CS2-TM MULTIFUNCTION Totalizer (Pulse input)

■DESCRIPTION

The CS2-TM(Pulse Input) is innovation totalizer.

☑ Adtek builds in high technology with wide input range from 0.01Hz~ 140.00KHz with auto-range function at same unit. There are three setting modes for K factor, 1/K factor and flow speed to match the difference output description of flow-meters.

The Totalizer provides high accuracy measurement, display, control and communication (Modbus RTU mode) of Pulse from Flowmeter or encoder, proximity switch, photo switch for length control.

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 Pulse auto range 0.01Hz~100KHz(optional:140KHz); Contact / NPN / PNP / Voltage Pulse can be switch on rear of meter
- Accuracy of immediate Value: ± 0.005%; Decimal Point auto moving according to input frequency
- Dual display screen for 10 digital Totalizer or Batch counter + 4 2/3 Immediate Value (PV) or 6 digital Batch programmable.
- 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

CS2-TM- [Input Range] – [Relay Output] OPTION – [Analogue Output] OPTION – [RS 485 Port] OPTION – [Pulse Output] – [AUX. POWER]

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

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
U	P	Pick Up sensor

Please specify the range of amplitude, If the input mode has specified to be pick up sensor.

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

■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.		

Calibration: Doesn't need calibration

Input range: **Auto range: 0.01Hz~100kHz(~140kHz in option)**

Accuracy: ≤± 0.005% of FS ± 1C for immediate value(PV);

Sampling rate: 15 cycles/sec(≥15Hz);
f cycles/sec(≤15Hz)

Response time: ≤100 m-sec.(when the AvG = "1") in standard

Time out function: Auto, Manual programmable, In manual mode, the period of time out can be set 0.0 sec~999.9sec

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): 0~99999;
Batch: 0~999999
Totalizer / Batch Counter: 0~9999999999

For Immediate Value(PV)

Time unit(Flow/T_unit): Flow/second, Flow/Min, K*Flow/Min, Flow/Hour, K*Flow/Hour programmable

Resolution of PV: Decimal point will Auto-changed according to input

(Auto-Moving for d.p.) **Auto / Semi-Auto / Fix; 3 mode programmable**

Over range indication: ouFL, when input is over 20% of input range Hi

Max / Mini recording: Maximum and Minimum value storage during power on.

Display functions: **PV / Max(Mini) Hold / RS 485 / Batch programmable for down screen.**

Factor setting: **there are 3 parameter modes can be set**

Pulse/Flow-unit(K factor): settable range: 0.0001~99999

Flow/Pulse (1/K factor) : settable range: 0.0001~99999

Volume/Hz with diameter of pipe:

Diameter settable range: 0.0001~99999

Volume/Hz(Flow rate) settable : 0.0001~99999

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: 0~99999

PuSPn: Settable range: 0~99999

For Totalizer / Batch / Batch Counter

Decimal point: Settable: 0 / 0.0 / 0.000 / 0.000 / 0.0000
(If time unit set to be K*Flow/Min or K*Flow/Hour, the decimal point is settable 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

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

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 / DO programmable;
DO function: Energized by RS485 command of master.

D.P. of Set Point: 0 / 0.0 / 0.00 / 0.000 / 0.0000

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 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**
RaHS (output range high):
Settable range: 0~99999 / 0~9999999999
RaLS (output range Low):
Settable range: 0~99999 / 0~9999999999
RaLHt (output High Limit): 0.00~110.00% of output High

Digital fine adjust: RaPro: Settable range: -38011~+27524
RaSPn: 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

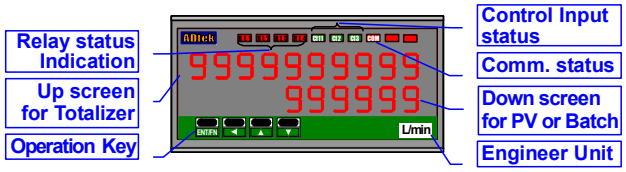
Power consumption: 5.0VA maximum

Back up memory: By EEPROM

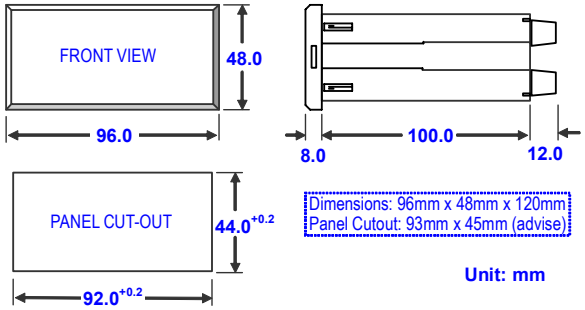
Amend: 2009/11/10: add new function Duty cycle(PLSH): Settable from 0(Auto: Duty cycle=50%)/1~5000(x 4msec.)

