

KCN-A Single Preset Counters for Addition or Subtraction

Maximum counting speed:
30cps/5kcps(selected by dip switch)
200cps/1kcps(selected in Setup mode)

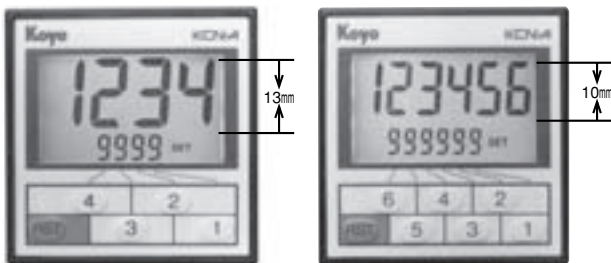
With the DIN standard of only 48 mm by 48 mm, the full featured preset counter incorporates an easy to read LCD display.

Just press keys to set values by digit, or change operation between addition and subtraction.

Merits

● Small body and easy to read display

With its body of only 48 mm by 48 mm, the counter provides full screen display of either 4-digit or 6-digit numbers with the height of 13 mm or 10 mm.



● Backlit LCD integrated in all models

Displayed values are backlit to facilitate reading in darkness.

● Key Protection to lock keys individually

On the front panel, each digit key and the Reset key can be locked to protect against erroneous operation. The digit keys can be also used to increment the corresponding digit values.

● Keypad protection cover

A keypad cover is also attached to provide additional protection.



● EEPROM to eliminate cell replacement

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

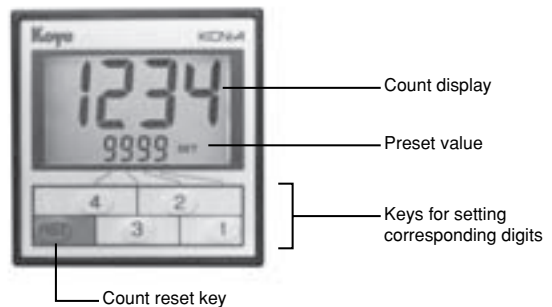
● Water proofed front panel

The keypad on the front panel is completely coated (IP64) for insulation from dust and water.



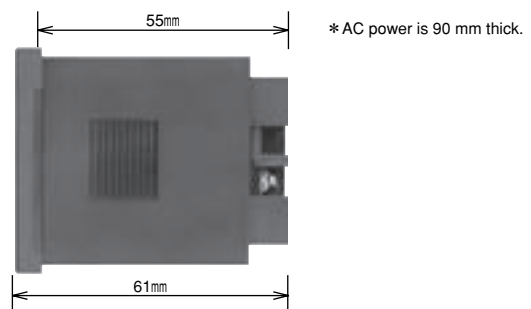
● Easy operation.

Values can be set and changed digit by digit simply by pressing the corresponding keys.



● DC power as thin as 55 mm

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

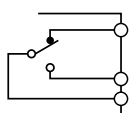


● A series of models to meet all your needs

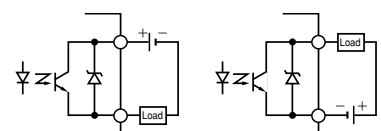
All eight models include advanced functions such as prescaling and decimal display. These models can be combined appropriately to satisfy your requirements.

● Output options

1c relay output



Either a sink or source can be used for DC output.



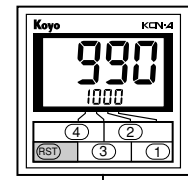
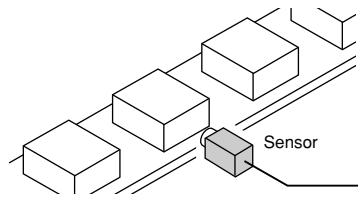
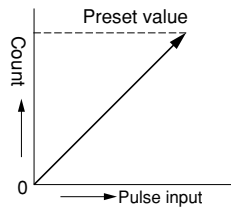
Isolated from internal circuit by photocopler

● Switching between addition and subtraction

Addition mode and Subtraction mode

Addition mode

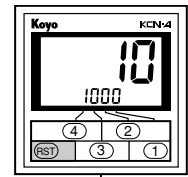
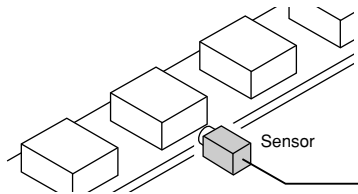
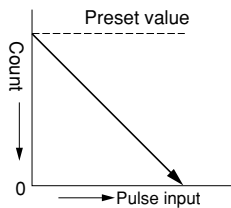
In the Addition mode, the count increments by one for each pulse input. When the value has reached a preset value, the counter generates a signal.



← Incremented to 990

Subtraction mode

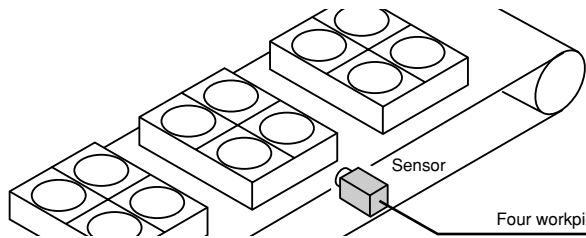
In the Subtraction mode, the count decrements by one for each pulse input. When the value has reached zero, the counter generates a signal.



← Decrement to 10

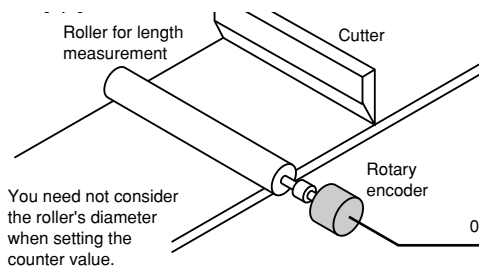
● Prescaling

Converting the number of pulses to quantity or dimension

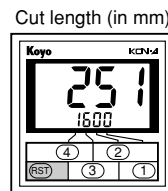


← Multiplied by 4

Prescaled at 4



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



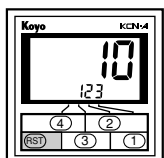
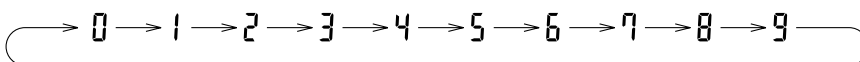
← Can be set in a desired unit.

