KLCNT-A Series Counter

User Manual

Publication Release Data：September 19, 2007
Revision：1.0

For models：（this manual is only suitable for the items with frame and shadow）

KLCNT – □ □ □ □ □ □ □
① ② ③ ④ ⑤ ⑥ ⑦

① Series		② Power supply		③Led color		④ Input type		⑤ Output type		⑥ Interface		⑦ Printer	
A	Series A	**–**	AC 220V	**–**	red	**–**	PNP	**–**	Contact output	**–**	None	**–**	None
		D1	DC 12V	**G6**	green	**N**	NPN	**T**	Transistor output	**232**	RS-232	**P**	Serial Microprinter
		D2	DC 24V	**Y6**	yellow					**422**	RS-422		
										485	RS-485		

Table of contents

1. Features

- Two input channels for high speed pluses (Max. 5kHz)
- One input channel for external reset signal
- Two digital output channels
- Highly visible displays with six 7-seg leds
- Counting range: 0 ~ 999999
- Decimal point adjustable
- 7 counting modes
- 8 output modes
- Prescaling function
- One-shot output function (holding time can be set)
- Present count value can be saved when power-off
- Color of the leds can be selected according to the model (red / green / yellow)
- Input types can be selected according to the model (NPN type / PNP type)
- Output type can be selected according to the model (contact output / transistor output)
- Serial Communication type can be selected according to the model (RS-232C / RS-422 / RS-485)
- Power supply can be selected accroding to the model (AC 220V / DC 12V / DC 24V)

2. Ording Information and Specifications

2.1 Ording Information

KLCNT – □ □ □ □ □ □ □
① ② ③ ④ ⑤ ⑥ ⑦

（Not all models here can be manufactured, please contact with us first）

① Series		② Power supply		③ Led color		④ Input type		⑤ Output type		⑥ Interface		⑦ Printer	
A	Series A	—	AC 220V	—	Red	—	PNP	—	Contact output	—	None	—	None
		D1	DC 12V	**G6**	Green	**N**	NPN	**T**	Transistor output	**232**	RS-232C	**P**	Serial Microprinter
		D2	DC 24V	**Y6**	Yellow					**422**	RS-422		
										485	RS-485		

2.2 Specifications

2.2.1 Input Characteristics

■ **No-voltage input（NPN type）**

Input current when **ON**	Max. 10 mA
Residual voltage when **ON**	Max. 2.0V
Leakage current when **OFF**	Max. 0.1 mA

■ **Voltage input（PNP type）**

Input voltage	Max. DC 15V
Logic **H**	DC 6V~15V
Logic **L**	DC 0~2V

2.2.2 Output Characteristics

■ **NPN open collector output**

Rated load voltage	DC 24V
Load current	Max. 100 mA
Leakage current	Max. 100uA

2.2.3 Functions

Input	Max. counting speed	30 Hz or 5 kHz (selectable, ON/OFF ratio 1:1), common setting for CP1 and CP2
	External reset singal	Minimum reset input signal width: 30 ms
	Counting mode	UP-1, UP-2, DN-1, DN-2, UD-A, UD-B, UD-C
	Input type	No-voltage input / voltage input, (can be selected according to the model)
Display	display	Six 7-seg leds and six red led lights
	Dimension of the led	10.2X5.8 mm
	Color of the 7-seg leds	Red / green / yellow (can be selected according to the models)
	digits	6 digits（000000 ~ 999999）
	Decimal point position	Rightmost 3 digits
	Display refresh period	About 50ms typically
	Zero display	Leading zeros are not displayed
Output	Oupput type	Transistor output / contact output (can be selected according to the models)
	Delay in comparative outputs	Max. 50ms
	Output mode	N, F, C, k-1, P, Q, A
	One-shot output time	The one-shot output time can be set
	External power supply	DC 12V(±10%) 100mA
Reset source		External, manual, and automatic reset (internal according to C, R, P, and Q mode operation)
Prescale Function		transfer the present count value into the form user needed
Memory backup		EEPROM (overwrites: 100,000 times min.) that can store data for 10 years min.

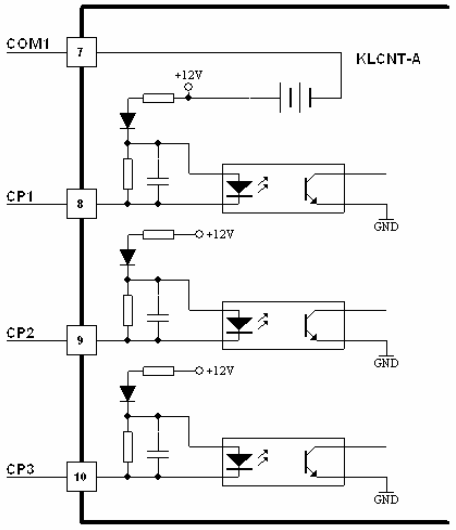
2.2.4 Ratings

Power Supply	AC 220V	AC 220V (±10%) , 50Hz / 60Hz
	DC 12V	DC 12V (±10%)
	DC 24V	DC 24V (±10%)
Power consumption		4.4 VA typically
Ambient temperature		(-10 ~ +45)℃ (with no icing or condensation)
Ambient humidity		25% to 85% (with no condensation)
Storage temperature		(-15 ~ +55)℃ (with no icing or condensation)