Amend: 2010/4/14: add new selection in time unit for K*Flow/Min and K*Flow/Hour

■FRONT PANEL

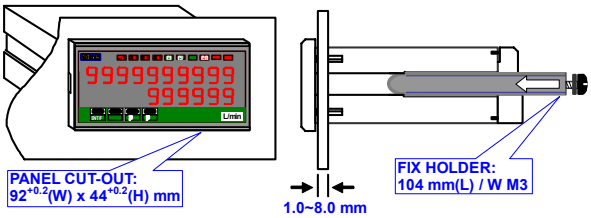


■DIMENSIONS

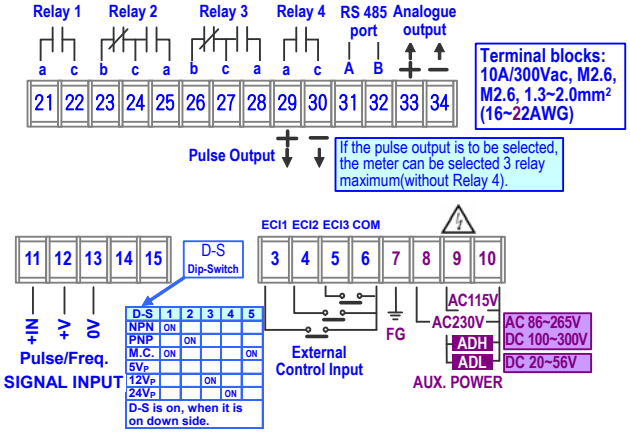


■INSTALLATION

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

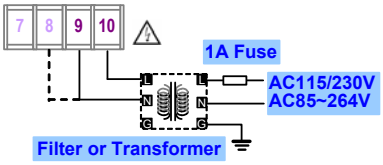


■CONNECTION DIAGRAM

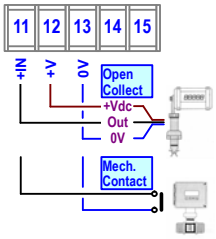


Please check the voltage of power supplied first, and then connect to the specified terminals. It is recommended that power supplied to the meter be protected by a fuse or circuit breaker.

Power Supply



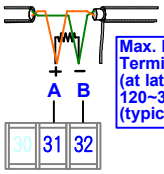
Sensor input connection



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 $5V_P$					
Voltage pulse $12V_P$			ON		
Voltage pulse $24V_P$				ON	
D-S is on when it is in down site					

RS485 Communication Port



Max. Distance: 1200M
Terminate Resistor
(at latest unit):
120~300ohm/0.25W
(typical: 150ohm)

■FUNCTION DESCRIPTION

Input & Scaling Functions

Input range: **Auto-Range:** 0.01Hz~100.00KHz(option 140KHz),

The meter has been designed very wide input auto-range from 0.01Hz~100.00KHz (Option: 0.01Hz~140.00KHz) that can cover almost any application for RPM, Linear Line Speed and Frequency. User doesn't need to specify the input range.

Auto range display: programmable between Auto Range / Semi-Auto Range / manual range, The description as below,

Auto range AUto: The decimal point will be auto changed according to the input frequency so that keep reading in the highest resolution.

Semi-Auto range SEMI:

The decimal point will be auto changed according to the input frequency to keep reading in the highest resolution under setting position of decimal point, According to the setting of decimal point. So, it's possible to show "overflow", if the input frequency is over the display range.

Manual range MANUL: The decimal point will be fixed

Time out of input:

In the case of low frequency, the meter can not to identify that is low frequency and no input until the next pulse input. Sometimes, it takes a long period.

The meter builds in a time out function to cut out the reading to be "0".

There are two modes MANUL / AUto can be programmed.

Manual MANUL: There is a period named tto can be set from 0.0 sec ~ 999.9 sec. The reading will display "0", when the next pulse doesn't input during the setting time.

Auto range AUto: The reading will display "0", when the next pulse doesn't input during the time that gave by formula of meter's firmware.