Prescaled at 0.8

Using a present scale, the count is converted to quantity or dimension.

● Easy operation

Changing a preset value: On the front panel, press a digit key once to increment the corresponding digit by one.



Example: When the counter is preset to 123

Pressing (1) key increments the first digit by one to 124

Pressing (2) key increments the second digit by one to 134

Pressing (3) key increments the third digit by one to 234

Each digit is preset upon change.

●Key Protection against erroneous operation

All keys on the front panel can be locked to secure current settings.

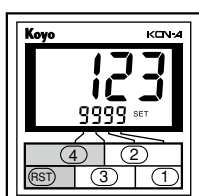
These keys can be protected individually.

The digit keys can be also used to increment the corresponding digit.

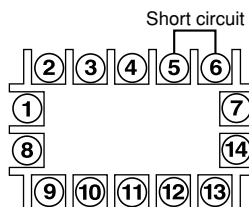
Example: Protecting the fourth digit of KCN-A4SR Counter

(1) In the Setup mode, select the key to be protected.
In this case, choose the digit 4.

(2) Short circuit the Key Protection input ⑥ and the 0V pin ⑤.

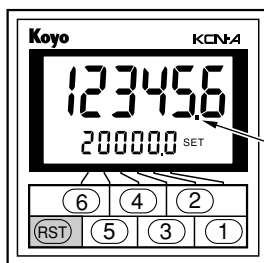


Protectable keys



●Displaying a decimal point

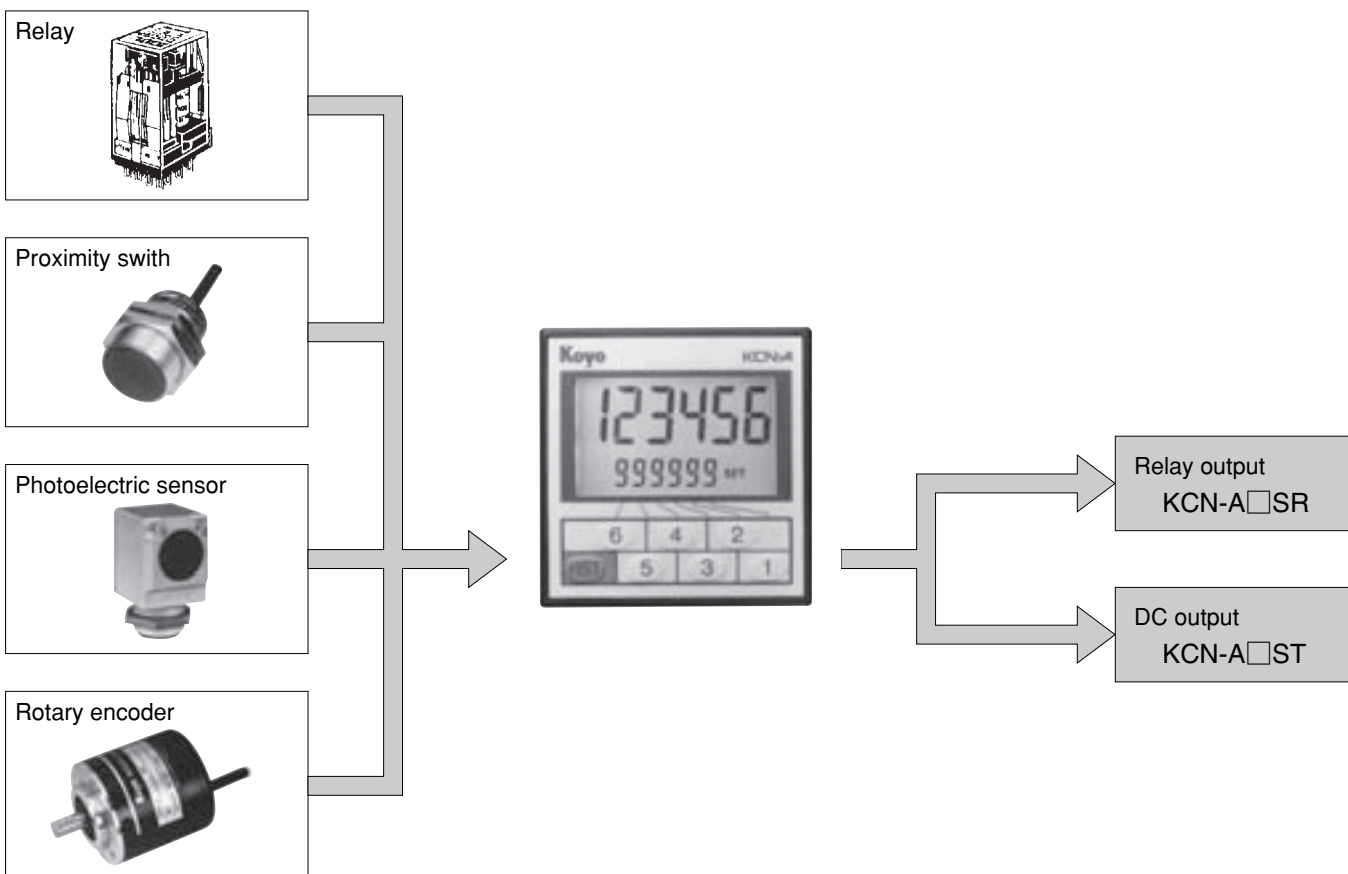
A decimal point can be displayed at a desired location.



