CS2-TM MULTIFUNCTION Totalizer (Analog input)

■DESCRIPTION

The CS2-TM Totalizer controller provide high accuracy measurement, display, control and communication (Modbus RTU mode) of 0~10V/4~20mA from flow meter or mV from Shunt for Amp-Hour.
There are two display screen and 3 external control input (DI) in standard and the optional 4 Relay, 1 Analogue, 1 Pulse and RS485 port available. They are also support fantastic control function as like as N, R, C mode for totalizer and batch control.

■FEATURE

- Measuring DC signal 0 ~ 10V or 0(4) ~ 20mA (with square root function) from flow meter or 0~50/~60/ ~100mV from Current Shunt for Amp-Hour control.
- Dual display screen for 10 digital Totalizer or Batch counter + 4 2/3 Immediate Value (PV) or 6 digital Batch programmable.
- 4 banks pre-set for all relay functions relative 4 difference scaling, and selectable by 3 External Control Inputs(E.C.I.) or front key in optional
- 4 relay can be individual programmed to relative immediate value (PV) or totalizer / batch / batch counter.
  - ▶ Relative to Immediate Value (PV): Functions settable Energized Mode Hi / Lo / Hi (Lo) Hold / DO / Go, Hysteresis, Energized Delay, De-energized Delay, Energized latch or Energized by RS485 command.
  - ▶ Relative to Totalizer / Batch / Batch Counter: N / R / C mode and energized time programmable.
- 3 external control input can be individual programmed for immediate value (PV) or totalizer / batch / batch counter.
  - ▶ Immediate Value (PV): PV Hold / Reset for Maxi. (or Mini.) Hold / DI / Reset for Relay Energized Latch
  - ▶ Totalizer / Batch / Batch Counter: Reset, Gate
- Analogue Output and Pulse Output available in option
- RS485(Modbus RTU mode), Baud Rate is up to 38400bps
- Comply to CE standard & RoHS

■ORDERING INFORMATION

Excitation Supply DC24V in build for 2 wire transmitters

CS2-TM- [Input Range] - [Relay Output] - [Analogue Output] - [RS 485 Port] - [Pulse Output] - [AUX. POWER] - [*Optional Function]

Relay Output, Analogue Output, RS 485 Port: OPTION

*Optional Function: Customize function is welcome. Please contact with our sales for detail.

CODE	INPUT RANGE
A1	0(4) ~ 20 mA
V1	0 ~ 10 V
VA	0 ~ 50 mV
VB	0 ~ 60 mV
VC	0 ~ 100 mV
AO	Specify A input
VO	Specify V input

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

* If the pulse output is to be selected, the meter can be selected 3 relay maximum.

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	PULSE O/P
N	None
C	Open Collect
R	Relay Contact

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

CODE	OPTION
3BK	3 Banks

■TECHNICAL SPECIFICATION

Input

Input Range		Input Impedance	Input Range		Input Impedance
Voltage	0 ~ 10 V	≥ 1M ohm	Current	4(0)~20 mA	250 ohm
	0 ~ 100 mV	≥ 3M ohm			

Calibration: Digital calibration by front key
A/D converter: **16 bits resolution**
Accuracy: ≤± 0.04% of FS ± 1C for immediate value(PV);
Sampling rate: 15 cycles/sec
Response time: ≤100 m-sec.(when the AvG = "1") in standard
Input range: Input High and Low programmable with **square root function**
AL.HI: Settable range: 0.00~100.00% of input range
AL.Lo: Settable range: 0.00~100.00% of input range

Display & Functions

LED: **Numeric: Up screen:** 10 digits, 0.28" red high-bright LED
Down screen: 6 digits, 0.28" green high-bright LED
Relay output indication: 4 square red LED
RS 485 communication: 1 square orange LED
E.C.I. function indication: 3 square green LED
Max/Mini Hold indication: 2 square orange LED

Up screen selection: Up screen can be programmed to show Totalizer(10digits) or Batch Counter(10 digits)

Down screen selection: Down screen can be programmed to show Batch(6 digits) or Immediate Value(5 digits)
Display range: **Immediate Value(PV):** -19999~+29999;
Batch: 0~999999
Totalizer / Batch Counter: 0~9999999999

For Immediate Value(PV)

Scaling function: LoSC : Low Scale; Settable range: -19999~+29999
HiSC : High Scale; Settable range: -19999~+29999
Decimal point: Programmable from 0 / 0.0 / 0.00 / 0.000 / 0.0000
Banks function: Extra 3 banks programmable for scaling & decimal point
Square root function: Selectable for differential pressure transducers
Over range indication: ouFL, when input is over 20% of input range Hi
Under range indication: -ouFL, when input is under -20% of input range Lo
Max / Mini recording: Maximum and Minimum value storage during power on.
Display functions: **PV / Max (Mini) Hold / RS 485 / Batch programmable for down screen.**
Front key functions: **Up and down key can be set to be a function as ECI.**
Low cut: Settable range: -19999~29999 counts
Digital fine adjust: PuPro: Settable range: -19999~+29999
PuSPn: Settable range: -19999~+29999

For Totalizer / Batch / Batch Counter

Decimal point: Settable: 0 / 0.0 / 0.000 / 0.000 / 0.0000
Over flow indication: Overflow ouFL / Re-cycle rCYCL counting programmable

Reading Stable Function

Average: Settable range: 1~99 times
Moving average: Settable range: 1(None)~10 times
Digital filter: Settable range: 0(None)/1~99 times

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
Banks pre-set: **4 banks pre-set for all relay functions to relative 4 difference scaling, and selectable by 3 External Control Inputs(E.C.I.) Or front key**
Relay energized mode: Multi-cross selection for immediate Value (PV), batch, batch counter and totalizer.