Period of time out: Settable: 0.0 sec~999.9sec

If the time out mode **[ttoMd]** set to be MANUL, it's will be show up.

Display & Functions

Dual display screens:

Down screen can be Immediate Value(PV) and Batch programmable; Up screen can be Totalizer and Batch counter programmable.

For Immediate Value(PV)

Three setting modes for flow meters:

There are three types setting for **Pulse/Flow-unit(K factor)**, **Flow/Pulse(1/K factor)** and **Flow rate/Hz** to match the difference output description of flow meters. Engineer needs just to check the mode of flowmeter and setting. The totalizer will calculating the flow rate, and accumulation.

Remark: A K-Factor is the number of pulses a sensor will generate for each engineering unit of fluid which passes the sensor.

Pulse/Flow-unit (K factor):

▶ **The decimal point of K Factor:** Settable range from 0 to 0.0000.

▶ **Pulse/Flow-unit(K factor):** Settable range from 0.0001 to 99999

Ex. A rotor X sensor fit in 4" pipe. The K Factor is 5.2417Pulse/Liter

Please select PLSPF in function **[FtYP]**, set the **[FdP]** to 00000, and **[PLSPF]** to 52417. The meter will caculate and show the right meassuring(Immediate value).

Flow/Pulse (1/K factor):

▶ **The decimal point of 1/K Factor:** Settable range from 0 to 0.0000.

▶ **Flow/Pulse(1/K factor):** Settable range from 0.0001 to 99999

Ex. A rotor X sensor fit in 4" pipe. The 1/K Factor is 1.2345Liter/Pulse

Please select FPPLS in function **[FtYP]**, set the **[PdP]** to 00000, and **[FPPLS]** to 12345. The meter will caculate and show the right meassuring(Immediate value).

Volume/Hz:

▶ **The decimal point of pipe's diameter:** Settable range from 0.0001 to 99999.

▶ **Diameter of pipe:** Settable range from 0 to 0.0000(Unit)

▶ **The decimal point of flow rate (Length/sec):** Settable range from 0 to 0.0000.

Flow Rate: Settable range from 0.0001 to 99999(Unit)

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.

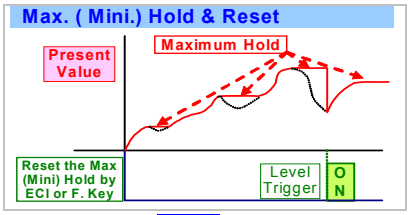
Display functions: **PV / Max(Mini) Hold / RS 485 programmable for down screen in [dSPLY] function of [inPUt GroUP]**

Present Value Pv: 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 MH 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 [ECi GroUP]. Please refer to explain of ECI functions.**

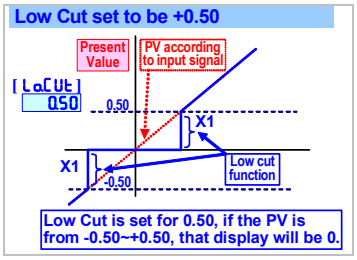
Low cut: Settable range from -19999~+99999 counts.

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

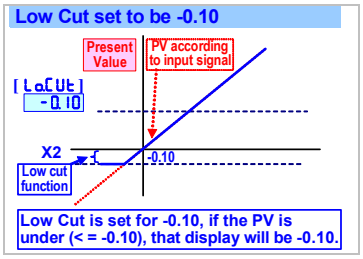
EX: Low Cut is set for 0.50. If the display is from -0.50~+0.50, that will be 0.



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.

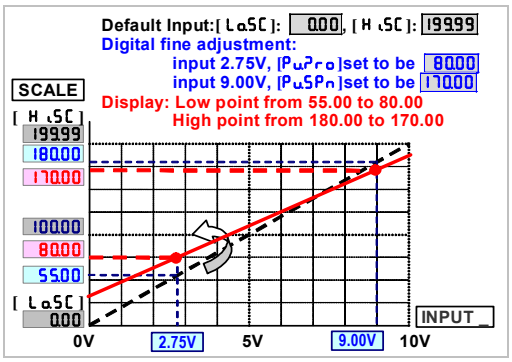


Digital fine adjust: Settable range: 0~99999

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: ovFL ouFL / Re-cycle rCYCL counting programmable

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

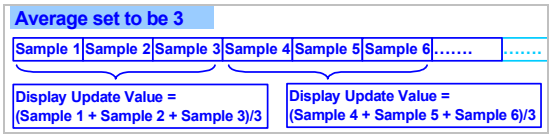
And it will re-count from "0", if the [oFLmd] set to be rCYCL.

