CS2-CT MULTIFUNCTION Counter (Pulse input)

■DESCRIPTION

The CS2-CT provides high speed and multifunction, counting, control and communication (Modbus RTU mode) of Pulse from flow meter or encoder, proximity switch, photo switch for length control. There are 3 external control input (DI) in standard and the optional 4 Relay, 1 Analogue,and RS485 port available. They are also support N, R, C mode for totalizer control.

■FEATURE

- **Measuring Pulse 0.01Hz~20KHz(optional: over 20KHz~50KHz); Contact / NPN / PNP / Voltage Pulse can be switch on rear of meter**
- **4 banks pre-set for all relay functions relative 4 difference application, and selectable by 3 External Control Inputs(E.C.I.) or front key in optional**
- **4 relay can be individual programmed for N/R/C mode and energized time.**
- **3 external control input can be individual programmed for Reset, Gat**
- **Analogue Output and RS485(Modbus RTU mode) available in option**
- **Comply to CE standard & RoHS**

■ORDERING INFORMATION

CS2-CT- [Input Range] – [Relay Output] – [Analogue Output] – [RS 485 Port] – N – [AUX. POWER]

OPTION 1 (Relay Output) OPTION 2 (Analogue Output) OPTION 3 (RS 485 Port)

CODE		INPUT RANGE
C		Mech. contact
N		NPN
P		PNP
V		Voltage pulse
	05	5V pulse
	12	12V pulse
	24	24V pulse
O	xx	Specify

Input mode and level can be changed by dip switches on rear of meter

CODE	REALY O/P
N	None
R2	2 Relay
R3	3 Relay
R4	4 Relay

CODE	ANALOG O/P
N	None
V	0(1) ~ 5 V 0 ~ 10 V
I	0 ~ 10 mA 0(4)~20 mA

CODE	RS 485 PORT
N	None
8	RS 485

CODE	AUX. POWER
A	AC 115/230 V
OPTION 4	
ADH	AC 85~264V DC 100~300V
ADL	AC/DC 20~56V

■TECHNICAL SPECIFICATION

Input

Input Frequency	Input Mode	Input Level
0.01Hz ~ 50 Hz	Mech. Contact	
0.01Hz ~ 50 Hz 0.01Hz ~ 100KHz 0.01Hz ~ 140KHz (optional)	NPN	High Level: 8~12V; Low Level: 0.0~4.0 V (with excitation supply 12Vdc)
	PNP	
	Voltage Pulse	High Level: over 2/3 of input level Low Level: under 1/3 of input level
	Pick Up Sensor	Specified by order
Input Mode(NPN, PNP, Contact) & Level(5Vp, 12Vp, 24Vp) changeable by dip switch of rear terminal block.		

Input range: 0.01Hz~20kHz (~50kHz in option)
Sampling time: 0.05 m-second~100 seconds (0.02 m-second in option)
Response time: ≤100 m-sec.(when the AvG = "1") in standard

Display & Functions

LED: **Numeric:** 5 digits, 0.8"(20.0mm)H red high-brightness LED
Relay output indication: 4 square red LED
RS 485 communication: 1 square orange LED
E.C.I. function indication: 3 square green LED
Display range: 0.0000~99999 with auto moving of decimal point
Factor Setting: Settable Range: -19999~+99999 with decimal point settable 0 / 0.0 / 0.00 / 0.000 / 0.0000
Decimal Point: Settable: 0 / 0.0 / 0.00 / 0.000 / 0.0000
Over Flow indication: Overflow `ouFL` / Re-cycle `rCYCL` counting programmable
Compensation setting: Option: Settable range: -19999~+99999
Digital adjustment: Option: `CtSPn`: Settable range: -19999~99999

Control Functions(option)

Set-points: Four set-points
Control relay: Four relays
Relay 2 & Relay 3: Dual FORM-C, 5A/230Vac, 10A/115V
Relay 1 & Relay 4: Dual FORM-A, 1A/230Vac, 3A/115V

Energized mode: N / R / C Mode
Period of Relay on: 0:00.0~9(Minutes):59.9(Second)
DO function: Energized by RS485 command of master.
Banks pre-set: 4 banks pre-set for all relay functions to relative 4 difference control condition, and selectable by 3 External Control Inputs(E.C.I.) or front key

External Control Inputs(ECI)

Input mode: 3 ECI points, Contact or open collect input, Level trigger
Functions: Gate / Reset / Offset / Bank selection(option) programmable
Debouncing time: Settable range 5 ~255 x (8m seconds)

Analogue output(option)

