

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.

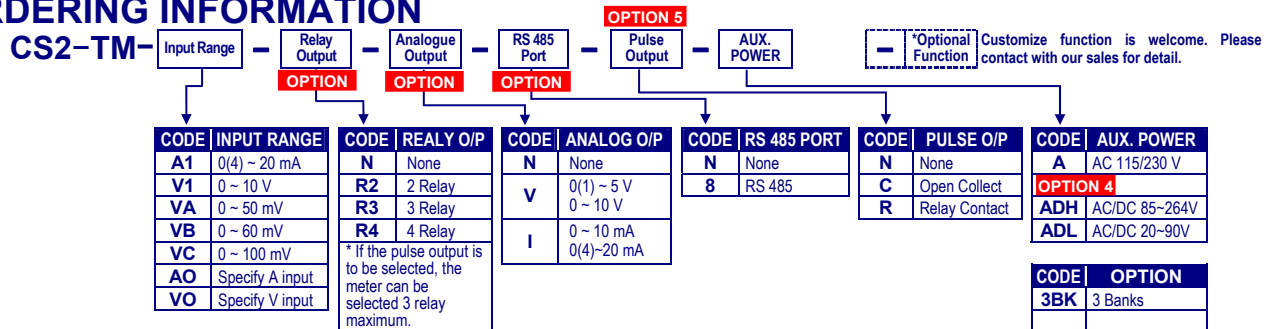
There are two display screen and 3 external control input (DI) in standard and the optional 4 Relay, 1 Analogue, 1 Pulse and RS485 port available. They are also support fantastic control function as like as N, C, R mode for totalizer and batch control.



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, Hysteresys, Energized Delay, De-energized Delay, Energized latch or Energized by **RS485 command.**
 - Relative to Totalizer / Batch / Batch Counter: N/C/R 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 Maximum or Minimum 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



TECHNICAL SPECIFICATION

Input

Input Range	Input Impedance	Input Range	Input Impedance
Voltage	0 ~ 10 V	Current	0(4)~20 mA
	0 ~ 100 mV		
	≥ 1M ohm		250 ohm
	≥ 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 msec.(when the AvG = "1") in standard

Input range: Input High and Low programmable with **square root function**
 Ai.Hi: Settable range: 0.00~100.00% of input range
 Ai.Lo: Settable range: 0.00~100.00% of input range

Display & Functions

LED: Up screen: 10 digits, 0.28" red high-brightness LED
 Down screen: 6 digits, 0.28" red high-brightness LED
 Relay output indication: 4 square red LED

RS 485 communication: 1 square orange LED
 E.C.I. function indication: 3 square green LED
 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: Lo.SC: Low Scale; Settable range: -19999~+29999
 Hi.SC: High Scale; Settable range: -19999~+29999
 Programmable from 0 / 0.0 / 0.00 / 0.000 / 0.0000
Decimal point: Extra 3 banks programmable for scaling & decimal point

Banks function: ovFL, when input is over 20% of input range Hi

Over range indication: -ovFL, when input is under -20% of input range Lo

Under range indication: Maximum and Minimum value storage during power on.

Max / Mini recording: PV / Max(Mini) Hold / RS 485 / Batch

Display functions: Programmable for down screen.

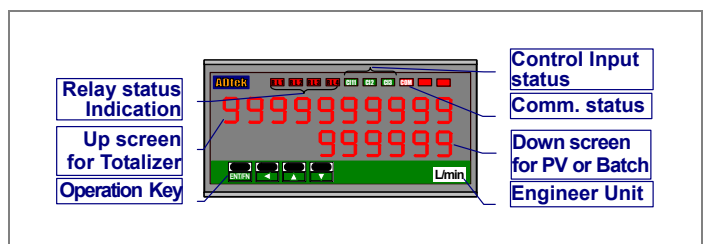
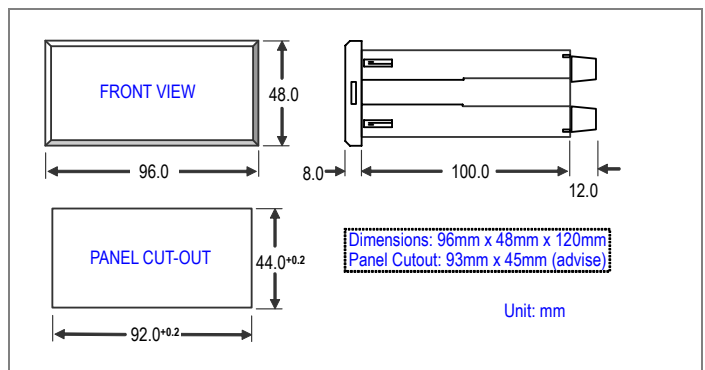
Front key functions: *Up and down key can be set to be a function as ECI.***Low cut:** Settable range: -19999~29999 counts**Digital fine adjust:** Pv.Zro: Settable range: -19999~+29999

Pv.SPn: Settable range: -19999~+29999

For Totalizer / Batch / Batch Counter**Decimal point:** Settable: 0 / 0.0 / 0.000 / 0.000 / 0.0000**Over flow indication:** ovFL / Re-cycle counting programmable**Reading Stable Function****Average:** Settable range: 1~99 times**Moving average:** Settable range: 1(Non)e~10 times**Digital filter:** Settable range: 0(Non)e/1~99 times**Control Functions(option)****Set-points:** Four set-points**Control relay:** Four relays

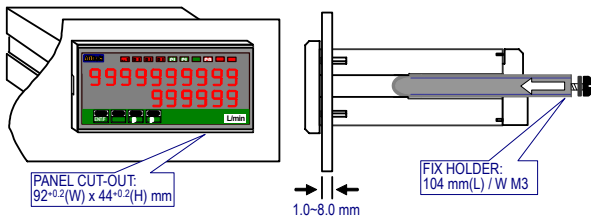
Relay 2 & Relay 3: Dual FORM-C, 5A/230Vac, 10A/115V