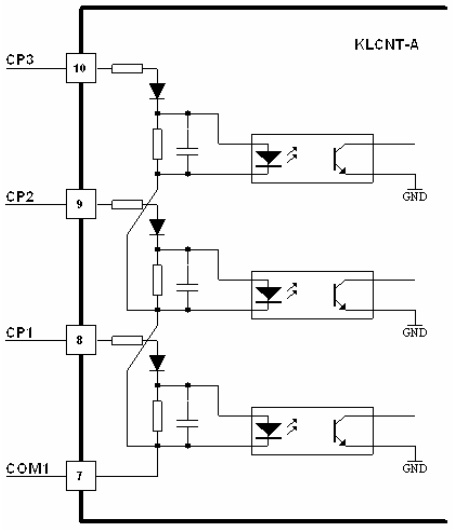
2.3 Internal Connections

2.3.1 Input Circuit

■ No-voltage input (NPN isolated type)：

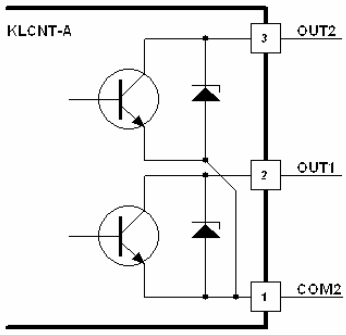


■ Voltage input (PNP isolated type)：



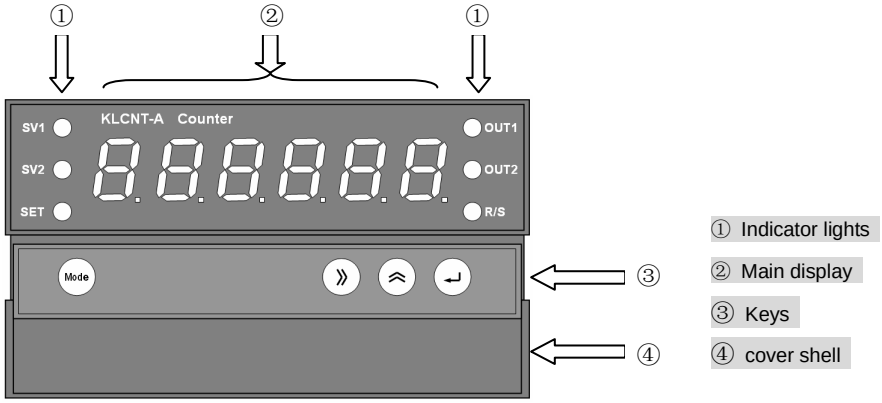
2.3.2 Output Circuit

■ NPN Open collector output type：



3. Introduction of the Panel

Panel of KLCNT-A series counter is shown as below:



3.1 Indicator Lights

Indicator lights	explanation
SV1（count）	Lit when displaying the **Set Value 1** on the main display area
SV2（Set Value 2）	Lit when displaying the **Set Value 2** on the main display area
SET（Set Value 1）	Lit when entering or working in the Function Setting Mode
OUT1	Lit during the period that OUT1 gives an output
OUT2	Lit during the period that OUT2 gives an output
R/S	Lit when the reset singal comes or in the course of serial conmmunication.

3.2 Main Display

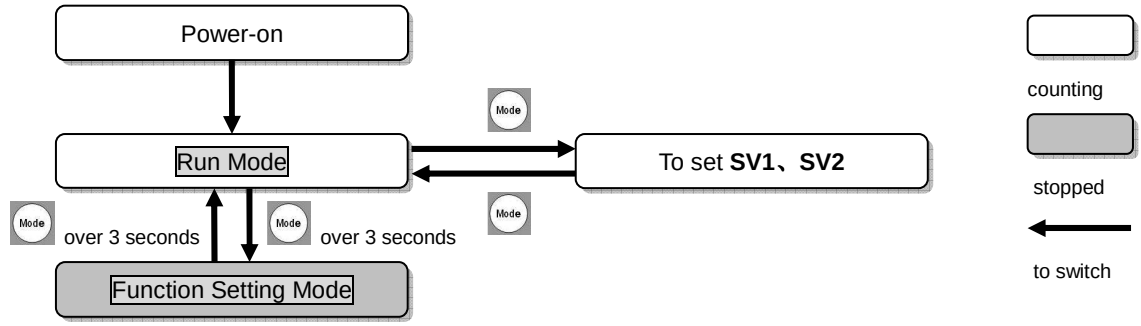
Main display	Explanation
168668	Showing the present count when all the indicator lights are off ; Showing the Set Value 1 when the indicator light “SV1” is on Showing the Set Value 2 when the indicator light “SV2” is on
CntN	Showing the present function parameter when the indicator light “SET” is on
000800	Showing the value of present function parameter when the indicator light “SET” is on

3.3 Keys

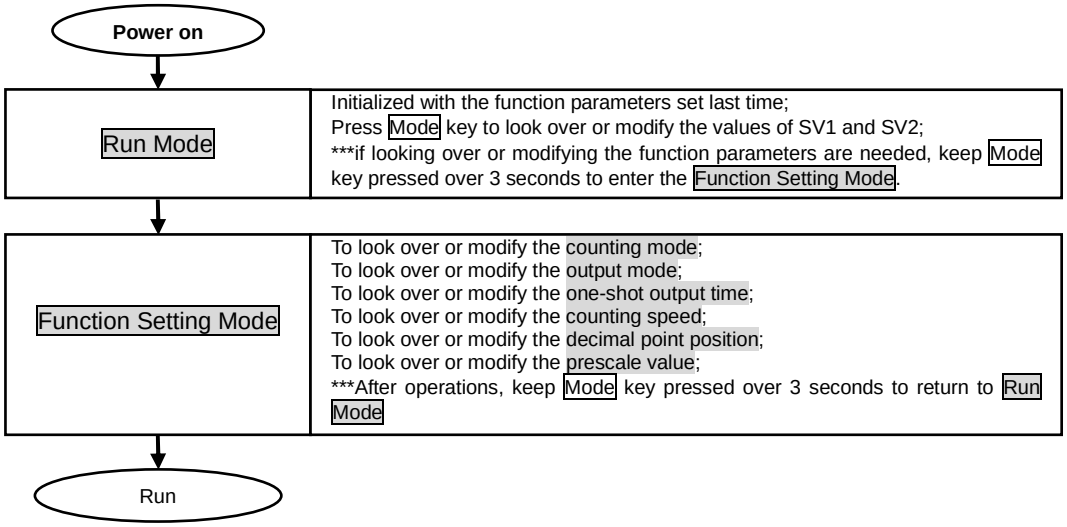
key	Explanation
Mode	**Mode** key, to switch modes and function parameters
»	**Tab** key, to shift the present set bit
^	**Up** key, to increase the value of present function parameter
↵	**Enter** key, to give a confirm / to save the present function parameter

4. Operation

After power-on, the counter enters Run mode and initialized with the parameters set last time, press Mode key to set the SV1 and SV2 . Keeping Mode key pressed over 3 seconds to enter Function Setting Mode , in this mode all the function parameters can be modified. If parameters are changed, the counter will be reset (present count value initialized and output turned OFF) on returning to Run mode.



4.1 Recommanded Operation Procedure



4.2 Meaning of the Characters Showing on the 7-seg Led

0	1	2	3	4	5	6	7	8	9	A	b	C	d	E	F
G	H	i	J	k	L	m	n	o	p	q	r	S	t	U	v
w	y	Z	-	.											

4.3 Overview of Function Parameters

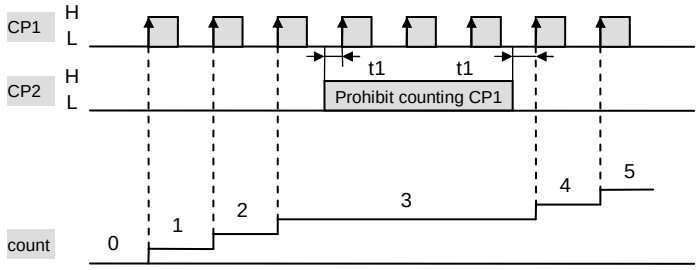
The table below gives all the function parameters in setting mode, In the column "Value of menu", the value with frame and shadow means that it is the factory-set value of the present function parameter.

