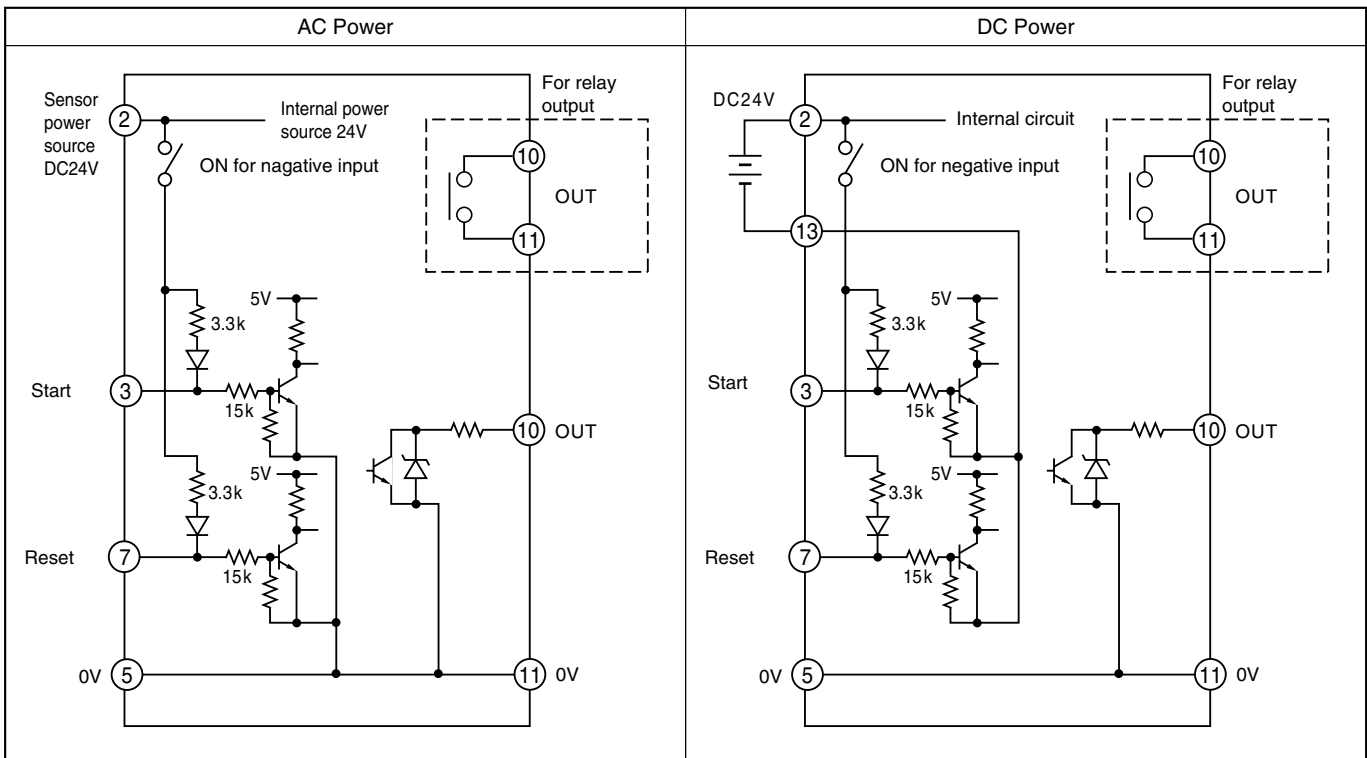

Dimensions of Terminal Block
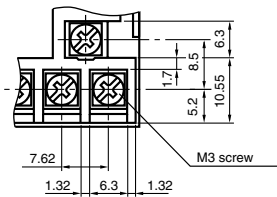
Wire section: 0.25 to 1.65 mm²
Conforming crimped contact: 1.25-3

＊To use the timer option, connect the 0V pin ⑤ and the C/T pin ⑥ before turning the power on.