For Immediate Value(PV)

Hi / Lo / Go.12 / **Hi.HLd** / **Lo.HLd**; programmable
DO function: Energized by RS485 command of master.
Energizing functions: Start delay / Energized & De-energized delay / Hysteresis / Energized Latch
Start band(Minimum level for Energizing): 0~9999counts
Start delay time: *0:00.0~9(Minutes):59.9(Second)*
Energized delay time: 0.00.0~9(Minutes):59.9(Second)
De-energized delay time: 0.00.0~9(Minutes):59.9(Second)
Hysteresis: 0~5000 counts

For Totalizer / Batch / Batch Counter

Energized mode: **N / R / C Mode**
Period of Relay on: 0:00.0~9(Minutes):59.9(Second)

External Control Inputs(ECI)

Input mode: 3 ECI points, Contact or open collect input, Level trigger
Functions: Multi-cross selection for immediate Value (PV), batch, batch counter and totalizer.
Debouncing time: Settable range 5 ~255 x (8m seconds)

For Immediate Value(PV)

Functions: Relative PV / PV Hold / Reset Max or Mini. Hold / **DI** / Reset for Relay Energized latch / **Banks selection** programmable

For Totalizer / Batch / Batch Counter

Functions: Gate for Totalizer and(or) Batch(Batch Counter) / Reset for Totalizer and(or) Batch(Batch Counter) programmable

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: **Relative to immediate value(PV), totalizer, batch or batch count programmable**
AoHS (output range high):
Settable range: -19999~29999 / 0~9999999999
AoLS (output range Low):
Settable range: -19999~29999 / 0~9999999999
AoLnt (output High Limit): 0.00~110.00% of output High
Digital fine adjust: AoPro: Settable range: -38011~+27524
AoSPn: Settable range: -38011~+27524

Pulse output(option)

Output mode: Open collect: 30V/60mA or Relay: DC24V/1A
Output vs. parameter: **Relative to totalizer, batch or batch count programmable**
Output range: **1000Hz max.** duty cycle 50%
Duty cycle(PLSH): Settable from 0(Auto: Duty cycle=50%)/1~5000(x 4msec.)
Pulse divider: Settable range from 1~9999.

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 549 (IP54); Housing: IP20

Mechanical

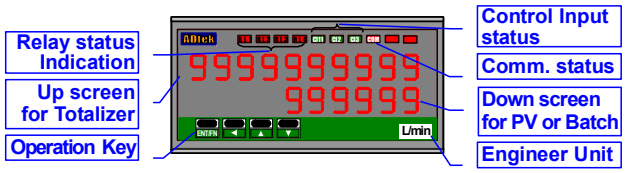
Dimensions: 96mm(W) x 48mm(H) x 120mm(D)
Panel cutout: 92mm(W) x 44mm(H)
Case material: ABS fire-resistance (UL 94V-0)
Mounting: Panel flush mounting
Terminal block: Plastic NYLON 66 (UL 94V-0)
10A 300Vac, M2.6, 1.3~2.0mm²(16~22AWG)
Weight: 550g / 350g(Aux. Power Code: ADH or ADL)

Power

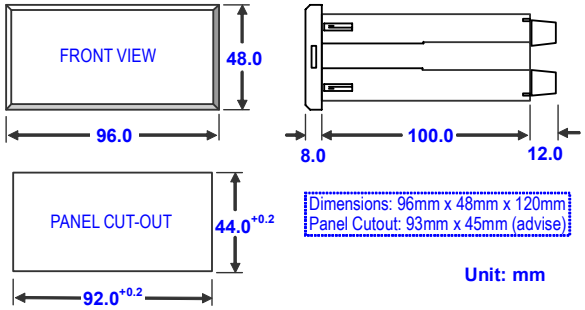
Power supply: AC115/230V,50/60Hz;
Optional: AC 85~264V / DC 100~300V, DC 20~56V
Excitation supply: DC24V/40mA maximum in standard
Power consumption: 5.0VA maximum
Back up memory: By EEPROM

Amend: 2009/11/10: add new function Duty cycle (PLSH): Settable from 0(Auto: Duty cycle=50%)/1~5000(x 4msec.)

■FRONT PANEL

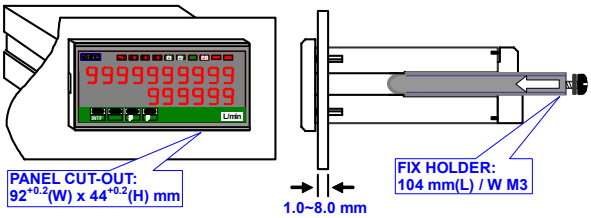


■DIMENSIONS

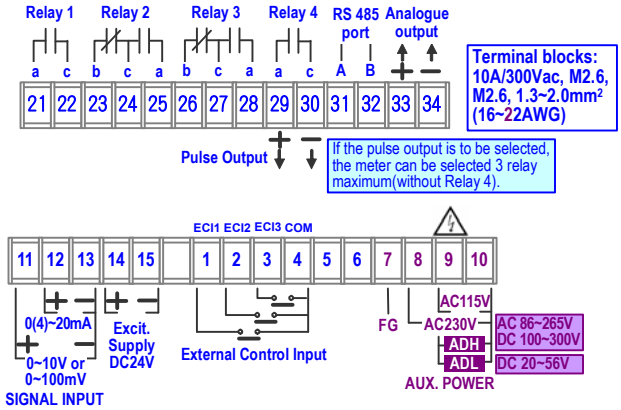


■INSTALLATION

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

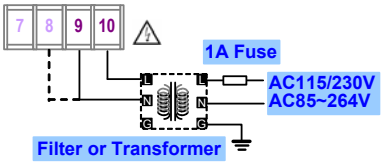


■CONNECTION DIAGRAM

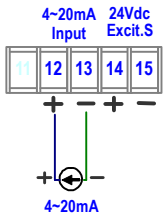


Please check the voltage of power supplied first, and then connect to the specified terminals. It is recommended that power supplied to the meter be protected by a fuse or circuit breaker.