Function parameter	menu	Value of menu	Explanation
Counting Mode	CntM	UP-1/UP-2/dn-1/dn-2/Ud-A/Ud-b/Ud-C	Used to select the counting mode
Output Mode	oUtM	N / F /C / R / K-1 / P / Q / A	Used to select the output mode
One-shot Output time 1	ot1	HOLD / 0.01 ~ 99999	Used to set the one-shot output time of out1 channel
One-shot Output time 2	ot2	0.01 ~ 0.50 ~ 99999	Used to set the one-shot output time of out2 channel
Counting Speed	CntS	30Hz / 5KHz	Used to select counting speed
Decimal Point Position	dP	------ / -----.- / ----.-- / ---.---	Used to decide decimal point position
PreScale Value	PSCL	0.001 ~ 1.000 ~ 99.999	Used to set prescale value

4.3.1 Counting Modes

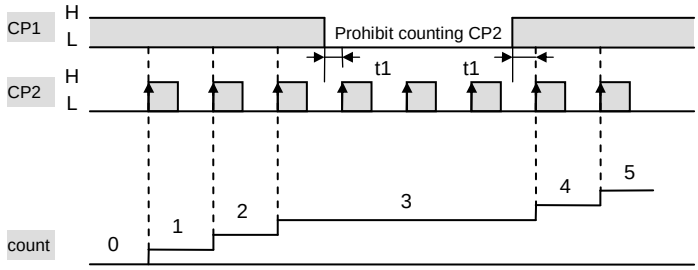
Counting mode	Explanation
UP-1	Taking CP1 as Increment count input（Prohibit counting CP1 when CP2 is **H**）
UP-2	Taking CP2 as increment count input（Prohibit counting CP2 when CP1 is **L**）
dn-1	Taking CP1 as decrement count input（Prohibit counting CP1 when CP2 is **H**）
dn-2	Taking CP2 as decrement count input（Prohibit counting CP2 when CP1 is **L**）
Ud-A	Command input mode, taking CP1 as count input, taking CP2 as command input
Ud-b	Individual input mode, taking CP1 as incremnet count input, taking CP2 as decrement count input
Ud-C	Quadrature input mode

UP-1 (Increment) Mode



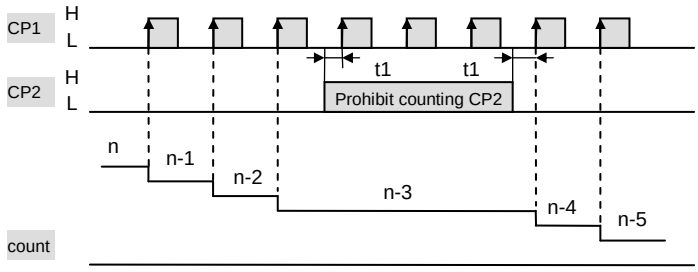
- Taking CP1 as Increment count input
- Prohibit counting CP1 when CP2 is **H** short circuit
- t1 must be greater than the **minimum signal width**.

UP-2 (Increment) Mode



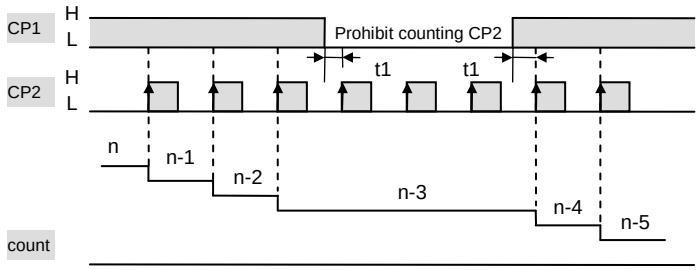
- Taking CP2 as increment count input
- Prohibit counting CP2 when CP1 is **L** open circuit
- t1 must be greater than the **minimum signal width**.

DN-1 (Decrement) Mode



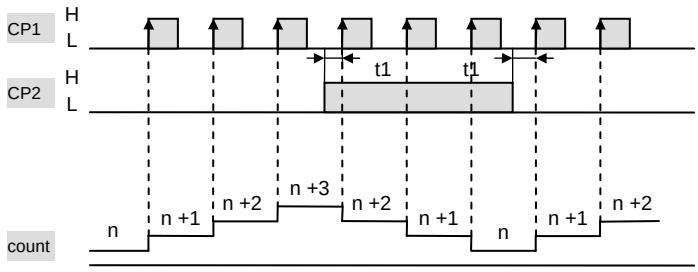
- Taking CP1 as decrement count input
- Prohibit counting CP1 when CP2 is **H** short circuit
- t1 must be greater than the **minimum signal width**.

DN-2 (Decrement) Mode



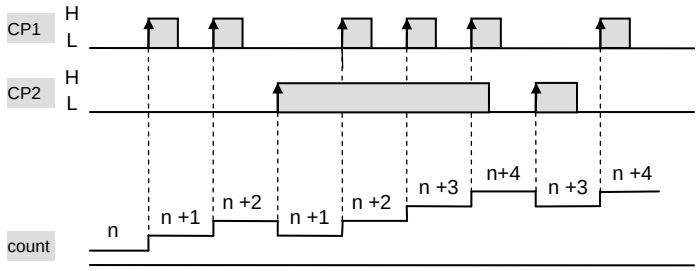
- Taking CP2 as decrement count input
- Prohibit counting CP2 when CP1 is **L** open circuit
- t1 must be greater than the **minimum signal width**.

UP/DOWN A Command Input Mode



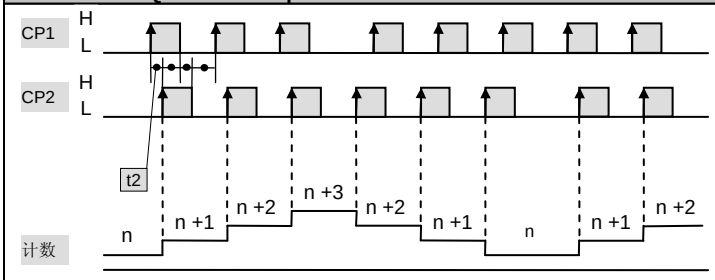
- Taking CP1 as count input
- Taking CP2 as command input
- Count CP1 increaedly when CP2 is **L** open circuit
- Count CP1 decreaedly when CP2 is **H** short circuit
- t1 must be greater than the **minimum signal width.**

UP/DOWN B Individual Input Mode



- Taking CP1 as **increment** count input
- Taking CP2 as **decrement** count input
- CP1 and CP2 count individually

UP/DOWN C Quadrature Input Mode



- Count increasedly when the rising edge of CP1 keeps ahead of which of CP2
- Count decreasedly when the rising edge of CP2 keeps ahead of which of CP1
- t2 must be at least 1/2 the **minimum signal width.**