Relay 1 & Relay 4: Dual FORM-A, 1A/230Vac, 3A/115V

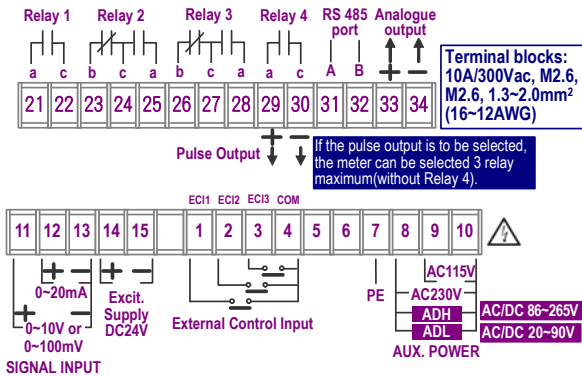
Banks pre-set:**4 banks pre-set for all relay functions to relative 4 difference scaling, and selectable by 3 External Control Inputs(E.C.I.) Or front key****Relay energized mode:** multi-cross selection for immediate Value(PV), batch, batch counter and totalizer.**For Immediate Value(PV)****Energized mode:** Energized levels compare with set-points:*Hi / Lo / Go.12 / Go.23 / 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:** *5 ~255 x (8m seconds)***For Immediate Value(PV)****Functions:** *Relative PV(Tare) / 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 Gate for Totalizer and(or) Batch(Batch Counter) programmable***Analogue output(option)****Accuracy:** $\leq \pm 0.1\%$ of F.S.; 16 bits DA converter**Ripple:** $\leq \pm 0.1\%$ of F.S.**Response time:** ≤ 100 msec. (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**Voltage:** 0~10V; $\geq 1000\Omega$;**Current:** 4(0)~20mA; $\leq 600\Omega$ max**Output capability:****Functions:****Relative to immediate value(PV), totalizer, batch or batch count programmable****Ao.HS**(output range high): Settable range: -19999~29999**Ao.LS**(output range Low): Settable range: -19999~29999**Ao.LMt**(output High Limit): 0.00~110.00% of output High**Digital fine adjust.:****Ao.Zro:** Settable range: -38011~+27524**Ao.SPn:** 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***Amend: 2009/11/10: add new function Duty cycle(PLSH):** Settable from 0(Auto: Duty cycle=50%)/1~5000(x 4msec.)**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:** 150 Ω at last unit.**Electrical Safety****Dielectric strength:** AC 2.0 KV for 1 min, Between Power / Input / Output / Case**Insulation resistance:** $\geq 100M$ 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 materiel:** 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(16~12AWG)**Weight:** 550g / 350g(Aux. Power Code: ADH or ADL)**Power****Power supply:** AC115/230V,50/60Hz;**Optional: AC/DC 85~264V or 20~90V(RoHS version)****Excitation supply:** DC 24V/30mA maximum**Power consumption:** 5.0VA maximum**Back up memory:** By EEPROM**FRONT PANEL****DIMENSIONS**

■ INSTALLATION

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

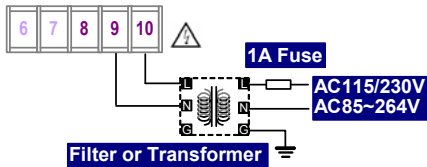


■ CONNECTION DIAGRAM

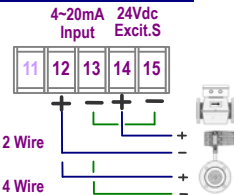


Please check the voltage of power supplied first, and then connect to the specified terminals. It is recommended that power supplied to the meter be protected by a fuse or circuit breaker.

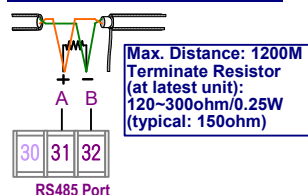
Power Supply



Flow meter connection



RS485 Communication Port



■ FUNCTION DESCRIPTION

Input & Scaling Functions

Dual input types: (Option Code: AV)

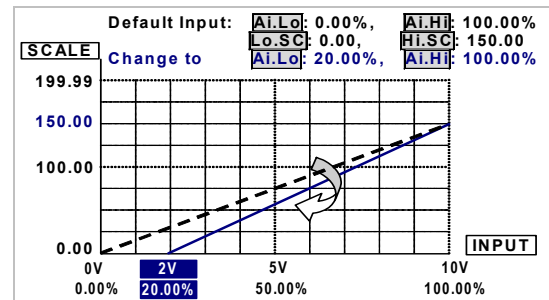
Voltage and Current Type are in one unit available in option. If the customer specifies the input coding for **AV**, the meter will be calibrated for 0~10V and 0~20mA in factory. The user can use in 0~10V or 4(0)~20mA by difference terminals connection (#11 & #13 for 0~10V or #12 & #13 for 4(0)~20mA) and programming in **[Ai.TYP]** of **[inPUt GroUP]**.

Input range:

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 **[Ai.Lo]** and **[Ai.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 **[Ai.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 **[Ai.Lo]** and **[Ai.Hi]**.



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

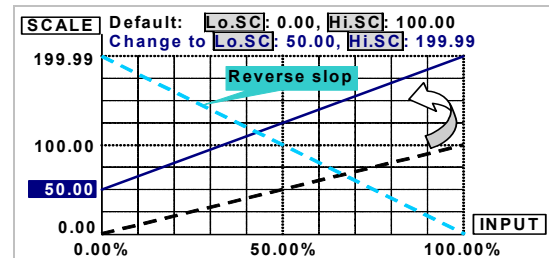
Square root function:

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

The formula = $\sqrt{(Pv/HS)} \times HS$

Scaling function:

The high and low of display range can be programmable to relative input signal high and low. Setting the **[Lo.SC]** (Low scale) and **[Hi.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 cause display lower resolution.