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.

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

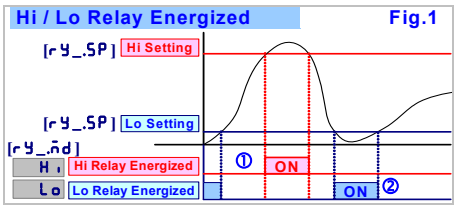
4 relay can be programmable to relative Totalizer, Batch, Batch Counter and Immediate Value (PV) with individual functions. Please refer to the detail as following

For Immediate Value(PV)

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

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

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

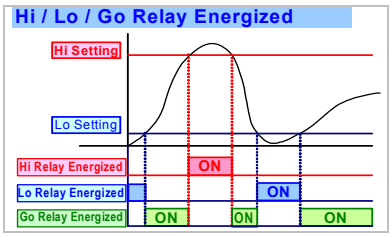


Go-1.2 Go-12: This function is programmable in Relay 3 only.

If the Relay 3 set to be Go function, the relay will compare with [ry1SP] and [ry2SP].

Go relay energized when the condition is

[ry1SP] (Hi) > PV > [ry2SP] (Lo)



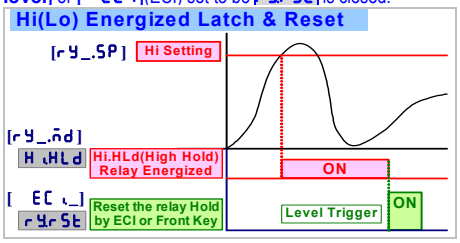
Hi.HLd HiHLd **(Lo.HLd** LoHLd**) :**

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

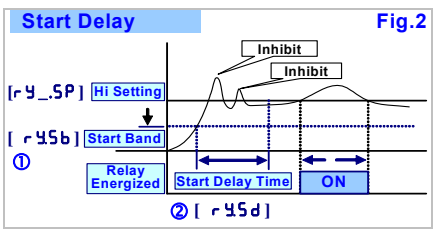
Start delay band and Start delay time:

The functions have Been designed for,

- ► To avoid starting current of inductive motor (6 times of rated current) with alarm.
- ► If the ry_md 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

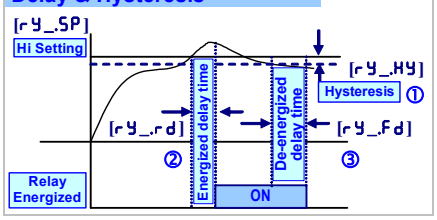
As the display value is swing near by the set point to cause the relay on and off frequently. The function is to avoid the relay on and off frequently such as compressor…….etc.,

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.

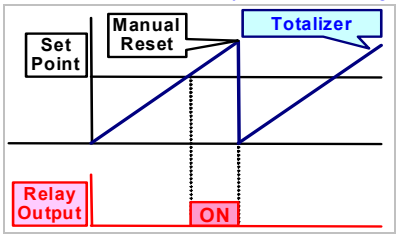
Relay energized mode: N / C / R mode

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:

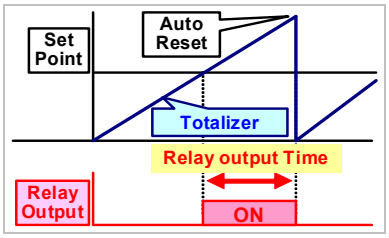
1. The relay will be energized;
2. The totalizer / batch count will run as same as usual, until manual reset by front key or by ECI of rear terminal, the totalizer / batch count will be reset to "0" and the relay will be de-energized.



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

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

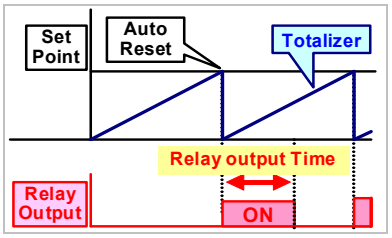
1. The relay will be energized, until the time is over Relay output time **[ry_.ot]**(Relay _ output times).
2. The totalizer / batch count will run as same as usual; until the time is over Relay output time **[ry_.ot]** (Relay _ output time),The totalizer / batch count will be reset to "**0**".