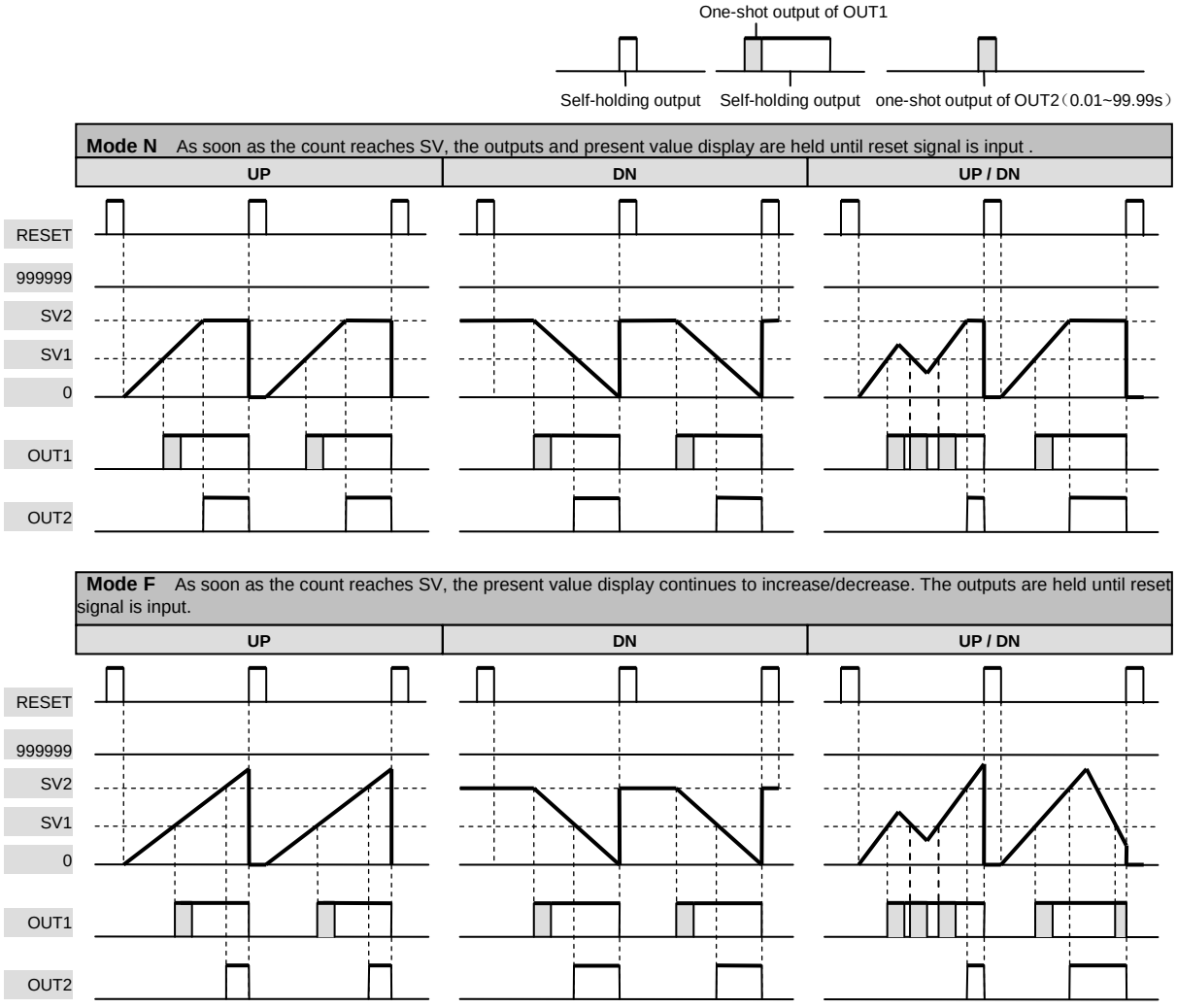
Note 1. Definitions of H & L: No-voltage input（**H** means **shor circuit**, **L** means **open circuit**）; voltage input（**H** means DC 6~15V input, **L** means DC 0~2V input）.

Note 2. minimum signal width: 16.7mS（when maxium counting speed = 30Hz）、100uS（when maxium counting speed = 5kHz）。

4.3.2 Output Modes

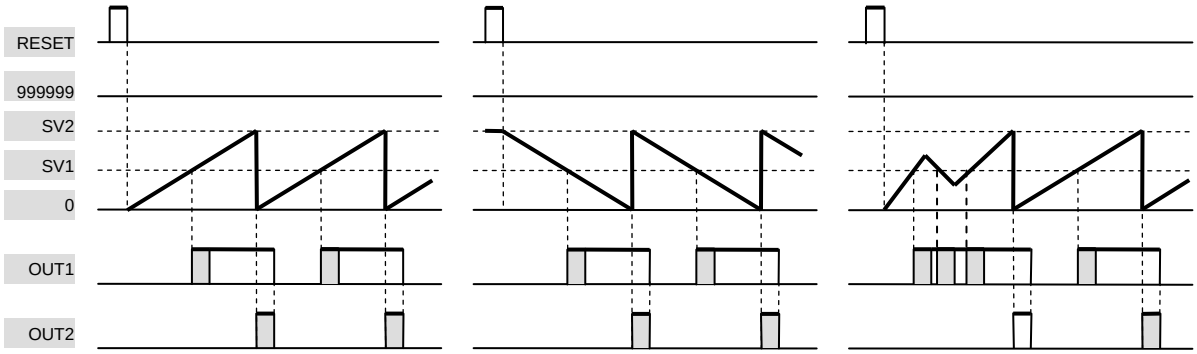
Mode	Explanation
n	As soon as the count reaches SV, the outputs and present value display are held until reset signal is input .
F	As soon as the count reaches SV, the present value display continues to increase/decrease. The outputs are held until reset signal is input.
C	As soon as the count reaches SV, the present value display returns to the reset start status. The present value display does not show the present value upon count-up. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot.
r	As soon as the count reaches SV, the present value display returns to the reset start status after the one-shot output time. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time.The OUT1 one-shot output time is independent of OUT2.
H-1	As soon as the count reaches SV, the present value display continues to increase/decrease until reset signal is inputed. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2.
P	As soon as the count reaches SV, the present value display does not change during the one-shot output time period, but the actual count returns to the reset start status, the outputs return to the start state and repeat the one-shot operation. OUT1 self-holding output turns off after the OUT2one-shot output time. The OUT1 one-shot output time is independent of OUT2.
q	As soon as the count reaches SV, the present value display continues to increase/decrease during the one-shot time and returns to the reset start status after the one-shot output time. OUT1 self-holding output turns OFF after the OUT2 one-shot output time.The OUT1 one-shot output time is independent of OUT2.
A	As soon as the count reaches SV, the present value display and OUT1 self-holding output is held until reset/reset 1 is input. OUT1 and OUT2 are independent.