Display & Functions

Dual display screens:

Down screen can be **[Immediate Value(PV)]** or **[Batch]** programmable; Up screen can be **[Totalizer]** or **[Batch counter]** programmable.

Max / Mini recording:

The meter will storage the maximum and minimum value in **[User Level]** during power on in order to review drifting of PV.

Display functions:

(Please refer to step A-15)

PV / Max(Mini) Hold / RS 485 programmable in

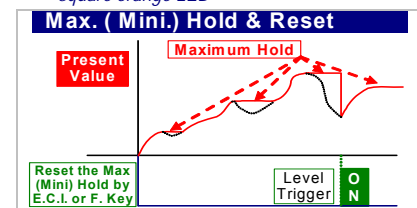
[dSPLY] function of [inPUt GroUP]

Present Value [PV] (Immediate value): The display will show the value that Relative to Input signal.

Maximum Hold [Max.H] / Minimum Hold [Mini.H]:

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 (E.C.I.)]** or press front down or up key to reset (according to setting, please functions of refer to the ECI Group)

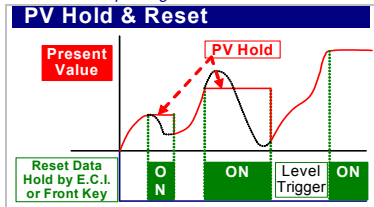
➤ Please find the **[M.H]** sticker that enclosure the package of the meter to stick on the right side of square orange LED



Remote Display by RS485 command RS485: The meter will show the value in down screen that received from RS485 command sending value. The up screen, control function, analogue output... will work and action according to the value.

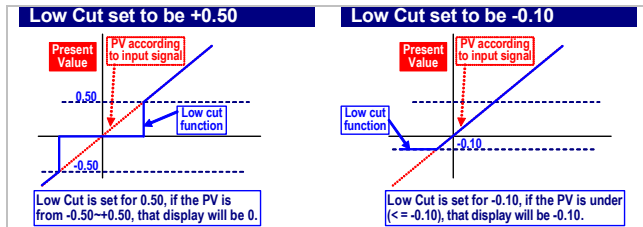
PV Hold Pv.HLd: [External Control Input(E.C.I.)] can be set to be **Pv.HLd** function. (Please refer to the function of ECI Group). The display will be hold, when the E.C.I. is closed.

➤ Please find the **ECI (Pv.HLd)** sticker to stick on the right side of square green LED.



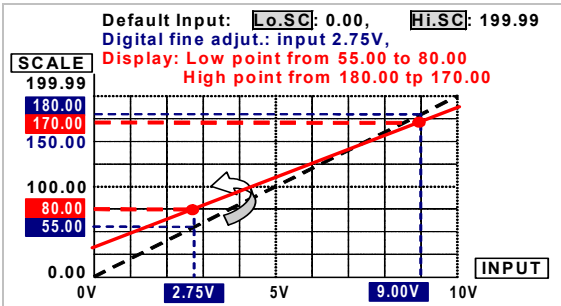
Low cut:

If the setting value is positive, it means when the absolutely value of $PV \leq$ Setting value, the display will be 0. If the setting value is negative, it means when the PV under setting value ($PV \leq -$ Setting value), the display will be setting value.



Digital fine adjustment:

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 [Pv.Zro] & [Pv.SPn] are not only in zero & span of PV, but also any lower point for [Pv.Zro] & higher point for [Pv.SPn]. The meter will be linearization for full scale. The adjustment can be clear in function [Z.S.Clr] .



For Totalizer / Batch / Batch Counter

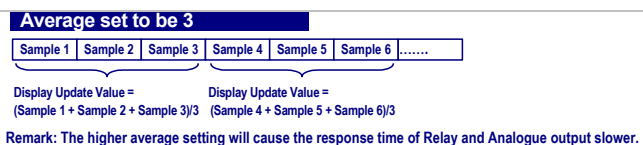
Over flow indication:

The up screen can be programmable **ovFL** or **rCYCL** in [oFL.Md]. **ovFL** that will be stop to count and show **ovFL**, when it is overflow. **rCYCL** that will be re-counting from "0" when it overflow.

Reading Stable Function

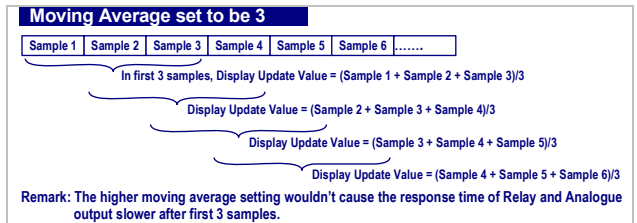
Average:

Basically, the sampling rate of meter is 15cycles/sec. If the function set to be 3 times, It means the meter will update of display will be 5 times/sec.



Moving average:

If the function to be set 3 times, the meter will update delay in first 3 samples, then it will update 15 times/sec continuously.



Digital filter:

The digital filter can reduce the magnetic noise in field.

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.

For Immediate Value(PV)

Relay energized mode: Hi / Lo / Go-1.2 / Go-2.3 / Hi.HLd / Lo.HLd / do programmable

Hi: Relay will energize when $PV >$ Set-Point

Lo: Relay will energize when $PV <$ Set-Point

Go-1.2: This function is programmable in Relay 4 only.

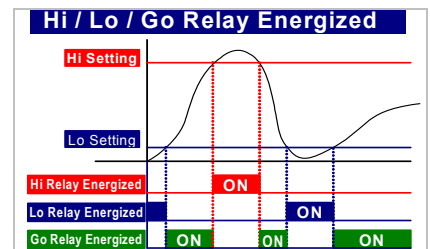
If the Relay 4 set to be Go function, the relay will compare with [rY1.SP] and [rY2.SP] .