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.

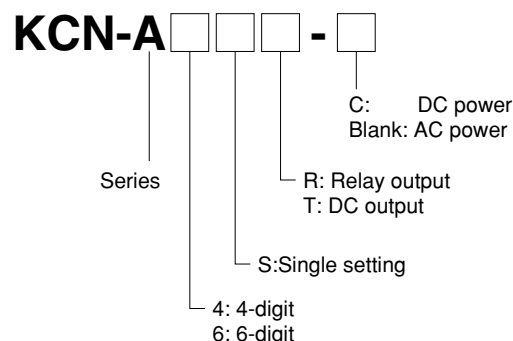


KCN-A

List of models

Source voltage	Output	Sensor power	4-digit counters	6-digit counters
DC24V only	Relay output	None	KCN-A4SR-C	KCN-A6SR-C
	DC output		KCN-A4ST-C	KCN-A6ST-C
AC110V or AC200V	Relay output	DC24V 15mA	KCN-A4SR	KCN-A6SR

Model number system



General Specifications

Item		Specification
Source voltage	AC	AC 85~115V, or AC 180~240V
	DC	DC 20~28V (Max. 10%p-p ripple)
Power consumption	AC	Approx. 5VA
	DC	Approx. 2W
Sensor power	AC	DC 24V (20~28V) 15mA (Max. 10%p-p ripple)
	DC	None
Memory backup at power failure		EEPROM (Up to 100,000 writes) Either power-on reset or memory backup can be selected in Setup mode.
Ambient temperature		-10~+50°C
Storage temperature		-20~+70°C (with no freezing)
Ambient/Storage humidity		35~85%RH (with no dewing)
Withstand voltage	AC	AC 2kV for one minute (For each of AC input, OV and relay output interconnection)
	DC	AC 2kV for one monute (between 0V and relay output)
Insulation resistance	AC	Min. 20MΩ at DC 500V (between AC input/0V/relay output)
	DC	Min. 20MΩ at DC 500V (between 0V and relay output)
Vibration resistance		Durable for one hour along three axes at 10~55Hz with 0.5mm amplitude No error for one hour along three axes at 10~55Hz with 0.35mm amplitude
Shock resistance		Durable for 11 ms along three axes at 490 m/s ² (50G) No error for 11 ms along three axes at 98 m/s ² (10G) (Shock applied three times in each case)
Noise resistance	AC	±1.5kV between power terminals (square wave pulse with 1 μs width and 1 ns rise time)
	DC	±1kV between power terminals (square wave pulse with 1 μs 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 (weight)	AC	Approx. 220g
	DC	Approx. 110g

Performance Specification

Item	Specification				
Operation	Addition or subtraction (selectable)				
Setting	Single				
Number of digits	4 or 6 digits				
Setting range	4 digits: 0~+9999 6 digits: 0~+999999				
Counting range	4 digits: -999~+9999 6 digits: -99999~+999999				
Counting speed	30 cps or 5kcps (selected by Dip Switch 1) 200cps or 1kcps (selected in Setup mode)				
Input mode	Addition or subtraction (selected by Dip Switch 2)				
Input logic	Negative (no voltage) or positive (selected in Setup mode)				
Count disable input	Responded within 0.2ms				
External reset input	Minimum pulse width: 6ms				
Auto reset	Responded within 0.2ms (14ms at 30cps)				
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 1c (depending on models)				
Output mode	One Shot (momentary output) or Hold (selected by Dip Switch 3), or Countup (selected in Setup mode)				
Output duration in One Shot mode	100ms, or 10~9990ms (selected in Setup mode)				
Key protection	Both the Reset key and digit set keys, or individual key protection (selected in Setup mode)				
Zero setting	Enabled or disabled (selected in Setup mode)				
I/O response	Maximum counting speed	Open collector output		Relay output	
		On delay	Off delay*	On delay	Off delay
	30cps	14ms or less	15ms or less	24ms or less	24ms or less
	200cps	2.5ms or less	3.5ms or less	13ms or less	13ms or less
	1kcps	1ms or less	2.5ms or less	11ms or less	11ms or less
5kcps	0.5ms or less	2ms or less	11ms or less	11ms or less	
Decimal point display	Any location (selected in Setup mode)				
Prescaling	4 digits: 0.001~9.999 6 digits: 0.001~99.999 (selected in Setup mode)				

* Off delay time applies only to the Countup mode.

I/O Specifications

Count input	Input speed	30cps/200cps/1kcps/5kcps		
	Input resistance	Positive: 15k Ω Negative: 3.3k Ω		
	Input voltage	L : 0~3V H : 7~30V		
Count disable input	Input response	On delay: 0.2ms Off delay: 0.2ms		
	Input resistance	Positive: 15k Ω Negative: 3.3k Ω		
	Input voltage	L : 0~3V H : 7~30V		
External reset input	Input response	On delay: 6ms or less Off delay: 6ms or less		
	Input resistance	Positive: 15k Ω Negative: 3.3k Ω		
	Input voltage	L : 0~3V H : 7~30V		
DC output (Type T)	Withstand voltage	Max. 35 V		
	Current	Max. 100 mA		
	Residual voltage	Max. 2 V		
Relay output (Type R)	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