Explications are shown as the graphics below：



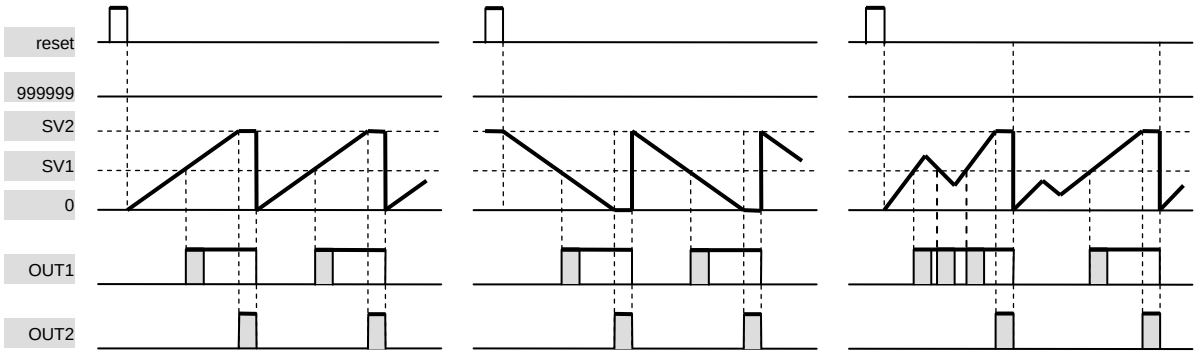
Mode C As soon as the count reaches SV, the present value display returns to the reset start status. The present value display does not show the present value upon count-up. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot.output time.The OUT1

UP	DN	UP / DN



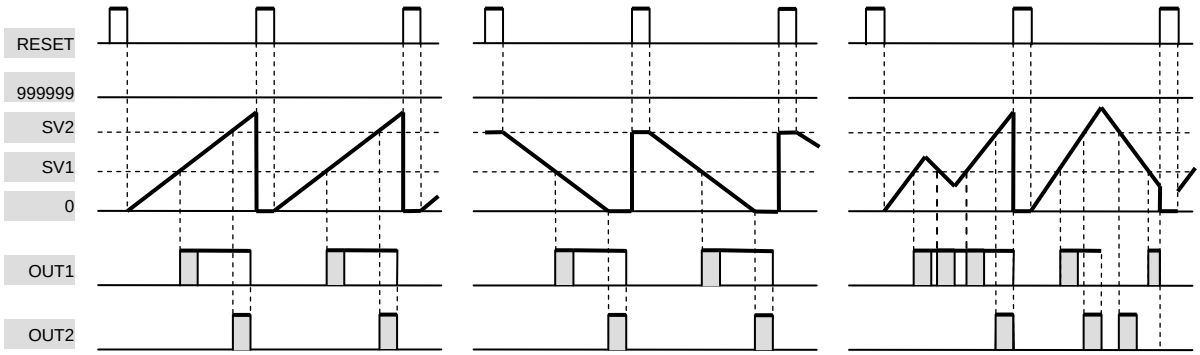
Mode R As soon as the count reaches SV, the present value display returns to the reset start status after the one-shot output time. The outputs repeat one-shot operation. OUT1 self-holding output turns OFF after the OUT2 one-shot output time.The OUT1 one-shot output time is independent of OUT2.

UP	DN	UP / DN

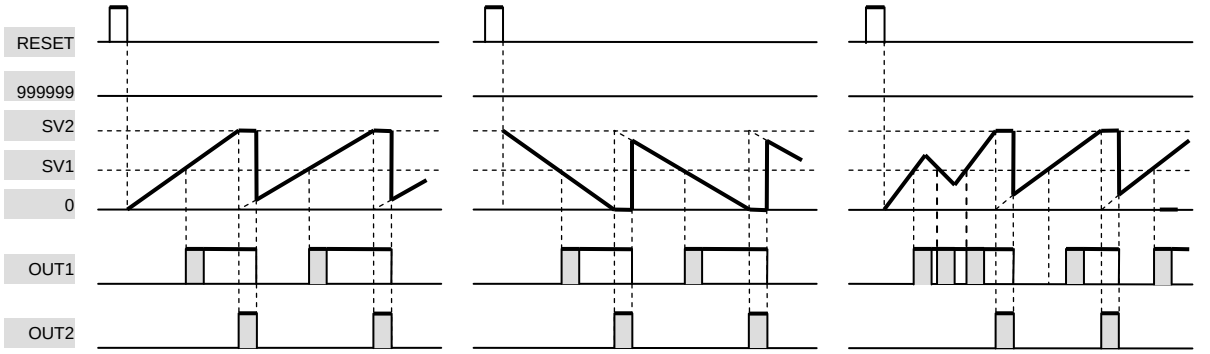


Mode K-1 As soon as the count reaches SV, the present value display continues to increase/decrease until reset signal is inputed. OUT1 self-holding output turns OFF after the OUT2 one-shot output time. The OUT1 one-shot output time is independent of OUT2.

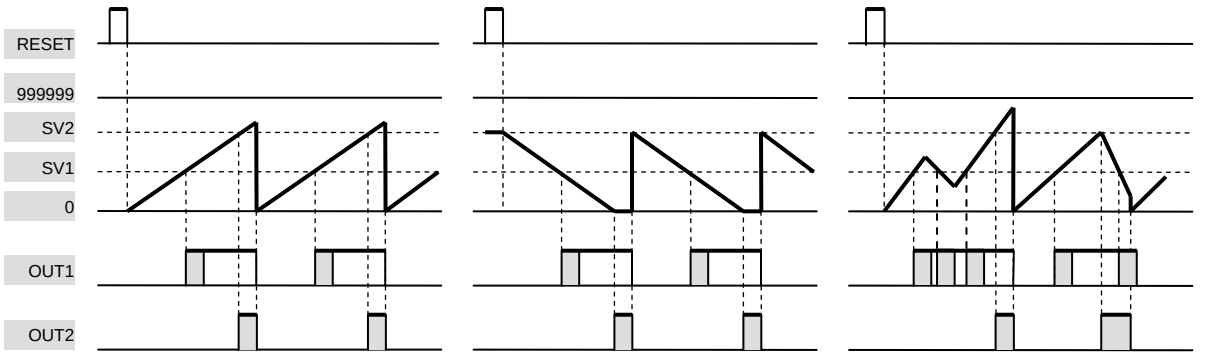
UP	DN	UP / DN



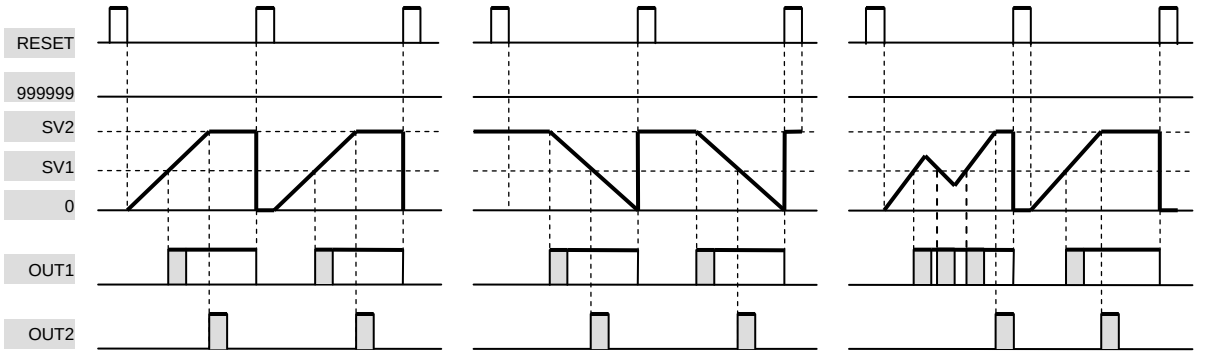
Mode P As soon as the count reaches SV, the present value display does not change during the one-shot output time period, but the actual count returns to the reset start status, the outputs return to the start state and repeat the one-shot operation. OUT1 self-holding output turns off after the OUT2one-shot output time. The OUT1 one-shot output time is independent of OUT2.