Accuracy: ≤± 0.1% of F.S.; 16 bits DA converter
Ripple: ≤± 0.1% of F.S.
Response time: ≤100 m-sec. (10~90% of input)
Isolation: AC 2.0 KV between input and output
Output range: Specify either Voltage or Current output in ordering
Voltage: 0~5V / 0~10V / 1~5V programmable
Current: 0~10mA / 0~20mA / 4~20mA programmable
Output capability: Voltage: 0~10V: ≥ 1000Ω;
Current: 4(0)~20mA: ≤ 600Ω max
Functions: `AoHS` (output range high): Settable range: -19999~99999
`AoLS` (output range Low): Settable range: -19999~99999
`AoLit` (output High Limit): 0.00~110.00% of output High
Digital fine adjust: `AoPro`: Settable range: -38011~+27524
`AoSPn`: Settable range: -38011~+27524

RS 485 Communication(option)

Protocol:	Modbus RTU mode
Baud rate:	1200/2400/4800/9600/19200/38400 programmable
Data bits:	8 bits
Parity:	Even, odd or none (with 1 or 2 stop bit) programmable
Address:	1 ~ 255 programmable
Remote display:	**to show the value from RS485 command of master**
Distance:	1200M
Terminate resistor:	150Ω at last unit.

Electrical Safety

Dielectric strength:	AC 2.0 KV for 1 min, Between Power / Input / Output / Case
Insulation resistance:	≥100M ohm at 500Vdc, Between Power / Input / Output
Isolation:	Between Power / Input / Relay / Analogue / RS485 / E.C.I.
EMC:	EN 55011:2002; EN 61326:2003
Safety(LVD):	EN 61010-1:2001

Environmental

Operating temp.:	0~60 ˚C
Operating humidity:	20~95 %RH, Non-condensing
Temp. coefficient:	≤100 PPM/˚C
Storage temp.:	-10~70 ˚C
Enclosure:	Front panel: IEC 529 (IP52); Housing: IP20

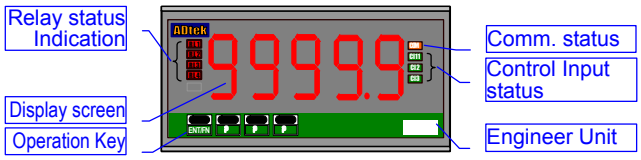
Mechanical

Dimensions:	96mm(W) x 48mm(H) x 120mm(D)
Panel cutout:	92mm(W) x 44mm(H)
Case material:	ABS fire-resistance (UL 94V-0)
Mounting:	Panel flush mounting
Terminal block:	Plastic NYLON 66 (UL 94V-0)
	10A 300Vac, M2.6, 1.3~2.0mm²(16~22AWG)
Weight:	550g / 350g(Aux. Power Code: ADH or ADL)

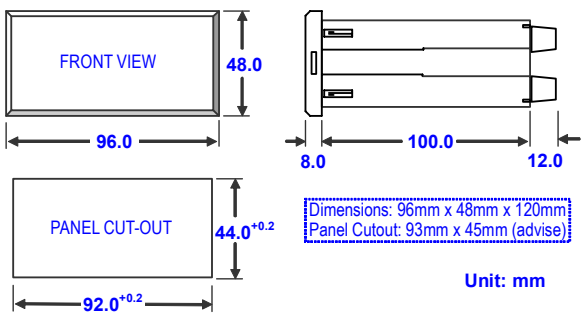
Power

Power supply:	AC115/230V,50/60Hz;
	Optional: AC 85~264V / DC 100~300V, DC 20~56V
Excitation supply:	DC 12, 24V/40mA maximum in standard
Power consumption:	5.0VA maximum
Back up memory:	By EEPROM

■FRONT PANEL

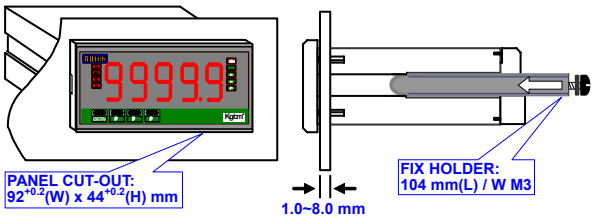


■DIMENSIONS

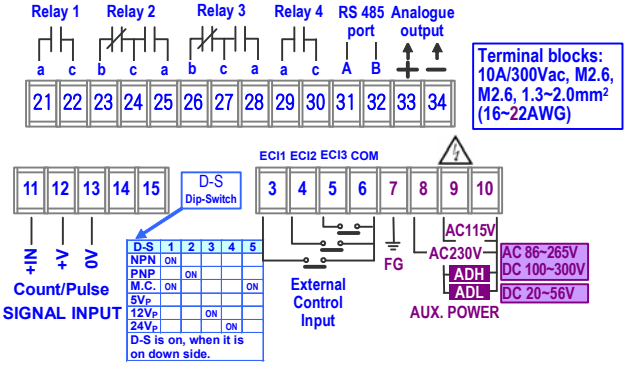


■INSTALLATION

The meter should be installed in a location that does not exceed the maximum operating temperature and provides good air circulation.