Go relay energized when the condition is $[rY1.SP] (Hi) > PV > [rY2.SP] (Lo)$

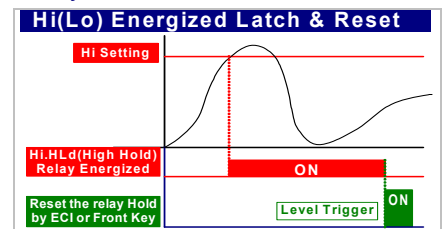
Go-2.3: This function is programmable in Relay 4 only.

If the Relay 4 set to be Go function, the relay will compare with [rY2.SP] and [rY3.SP] .

Go relay energized when the condition is $[rY2.SP] (Hi) > PV > [rY3.SP] (Lo)$



Hi.HLd (Lo.HLd): When the PV is Higher (or lower) than set-point, the relay will be energized and latch until manual reset by from key in [User Level] , [External Control Input(E.C.I.)] is closed or Press front down or up key to reset (UP Key or Down Key functions have been set to be "YES").

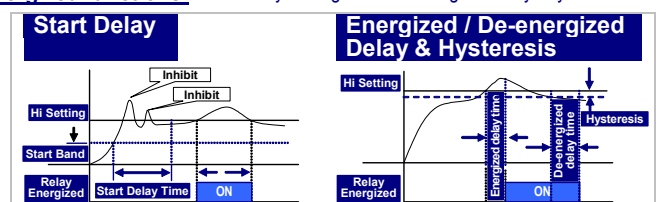


DO function: Energized by RS485 command of master.

The function was designed to get remote control by RS485 command of master. The typical application is to control a switch in field from computer center as like as digital output(DO) of PLC.

Energized functions:

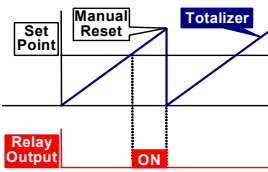
Start delay / Energized & De-energized delay / Hysteresis



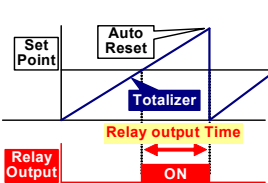
For Totalizer / Batch / Batch Counter

Relay energized mode: N / R / C Mode programmable

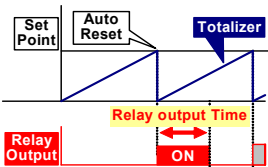
The 3 mode are very useful idea to control the totalizer, batch and batch counter. The relay energized condition is according to not only energized level, but also time and reset for totalizer, batch and batch counter.



N MODE:
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 rear terminal, the totalizer will be reseted to "0" and the relay will be de-energized.



R MODE:
When the condition of Set Point is met:
1. The relay will be energized; until the time is over Relay output time **RY.1(2).ot** (Relay1(2) output time).
2. The totalizer will run as same as usual; until the time is over Relay output time **RY.1(2).ot** (Relay1(2) output time), The totalizer will be reset to "0".



C MODE:
When the condition of Set Point is met:
1. The relay will be energized; until the time is over Relay output time **RY.1.ot** or **RY.2.ot**.
2. The totalizer will be reset to "0", then counts-up from "0".

External Control Inputs(ECI)

The three external control inputs are individually programmable to perform specific meter control or display functions. All E.C.I. have been designed in level trigger actions. Please pay attention, the EC1 or EC2 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 8m seconds. It means you set the number that has to multiple 8m seconds.

For example:

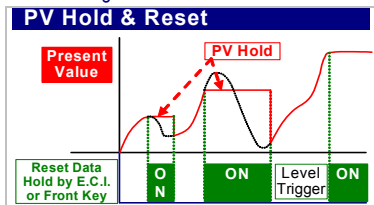
[dEbnC] set to be 5, it means 5 x 8m seconds = 40m seconds

For Immediate Value(PV)

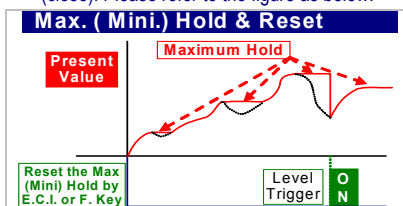
Functions: Relative PV / PV Hold / Reset Max or Mini. Hold / DI / Reset for Relay Energized latch / Banks selection programmable

Relative PV or Tare: The E.C.I. can be set to be **Rel.PV** function. When the E.C.I. is closed, the reading will show the differential value.

PV Hold: The E.C.I. can be set to be **Pv.HLd** function. The display will be hold when the E.C.I. is closed, until the E.C.I. is to be open. Please refer to the below figure.



Reset for Maximum or Minimum Hold: When the [DSPLY] function in [inPUt GroUP] selected **MAX.H** or **Mini.H**, the display will show Maximum or Minimum value, and can be reset by the E.C.I (close). Please refer to the figure as below.



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: If relay energized mode has set to be Energized latch (**Hi.HLd** / **Lo.HLd**), the E.C.I. can be set to be **RY.RSt**. When the PV meets the condition of relay energizing, the relay will be energized and latch until the E.C.I. is closed.

For Totalizer / Batch / Batch Counter

Gate function:

When the ECI close, the totalizer, Batch or Batch counter will stop to accumulate and keep the value until the ECI open. There are three mode programmable; Totalizer, Batch & Batch counter / Totalizer / Batch & Batch Counter.

Reset function:

When the ECI close, the totalizer, Batch or Batch counter will reset to "0", and start to count until the ECI open. There are three mode programmable; Totalizer, Batch & Batch counter / Totalizer / Batch & Batch Counter.