Mode Q As soon as the count reaches SV, the present value display continues to increase/decrease during the one-shot time and returns to the reset start status after the one-shot output time. OUT1 self-holding output turns OFF after the OUT2 one-shot output time.The OUT1 one-shot output time is independent of OUT2.



Mode A As soon as the count reaches SV, the present value display and OUT1 self-holding output is held until reset/reset 1 is input. OUT1 and OUT2 are independent.



Note 1. The full scale (FS) for KLCNT-A is 999999.
Note 2. When the present value reaches 999999, it returns to 0.
Note 3. If reset/reset 1 is input while one-shot output is ON, one-shot output turns OFF.
Note 5. If there is power failure while output is ON, output will turn ON again when the power supply has recovered. For one-shot output, output will turn ON again for the duration of the output time setting once the power supply has recovered.
Note 6. Do not use the counter function in applications where the count may be completed (again) while one-shot output is ON.
Note 7. Range of set value : 0 ~ 999999。

4.3.3 One-shot Output Time

ōtn1 is used to control the one-shot output time of OUT1 (0.01~99.99 seconds). If modified to zero “0.00”, it is displayed “HOLD”, and the output is held.
ōtn2 is used to control the one-shot output time of OUT2 (0.01~99.99 seconds). One-shot output can be used only when C, R, K-1, P, Q, or A is selected as the output mode.

4.3.4 Counting Speed

Set the maximum counting speed (30Hz / 5kHz) for CP1 and CP2 inputs together.

CnTS	Explanation
30HZ	In this mode , frequency of input pulse should be less than 30Hz
5KHZ	In this mode , frequency of input pulse should be less than 5kHz

4.3.5 Decimal Point Position

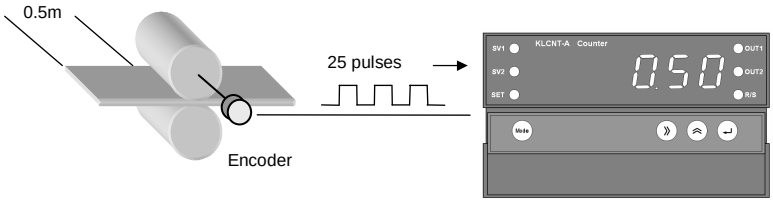
Change of this parameter will influence all the three values: the present count value, Set Value 1 and Set Value 2。

dP	Explanation
------	The present count value, Set Value 1 and Set Value 2 are all integer
-----.-	The present count value, Set Value 1 and Set Value 2 all have one point
----.--	The present count value, Set Value 1 and Set Value 2 all have one point
---.---	The present count value, Set Value 1 and Set Value 2 all have one point

4.3.6 Prescale Value

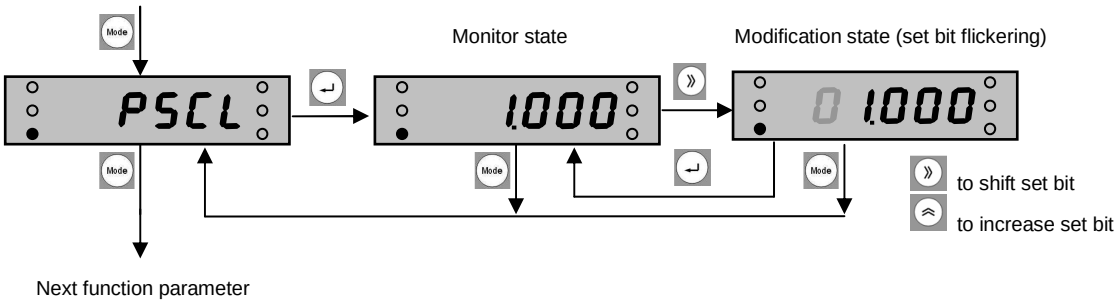
With prescale value, the present count value can be changed into the format that user needed. The range of the prescale value is: 0.001 ~ 99.999.

For example: Using a KLCNT-A counter and an encoder to measure the distance (shown in the form: □□.□□m) that the strap went across. As shown in the picture below, if the encoder output 25 pulses while the strap moved across 0.5m, function settings below should be performed to the KLCNT-A counter:
① Set the decimal point position to 2 decimal places.
② Set the prescale value to 0.02 (0.5÷25).