I/O Circuit Diagrams

AC Power	DC Power

Electronic Counters

KCN-A
KCN-A
KCN-S/W
KCN-B
KCN-T
KCY
KCX
KCX-RN
KCH-B
KCM

Electronic Counters

KCV

KCN-A

KCN-S/W

KCN-B

KCN-T

KCY

KCX

KCX-RN

KCH-B

KCM

Input Wiring Examples (start and reset)

Proximity switch with voltage output or PNP open collector output	Proximity switch with NPN open collector output

● Input logic: Positive (voltage) input(Pos)

- 2 24V sensor power
- Brown (Red)
- Start
- Black (White)
- 3 Start signal input
- Reset
- Black (White)
- 7 Reset signal input
- Black (White)
- 5 0V
- 6 Counter/Timer switch

Recommended proximity switch: APS□-□-T／E2

● Input logic: Negative (no voltage) input (nEG)

- 2 24V sensor power
- Brown (Red)
- Start
- Black (White)
- 3 Start signal input
- Reset
- Black (White)
- 7 Reset signal input
- Black (White)
- 5 0V
- 6 Counter/Timer switch

Recommended proximity switch: APS□-□-N／E

DC 2-wire proximity switch	Switch or relay	

● Input logic: Negative (no voltage) input (nEG)

- 2 24V sensor power
- Start
- 3 Start signal input
- Reset
- 7 Reset signal input
- 5 0V
- 6 Counter/Timer switch

Recommended proximity switch: APS□-□-Z

● Input logic: Positive (voltage) input (Pos)

- 2 24V sensor power
- Start switch
- 3 Start signal input
- Reset switch
- 7 Reset signal input
- 5 0V
- 6 Counter/Timer switch

● Input logic: Negative (no voltage) input (nEG)

- 2 24V sensor power
- Start switch
- 3 Start signal input
- Reset switch
- 7 Reset signal input
- 5 0V
- 6 Counter/Timer switch

Output Wiring Examples

NPN open collector output	Relay output

- OUT 10
- Load
- Compatible with relay drive
- MAX.100mA
- 0V 11
- Load power rated at 24 V

- 10 Load
- OUT
- 11

Front Panel Layout and Description
■Front panel

Count (zero-suppressed)
Character height: 13 mm
Initial settings are displayed in the Setup mode.

Koyo   **KCN·S**

Preset value
Initial settings are displayed in the Setup mode.

Measurement unit
H:M: hours: minutes
M:S: minutes: seconds
S: seconds

Output status — OUT   H:M: S   SET 1 2

Flicker mode: 1- or 2-step

Reset key
Resets initial settings in the Setup mode.
Response time: 0.5 second

(RST) (MODE) (→) (+) (ENT)

ENTER key:
Used to store settings.

MODE key:
Used to change display mode or operation mode. Press this key and the +key at the same time to change operation mode between Run and Setup.

Right arrow key:
Press this key to shift one digit to the right.

+key:
Used to select a digit or set its value.

■Operating procedures
●Switching between Setup mode and Run mode

Power on → Run mode ⇄① ② Setup mode

① Press the (MODE) key and the (+) key at the same time for at least 0.5 second.
② Press the (MODE) key and the (+) key at the same time for at least 0.5 second, or leave the system in the Setup mode for one minute.

●Changing a preset value

Mode A · B · C · E	Mode D

Mode D → (MODE) Press the MODE key to select SET2 or SET1.

(→) Select digit

(+) Select new value → 0 1 2 3 4 5 6 7 8 9

(ENT) Store new value

●Initializing the timer

Operation mode   Select operation mode
t-dtr
(MODE)   → u P* → d n
     addition   subtraction

Input logic   Select input logic
5 iGnL
(MODE)   → P o 5 → n E G*
     positive   negative
     power input   power input

Output mode   Select output mode
t-oP
(MODE)   → A* → b → C → d → E

Timer range   Select timer range
rAnGE
(MODE)   → nn.nn* nnn.n nnnn. nn:nn nn:nn
     S   S   S   M:S   H:M

Reset key   Select reset key mode
rESEt
(MODE)   → E n R b* → d i 5 R
     enable reset key   disable reset key

Notes:
1. After you change a current setting, always press the (ENT) key to store the new value.
2. *indicates a value set at delivery.
3. After you change an initial setting, always press the (RST) key to reset the count.