Pulse Output(Optional)

The totalizer has been built in a pulse output to relative totalizer, batch or batch counter programmable. The terminals are same as relay 4 so that can not exit relay 4 and pulse output in one totalizer.

Pulse divider:

- > **PLS.dv** 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.
- > **PLS.dv** 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)

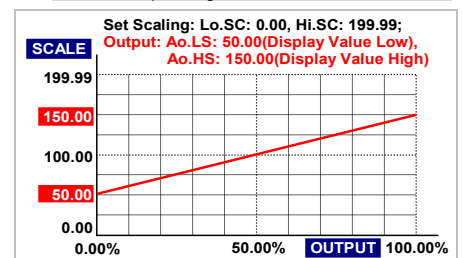
Please specify the output type either an 0~10V or 4(0)~20mA in ordering. The programmable output low and high scaling can be based on various display values. Reverse slope output is possible by reversing point positions.

Output range:

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

Functions:

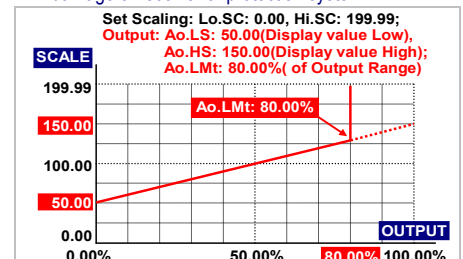
Ao.HS (output range high): setting the Display value High to versus output range High (as like as 20mA in 4~20)
Ao.LS (output range Low): setting the Display value Low to versus output range Low (as like as 4mA in 4~20)



The range between **Ao.HS** and **Ao.LS** should be over 20% of span at least; otherwise, it will be got less resolution of analogue output.

Ao.LMt (output High Limit): 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:

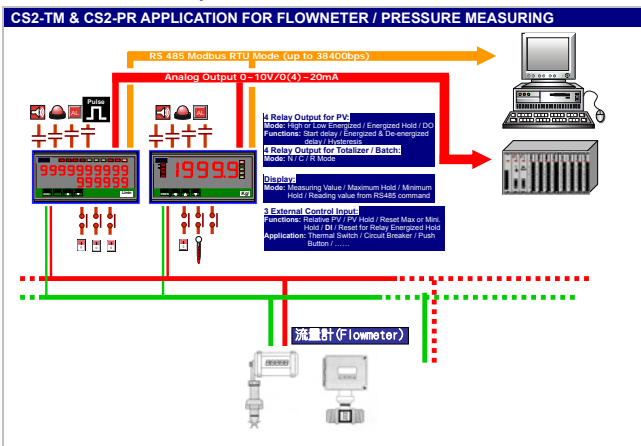
Users can get Fine Adjustment of analogue output by front key of the meter. Please connect standard meter to the terminal of analogue output. To press the front key(up or down key) of meter to adjust and check the meter the output.

[Ao.Zro] : Fine Zero Adjustment for Analog Output;
Settable range: -38011~27524;

[Ao.Spn] : Fine Span Adjustment for Analog Output;
Settable range: -38011~27524;

RS 485 communication(option)

The RS485's protocol is Modbus RTU mode, and baud rate up to 38400 bps. It's not only convenience to remote monitoring, display for reading and ECI status, but also for remote control in the case that doesn't have any DIO device in the field.

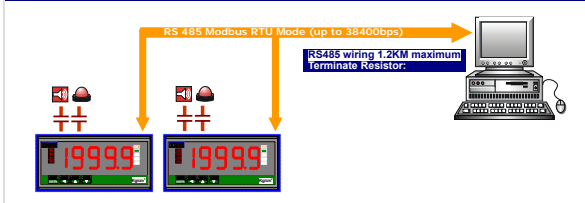


Remote display:

The meter will show the value in down screen that received from RS485 command sending value.

When the **[dSPLY]** set to be RS485, it means, the down screen will show the number from RS485 command & data. The data(number) will be same as PV that will make totalizer/batch/batch counter to accumulate, compare with set-point, analogue output and ECI functions so that is to control analogue output, relay energized and so on.

CS2 APPLICATION FOR REMOTE DISPLAY FROM RS485 COMMAND



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 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 **Lo.SC**: 0.0000 **Hi.SC**: 1.0000 **rY1.Md**: totL_C

rY1.SP: 2.0000 **rY1.rd**: 0(M).00.5(S)

BANK2: **dp**:0.000 **Lo.SC**: 0.000 **Hi.SC**: 5.000 **rY1.Md**: totL_C

rY1.SP: 6.0000 **rY1.rd**: 0(M).01.0(S)

ECI.1: Bank.1 **ECI.2**: Bank.2;

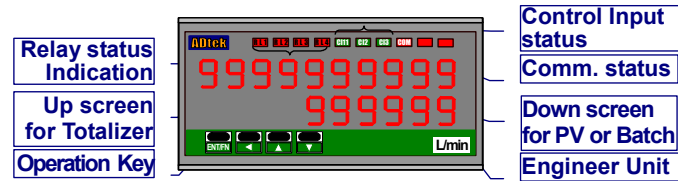
connect to a selector (or DO of PLC) to ECI1 and ECI2

- 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

DESCRIPTION	DISPLAY	FLASH	REMARK
BEFORE POWER ON, PLEASE CHECK THE SPECIFICATION AND CONNECTION AGAIN.			
SELF-DIAGNOSIS AND ERROR CODE:			
ouFL : Display is positive-overflow (Signal is over display range)	ouFL		(Please check the input signal)
-ouFL : Display is negative-overflow (Signal is under display range)	-ouFL		(Please check the input signal)
ouFL : ADC is positive-overflow (Signal is higher than input 120%)	ouFL		(Please check the input signal)
-ouFL : ADC is negative-overflow (Signal is lower than input -120%)	-ouFL		(Please check the input signal)
EEP / FAiL : EEPROM occurs error	EEP	FAiL	(Please send back to manufactory for repaired)
Ai.C.nG / Pu : Calibrating Input Signal do not process	Ai.C.nG	Pu	(Please process Calibrating Input Signal)
Ai.C. / FAiL : Calibrating Input Signal error	Ai.C.	FAiL	(Please check Calibrating Input Signal)
AO.C.nG / Pu : Calibrating Output Signal do not process	AO.C.nG	Pu	(Please process Calibrating Output Signal)
Ai.C. / FAiL : Calibrating Output Signal error	Ai.C.	FAiL	(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) red 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
 - EC1** display when E.C.I. 1 close(dry contact)
 - EC2** display when E.C.I. 2 close(dry contact)
 - EC3** 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:** **HHHiLoLLDO**
- **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 fo 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 forget the password, please contact with the service window.