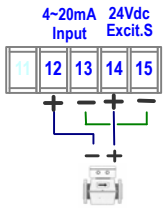
Power Supply



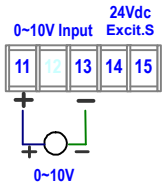
4(0)~20mA Input connection



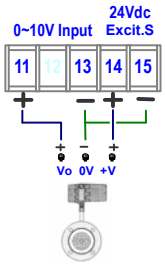
2 wire Transmitter connection



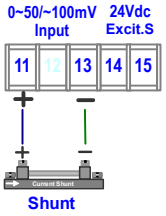
0~10V Input connection



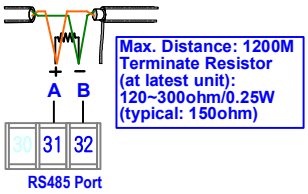
0~10V(3 Wire) connection



Shunt Input connection



RS485 Communication Port



CS2-TM(Analog)

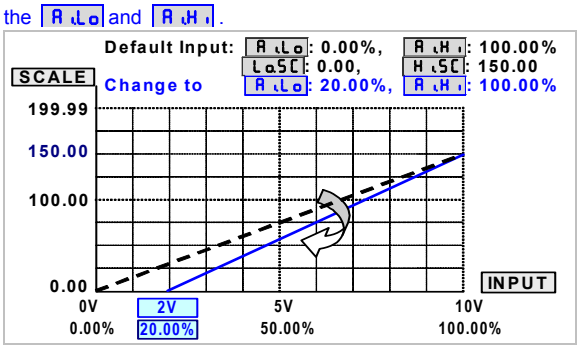
■FUNCTION DESCRIPTION

Input & Scaling Functions

Input range: Analogue input High and Low programmable

The meter has to be specified and fixed according to ordering code (ex. 0~10V or 4(0) ~ 20mA) in factory. If the meter has to install in difference range of input, the meter can be set in function [A.Lo] and [A.Hi] of input group to meet the input signal.

For example: The meter is 0~10Vdc input, and the signal from sensor is 2~10Vdc. Please get into [inPUt GroUP] to set [A.Lo] (Analogue input Low) to be 20.00%(10V x 20.00% = 2V), then the meter has been changed the input range to 2~10Vdc and the all relative parameters will work base on 2~10V. The meter doesn't need re-calibration after change the [A.Lo] and [A.Hi].

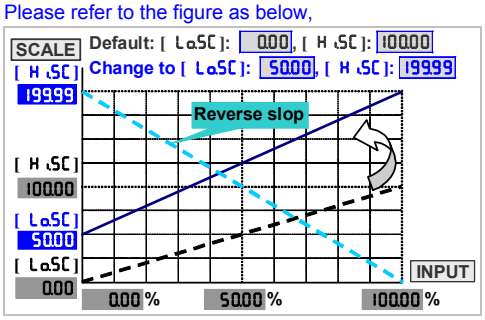


*The setting may course display lower resolution. Please set lower resolution when the input signal has been high compressed.

Scaling function:

Setting the [LaSC] (Low scale) and [H.SC] (High scale) in [inPUt GroUP] to relative input signal. **Reverse scaling will be done too.**

Please refer to the figure as below,



*Too narrow scale may course display lower resolution.

Square root function: The function can be set [no] or [YES] in [inPUt GroUP] to measure the signal from differential pressure flow-meter.

The formula = √(Pv/HS) x HS

Display & Functions

Max / Mini recording: The meter wills storage the maximum and minimum value in **[user level]** during power on in order to review drifting of PV.

Display functions: **PV / Max(Mini) Hold / RS 485 programmable in [dSPLY] function of [inPUt GroUP]**

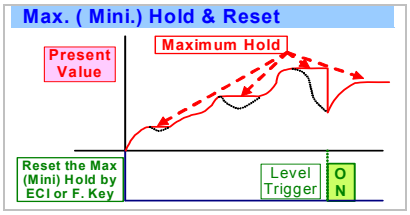
(Please refer to step A-07)

Present Value [Pu]: The display will show the value that Relative to Input signal.

Maximum Hold [MAXHd] / Minimum Hold [MinHd]:

The meter will keep display in maximum(minimum) value during power on, until manual reset by front key in **[User level]**, rear terminal is close **[External Control Input(ECI)]** or press front down or up key to reset (according to setting, please refer to the function of the ECI Group)

▶ Please find the M.H sticker that enclosure the package of the meter to stick on the right side of square orange LED



Remote Display by RS485 command [rS485]:

The meter will show the value that received from RS485 sending. 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 can so that can be **save cost and wiring** from PLC.

Other functions : **The meter is also support relative PV (ΔPV) and PV hold functions that set in [EC i GroUP]. Please refer to explain of ECI functions.**

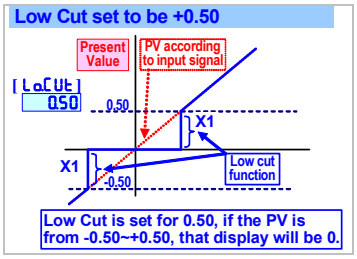
Low cut: Settable range from -19999~+99999 counts.

The users can set the value range.

1. If set the positive value (X1) here to display "0" which it expressed to be low-cut the PV between "+X1 (plus)" & "-X1(minus)" /absolute value

   PV< I Setting value (X1) I, the display will be shown 0

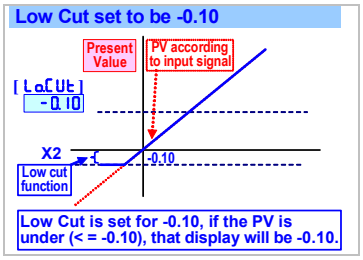
   EX: Low Cut is set for 0.50. If the display is from -0.50~+0.50, that will be 0.



2. If set the negative value (X2) here to display "X2" which it expressed to be low-cut the PV that it's under the X2 setting value;

   PV< Setting value(X2), the display will be shown X2.

   EX: Low Cut is set for -0.01. If the display is < -0.01, and all the display will be -0.01.

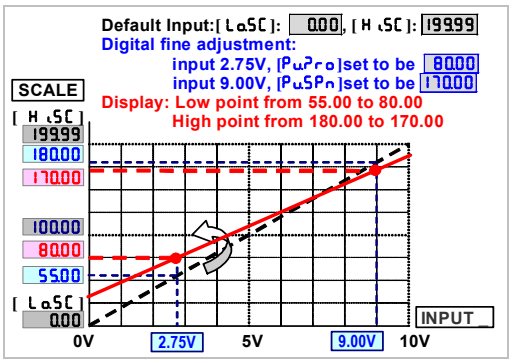


Digital fine adjust: Settable range: -19999~+29999

Users can get Fine Adjustment for Zero & Span of PV by front key of the meter, and "**Just Key In**" the value which user want to show in the current input signals.

