

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.

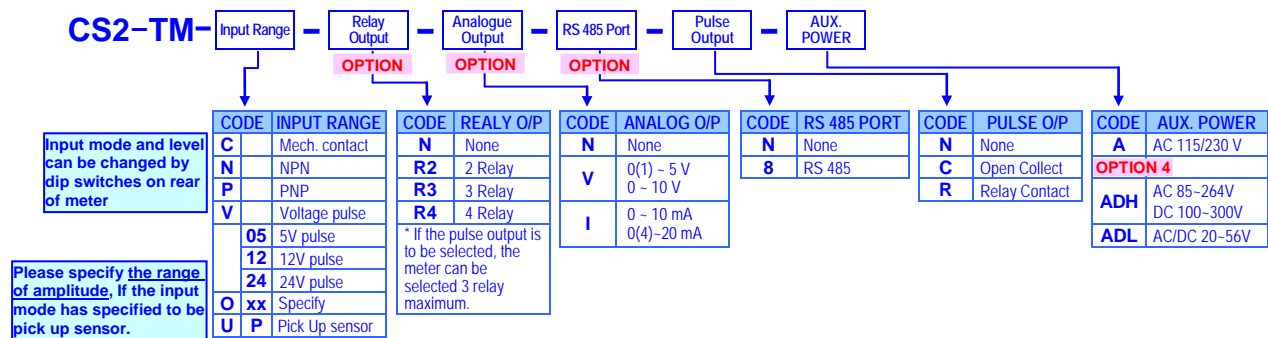
There are two display screen and 3 external control input (DI) in standard and the optional 4 Relay, 1 Analogue, 1 Pulse and RS485 port available. They are also support fantastic control function as like as N, R, C mode for totalizer and batch control.



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: $\pm 0.005\%$; 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



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)
 $\leq \pm 0.005\%$ of FS $\pm 1C$ for immediate value(PV);
Accuracy:
Sampling rate: 15 cycles/sec(≥ 15 Hz);
 f cycles/sec(≤ 15 Hz)
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:

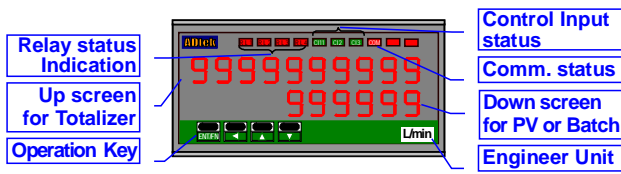
Immediate Value(PV): 0~999999;