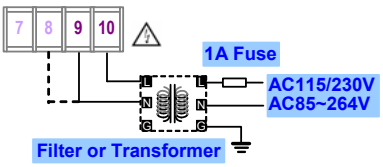


■CONNECTION DIAGRAM

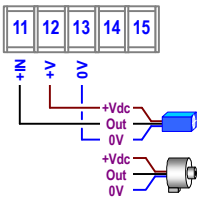


Please check the voltage of power supplied first, and then connect to the specified terminals. It is recommended that power supplied to the meter be protected by a fuse or circuit breaker.

Power Supply



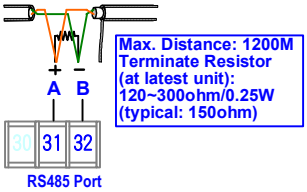
Sensor input connection



Please change the dip-switch on rear of meter to match the input mode and level.

D-S	1	2	3	4	5
NPN	ON				
PNP		ON			
Mech. Contact	ON				ON
Voltage pulse 5Vp					
Voltage pulse 12Vp			ON		
Voltage pulse 24Vp				ON	
D-S is on when it is in down site					

RS485 Communication Port



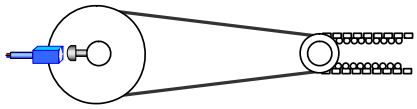
■FUNCTION DESCRIPTION

Display & Functions

Factor:

The factor can be set from -19999 to 99999 with decimal point. It also can be set 0.0001 as like as divider.

It is very popular application to install an encoder to measure the running length. The engineers normally know the factor is x length/pulse. It just sets the x into the function to show the length on meter.



Digital adjustment(option):

Sometimes, the counter will display an error due to the structure of machine or some reason. In the case, user can set the digital adjustment to compensate the value.

Users can get Fine Adjustment for Span of counting by front key of the meter, and "**Just Key In**" the value which user wants to show the number.

The adjustment can be clear in function **[C.SCLr]**.

Offset preset(Option):

CS2-CT can set a value(ex. 200) in [oFSEt] of [inPUt GroUP] to control the start counting value by external control input(E.C.I.) that has been set oFSEt.

- ▶ The counter will re-count from "0", when the E.C.I is open.
- ▶ The counter will re-count from "the value(200)", when the E.C.I is close

Over flow indication: ovFL ouFL / Re-cycle rCYCL counting programmable

The up screen will show the ouFL, if the **[oFLnd]** set to be ouFL.

And it will re-count from "0", if the **[oFLnd]** set to be rCYCL.

Control Functions(option)

The 3 mode are very useful idea to control the totalizer. The relay energized condition is according to not only energized level, but also time and reset for totalizer.

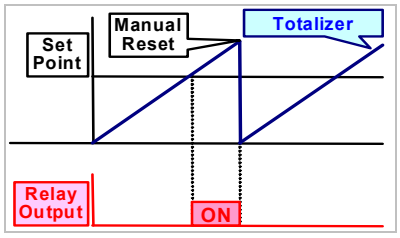
Relay energized mode: N / R / C Mode programmable

Relay output time: Settable range from 0.0(s)~9(m)59.9(s)

N mode: Totalizer & relay reset by manual

When the condition of **Set Point** is met:

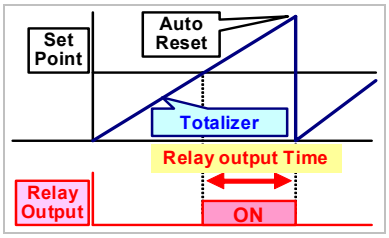
1. The relay will be energized;
2. The totalizer will run as same as usual, until manual reset by front key or by ECI of rear terminal, the totalizer will be reset to "0" and the relay will be de-energized.