KCN-A

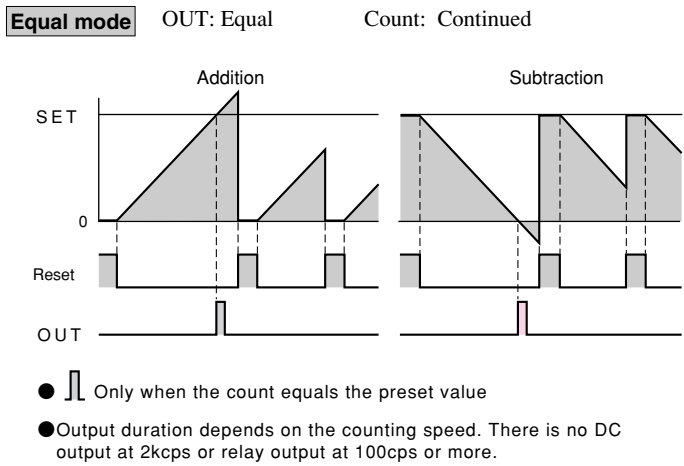
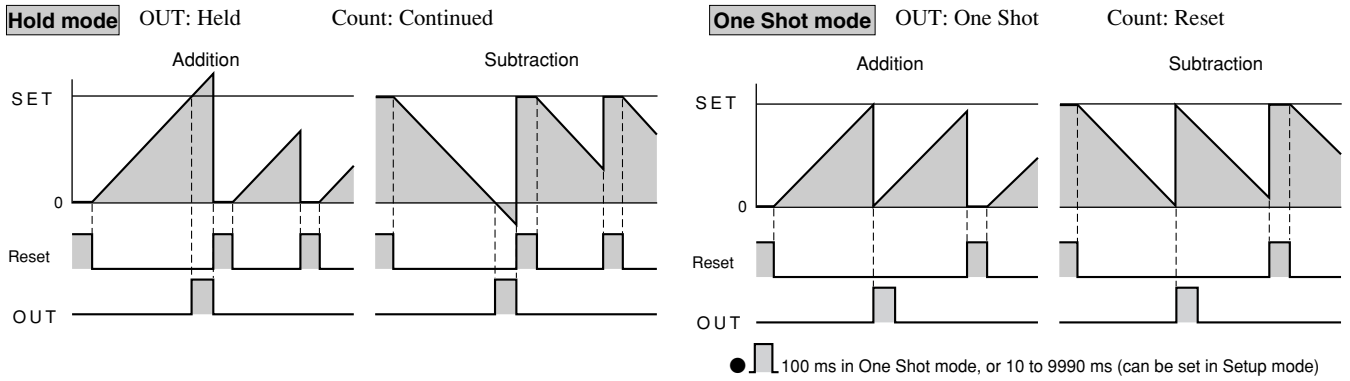
Electronic Counters
 KCV
 KCN-A
 KCX
 KCM

Output modes

Mode	Count	Signal output
Hold	Continued	Held
One Shot	Reset	Momentary (for 10 to 9990 ms*)
Equal	Continued	Only when the count equals the preset value

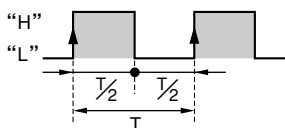
* Can be set in 10 milliseconds from 10 to 9990 ms (in Setup mode).

Output mode diagrams

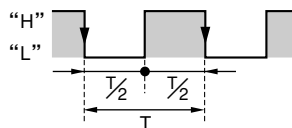


Counting timing

● Positive (voltage) input



● Negative (no voltage) input



⟨Note⟩ or Counted at rising or falling edge.

$$\text{Minimum speed required (cps)} = \frac{1}{T_{\text{sec}}}$$

Wiring Diagrams

<p>KCN-A4SR/A6SR</p> <p>Sensor power DC24V 15mA Count input IN Count disable input INH Sensor power / common input OV Key protection input KP Reset input R Relay output (N.C., COM, N.O.) AC100V, AC200V</p>	<p>KCN-A4ST-C/A6ST-C</p> <p>Count input IN Count disable input INH Common input OV Key protection input KP Reset input R DC output (OUT) DC power DC24V</p>	<p>Dimensions of Terminal block</p> <p>Wire section: 0.25~1.65mm² Conforming crimped contact: 1.25-3</p>
<p>KCN-A4SR-C/A6SR-C</p> <p>Count input IN Count disable input INH Common input OV Key protection input KP Reset input R Relay output (N.C., COM, N.O.) DC power DC24V</p>		

I/O Circuit Diagrams

AC Power	DC Power
<p>Internal power source 24V ON for negative input ON 5V, 3.3k, 15k resistors Count input (3), Reset (7), Count disable input (4), Key protection input (6) Relay output (9, 10, 11) OUT</p>	<p>Internal circuit ON for negative input ON 5V, 3.3k, 15k resistors Count input (3), Reset (7), Count disable input (4), Key protection input (6) Relay output (9, 10, 11) OUT</p>

Input Wiring Examples (count, reset and count disable)