Batch: 0~999999

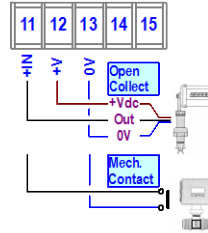
Totalizer / Batch Counter: 0~9999999999

For Immediate Value(PV)		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
Time unit(Flow/T unit):	Flow/second, Flow/Min, K*Flow/Min, Flow/Hour, K*Flow/Hour programmable	Output capability:	Voltage: 0-10V: $\geq 1000\Omega$ Current: 4(0)-20mA: $\leq 600\Omega$ max
Resolution of PV:	Decimal point will Auto-changed according to input	Functions:	Relative to immediate value(PV), totalizer, batch or batch count programmable
(Auto-Moving for d.p.)	Auto / Semi-Auto / Fix; 3 mode programmable	RaHS (output range high):	Settable range: 0-99999 / 0-999999999
Over range indication:	oFL , when input is over 20% of input range Hi	RaLS (output range Low):	Settable range: 0-99999 / 0-999999999
Max / Mini recording:	Maximum and Minimum value storage during power on.	RaLHt (output High Limit):	0.00-110.00% of output High
Display functions:	PV / Max(Mini) Hold / RS 485 / Batch programmable for down screen.	RaPto : Settable range: -38011~+27524	
Factor setting:	there are 3 parameter modes can be set	RaSPn : Settable range: -38011~+27524	
	Pulse/Flow-unit(K factor): settable range: 0.0001-99999		
	Flow/Pulse (1/K factor): settable range: 0.0001-99999	Digital fine adjust:	
	Volume/Hz with diameter of pipe:		
	Diameter settable range: 0.0001-99999	Pulse output(option)	
	Volume/Hz(Flow rate) settable: 0.0001-99999	Output mode:	Open collect: 30V/60mA or Relay: DC24V/1A
Front key functions:	Up and down key can be set to be a function as ECI.	Output vs. parameter:	Relative to totalizer, batch or batch count programmable
Low cut:	Settable range: -19999-29999 counts	Output range:	1000Hz max. duty cycle 50%
Digital fine adjust:	RaPto : Settable range: 0-99999	Duty cycle(PL5H):	Settable from 0(Auto: Duty cycle=50%)/1-5000(x 4msec.)
	RaSPn : Settable range: 0-99999	Pulse divider:	Settable range from 1-9999.
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 oFL / 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)		RS 485 Communication(option)	
Set-points:	Four set-points	Protocol:	Modbus RTU mode
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	Baud rate:	1200/2400/4800/9600/19200/38400 programmable
Relay energized mode:	Multi-cross selection for immediate Value(PV), batch, batch counter and totalizer.	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.
For Immediate Value(PV)		Electrical Safety	
	Hi / Lo / Go.12 / Hi.HLd / Lo.HLd / DO programmable; DO function: Energized by RS485 command of master.	Dielectric strength:	AC 2.0 KV for 1 min, Between Power / Input / Output / Case
	D.P. of Set Point: 0 / 0.0 / 0.00 / 0.000 / 0.0000	Insulation resistance:	$\geq 100M$ ohm at 500Vdc, Between Power / Input / Output
Energizing functions:	Start delay / Energized & De-energized delay / Hysteresis / Energized Latch	Isolation:	Between Power / Input / Relay / Analogue / RS485 / E.C.I.
	Start band(Minimum level for Energizing): 0-9999counts	EMC:	EN 55011:2002; EN 61326:2003
	Start delay time: 0:00.0-9(Minutes):59.9(Second)	Safety(LVD):	EN 61010-1:2001
	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		Environmental	
Energized mode:	N / R / C Mode	Operating temp.:	0-60 °C
	Period of Relay on: 0:00.0-9(Minutes):59.9(Second)	Operating humidity:	20-95 %RH, Non-condensing
		Temp. coefficient:	≤ 100 PPM/°C
		Storage temp.:	-10-70 °C
		Enclosure:	Front panel: IEC 529 (IP52); Housing: IP20
External Control Inputs(ECI)		Mechanical	
Input mode:	3 ECI points, Contact or open collect input, Level trigger	Dimensions:	96mm(W) x 48mm(H) x 120mm(D)
Functions:	Multi-cross selection for immediate Value(PV), batch, batch counter and totalizer.	Panel cutout:	92mm(W) x 44mm(H)
Debouncing time:	Settable range 5 -255 x (8m seconds)	Case material:	ABS fire-resistance (UL 94V-0)
For Immediate Value(PV)		Mounting:	Panel flush mounting
Functions:	Relative PV / PV Hold / Reset Max or Mini. Hold / DI / Reset for Relay Energized latch programmable	Terminal block:	Plastic NYLON 66 (UL 94V-0) 10A 300Vac, M2.6, 1.3-2.0mm ² (16-22AWG) 550g / 350g(Aux. Power Code: ADH or ADL)
For Totalizer / Batch / Batch Counter		Weight:	
Functions:	Gate for Totalizer and(or) Batch(Batch Counter) / Reset for Totalizer and(or) Batch(Batch Counter) programmable	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
Analogue output(option)			
Accuracy:	$\pm 0.1\%$ of F.S.; 16 bits DA converter		
Ripple:	$\leq \pm 0.1\%$ of F.S.		
Response time:	≤ 100 m-sec. (10-90% of input)		
Isolation:	AC 2.0 KV between input and output		
Amend: 2009/11/10: add new function Duty cycle(PL5H): 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