Electronic Counters

KCN-A
KCN-A
KCN-S/W
KCN-B
KCN-T
KCY
KCX
KCX-RN
KCH-B
KCM

List of Error Codes

Error code		Description	Possible cause
Count display	Preset display		
F F F F F F	Preset value	Counter overflow	Count has exceeded upper limit.
- F F F F F	Preset value	Counter underflow	Count has decreased below lower limit.
E r r	P 5 E t P 5 E t 1 P 5 E t 2	Preset memory data error	Preset value divided by prescale exceeds count range. The error code is followed by 1 or 2 to indicate SET1 or SET2 error.
	5 P E E d	Counting speed memory data error	A memory data error occurs when the current settings do not produce a meaningful result.
	[- o P	Output mode memory data error	
	o u t - t ※1	Output duration memory data error	
	o u t - t 1 ※2	OUT1 output duration memory data error	
	o u t - t 2 ※2	OUT2 output duration memory data error	
	5 [A L E	Prescale memory data error	
	P o i n t	Decimal point memory data error	
	t - o P ※1	Timer output mode memory data error	
	r A n G E ※1	Timer range memory data error	

＊1: KCN-S only　　＊2: KCN-W only

■Solving errors

For an overflow or underflow, press the (RST) key to reset the counter and clear the error code.

For any other errors, press the (ENT) key to clear the error code then make the current settings.

Notes:
- ●The counter continues counting even after an overflow or underflow has occurred. This is performed in the range of -2147483.648 to 2147483.647.
- ●The counter is self-checked for errors when its power is turned on. When an error occurs, counting and display are disabled except for overflow and underflow.

Settings at delivery

Counter

Item	Set value	
	KCN-S	KCN-W
First setting	—	1000
Second setting	5000	
Counting speed	30cps	
Operation	Addition/subtraction separate inputs	
Count memory	Power-on reset	
Counter mode	Addition	
Input mode	Negative	
Preset mode	—	Dual preset
Output mode	Mode 1	
OUT 2 output duration	100ms	
OUT 1 output duration	—	100ms
Prescale	1.000	
Decimal point	n n n n n H.	
Reset key	Enabled	

Timer

Item	Set value
First setting	10.00
Second setting	50.00
Operation	Addition
Input logic	Negative
Timer mode	Mode A
Timer range	n n n n (s)
Reset key	Enabled

Important

- ●Using a relay, bring the power voltage quickly to the rated level.
- ●The KCN-W counters integrate a switching source circuit. Starting the counter causes a surge current to flow into the circuit and may prevent counter operation. Use a power source with a sufficient capacity to prevent the surge current.
- ●Keep the source voltage in the 20 to 30 V range for DC 2-wire proximity switch.
- ●After changing initial settings, always press the RST key to reset the counter.
- ●To use the counter as timer, connect the common input (sensor power) terminal 5 to the Counter-Timer switch terminal 6 then turn the power on.
- ●After you change the timer range from "S" to "M:S" or "H:M", check that the second digit of the preset value is set to a number less than 6. If necessary, correct the value to prevent a preset error.
- ●When you switch the function from timer to counter, re-enter the initial settings and preset value.
- ●Any changed preset value during counting is enabled by pressing the (ENT) key.
- ●For maintenance purposes, keep records of the initial settings and preset values.
- ●During counting, any change to a preset value become. Avoid using the counter in the environments where:
  (1)Ambient temperature is above 50℃ or below －10℃.
  (2)Ambient humidity exceeds 85%, or abrupt temperature changes may cause dewing.
  (3)The operation may be affected by dust, metal chips, corrosive gases or other harmful objects.
  (4)The machine is exposed to direct sunlight.
  (5)You anticipate vibration or shock.
- ●Keep the following in mind when wiring:
  (1)The wiring to the counter should be separated from power line.
  (2)Keep the counter body and wiring away from noise sources.
  (3)Never use a free terminal as a relay.
- ●Isolate the counter from the control circuit before testing insulation voltage and resistance.
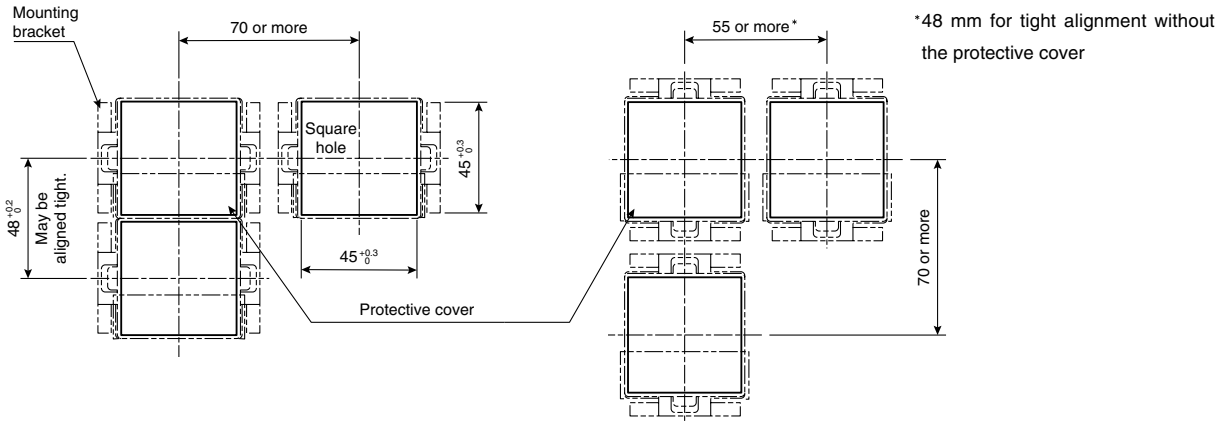
External Dimensions