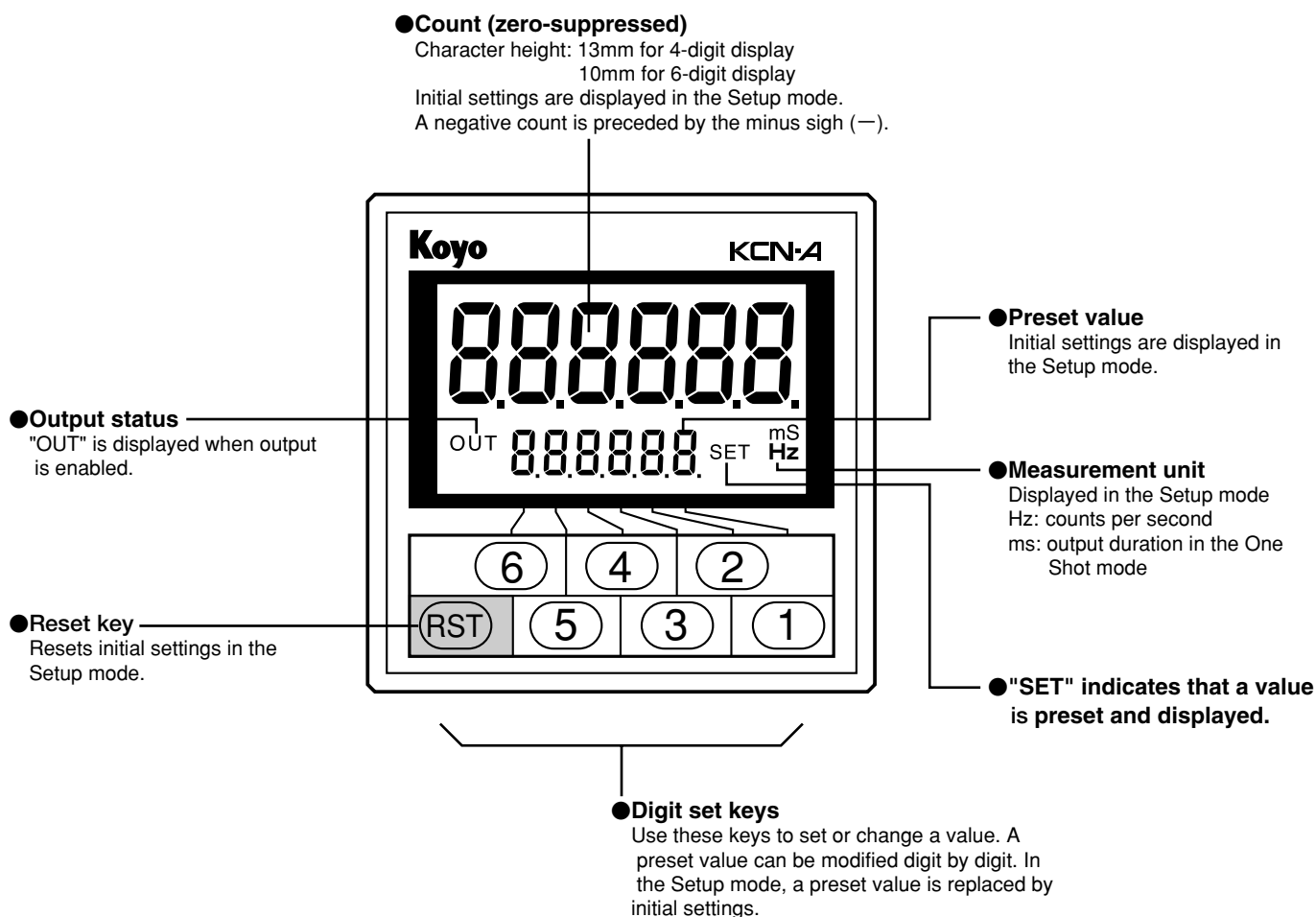
Proximity switch with voltage output or PNP open collector output	Proximity switch with NPN open collector output
<p>● Input logic: Positive (voltage) input(P_{o5})</p> <p>Recommended proximity switch: APS□-□-$T/E2$</p>	<p>● Input logic: Negative (no voltage) input($nE\bar{U}$)</p> <p>Recommended proximity switch: APS□-□-N/E</p>
DC 2-wire proximity switch	Rotary encoder
<p>● Input logic: Negative (no voltage) input($nE\bar{U}$)</p> <p>Recommended proximity switch: APS□-□-Z</p>	<p>● Input logic: Positive or negative to be set according to the encoder output</p> <p>Recommended rotary encoder: TRD-J□-S(one-phase output)</p>
Switch or relay	
<p>● Input logic: Positive (voltage) input(P_{o5})</p>	<p>● Input logic: Negative (no voltage) input($nE\bar{U}$)</p> <p>This connection is preferable to accommodate high input current.</p>

Output Wiring Examples

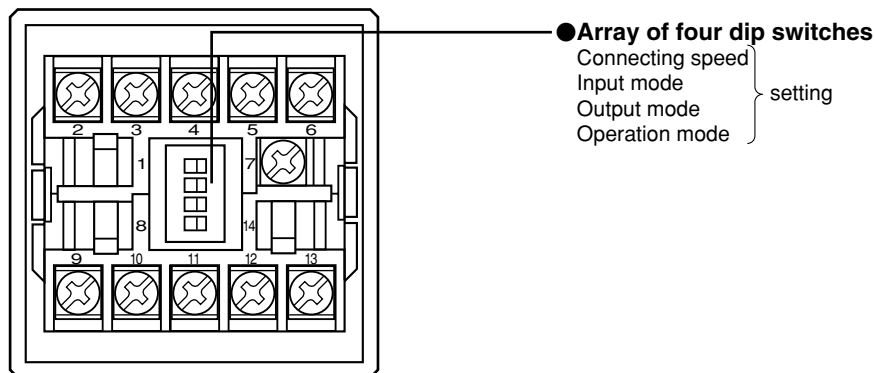
NPN open collector output	Relay output
<p>Compatible with relay drive MAX.100mA Load power rated at 24 V</p>	

Front Panel Layout and Description

■ Front panel



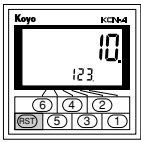
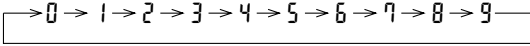
[Rear side]



Using the keys

1. Changing a preset value

On the front panel, press a set key once to increment the corresponding digit by one.



Example: When the counter is preset to 123
 Pressing (1) key..... 124
 Pressing (2) key..... 134
 Pressing (3) key..... 234

Each digit is preset upon change.

2. Resetting the count

Press the (RST) key to reset the currently displayed count. The count is reset within 0.1 second after the key is pressed.

For example, the current count "0010" is reset to "0" in the Addition mode, and to the preset value in the Subtraction mode.

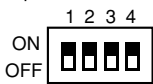
3. Protecting the keys

You can lock the (RST) key and the set keys by short circuiting the Key Protection input pin (6) and the 0V pin (5). The keys to be protected can be selected in the Setup mode.

Standard initialization using the dip switches

Use the dip switches on the rear panel to initialize the counter speed and modes. This initialization should be performed before you turn the power on.

Dip switches



*All switches are set to OFF at delivery.