Sensor input connection

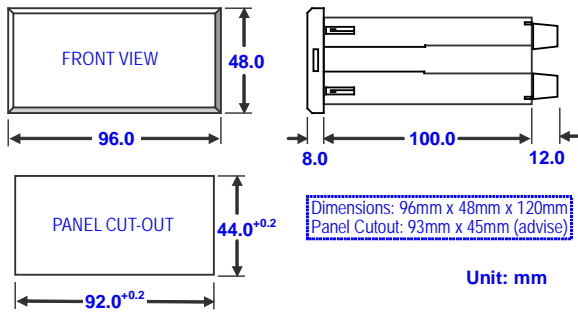


Please change the dip-switch on rear of meter to match the input mode and level.

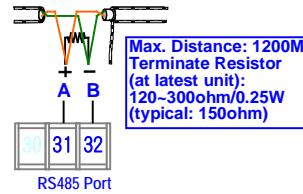
	D-S	1	2	3	4	5
NPN		ON				
PNP			ON			
Mech. Contact				ON		ON
Voltage pulse 5V _p					ON	
Voltage pulse 12V _p						ON
Voltage pulse 24V _p						ON

D-S is on when it is in down side

DIMENSIONS

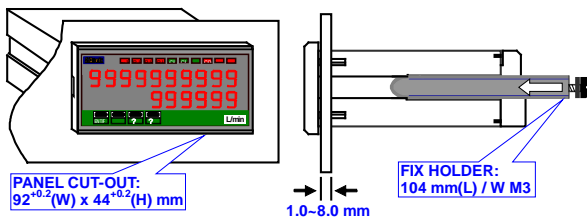


RS485 Communication Port

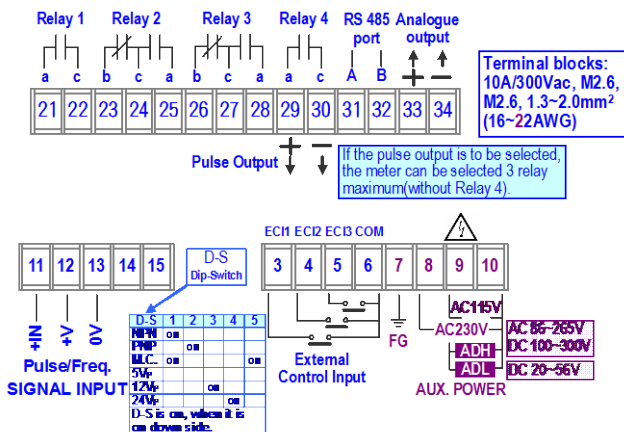


INSTALLATION

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

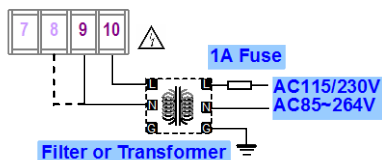


CONNECTION DIAGRAM



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



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 [RUL]: The decimal point will be auto changed according to the input frequency so that keep reading in the highest resolution.

Semi-Auto range [SEn]:
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 [RRUL]: 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 [RRUL] / [RUL] can be programmed.

Manual [RRUL]: There is a period named [t] 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 [RUL]: 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 [t] set to be [RRUL], 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 [PLSP] in function [FtYP], set the [FtP] to [00000], and [PLSP] to [5.2417]. The meter will calculate and show the right measuring(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 [FPLS] in function [FtYP], set the [FtP] to [00000], and [FPLS] to [1.2345]. The meter will calculate and show the right measuring(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 will storage the maximum and minimum value in [user level] during power on in order to review drifting of PV. PV / Max(Mini) Hold / RS 485 programmable for down screen in [dSPLy] function of [InPUt GRoUP]

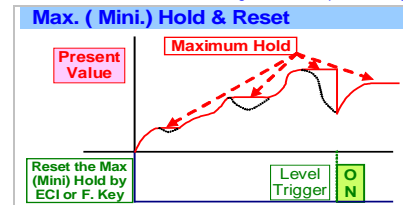
Display functions:

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

Maximum Hold [RRHd] / Minimum Hold [RRnHd]:

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 [5485]:

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 (Δ PV) and PV hold functions that set in [EC GROUP]. Please refer to explain of ECI functions.