R mode: Totalizer & relay reset by time setting of relay output time **[ry_ot]**

When the condition of **Set Point** is met:

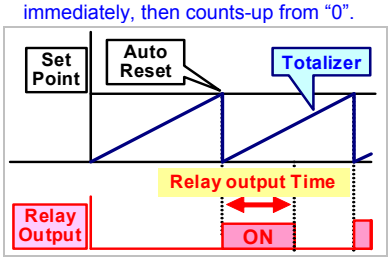
1. The relay will be energized, until the time is over Relay output time **[ry_ot]**(Relay _ output times).
2. The totalizer will run as same as usual; until the time is over Relay output time **[ry_ot]** (Relay _ output time),The totalizer will be reset to "**0**".



C mode: Totalizer auto reset & relay reset by time setting of relay output time**[ry_ot]**

When the condition of **Set Point** is met:

1. The relay will be energized, until the time is over Relay output time **[ry_ot]** (Relay_ output times).
2. The totalizer(±kWh) will be reset to "**0**" immediately, then counts-up from "0".



DO function do: The function has been designed not only a meter but also an I/O interface. In the case of motor control cabinet can't get the remote function. It's very easily to get the ON/OFF status of switch from CS2 series with RS485 function.

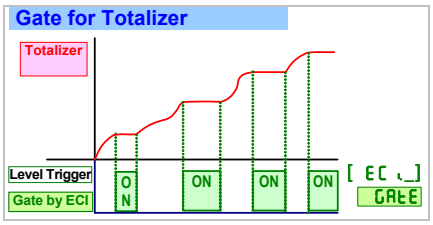
If the **[ry_nd]** had been set do, the relay will be energized by RS485 command directly, but no longer to compare with set-point.

External Control Inputs(ECI)

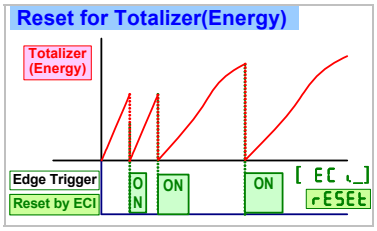
The three external control inputs are individually programmable to perform specific meter control or display functions. All E.C.I. have been designed in level trigger actions. Please pay attention, the ECI1 or ECI2 input will be disable while UP or Down Key has been set to be "YES".

ECI Functions: Gate / Reset / Offset

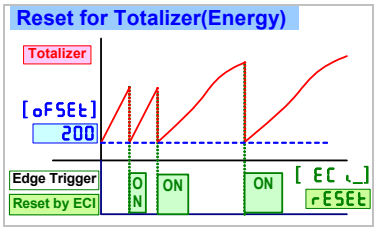
Gate function: Totalizer will be stopped to accumulate, when ECI is closed, until the ECI open again. The Totalizer count will accumulate continuously after the ECI open.



Reset Function: Totalizer will be reset to "0", when ECI is closed, until the ECI open again. The Totalizer will accumulate from 0 after the ECI open.



Offset function: When the [oFSEt] in [inPUt GroUP] set to be 200: Totalizer will be reset to "200", when ECI is closed. The Totalizer will count-up from 200.



Banks selection function(option):

There are extra 3 banks can be selected by E.C.I.
E.C.I.1 close means bank 1 has been selected.
E.C.I.2 close means bank 2 has been selected.
E.C.I.3 close means bank 3 has been selected.
E.C.I. all open means bank 0 has been selected.

Debouncing time:

The function is for avoiding noise signal to into the meter. And The basic period is 8 m-seconds. It means you set the number that has to multiple 8 m-seconds.
For example:
[dEbnC] set to be 5, it means 5 x 8mseconds = 40mseconds

Analogue output(option)

Please specify the output type either a 0~10V or 4(0)~20mA in ordering.
The meter offers one analogue output with Multi-Cross selection function. User can program the output to correspond immediately value, totalizer, batch and batch count, and also the output low and high can be programmable which it's related to various display values easier in [Ao GroUP].
Reverse slope output is possible by reversing point positions. Please refer to the detail description as below,

Output range: Voltage: 0~5V / 0~10V / 1~5V programmable
Current: 0~10mA / 0~20mA / 4~20mA programmable

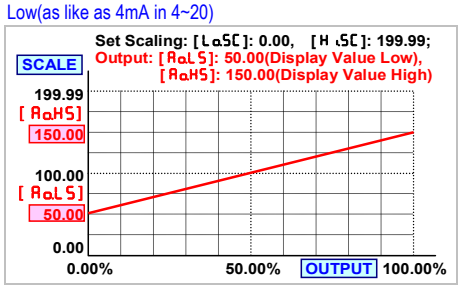
Functions: Output High / Low scale, output limit, fine adjustment

Output range high [AoHS]:

To setting the Display value High to versus output range High(as like as 20mA in 4~20)

Output range low [AoLS]:

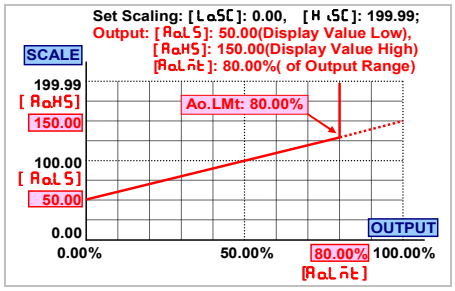
To setting the Display value Low to versus output range Low(as like as 4mA in 4~20)



The range between [AoHS] and [AoLS] should be over 20% of span at least; otherwise, it will be got less resolution of analogue output.

Output High Limit [AoLnt]:

0.00~110.00% of output High User can set the high limit of output to avoid a damage of receiver or protection system.



Fine zero & span adjustment:

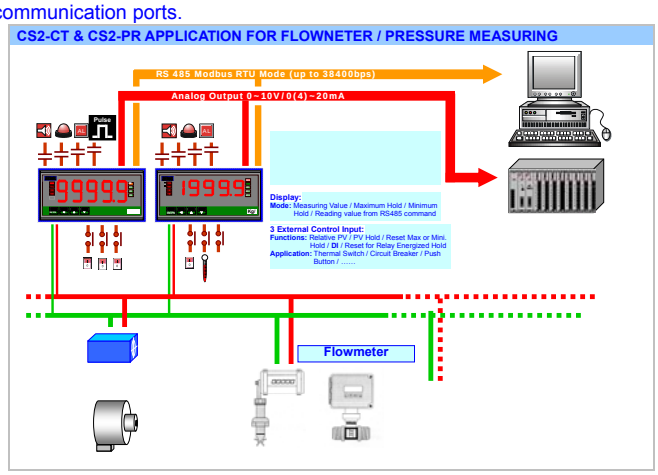
Users can get Fine Adjustment of analogue output by front key of the meter. Please connect standard meter to the terminal of analogue output. To press the front key(up or down key) of meter to adjust and check the output.

Zero adjust [AoZro]: Fine Zero Adjustment for Analog Output;
Settable range: -38011~27524;

Span adjust [AoSPn]: Fine Span Adjustment for Analog Output;
Settable range: -38011~27524;

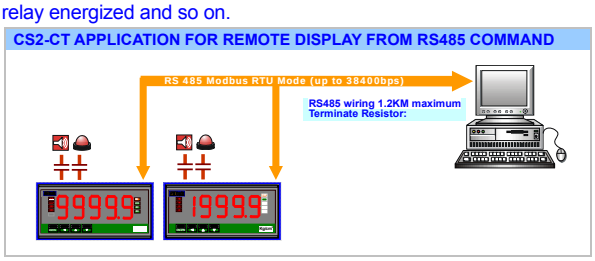
RS 485 communication(option)

CS2 series supports Modbus RTU mode protocol to be used as Remote Terminal Unit (RTU) for monitoring and controlling in a SCADA (Supervisor Control And Data Acquisition) system. The baud rate can be up to 38400 bps. It's not only can be read the measured value and DI (external control inputs) status but also controls the relays output (DO) by RS485 communication ports.



Remote Display:

The meter will show the value that received from RS485 command. In past, The meter normally receive 4~20mA or 0~10V from AO or digital output from BCD module of PLC .We support a new solution that PV shows the value from RS485 command of master so that can be **save cost and wiring** from PLC.
When the [dSPLY] set to be RS485, it means, the PV screen will show the number from RS485 command & data. The data (number) will be same as PV that will make the totalizer accumulate and compare with set-point, analogue output and ECI functions so that is to control analogue output, relay energized and so on.



■ OPTIONAL FUNCTION

Customize function with quantities is welcome. Please contact with our sales for detail. The appendix code of optional function will be add behind the code of auxiliary power as like as xxx-A-3BK.