Especially, the **[PuPro]** & **[PuSPn]** are not only in zero & span of PV, but also any lower point for **[PuPro]** & higher point for **[PuSPn]**. The meter will be linearization for full scale.

The adjustment can be clear in function **[PSCLr]**



For Totalizer / Batch / Batch Counter

Over flow indication:

The up screen can be programmable to be ouFL or rCYCL in [oFL.nd].

If user set [oFL.nd] to be ouFL, the up screen will be stop to count and show ouFL, when it has been run to 9999999999.

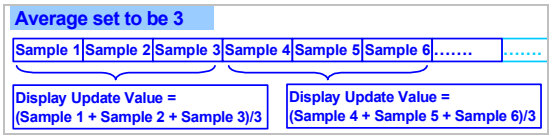
If user set [oFL.nd] to be rCYCL, the up screen will be re-counting from "0", when it has been run to 9999999999.

Reading Stable Function

Average display:

Jittery Display caused by the noise or unstable signal. User can set the times to average the readings, and to get smoothly display.

The meter's sampling is 15cycle/sec. If the [AvG](Average) set to be 3 to express the display update with 5 times/sec. The meter will calculate the sampling 1-3 and update the display value. At meantime, the sampling 4-6 will be processed to calculate.



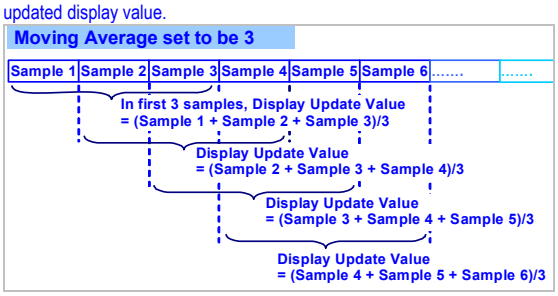
Remark: The higher average setting will cause the response time of Relay and Analogue output slower.

Moving average:

Jittery Display caused by the reasons as like as noise or unstable signal. User can set the times to average the readings, and get smoothly display.

The meter's sampling is 15cycle/sec. If the [nAvG](Moving Average) set to be 3 expressed the display update with 15 times/sec.,

In the first updated display value will be same as average function. In the next updated display value, the function will get the new fourth sample (sample 4) then throw away the first sample (sample 1) that the newest 3 samples(sample 2,3,4) will be calculated for the updated display value.



Remark: The higher moving average setting wouldn't cause the response time of Relay and Analogue output slower after first 3 samples.

Digital Filter: The digital filter can reduce the magnetic noise in field.

The digital filter can reduce the influence of spark noise caused by magnetic of coil.

If the values of samples are over digital filter band (fix in firmware and about 5% of stable reading) 3 times (Digital Filter set to be 3) continuously, the meter will admit the samples and update the new reading. Otherwise, it will be as treat as a noise and skip the samples.

Control Functions(option)

Multi-Cross function selection

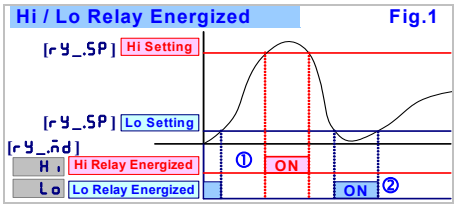
4 relay can be programmable to relative Totalizer, Batch, Batch Counter and Immediate Value (PV) with individual functions. Please refer to the detail as following

For Immediate Value(PV)

Relay energized mode: Hi / Lo / **Go-1.2** / **Hi.HLd** / **Lo.HLd** / **DO** programmable

Hi H i **(Fig.1-①):** Relay will energize when **PV > Set-Point**

Lo Lo **(Fig.1-②):** Relay will energize when **PV < Set-Point**

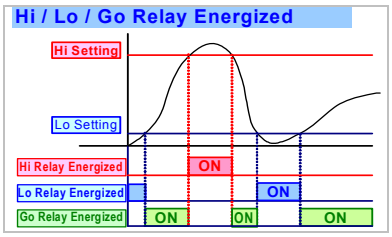


Go-1.2 Go-12**:** This function is programmable in Relay 3 only.

If the Relay 3 set to be Go function, the relay will compare with [ry 1SP] and [ry2SP].

Go relay energized when the condition is

[ry 1SP] (Hi) > PV > [ry2SP] (Lo)



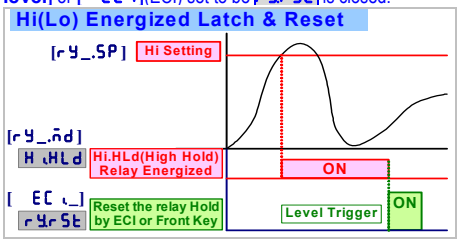
Hi.HLd H iHLd **(Lo.HLd** LoHLd**) :**

The relay energized with latched function is for electrical safety and human protection.

For example, a current meter relay installed for the over current alarm of motor. Generally, over current of motor caused by over load, mechanical dead lock, aging of insulation and so on.

Above cases will alarm in the meter, if the user doesn't figure out the real reason and re-start the motor. It may damage the motor. The functions of Hi.HLd & Lo.HLd are designed must be manual reset the alarm after checking out and solving the issue. It's very important idea for electrical safety and human protection.

As the PV Higher (or lower) than set-point, the relay will be energized to latch except manual reset by from key in **[user level]** or [EC i](ECI) set to be ryrSt is closed.



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.

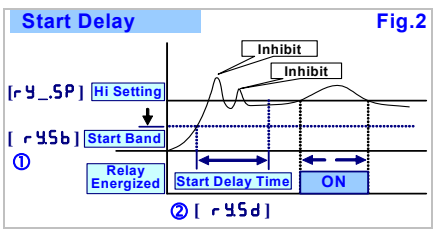
Start delay band and Start delay time:

The functions have Been designed for,

- ► To avoid starting current of inductive motor (6 times of rated current) with alarm.
- ► If the ry_.nd relay energized mode had been set to be Lo(Lo) or LoHLd(Lo & latch). As the meter is power on and no input to display the "0" caused the relay will be energized. User can set a band and delay time to inhibit the energized of relay.