No.	Item	ON/OFF	indicated by	Mode selected
1	Counting speed	ON	30	30cps
		OFF	5K	5Kcps
2	Input mode	ON	DWN	Subtraction
		OFF	UP	Addition
3	Output mode	ON	[Pulse]	One Shot (100 ms)
		OFF	[Hold]	Hold
4	Operation mode	ON	SET	Setup
		OFF	RUN	Run

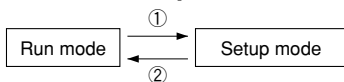
Set Dip switch 4 to the OFF position to start operation.

Custom initialization in the setup mode

In the Setup mode, you can initialize the counter to non-standard values.

- 1) Counting speed: 200cps or 1kcps
- 2) Count memory: Off (power-on reset)
- 3) Input logic: Positive (voltage) input
- 4) Output mode: Countup
- 5) Output duration: Output duration in the One Shot mode can be set to 10 to 9990 ms in 10 ms increments.
- 6) Prescale: Four digits: 0.001 to 9.999
Six digits: 0.001 to 99.999
- 7) Decimal point: Can be displayed at any digit location.
- 8) Key protection: Reset key and/or any set keys can be

1. Switching between Setup mode and Run mode



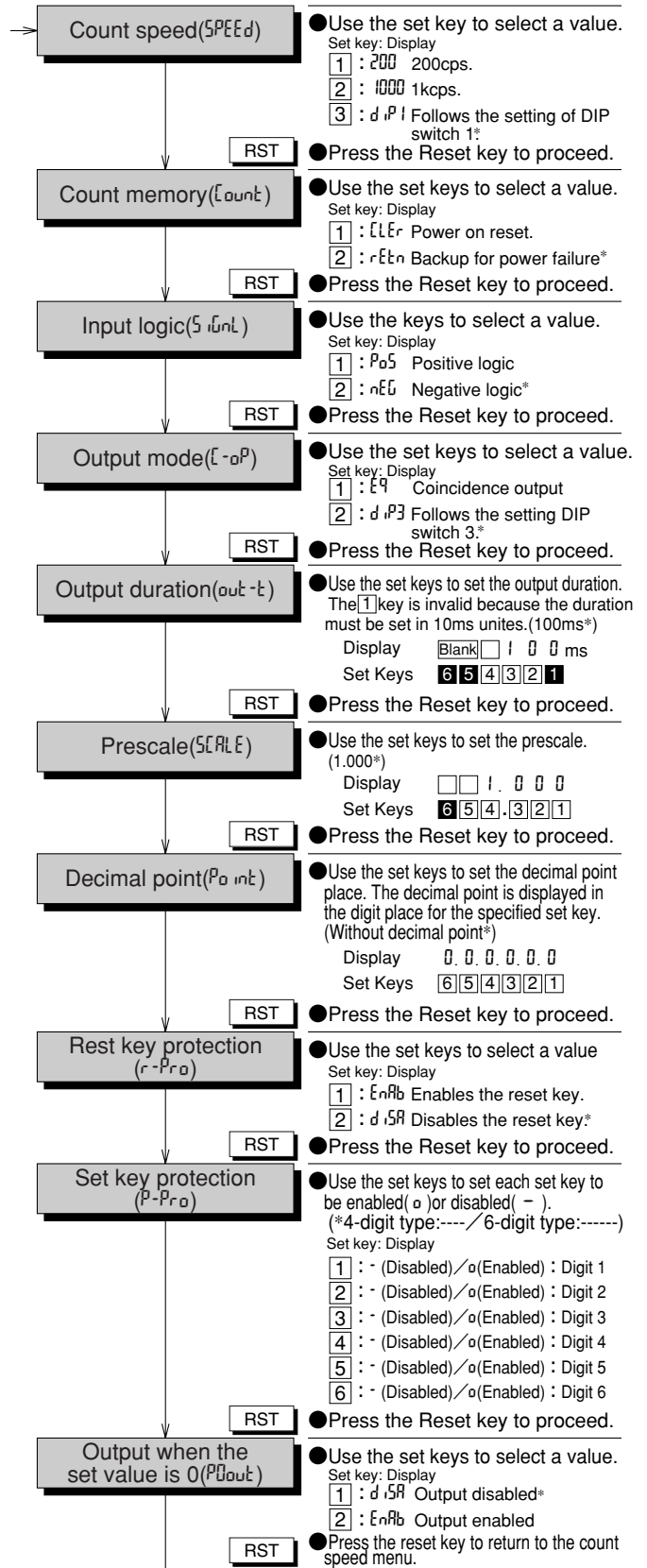
selected for protection.

1. Set Dip switch 4 to ON then turn the power on to enter into the Setup mode.
2. Set Dip switch 4 to OFF then turn the power on to enter into the Run mode.

* Initial values set in the Setup mode are written to the memory when the power is off.

2. Operation in Setup mode

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



*Indicates a value set at delivery

Important: Always press the Reset key in the Run mode after changing initial settings.

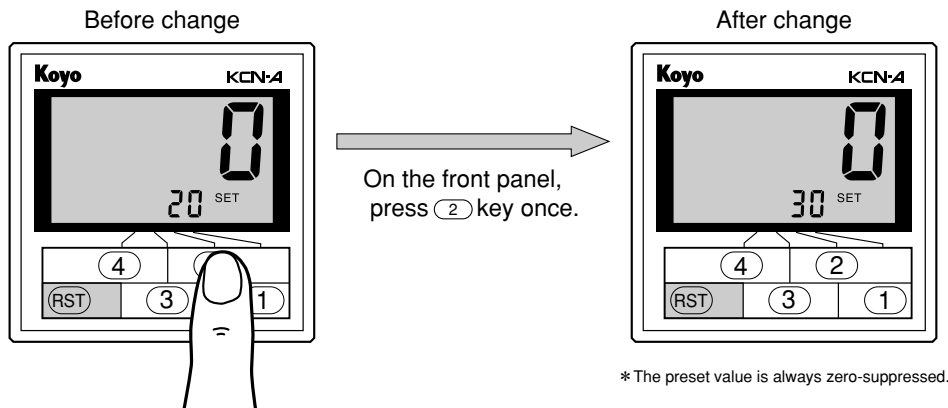
- Notes
- When you enable key protection, short circuit the Key Protection input pin 6 and the 0V pin 5.
 - Keys not available for specific operation are inversely highlighted.