■ BANK FUNCTION(Suffix-3BK)

- **The function is for CS2 to control difference process with a same meter.**
- **For example; a pressure testing equipment; it has to measure multi-range with difference pressure transducers. The meter can be pre-set 4 groups parameter to show difference scale and relay energized in difference set-points. The operator just selects the bank number (bank1) to meet the process (product A). To make easier operating and to avoid mistake in process.**
- **The bank function is available in CS2-CT (optional) too. It's useful to control as like as filling machine, Air flow measurement with difference sensor.**
- **4 banks pre-set for all relay functions relative 4 difference scaling, decimal point, and select by 3 External Control Inputs(E.C.I.) or front key.**

- **Example:**
  Product A: Flowmeter: 1.0000L/sec; Set-Point: 2.0000L
  Output: RS485
  Product B: Flowmeter: 5.000L/sec; Set-Point: 6.000L
  Output: RS485

  Setting:
  BANK1: [dP]: 0.0000 [ry Ind]: totLr [ry SP]: 2.0000
  [ry Lot]: 0.0005(M).00.5(S)
  BANK2: [dP]: 0.000 [ry Ind]: totLr [ry SP]: 6.000
  [ry Lot]: 0 00 10 (M).01.0(S)
  E.C. .. 1: Bank.1 E.C. .. 2: Bank.2;
  connect to a selector (or DO of PLC) to ECI1 and ECI2
  ▶ The order want to produce **Product A**, to switch selector to A(Label **A** on panel), and then ECI.1 close, the square green LED bright. The meter will work base on the setting of bank1 and relay1 output on 2.0000.
  ▶ The second order want to produce **Product B**, to switch selector to B(Label **B** on panel), and then ECI.2 close, the square green LED bright. The meter will work base on the setting of bank2 and relay1 output on 6.000.
- Only 1 Bank can be selected. The priority is Bank1 > Bank2 > Bank3, if it is double selection.

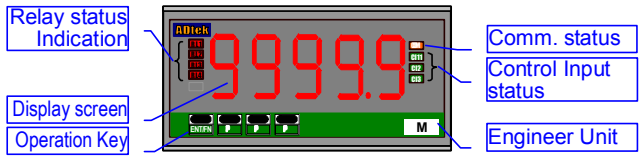
■ ERROR MESSAGE

BEFORE POWER ON, PLEASE CHECK THE SPECIFICATION AND CONNECTION AGAIN.

SELF-DIAGNOSIS AND ERROR CODE:

DISPLAY	DESCRIPTION	REMARK
ouFL	Display is positive-overflow (Signal is over display range)	(Please check the input signal)
-ouFL	Display is negative-overflow (Signal is under display range)	(Please check the input signal)
ouFL	ADC is positive-overflow (Signal is higher than input range high 20%)	(Please check the input signal)
-ouFL	ADC is negative-overflow (Signal is lower than input range low -20%)	(Please check the input signal)
EEP ⇄ FAIL	EEPROM occurs error	(Please send back to manufactory for repaired)
AICnG ⇄ Pu	Calibrating Input Signal do not process	(Please process Calibrating Input Signal)
AIC ⇄ FAIL	Calibrating Input Signal error	(Please check Calibrating Input Signal)
AoCnG ⇄ Pu	Calibrating Output Signal do not process	(Please process Calibrating Output Signal)
AoC ⇄ FAIL	Calibrating Output Signal error	(Please check Calibrating Output Signal)

■ FRONT PANEL:



■ **Numeric Screens**

- **Up screen:** 0.28"(0.71cm) red high-brightness LED for 10 digital totalizer.
- **Down screen:** 0.28"(0.71cm) green high-brightness LED for Immediate Value 4 2/3 digital or Batch 6 digital.

■ **I/O Status Indication**

- **Relay Energized:** 4 square red LED
  - RL1 display when Relay 1 energized;
  - RL2 display when Relay 2 energized;
  - RL3 display when Relay 3 energized;
  - RL4 display when Relay 4 energized;
- **External Control Input Energized:** 3 square green LED
  - ECI1 display when E.C.I. 1 close(dry contact)
  - ECI2 display when E.C.I. 2 close(dry contact)
  - ECI3 display when E.C.I. 3 close(dry contact)
- **RS485 Communication:** 1 square red LED

  COM will flash when the meter is receive or send data, and COM flash quickly means the data transient quicker.

■ **Stickers:**

Each meter has a sticker what are functions and engineer label enclosure.

- **Relay energized mode:** HH Hi Lo LL DO
- **E.C.I. functions mode:**

  PV.H **PV.H(PV Hold) /** DI **DI /**

  M.RS **M.RS(Maximum or Minimum Reset) /**
- **Engineer Label:** over 80 types.

■ **Operating Key: 4 keys for Enter(Function) / Shift(Escape) / Up key / Down key**

	Setting Status	Function Index
Up key	Increase number	Go back to previous function index
Down key	Decrease number	Go to next function index
Shift key	Shift the setting position	Go back to this function index, and abort the setting
Enter/Fun key	Setting Confirmed and save to EEProm	From the function index to get into setting status

■ **Pass Word:**

Setting range:0000~9999;

User has to key in the right pass word so that get into **【Programming Level】**. Otherwise, the meter will go back to measuring page. If user forgets the password, please contact with the service window.