Function Lock: There are 4 levels selectable for lock.

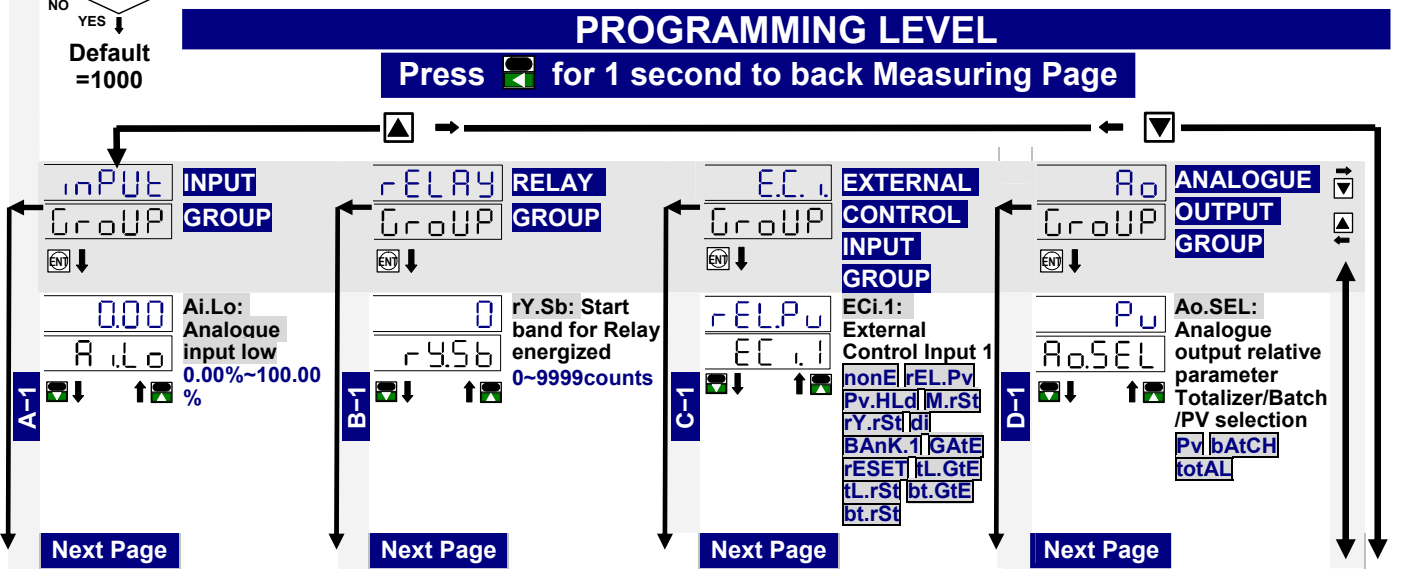
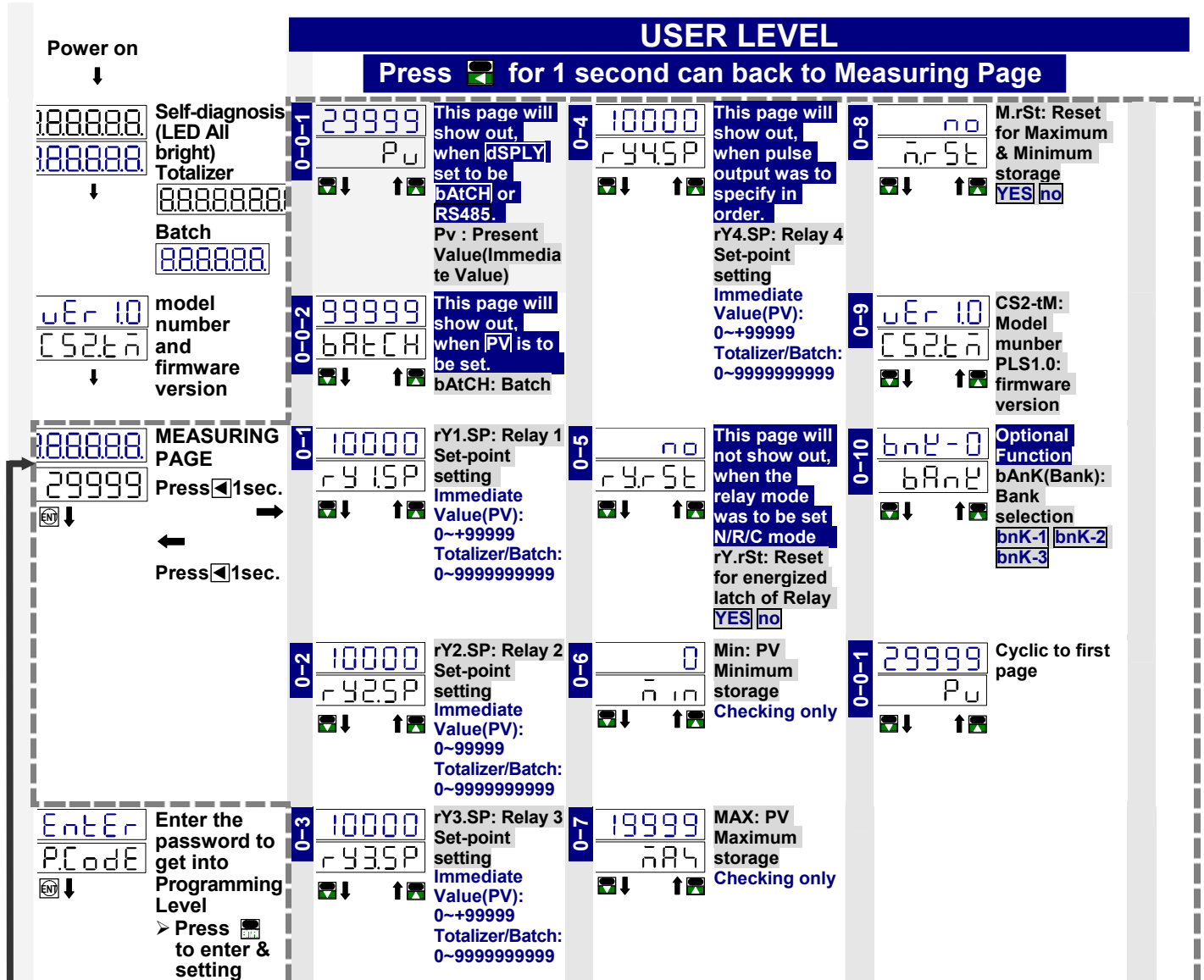
- **None:** no lock all.
- **User Level:** User level lock. User can get into user level for checking but setting.
- **Programming Level:** Programming level lock. User can get into programming level for checking but setting.
- **ALL:** All lock. User can get into all level for checking but setting.