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 / batch count 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:

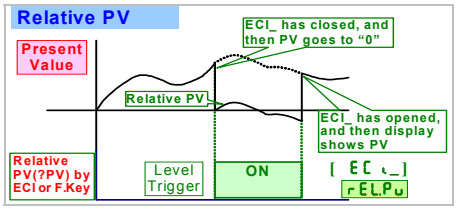
[dEbnC] set to be 5, it means 5 x 8mseconds = 40mseconds

For Immediate Value(PV)

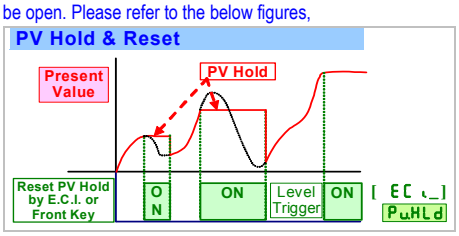
Functions: Relative PV / PV Hold / Reset Max or Mini. Hold / **DI** / Reset for Relay Energized latch **programmable.**

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.



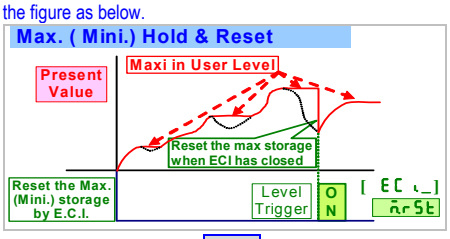
PV Hold [PvHLd]: The **[EC i_]** can be set to be **[PvHLd]**(PV Hold) function. The display will be hold when the E CI is closed, until the ECI is to be open. Please refer to the below figures,



Reset for Maximum or Minimum Hold [rnSt]:

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

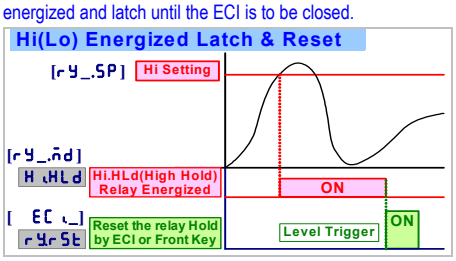
The **[EC i_]** function can be set to be **[rnSt]** function to reset the maximum and minimum value in **[User Level]** by terminals of ECI (close). Please refer to the figure as below.



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 [rYrSt]:

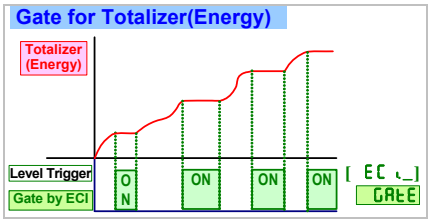
If the relay energized mode has been set to be [H.HLd](Energized latch), and the [EC ↳] can be set to be [rYrSt](Reset the Relay energized latch). When the PV meets the condition of relay energizing, the relay will be energized and latch until the ECI is to be closed.



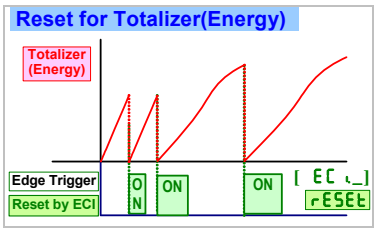
For Totalizer / Batch / Batch Counter

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 / batch count 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 / batch count 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

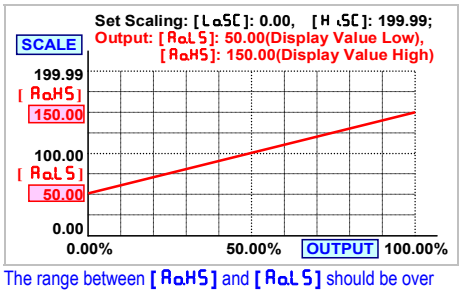
Functions: Output High / Low scale, output limit, fine adjustment

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]:

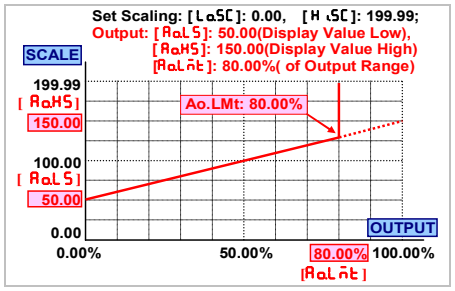
To setting the Display value Low to versus output range Low(as like as 4mA in 4~20)



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:

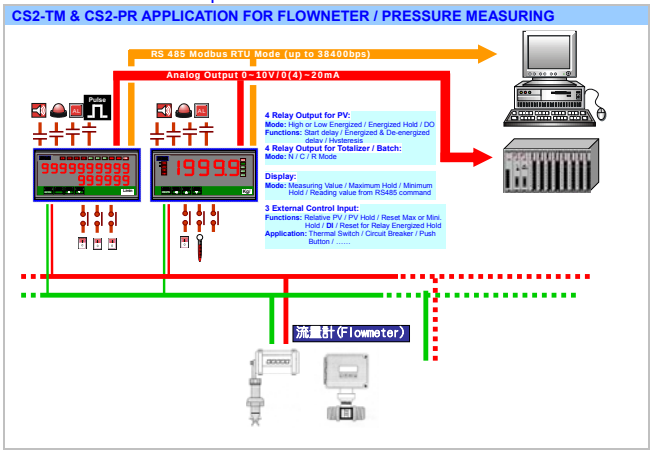
Users can get Fine Adjustment of analogue output by front key of the meter. Please connect standard meter to the terminal of analogue output. To press the front key(up or down key) of meter to adjust and check the output.

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.

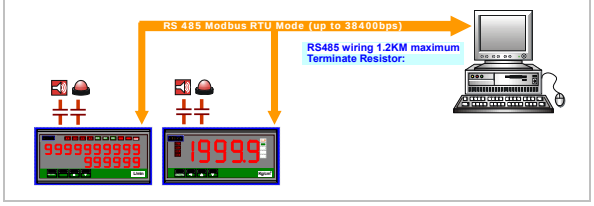


Remote Display:

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.

CS2-TM APPLICATION FOR REMOTE DISPLAY FROM RS485 COMMAND

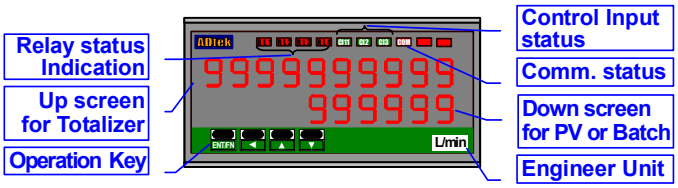


Calibration System calibration by front key. The process of calibration, please refer to the operating manual

■ 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.

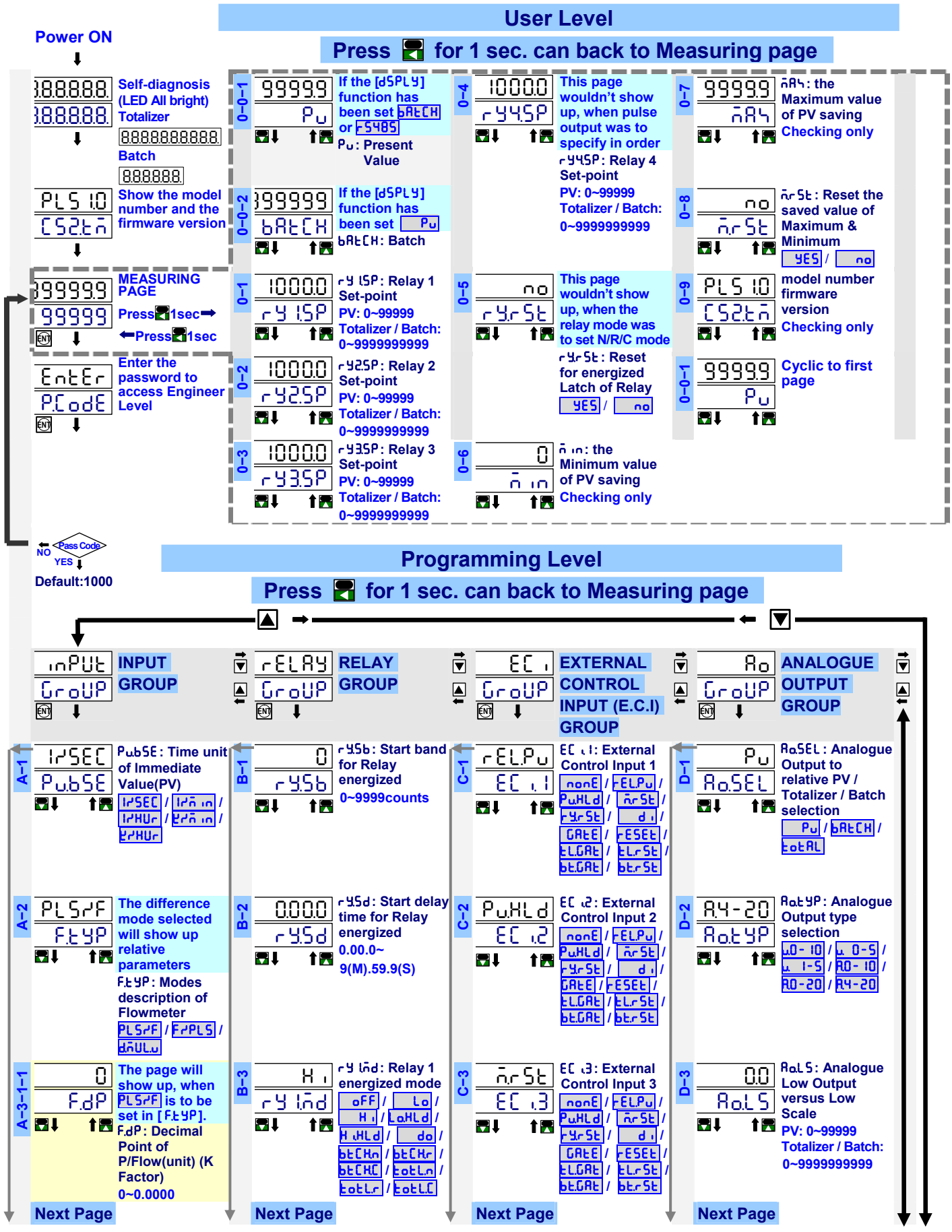
- **None** nonE**:** no lock all.
- **User Level** USEr**:** User Level lock. User can get into User Level for checking but setting.
- **Programming Level** EnG**:** Programming level lock. User can get into programming level for checking but setting.
- **ALL** ALL**:** All lock. User can get into all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