Operation Example (for KCN-A4S)

Run mode

Changing the preset value

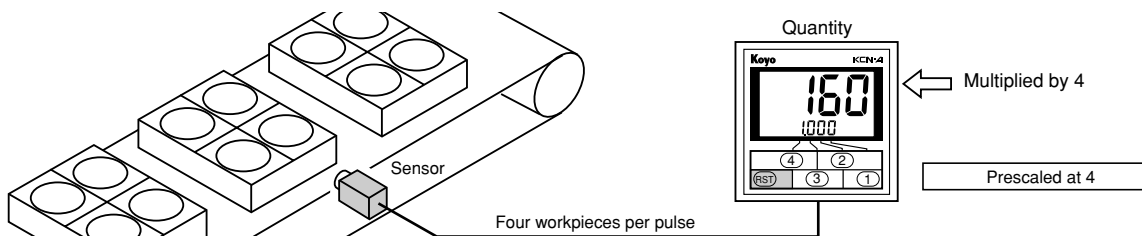
1. Change 20 to 30 as follows:



2. The new preset value 30 will be used for the subsequent operation.

Setup mode

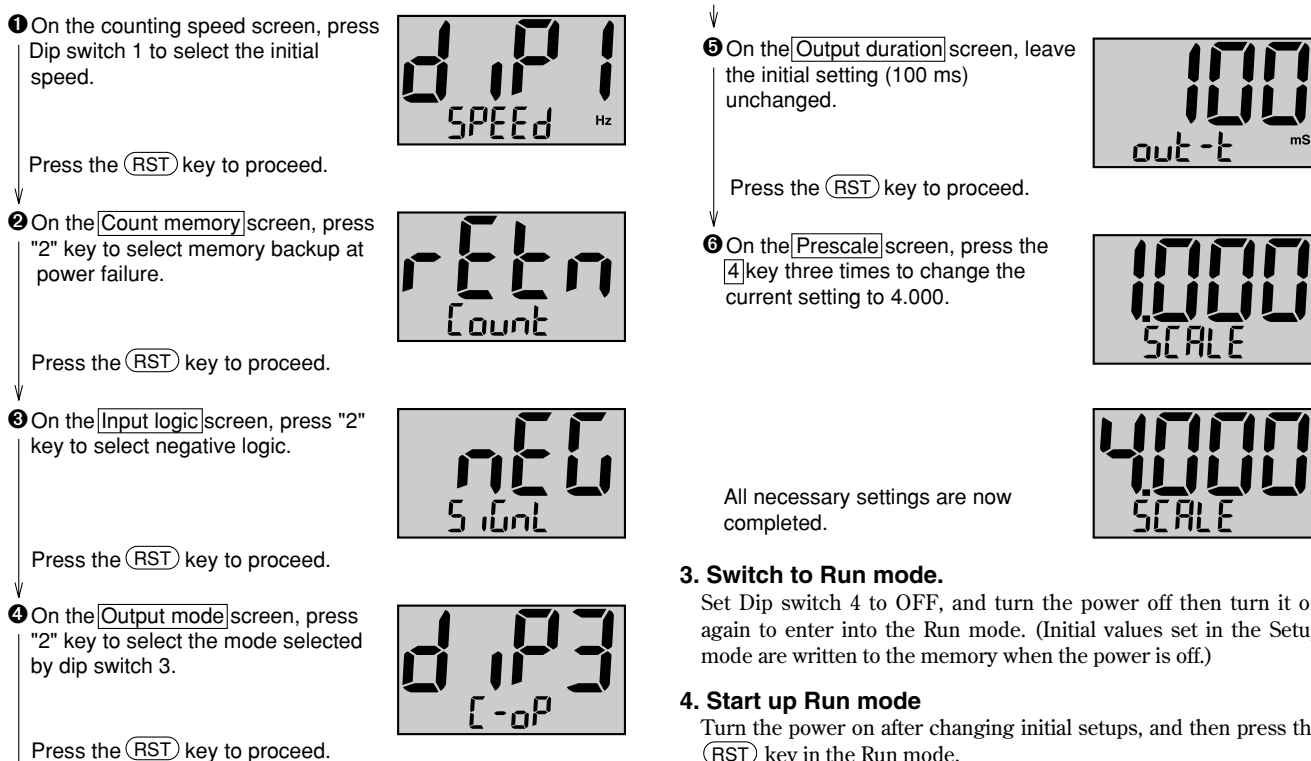
Set the prescale to 4 to count the number of workpieces processed as follows:



1. Switch to Setup mode.

Set Dip switch 4 to ON then turn the power on to enter into the Setup mode.

2. Set or change the initial settings.



List of Error Codes

● In Run mode

	Error code		Description	Possible cause
	Count display	Preset display		
①	F F F F F F	Preset	Counter overflow	Count has exceeded upper limit.
	- F F F F F F	Preset	Counter underflow	Count has decreased below lower limit.
②	E r r (ERR)	P S E t (PRESET)	Preset memory data error	Preset value divided by prescale exceeds count range.
③	E r r (ERR)	S E t (SET)	Initial setting memory data error	

Solving errors

- ① For an overflow or underflow, press the (RST) key to reset the counter and clear the error code.
- ② For a preset memory error, press the (RST) key. The preset display returns to the initial value (5000). Change this value as necessary.
- ③ When an initial setting error has occurred, switch to the Setup mode then restart the counter. One of the error codes listed below will be displayed, Initialize or change the corresponding item(s), and return to the Run mode then press the (RST) key.
Simply press the (RST) key if no change is required. All items are reset to the initial values set at delivery.