Start band ry5b **(Fig.2-①):** Settable range from 0~9999 Counts

Start delay time ry5d **(Fig.2-②):** Settable range from 0.0(s)~9(m)59.9(s);



Hysteresis [ry_.HY] (Fig.3-①): Settable range from 0~9999 Counts

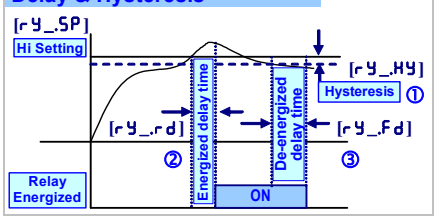
As the display value is swing near by the set point to cause the relay on and off frequently. The function is to avoid the relay on and off frequently such as compressor…….etc.,

Relay energized delay [ry_.rd] (Fig.3-②): Settable range from 0.0(s)~9(m)59.9(s);

The function is to avoid the miss action caused by noise. Sometime, the display value will swing caused by spark of contactor…etc… User can set a period to delay the relay energized.

Relay de-energized delay [ry_.Fd] (Fig.3-③): Settable range from 0.0(s)~9(m)59.9(s);

Energized / De-energized Delay & Hysteresis Fig.3



For Totalizer / Batch / Batch Counter

For totalizer, The relay output is not only according to relay energized mode, set-point and relay out time but also reset the relay and totalizer. Please refer to the description in following,

Relay energized mode: N / R / C Mode programmable

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

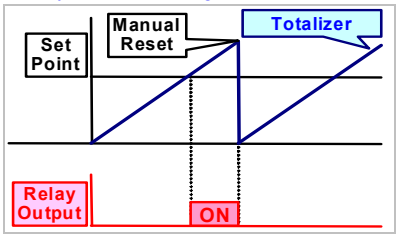
Relay energized mode: N / C / R mode

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:

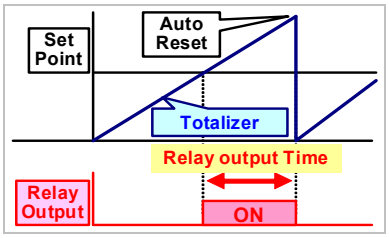
1. The relay will be energized;
2. The Totalizer will run as same as usual, until manual reset by front key or by ECI of rear terminal, the Totalizer will be reset to "0" and the relay will be de-energized.



R mode: Totalizer & relay reset by time setting of relay output time **[ry_.ot]**

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

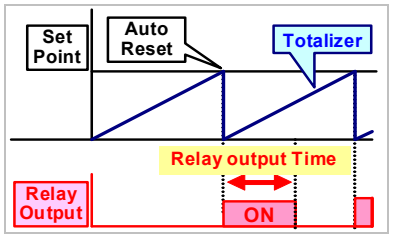
1. The relay will be energized, until the time is over Relay output time **[ry_.ot]** (Relay _ output times).
2. The Totalizer will run as same as usual; until the time is over Relay output time **[ry_.ot]** (Relay _ output time); The Totalizer will be reset to "**0**".



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 will be reset to "**0**" immediately, then counts-up from "0".



External Control Inputs(ECI)

CS2-TM offers 3 point external control inputs (ECI) with Multi-Cross selection function. User can set the ECI functions corresponding to Immediately value, totalizer, batch and batch count.

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]".

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:

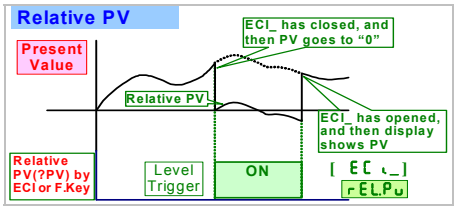
[dEbnC] set to be 5, it means 5 x 8mseconds = 40mseconds

For Immediate Value(PV)

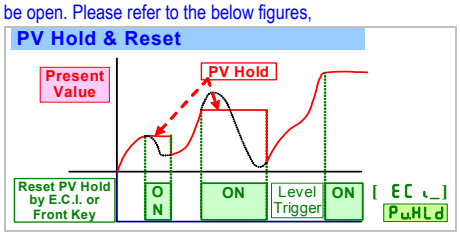
Functions: Relative PV / PV Hold / Reset Max or Mini. Hold / **DI** / Reset for Relay Energized latch **programmable.**

Relative PV [rELPv] or Tare:

The **[EC i_]** can be set to be **[rELPv]** function. When the E.C.I. is closed, the reading will show the differential value.



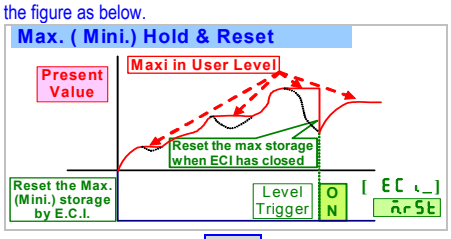
PV Hold [PvHLd]: The **[EC i_]** can be set to be **[PvHLd]** (PV Hold) function. The display will be hold when the E CI is closed, until the ECI is to be open. Please refer to the below figures,



Reset for Maximum or Minimum Hold [rSt]:

When the **[dSPLY]** function in **[inPUt GroUP]** selected [MAXHd] or [MinHd], the display will show Maximum or Minimum value.

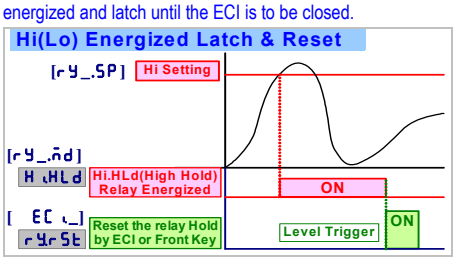
The **[EC i_]** function can be set to be **[rSt]** function to reset the maximum and minimum value in **[User Level]** by terminals of ECI (close). Please refer to the figure as below.



DI [di]: The E.C.I can be set to be **[di]** function, when the meter building in RS485 port. It is easier to get remote monitoring a switch status through the meter as like as DI of PLC.