■ **Function Lock:** There are 4 levels selectable for lock.

- **None** nonE: no lock all.
- **User Level** USEr: User Level lock. User can get into User Level for checking but setting.
- **Programming Level** EnG: Programming level lock. User can get into programming level for checking but setting.
- **ALL** ALL: All lock. User can get into all level for checking but setting.

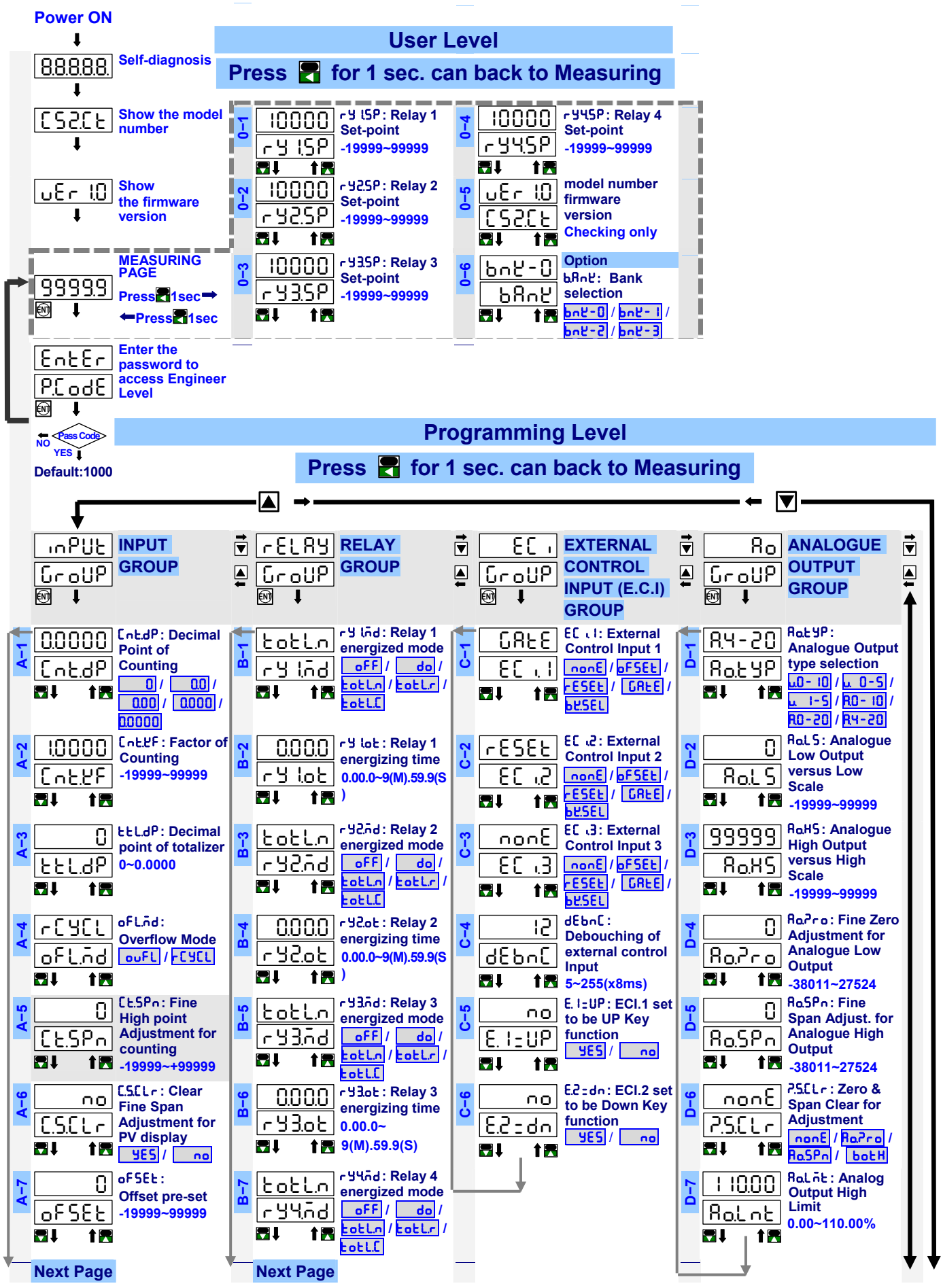
■ **Front Key Function**

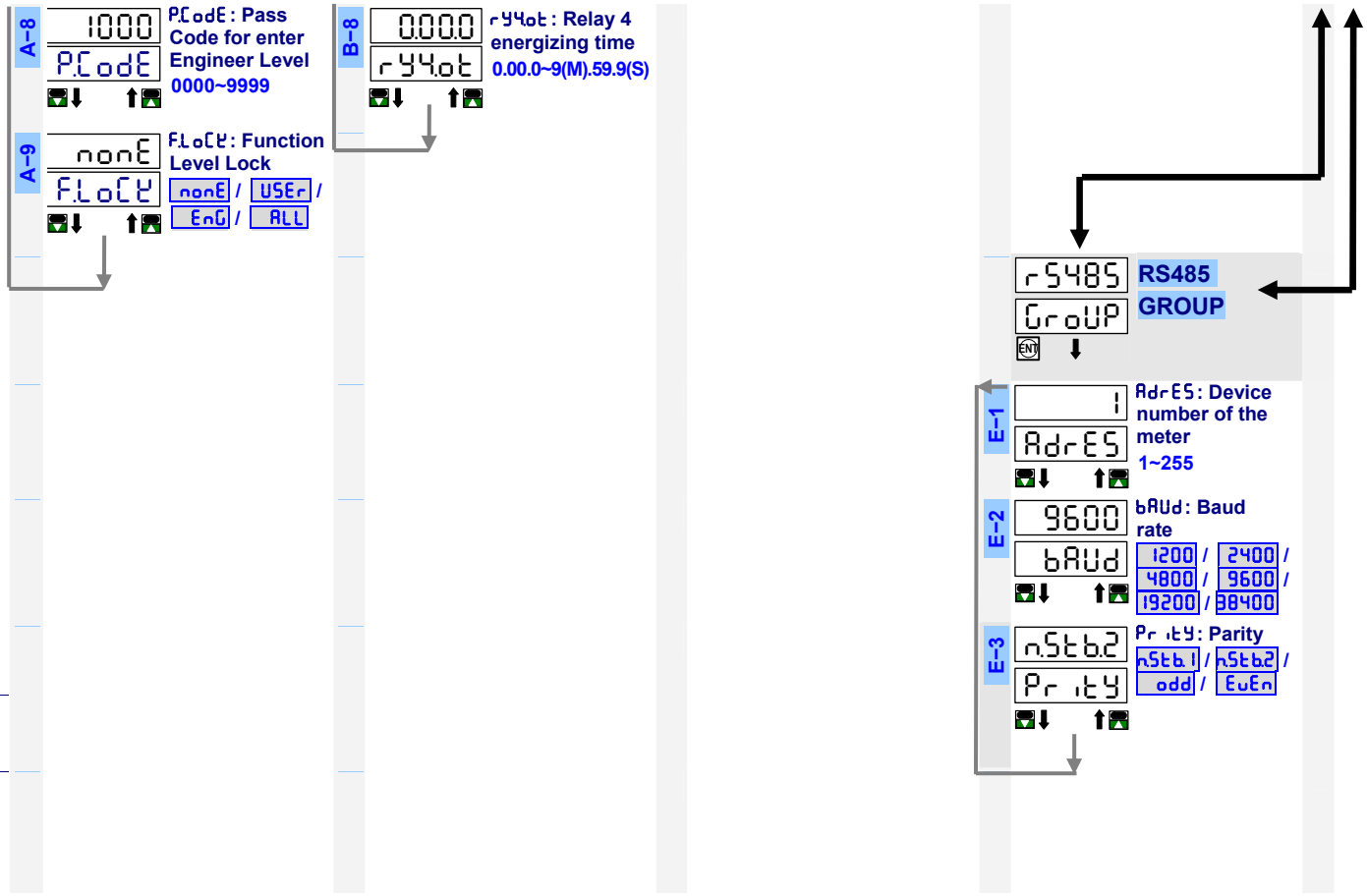
- The Key can be set to be the same function as the setting of ECI1.

  Ex. The ECI1 set to be GALE and the function [E.1-UP] set to be YES in [EC1 GroUP]. When user presses Key, the PV will hold as like as ECI1 close.
- The Key can be set to be the same function as the setting of ECI2.
- Ex. The ECI2 set to be rESEt and the function [E.2-dn] set to be YES in [EC1 GroUP]. When user presses Key, the PV will show relative value as like as ECI2 close.

  ▶ **If the front key function has been set, the terminal input for ECI will be disabling.**

■ OPERATING DIAGRAM (The detail description of operation, please refer to operating manual.)





▶ Plesae refer to operating manual for detail description