Front Key Function

- The Key can be set to be the same function as the setting of EC11.
 - Ex. The EC11 set to be **Pv.HLd** and the function [**E.1=UP**] set to be **YES** in [**ECI Group**] . When user presses Key, the PV will hold as like as EC11 close.
 - The Key can be set to be the same function as the setting of EC12.
 - Ex. The EC12 set to be **rEL.Pv** and the function [**E.2=dn**] set to be **YES** in [**ECI GroUP**] . When user presses Key, the PV will show relative value as like as EC12 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(Analogue)



<p>A-2</p> <p>100.00 A.Hi</p> <p>AiHi: Analogue input high 0.00%~100.00%</p>	<p>B-2</p> <p>0.000 rY.Sd</p> <p>rY.Sd: Start delay time for Relay energized 0:00.0~9(M):59.9(S)</p>	<p>C-2</p> <p>Pu.HLd EC.i.2</p> <p>ECi.2: External Control Input 2 nonE REL.Pv Pv.HLd M.rSt rY.rSt di BAnK.2 GAtE rESEt tL.GtE tL.rSt bt.GtE bt.rSt</p>	<p>D-2</p> <p>A4-20 Ro.tYP</p> <p>Ao.tYP: Analogue Output type v.0~10 v.0-5 v.1-5 A.0-10 A.0-20 A.4-20</p>
<p>A-3</p> <p>0 Pu.dP</p> <p>Pv.dP: Decimal Point of PV 0 0.0 0.00 0.000 0.0000</p>	<p>B-3</p> <p>totLn rY.lnd</p> <p>rY1.Md: Relay 1 energized mode oFF Lo Hi Hi.HLd Lo.HLd do btCH.n btCH.r btCH.C totL.n totL.r totL.C</p>	<p>C-3</p> <p>n.rSt EC.i.3</p> <p>ECi.3: External Control Input 3 nonE REL.Pv Pv.HLd M.rSt rY.rSt di BAnK.3 GAtE rESEt tL.GtE tL.rSt bt.GtE bt.rSt</p>	<p>D-3</p> <p>0 Ro.LS</p> <p>Ao.LS: Analogue Output relative Low Scale Immediate Value(PV): -19999~+29999 Totalizer/Batch: 0~9999999999</p>
<p>A-4</p> <p>0 Lo.SC</p> <p>Lo.SC: Low scale to relative input low -19999~+29999</p>	<p>B-4-0</p> <p>0.000 rY.lot</p> <p>The page will show out, when rY1.Md set to be N/R/C mode. rY1.ot: Relay 1 energized time 0:00.0~9(M):59.9(S)</p>	<p>C-4</p> <p>12 dEbnc</p> <p>dEbnc: Debouncing of external control Input 5~255(x8ms)</p>	<p>D-4</p> <p>19999 Ro.HS</p> <p>Ao.HS: Analogue Output relative High Scale Immediate Value(PV): -19999~+29999 Totalizer/Batch: 0~9999999999</p>
<p>A-5</p> <p>19999 Hi.SC</p> <p>Hi.SC: High scale to relative input high -19999~+29999</p>	<p>B-4</p> <p>0 rY.lHY</p> <p>The page will show out, when rY1.Md set to be Hi/Lo mode. rY1.HY: Relay 1 Hysteresis 0~5000 counts</p>	<p>C-5</p> <p>YES E.1=UP</p> <p>E.1=UP: E.C.I.1=UP; Up key will be same function as E.C.I.1 set. YES no</p>	<p>D-5</p> <p>0 Ao.p.ro</p> <p>Ao.Zro: Fine Zero Adjustment for Analog Output Immediate Value(PV): -38011~+27524 Totalizer/Batch: 0~9999999999</p>
<p>A-6</p> <p>no Sqr.ot</p> <p>Square Root function no YES Formular: $\sqrt{(Pv/HS) \times HS}$</p>	<p>B-5</p> <p>0.000 rY.l.rd</p> <p>The page will show out, when rY1.Md set to be Hi/Lo mode. rY1.rd: Relay 1 energized delay time 0:00.0~9(M):59.9(S)</p>	<p>C-6</p> <p>YES E.2=dn</p> <p>E.2=dn: E.C.I.2=Down; Down key will be same function as E.C.I.2 set. YES no</p>	<p>D-6</p> <p>0 Ao.SPn</p> <p>Ao.SPn: Fine Span Adjustment for Analog Output Immediate Value(PV): -38011~+27524 Totalizer/Batch: 0~9999999999</p>
<p>A-7</p> <p>0 Pu.p.ro</p> <p>Pv.Zro: Fine Zero Adjustment for PV display -29999~+29999</p>	<p>B-6</p> <p>0.000 rY1.Fd</p> <p>The page will show out, when rY1.Md set to be Hi/Lo mode. rY1.Fd: Relay 1 de-energized delay time 0:00.0~9(M):59.9(S)</p>		<p>D-7</p> <p>nonE Z.S.Clr</p> <p>Z.S.Clr: Clear Fine Zero / Span Adjustment for Analog Output nonE Ao.Zro Ao.SPn both</p>
<p>A-8</p> <p>0 Pu.SPn</p> <p>Pv.SPn: Fine Span Adjustment for PV display -29999~+29999</p>	<p>B-7</p> <p>Hi rY2.nd</p> <p>rY2.Md: Relay 2 energized mode oFF Lo Hi Hi.HLd Lo.HLd do btCH.n btCH.r btCH.C totL.n totL.r totL.C</p>		<p>D-8</p> <p>110.00 Ao.LMt</p> <p>Ao.LMt: Analog Output High Limit 0.00~110.00% of FS</p>
<p>A-9</p> <p>nonE Z.S.Clr</p> <p>Z.S.Clr: Clear Fine Zero & Span Adjustment for PV display nonE Pv.Zro Pv.SPn Both</p> <p>Next Page</p>	<p>B-8-0</p> <p>0.000 rY2.ot</p> <p>The page will show out, when rY2.Md set to be N/R/C mode. rY2.ot: Relay 2 energized time 0:00.0~9(M):59.9(S)</p> <p>Next Page</p>		