Reset for Relay Energized Latch [rySt]:

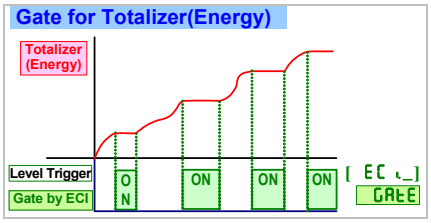
If the relay energized mode has been set to be [H.HLd] (Energized latch), and the [EC_] can be set to be [rySt] (Reset the Relay energized latch). When the PV meets the condition of relay energizing, the relay will be energized and latch until the ECI is to be closed.



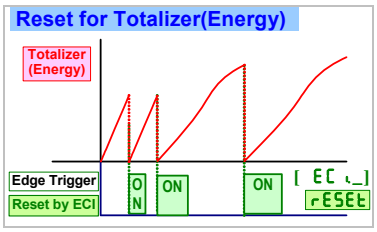
For Totalizer / Batch / Batch Counter

ECI Functions: Gate / Reset

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



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



Pulse Output(optional)

The meter offers a pulse output corresponding to totalizer / batch count programmable. The terminals are same as relay 4 so that can not exit relay 4 and pulse output in one meter.

The pulse output is 1000Hz maximum, and 50% duty cycle (0.5msec. minimum).

Pulse divider: Settable range from 1~9999.

- ▶[PLSdv] set to be [1]: It will output 1 pulse, when Totalizer increases "1Count".
  Ex: It will output 1 pulse, when Totalizer from 12345.678 increase to 12345.679.
- ▶[PLSdv] set to be [1000]: It will output 1 pulse, when Totalizer increases "1000Count".
  Ex: It will output 1 pulse, when Totalizer from 12345.678 increase to 12346.678.

Duty cycle([PLSH]): Settable from 0(Auto: Duty cycle=50%)/1~5000(x 4msec.)

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

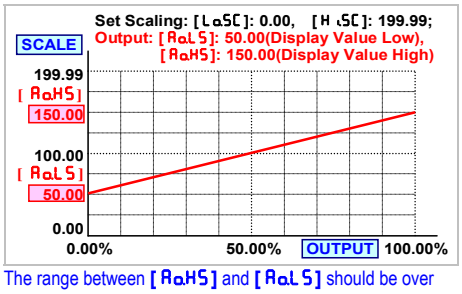
Functions: Output High / Low scale, output limit, fine adjustment

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]:

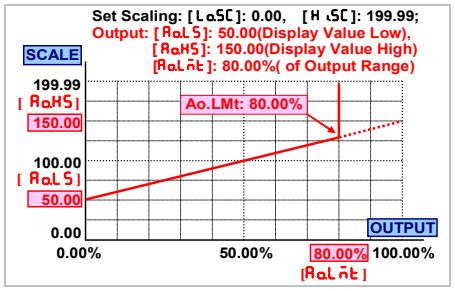
To setting the Display value Low to versus output range Low(as like as 4mA in 4~20)



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 [AoLmt]:

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:

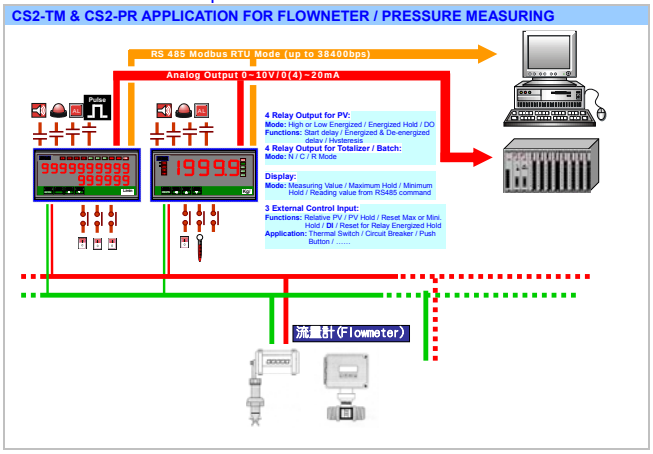
Users can get Fine Adjustment of analogue output by front key of the meter. Please connect standard meter to the terminal of analogue output. To press the front key (up or down key) of meter to adjust and check the output.

Zero adjust [AoPro]: 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)

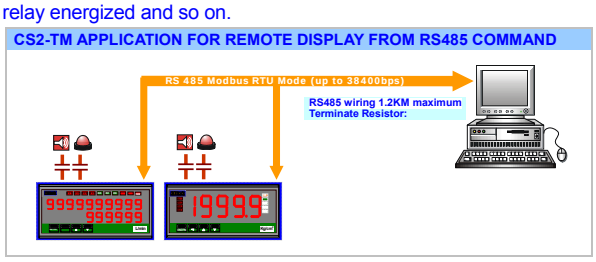
CS2 series supports Modbus RTU mode protocol to be used as Remote Terminal Unit (RTU) for monitoring and controlling in a SCADA (Supervisor Control And Data Acquisition) system. The baud rate can be up to 38400 bps. It's not only can be read the measured value and DI (external control inputs) status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



Calibration

System calibration by front key. The process of calibration, please refer to the operating manual

Optional Function

Customize function with quantities is welcome. Please contact with our sales for detail. The appendix code of optional function will be added behind the code of auxiliary power as like as xxx-A-HSM (High speed mode).

■ 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-TM (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;
Output: 4~20mA Set-Point: 2.0000L

Product B: Flowmeter: 5.000L/sec;
Output: 4~20mA Set-Point: 6.000L

Setting:

BANK1: [dP]: 0.0000 [LoSC]: 0.0000 [HiSC]: 1.0000
[ry Ind]: totL.C [ry 1SP]: 2.0000 [ry Hd]: 0.005 0(M).00.5(S)

BANK2: [dP]: 0.000 [LoSC]: 0.000 [HiSC]: 5.000
[ry Ind]: totL.C [ry 1SP]: 6.000 [ry Hd]: 0 00 10 (M).01.0(S)

EC.i.1: Bank.1 EC.i.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.