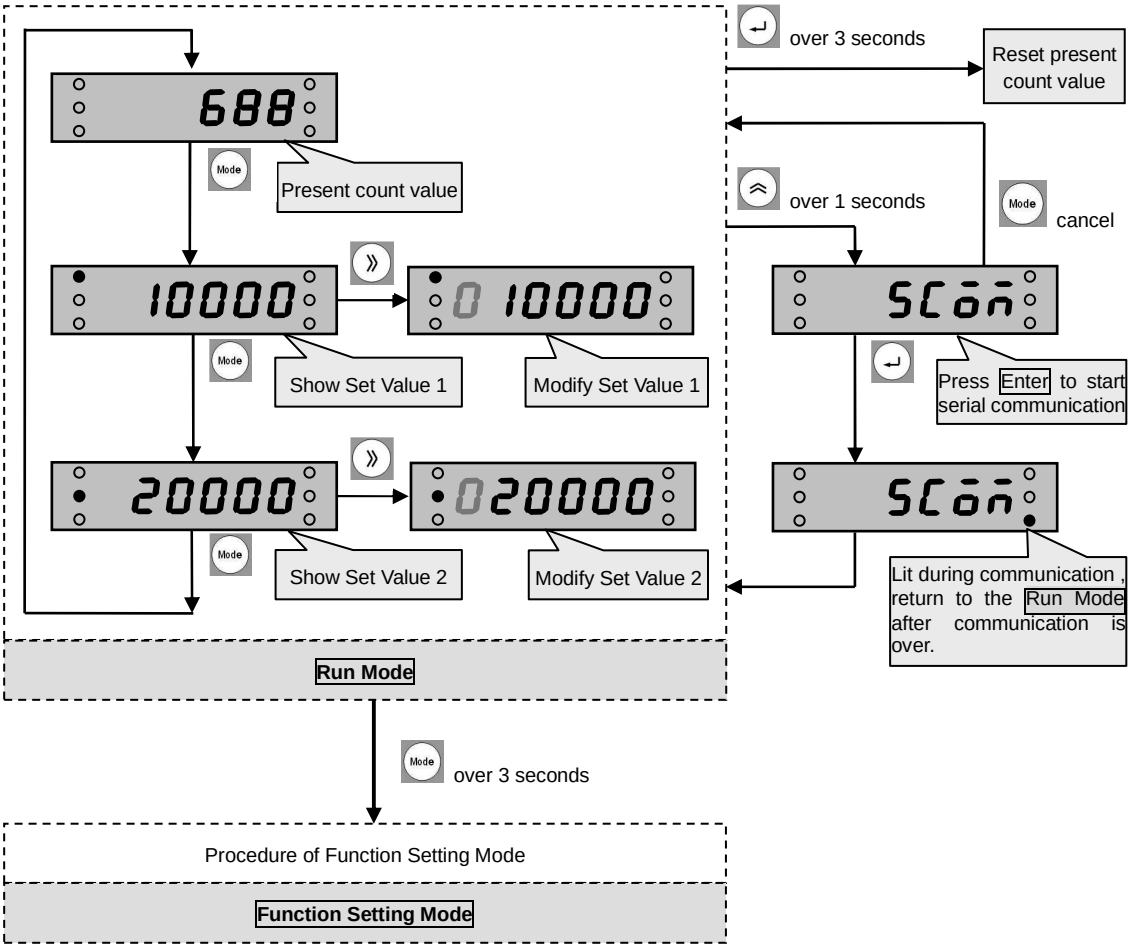
4.4 To Modify a Parameter

- Press Mode to shift parameter (menu) display;
- Press Enter to show the value of the function parameter (monitor state);
- Press Tab to the modification state;
- Press Tab to flicker the setting bit, to shift the setting bit, press Up to increase the present set bit by one (if over 9 then clear to 0).
- Press Enter to save the current value into the memory of the meter KLCNT-A and return to the monitor state;
- In monitor state and modification state, press Mode key to display parameter (menu).



4.5 Procedure of Running Mode

The chart below shows the procedure of Run Mode. Any time, keep Mode key pressed over 3 seconds to enter Function Setting Mode. Keep Up key pressed over 3 seconds to enter the serial communicaion menu.

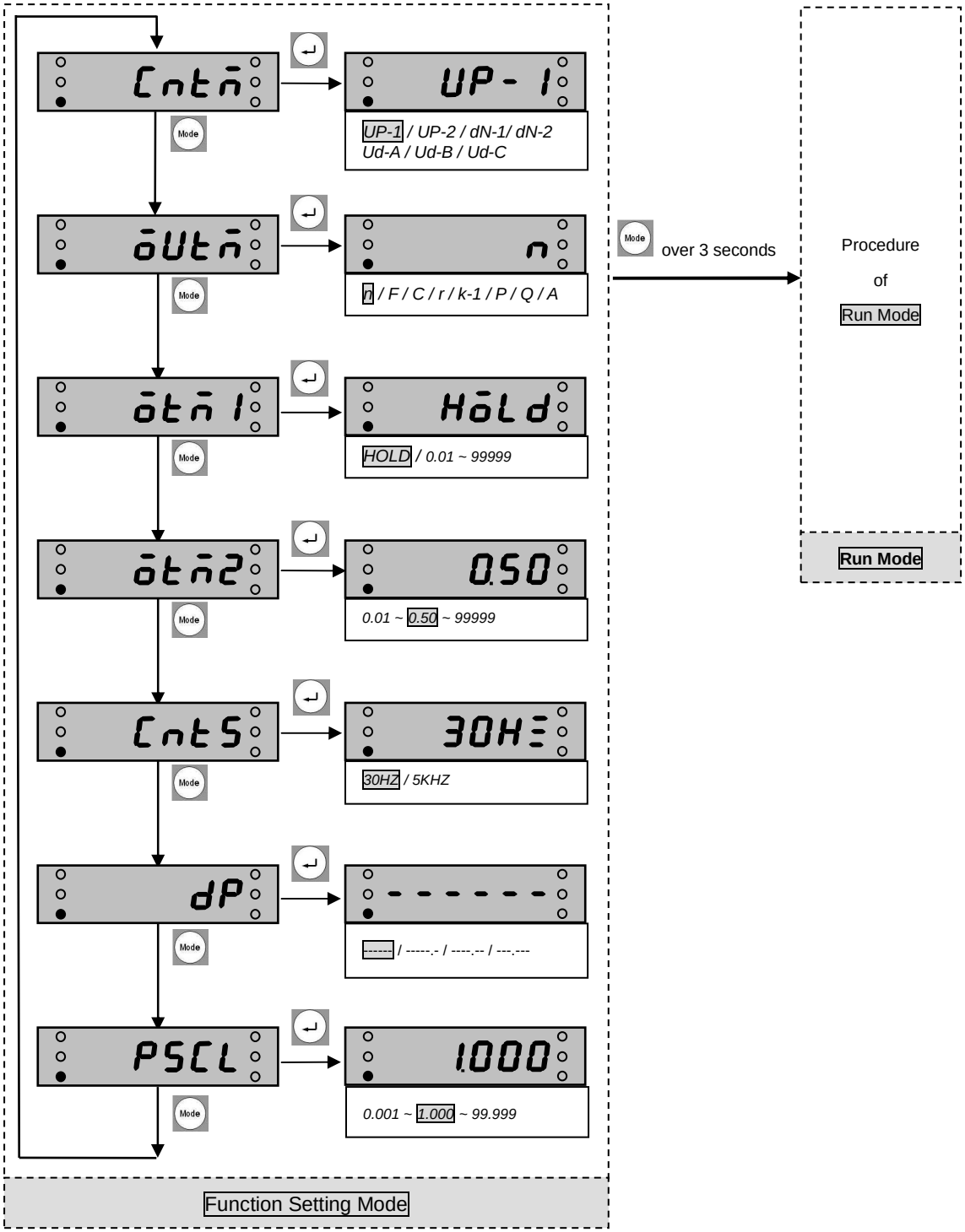


Note 1. The fixed setting of serial communication: baudrate at 9600 bps , 8 transfer data bits, 1 stop bit, no parity error;
Note 2. The data and program of the serial communication transmitted need to be customized. If there is no program customized, the KLCNT-A counter without serial microprinter will send the string "No serial communication program customized." by the UART port; while the KLCNT-A counter with serial microprinter will print the present count value (PCNT) and all the function parameters in the form as below:

```
FUNCTION PARAMETERS
cntm: UP-1
outm: n
otm1: HOLD
otm2: 00.50 s
cnts: 30Hz
dP:   ------
pscl: 001.00
SV1:  100000
SV2:  200000
PCNT: 000000
```

4.6 Procedure of Function Setting Mode

The chart below shows the procedure of Function Setting mode. Any time, keep Mode key pressed over 3 seconds to return to the Run mode, resetting the present count value and initializing with the parameters just modified.