CS2-TM(Pulse)

A-3-1-2
10000 / PLS-F
The page will show up, when PLS-F is to be set in [FtYP].
PLS-F: P/Flow(unit) (K Factor) Setting
0.0001~99999

A-3-2-1
0 / F.dP
The page will show up, when F-PLS is to be set in [FtYP].
F.dP: Decimal Point of Flow/P (1/K Factor)
0~0.0000

A-3-2-2
10000 / F-PLS
The page will show up, when F-PLS is to be set in [FtYP].
F-PLS: Flow/Pulse (1/K Factor) Setting
0.0001~99999

A-3-3-1
0 / d inDP
The page will show up, when dnULu is to be set in [FtYP].
d inDP: Decimal Point of diameter of pipe
0~0.0000

A-3-3-2
10000 / d inAt
The page will show up, when dnULu is to be set in [FtYP].
d inAt: Diameter of pipe setting
0.0001~99999 (Unit)

A-3-3-3
0 / uL.dP
The page will show up, when dnULu is to be set in [FtYP].
uL.dP: Decimal Point of Flow speed (Length/sec)
0~0.0000

A-3-3-4
0 / uL-HZ
The page will show up, when dnULu is to be set in [FtYP].
uL-HZ: Volume/Hz, Flow speed setting
0.0001~99999 (Unit)

A-4
0 / dP
dP: Decimal point of set-point for Realy energized
0~0.0000

A-5
0 / ttL.dP
ttL.dP: Decimal point of totalizer
0~0.0000

Next Page

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

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

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

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

B-7
Hi / rY2nd
rY2nd: Relay 2 energized mode
oFF / Lo / Hi / LoHLd / HiHLd / do / btCHn / btCHr / btCHC / totLn / totLr / totLC

B-8
0 / rY2HY
The page will show up, when [rY2nd] set to be Hi / Lo mode
rY2HY: Relay 2 Hysteresis
0~5000 counts

B-8-1
0.00.0 / rY2ot
The page will show up, when [rY2nd] set to be N/R/C mode
rY2ot: Relay 2 energizing time
0.00.0~9(M).59.9(S)

B-9
0.00.0 / rY2rd
The page will show up, when [rY2nd] set to be Hi / Lo mode
rY2rd: Relay 2 energized delay time
0.00.0~9(M).59.9(S)

B-10
0.00.0 / rY2Fd
The page will show up, when [rY2nd] set to be Hi / Lo mode
rY2Fd: Relay 2 de-energized delay time
0.00.0~9(M).59.9(S)

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
1000.0 / AoHS
AoHS: Analogue High Output versus High Scale
PV: 0~99999
Totalizer / Batch: 0~9999999999