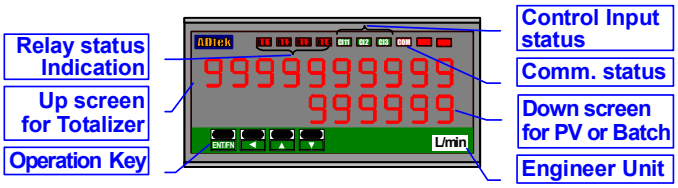
▶ The second order want to produce **Product B**, to switch selector to B (Label **B** on panel), and then ECI.2 close, the square green LED bright. The meter will work base on the setting of bank2 and relay1 output on 6.000.

- 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:



CS2-TM has two display screens and I/O status indication for purposes.

■ **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) /** Tare **Tare /** DI **DI /**
  M.RS **M.RS(Maximum or Minimum Reset) /**
  R.RS **R.RS(Reset for Relay Latch)**
- **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.

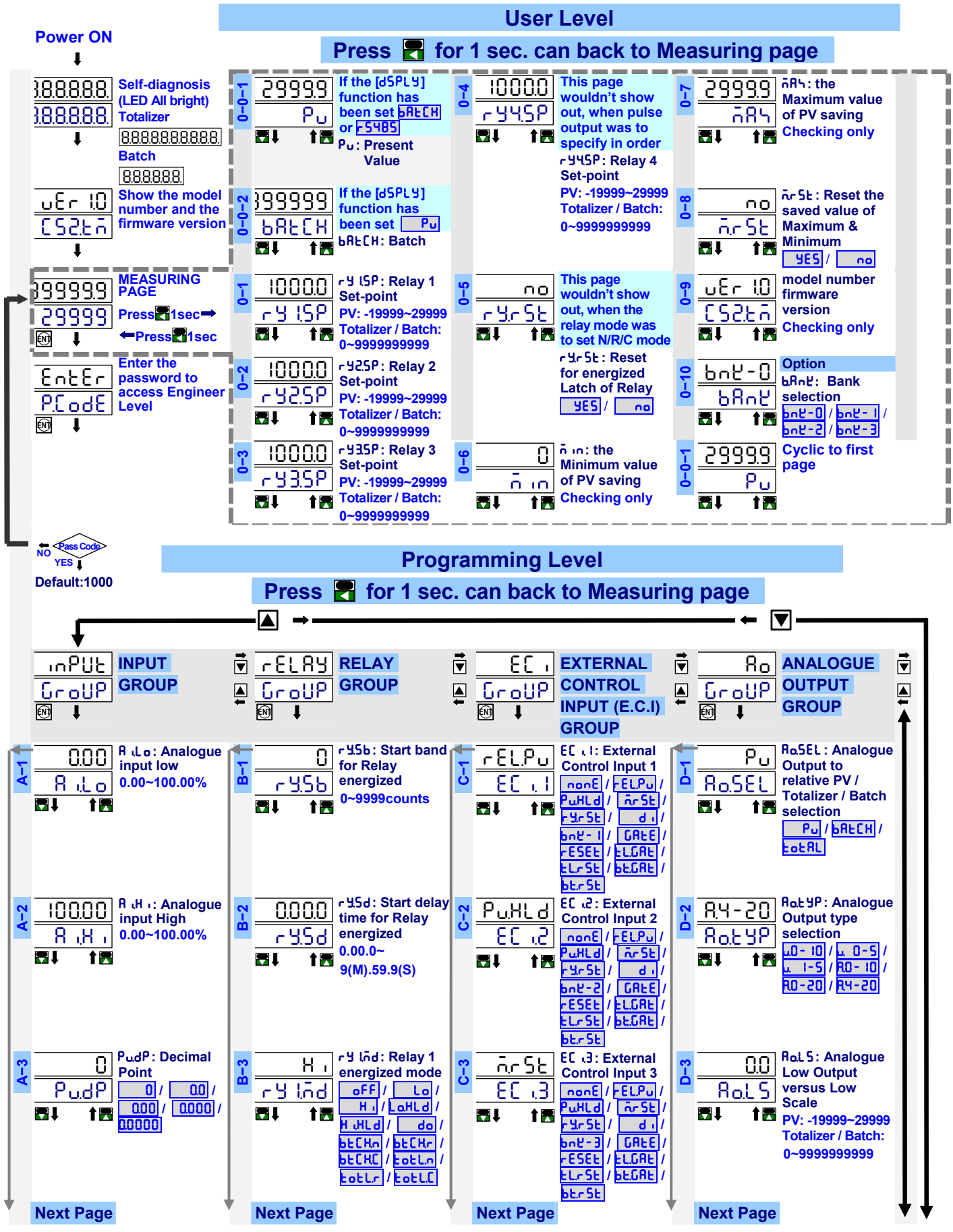
- **None** nonE**:** no lock all.
- **User Level** USEr**:** User Level lock. User can get into User Level for checking but setting.
- **Programming Level** EnG**:** Programming level lock. User can get into programming level for checking but setting.
- **ALL** ALL**:** All lock. User can get into all 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 PuHLd and the function [E.1:UP] set to be YES in [EC , 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 rELPu and the function [E.2:dn] set to be YES in [EC , 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.)



A-4 — 0 / LoSC — LoSC: Low scale of PV
-19999~29999

A-5 — 10000 / H.SC — H.SC: High scale of PV
-19999~29999

A-6 — no / SQrot — SQrot: Square Root function
YES / no

A-7 — 0 / Pu.Pro — Pu.Pro: Fine Low point Adjustment for PV display
-19999~29999

A-8 — 0 / Pu.SPn — Pu.SPn: Fine High point Adjustment for PV display
-19999~29999

A-9 — nonE / P.SCLr — P.SCLr: Clear Fine Zero & Span Adjustment for PV display
nonE / Pu.Pro / Pu.SPn / botH

A-10 — 0 / ttL.dP — ttL.dP: Decimal point of totalizer
PV: -19999~29999
Totalizer / Batch:
0~9999999999

A-11 — ttL / UP.dSP — UP.dSP: Up screen displays totalizer or batch Counter
ttL / btCnt

A-12 — ouFL / oFL.nd — oFL.nd: overflow mode of totalizer or batch
ouFL / rCYCL

A-13 — PStuE / S.Gn — S.Gn: Sign of accumulate up or down
PStuE / dUAL

Next Page

B-4 — 0 / ry1.HY — The page will show out, when [ry1.nd] set to be Hi / Lo mode
ry1.HY: Relay 1 Hysteresis
0~5000 counts