4.7 Diagnosis on the Abnormal Display

When an error occurs, error details will be displayed on the main display. Confirm the error from the main display and take the appropriate disposal.

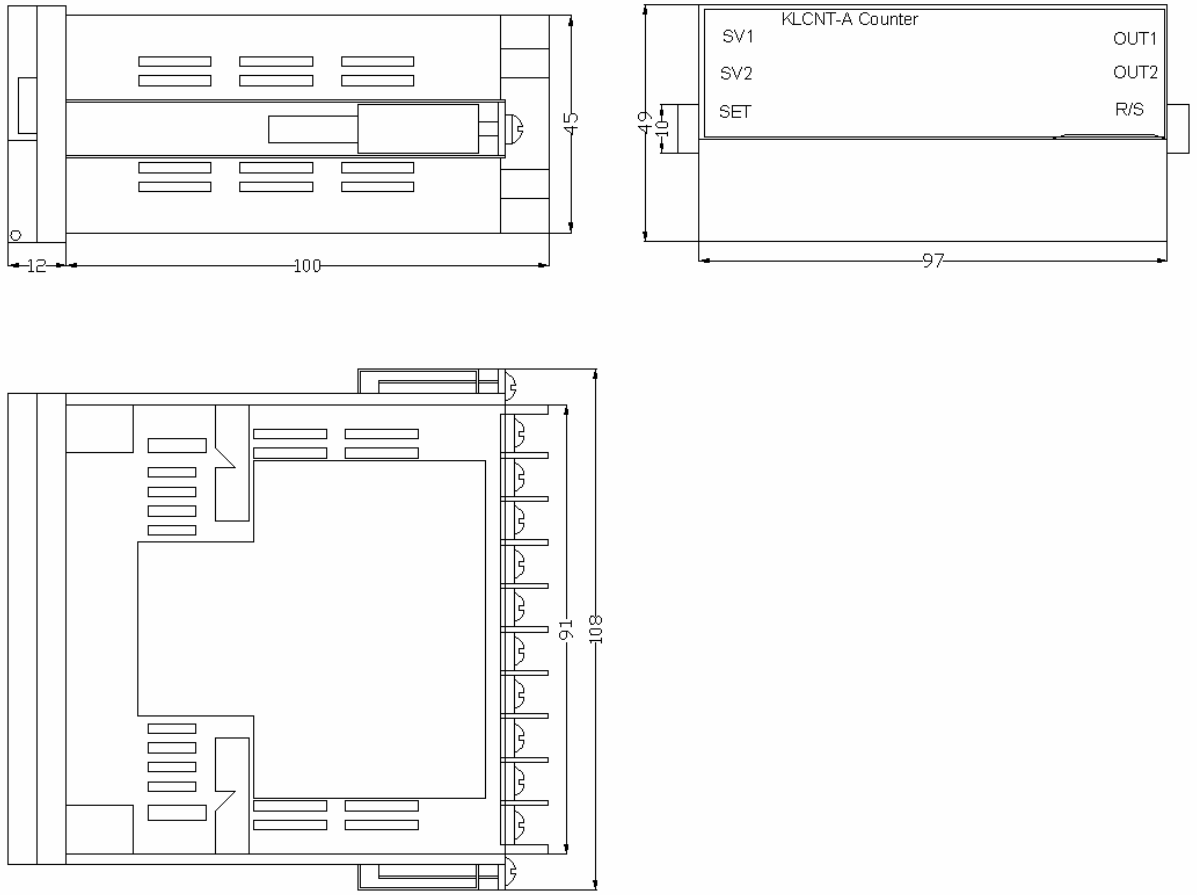
Main display	Indicator lights	Error contents	disposal
Err 1	All off	SV1 or SV2 setting error	Press any key to set SV1 or SV2 again（SV1<=SV2）
Err 2	All off	EEPROM memory error	Turn the power supply off and on again
Err 3	All off	Serial communication error	To confirm the serial device, press Mode key to return to Run Mode

If problems can not be solved according to the disposal above, please contact with us.

5. Dimensions and External Connections

5.1 Dimensions

KLCNT-A series counters can be embeded as a panel meter, Dimension of the recommanded rectangular hole is (92×46) mm.



Note: All units are in millimeters unless otherwise indicated.

5.2 External Connections

■ **Caution**

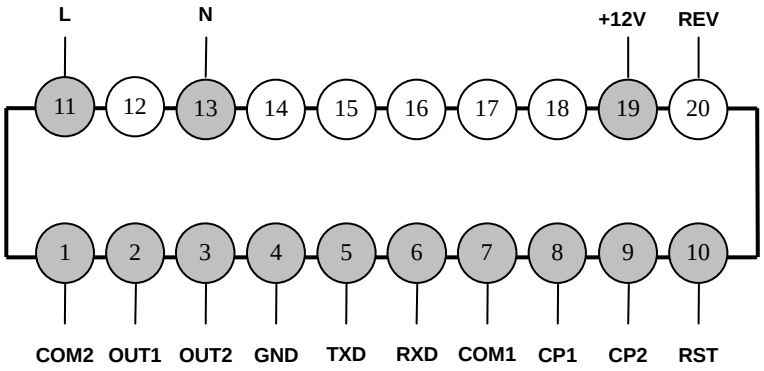
- Be sure to check each terminal for correct number and polarity before connection;
- Please use M3 crimp terminals;
- Confirm that the power supply is turned off during connection;
- Do not allow metal objects or conductive wires to enter the counter;
- Wire signal lines and power lines separately to reduce electrical noise and interference;
- Do not connect anything to unused terminals;
- Confirm that the power supply meets specifications before use;
- Do not touch the terminals while power is being supplied;
- Do not lay heavy objects on the product during use or storage.

■ **Definition of terminals**

- Termianl labels：

11	12	13	14	15	16	17	18	19	20
L	NC	N	NC	NC	NC	NC	NC	+12V	REV
1	2	3	4	5	6	7	8	9	10
COM2	OUT1	OUT2	GND	TXD	RXD	COM1	CP1	CP2	RST

- Please refer to the section 2.3 and the chart below during installation and connection。



Group	Terminal	Label	Explanation
Power supply	11	L	AC 220V power supply
	13	N	
Pulse input	10	RST	External reset signal input
	9	CP2	High speed pulse input channel 2
	8	CP1	High speed pulse input channel 1
	7	COM1	Reference ground of pulse input
Digital output	3	OUT2	Open collector output channel 2
	2	OUT1	Open collector output channel 1
	1	COM2	Reference ground of output
RS-232 output	4	RXD	RS232 signal receive
	3	TXD	RS232 signal transmit
	2	GND	Reference ground of RS-232 signal
External power supply	19	＋12V	＋12V external power supply, **reference ground is termial 2**
reserved	20	REV	Reserved, **DO NOT BE CONNECTED**