(in mm)

Mounting bracket

90 (for AC power)

48

44.5

Protective cover

48

(50.4)

63

1 to 5 mm thick panel

45

10

6

55 (for DC power)

	Depth
DC power	61mm
AC power	96mm
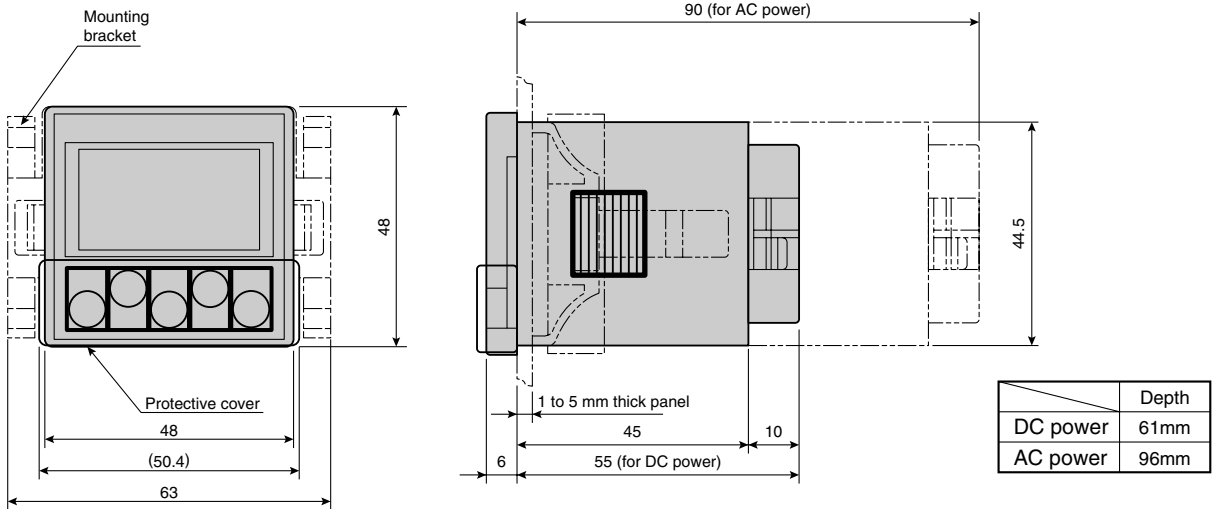
Boring dimensions for Installation

1. Horizontally aligned handles

2. Vertically aligned handles

Mounting bracket

70 or more

Square hole

$45^{+0.3}_{0}$

$48^{+0.2}_{0}$ May be aligned tight.

$45^{+0.3}_{0}$

Protective cover

55 or more*

70 or more

*48 mm for tight alignment without the protective cover

KCN-A

KCN-A

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KCN-B

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KCY

KCX

KCX-RN

KCH-B

KCM