CS2-TM_(Analogue)

A-10 **ttL.dSP:** Decimal point of totalizer 0~0.0000

A-11 **UP.dSP:** Up screen displays totalizer or batch Counter
ttL Bt.Cnt

A-12 **oFL.Md:** overflow mode of totalizer or batch
ovFL rCYCL

A-13 **SiGn:** Sign of accumulate up or down
PStvE dUAL

A-14 **t.bASE:** Time Base of Totalizer & Batch
SEC Min Hour DAY

A-15 **dSPLY:** Display Function for down screen
Pv Mini.H MAX.H RS485 bAtCH

A-16 **Lo.Cut:** Low Cut -29999~+29999

A-17 **AvG:** Average display for immediate Value(PV) 1(None)~99 times

Next Page

B-8 **rY2.HY:** Relay 2 Hysteresis 0~5000 counts

B-9 **rY2.rd:** Relay 2 energized delay time 0:00.0~9(M):59.9(S)

B-10 **rY2.Fd:** Relay 2 de-energized delay time 0:00.0~9(M):59.9(S)

B-11 **rY3.Md:** Relay 3 energized mode
oFF Lo Hi
Hi.HLd Lo.HLd do
btCH.n btCH.r
btCH.C totL.n
totL.r totL.C

B-12-0 **rY3.ot:** Relay 3 energized time 0:00.0~9(M):59.9(S)

B-12 **rY3.HY:** Relay 3 Hysteresis 0~5000 counts

B-13 **rY3.rd:** Relay 3 energized delay time 0:00.0~9(M):59.9(S)

B-14 **rY3.Fd:** Relay 3 de-energized delay time 0:00.0~9(M):59.9(S)

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RS485 GROUP

E-1 **AddrES:** Device number of the meter 1~255

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

E-3 **PrItY:** Parity
n.Stb.1 n.Stb.2 odd
EvEn

<p>A-18</p>	<p>M.Avg: Moving Average for display smooth 1(None)~10 times</p>	<p>B-15</p>	<p>The page will not show out, when pulse output has been specified. rY4.Md: Relay 4 energized mode oFF Lo Hi Hi.HLd Lo.HLd do btch.n btch.r btch.C totL.n totL.r totL.C</p>
<p>A-19</p>	<p>d.Filt: Digital Filter 0(None)/1~99 times</p>	<p>B-16-0</p>	<p>The page will show out, when rY4.Md set to be N/R/C mode. rY4.ot: Relay 4 energized time 0:00.0~9(M):59.9(S)</p>
<p>A-20</p>	<p>The page will show out, when pulse output specified. PLS.dv: Pulse divider 1~9999counts</p>	<p>B-16</p>	<p>The page will show out, when rY4.Md set to be Hi/Lo mode. rY4.HY: Relay 4 Hysteresis 0~5000 counts</p>
<p>A-21</p>	<p>The page will show out, when pulse output specified. PLS.Hi: High level time(duty cycle) of pulse 0(Auto)/1~5000(x 4msec.)</p>	<p>B-17</p>	<p>The page will show out, when rY4.Md set to be Hi/Lo mode. rY4.rd: Relay 4 energized delay time 0:00.0~9(M):59.9(S)</p>
<p>A-22</p>	<p>P.CodE: Pass code 0000~9999</p>	<p>B-18</p>	<p>The page will show out, when rY4.Md set to be Hi/Lo mode. rY4.Fd: Relay 4 de-energized delay time 0:00.0~9(M):59.9(S)</p>
<p>A-23</p>	<p>P.CodE: Pass code 0000~9999</p>		

➤ Please refer to operating manual for detail description.

Document Amend:
2009/11/10: Add high level time function (Duty cycle)