D-5
0 / AoZro
AoZro: Fine Zero Adjustment for Analogue Low Output
-38011~27524

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

D-7
nonE / ZSCLr
ZSCLr: Zero & Span Clear for Adjustment
nonE / AoZro / AoSPn / both

D-8
110.00 / AoLnt
AoLnt: Analog Output High Limit
0.00~110.00%

CS2-TM(Pulse)

A-6 `ttL` / `UP.dSP` — **UP.dSP: Up screen displays totalizer or batch Counter**
`ttL` / `btCnt`

A-7 `ouFL` / `oFLnd` — **oFLnd: overflow mode of totalizer or batch**
`ouFL` / `rCYCL`

A-8 `PSEuE` / `SiGn` — **SiGn: Sign of accumulate up or down**
`PSEuE` / `dUAL`

A-9 `0` / `PuSPn` — **PuSPn: Fine High point Adjustment for PV display**
0~99999

A-10 `nonE` / `SCLr` — **SCLr: Clear Fine Span Adjustment for PV display**
`nonE` / `PuSPn`

A-11 `Pu` / `dSPLY` — **dSPLY: Display Function**
`Pu` / `HinHd` / `rAYHd` / `rS485` / `bAtCH`

A-12 `0` / `LoCUt` — **LoCUt: Low Cut Function**
-19999~29999

A-13 `AUto` / `itond` — **itond: Input time out Mode**
`AUto` / `MAnUL`

A-14 `0.0` / `ito` — **If [itond] has been selected MAnUL, This function will be showed out**
ito: How long will be time out
0.0~999.9sec

A-15 `AUto` / `rAnGE` — **rAnGE: Reading Range with decimal point switching.**
`AUto` / `SEn.i` / `MAnUL`

Next Page

B-11 `Hi` / `ry3nd` — **ry3nd: Relay 3 energized mode**
`oFF` / `Lo` / `Hi` / `LoHLd` / `HiHLd` / `do` / `btCHn` / `btCHr` / `btCHC` / `totLn` / `totLr` / `totLC` / `Lo-12`

B-12 `0` / `ry3HY` — **The page will show up, when [ry3nd] set to be Hi / Lo mode**
ry3HY: Relay 3 Hysteresis
0~5000 counts

B-12-1 `0.00.0` / `ry3ot` — **The page will show up, when [ry3nd] 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 up, when [ry3nd] 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 up, when [ry3nd] set to be Hi / Lo mode**
ry3Fd: Relay 3 de-energized delay time
0.00.0~9(M).59.9(S)

B-15 `Hi` / `ry4nd` — **ry4nd: Relay 4 energized mode**
`oFF` / `Lo` / `Hi` / `LoHLd` / `HiHLd` / `do` / `btCHn` / `btCHr` / `btCHC` / `totLn` / `totLr` / `totLC`

B-16 `0` / `ry4HY` — **The page will show up, when [ry4nd] set to be Hi / Lo mode**
ry4HY: Relay 4 Hysteresis
0~5000 counts

B-16-1 `0.00.0` / `ry4ot` — **The page will show up, when [ry4nd] 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 up, when [ry4nd] 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 up, when [ry4nd] set to be Hi / Lo mode**
ry4Fd: Relay 4 de-energized delay time
0.00.0~9(M).59.9(S)

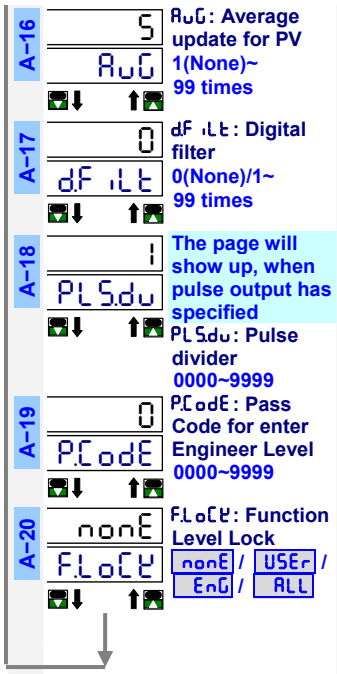
Next Page

`rS485` / `GroUP` — **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.St.2` / `Pr.tY` — **Pr.tY: Parity**
`nSt.1` / `nSt.2` / `odd` / `EuEn`



▶ Plesae refer to operating manual for detail description