Low cut:

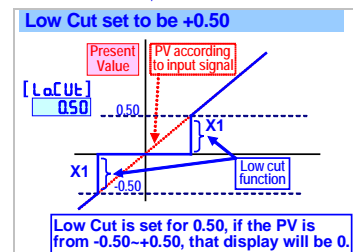
Settable range from -19999~+99999 counts.

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

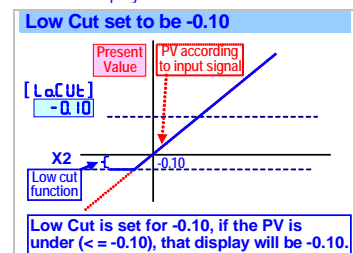
EX: Low Cut is set for 0.50. If the display is from -0.50~+0.50, that will be 0.



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 -0.10. If the display is < -0.10, and all the display will be -0.10.

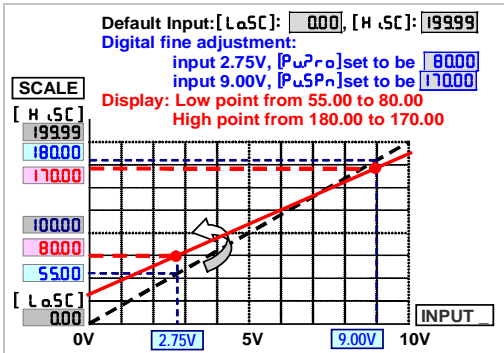


Digital fine adjust: Settable range: 0-99999

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 [PwrLo] & [PwrSpn] are not only in zero & span of PV, but also any lower point for [PwrLo] & higher point for [PwrSpn]. The meter will be linearization for full scale.

The adjustment can be clear in function [PCLr]



For Totalizer / Batch / Batch Counter

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

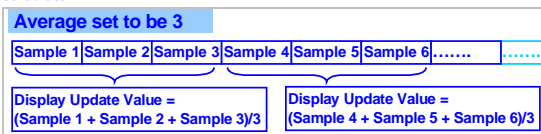
The up screen will show the ouFL, if the [oFLnd] set to be ouFL. And it will re-count from "0", if the [oFLnd] set to be rCYCL.

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 [AveG](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

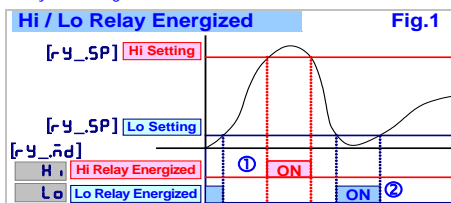
4 relay can be programmable to relative Totalizer, Batch, Batch Counter and Immediate Value (PV) with individual functions. Please refer to the detail as following

For Immediate Value(PV)

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

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

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



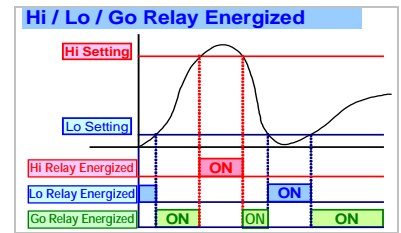
Go-1.2 [Go-1.2]:

This function is programmable in Relay 3 only.

If the Relay 3 set to be Go function, the relay will compare with [Y SP] and [Y2SP].