● Initial setting memory data errors

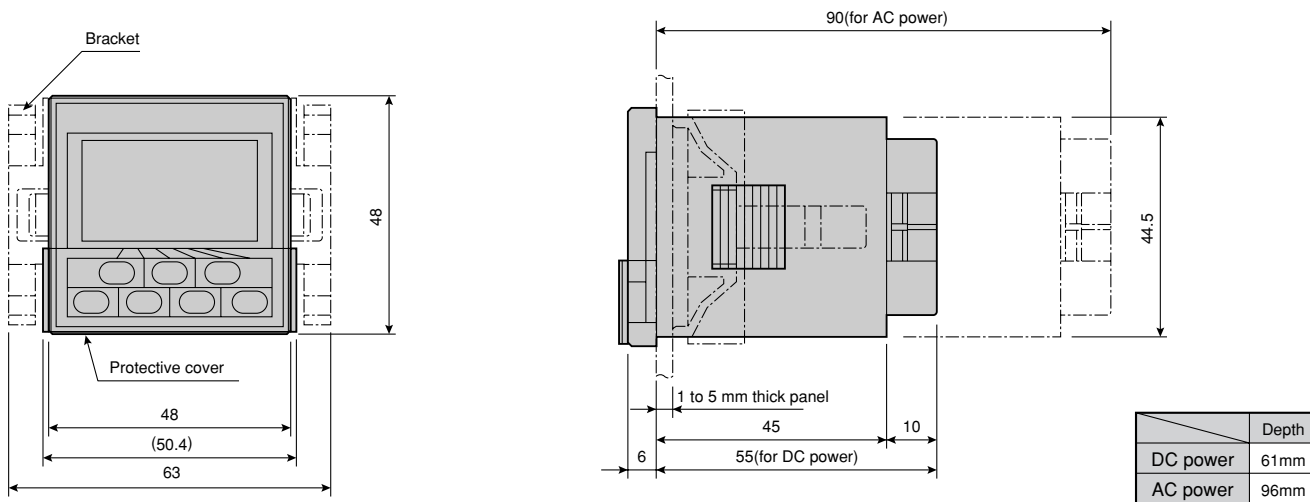
Error code		Description
Count display	Preset display	
E r r (ERR)	S P E E d (SPEED)	Counting speed memory data error
E r r (ERR)	C o u n t (COUNT)	Count memory/reset data error
E r r (ERR)	S i g n l (SIGNL)	Input logic memory data error
E r r (ERR)	C - O P (C-OP)	Output mode memory data error
E r r (ERR)	O u t - t (OUT-T)	Output duration memory data error
E r r (ERR)	S c a l e (SCALE)	Prescale memory data error
E r r (ERR)	P o i n t (POINT)	Decimal point memory data error
E r r (ERR)	P r o (PRO)	Key protection memory data error
E r r (ERR)	P 0 o u t (P0OUT)	Zero output memory data error

Note:
The counter is automatically checked for errors when its power is turned on. If an error occurs, counting and display are disabled except for overflow and underflow.

Important

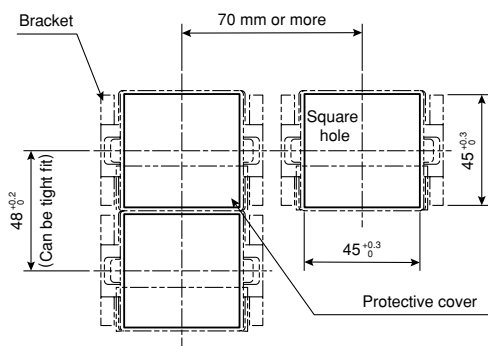
- For DC power source, the 0V power terminal ⑬ and the 0V common input terminal ⑤ are internally short-circuited.
- Always use negative input logic for DC 2-wire proximity switch.
- After changing initial settings, always press the (RST) key to activate the new values.
- During counting, any change to a preset value becomes effective when each digit key is pressed.
- For maintenance purposes, keep records of initial settings and preset values.
- Avoid using the counter in the environments where:
 - (1) Ambient temperature is above 50°C or below -10°C.
 - (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 of the counter should be separated from power line.
 - (2) Keep the counter body and wiring away from noise source.
 - (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)

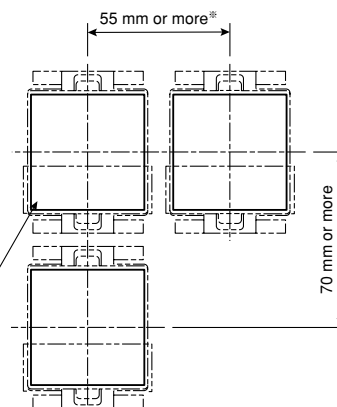


●Boring dimensions for Installation

1. Horizontally aligned handles

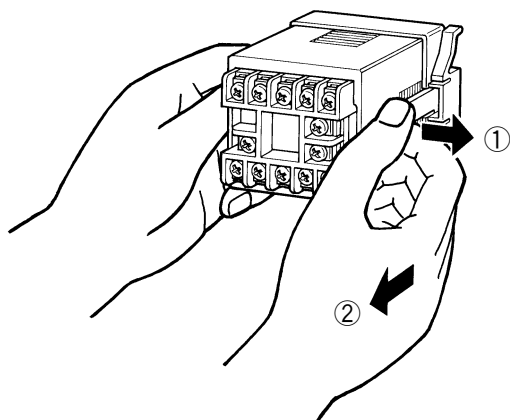


2. Vertically aligned handles



*48 mm for tight alignment without the protective cover.

●How to remove the counter



- ① Hold the lever then pull it 2 to 3 mm in the direction shown.
- ② Pull the lever to your side.