B-4-1 — 0.00.0 / ry1.ot — The page will show out, when [ry1.nd] set to be N/R/C mode
ry1.ot: Relay 1 energizing time
0.00.0~9(M).59.9(S)

B-5 — 0.00.0 / ry1.rd — The page will show out, when [ry1.nd] set to be Hi / Lo mode
ry1.rd: Relay 1 energized delay time
0.00.0~9(M).59.9(S)

B-6 — 0.00.0 / ry1.Fd — The page will show out, when [ry1.nd] set to be Hi / Lo mode
ry1.Fd: Relay 1 de-energized delay time
0.00.0~9(M).59.9(S)

B-7 — Hi / ry2.nd — ry2.nd: Relay 2 energized mode
oFF / Lo / Hi / LoHLd / H.HLd / do / btCHn / btCHr / btCHC / totL.n / totL.r / totL.C

B-8 — 0 / ry2.HY — The page will show out, when [ry2.nd] set to be Hi / Lo mode
ry2.HY: Relay 2 Hysteresis
0~5000 counts

B-8-1 — 0.00.0 / ry2.ot — The page will show out, when [ry2.nd] set to be N/R/C mode
ry2.ot: Relay 2 energizing time
0.00.0~9(M).59.9(S)

B-9 — 0.00.0 / ry2.rd — The page will show out, when [ry2.nd] set to be Hi / Lo mode
ry2.rd: Relay 2 energized delay time
0.00.0~9(M).59.9(S)

B-10 — 0.00.0 / ry2.Fd — The page will show out, when [ry2.nd] set to be Hi / Lo mode
ry2.Fd: Relay 2 de-energized delay time
0.00.0~9(M).59.9(S)

B-11 — Hi / ry3.nd — ry3.nd: Relay 3 energized mode
oFF / Lo / Hi / LoHLd / H.HLd / do / btCHn / btCHr / btCHC / totL.n / totL.r / totL.C / Lo-12

Next Page

C-4 — 12 / dEbnC — dEbnC: Debouching of external control Input
5~255(x8ms)

C-5 — no / E.1=UP — E.1=UP: ECI.1 set to be UP Key function
YES / no

C-6 — no / E.2=dn — E.2=dn: ECI.2 set to be Down Key function
YES / no

D-4 — 10000 / Ao.HS — Ao.HS: Analogue High Output versus High Scale
PV: -19999~29999
Totalizer / Batch:
0~9999999999

D-5 — 0 / Ao.Pro — Ao.Pro: Fine Zero Adjustment for Analogue Low Output
-38011~27524

D-6 — 0 / Ao.SPn — Ao.SPn: Fine Span Adjust. for Analogue High Output
-38011~27524

D-7 — nonE / P.SCLr — P.SCLr: Zero & Span Clear for Adjustment
nonE / Ao.Pro / Ao.SPn / botH

D-8 — 110.00 / Ao.Lmt — Ao.Lmt: Analog Output High Limit
0.00~110.00%

rS485 / GrUP — RS485 GROUP

E-1 — 1 / AdrES — AdrES: Device number of the meter
1~255

E-2 — 9600 / bAUd — bAUd: Baud rate
1200 / 2400 / 4800 / 9600 / 19200 / 38400

E-3 — n.8.2 / Pr.tY — Pr.tY: Parity
n.8.1 / n.8.2 / odd / EuEn

CS2-TM(Analog)

A-14 — min / tbASE

tbASE : Time Base of Totalizer & Batch

SEC / min / Hour / dAY

A-15 — Pu / dSPLY

dSPLY : Display Function

Pu / minHd / mAXHd / rS485 / bAtCH

A-16 — 0 / LoCUt

LoCUt : Low Cut Function

-19999~29999

A-17 — 5 / AvG

AvG : Average update for PV

1(None)~ 99 times

A-18 — 1 / mAvG

mAvG : Moving Average update for PV

1(None)~ 10 times

A-19 — 0 / dFiLt

dFiLt : Digital filter

0(None)/1~ 99 times

A-20 — 1 / PLSdu

The page will show out, when pulse output has specified

PLSdu : Pulse divider

0000~9999

A-21 — 0 / PCodE

PCodE : Pass Code for enter Engineer Level

0000~9999

A-22 — nonE / FLoCK

FLoCK : Function Level Lock

nonE / USEr / EnG / ALL

B-12 — 0 / rY3HY

The page will show out, when [rY3md] set to be Hi / Lo mode

rY3HY : Relay 3 Hysteresis

0~5000 counts

B-12-1 — 0.00.0 / rY3ot

The page will show out, when [rY3md] set to be N/R/C mode

rY3ot : Relay 3 energizing time

0.00.0~ 9(M).59.9(S)

B-13 — 0.00.0 / rY3rd

The page will show out, when [rY3md] set to be Hi / Lo mode

rY3rd : Relay 3 energized delay time

0.00.0~9(M).59.9(S)

B-14 — 0.00.0 / rY3Fd

The page will show out, when [rY3md] set to be Hi / Lo mode

rY3Fd : Relay 3 de-energized delay time

0.00.0~9(M).59.9(S)

B-15 — Hi / rY4md

rY4md : Relay 4 energized mode

oFF / Lo / Hi / LoHLd / HiHLd / do / btCHn / btCHr / btCHC / totLn / totLr / totLC

B-16 — 0 / rY4HY

The page will show out, when [rY4md] set to be Hi / Lo mode

rY4HY : Relay 4 Hysteresis

0~5000 counts

B-16-1 — 0.00.0 / rY4ot

The page will show out, when [rY4md] set to be N/R/C mode

rY4ot : Relay 4 energizing time

0.00.0~9(M).59.9(S)

B-17 — 0.00.0 / rY4rd

The page will show out, when [rY4md] set to be Hi / Lo mode

rY4rd : Relay 4 energized delay time

0.00.0~9(M).59.9(S)

B-18 — 0.00.0 / rY4Fd

The page will show out, when [rY4md] set to be Hi / Lo mode

rY4Fd : Relay 4 de-energized delay time

0.00.0~9(M).59.9(S)

▶ Plesae refer to operating manual for detail description