Go relay energized when the condition is

[Y SP] (Hi) > PV > [Y2SP] (Lo)



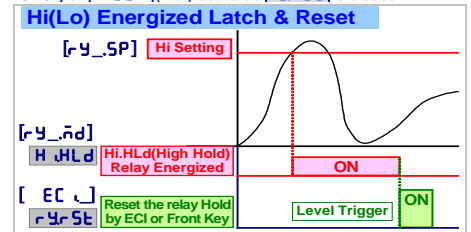
Hi.HLd [HLd] (Lo.HLd [oHLd]):

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

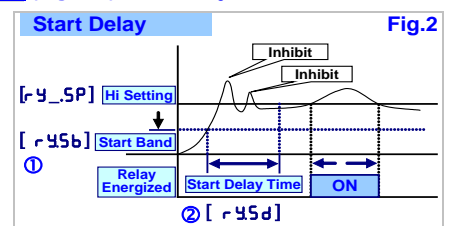
Start delay band and Start delay time:

The functions have been designed for,

- ▶ To avoid starting current of inductive motor (6 times of rated current) with alarm.
- ▶ If the [Ynd] 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 [rYsb] (Fig.2-①): Settable range from 0-9999 Counts

Start delay time [rYsd] (Fig.2-②): Settable range from 0.0(s)-9(m)59.9(s);



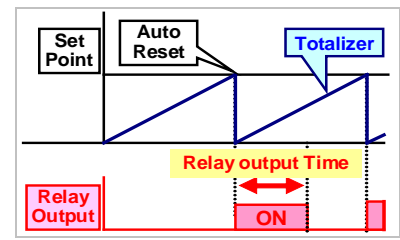
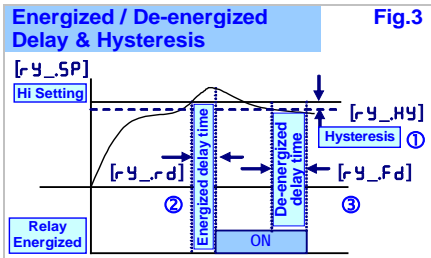
Hysteresis [F_y_HY] (Fig.3-①): Settable range from 0-9999 Counts

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 [F_y_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 [F_y_Fd] (Fig.3-③): Settable range from 0.0(s)-9(m)59.9(s);



For Totalizer / Batch or Counter

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

Relay energized mode: N / R / C Mode programmable

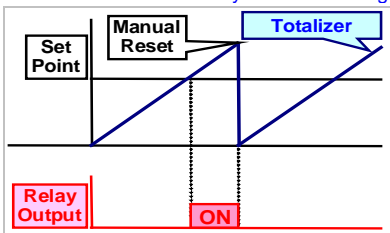
The 3 mode are very useful idea to control the totalizer, batch and batch counter. The relay energized condition is according to not only energized level, but also time and reset for totalizer, batch and batch counter.

Relay energized mode: N / C / R mode

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

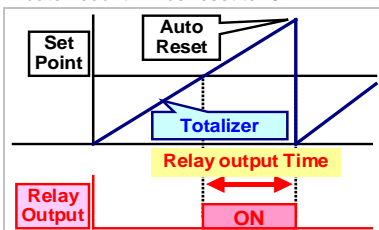
N mode:

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 [F_y_ot]
When the condition of **Set Point** is met:
1. The relay will be energized, until the time is over Relay output time [F_y_ot] (Relay _ output times).
2. The totalizer / batch count will run as same as usual; until the time is over Relay output time [F_y_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 [F_y_ot]
When the condition of **Set Point** is met:
1. The relay will be energized, until the time is over Relay output time [F_y_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 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 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

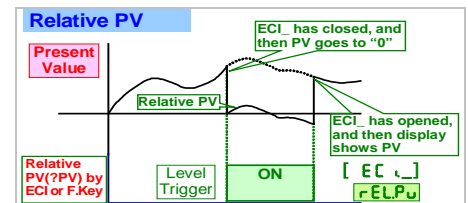
For Immediate Value (PV)

Functions:

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

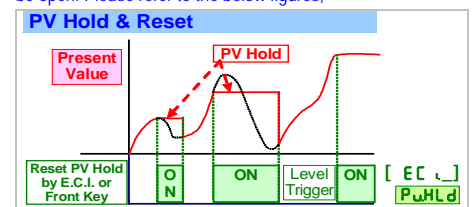
Relative PV [FELPu] or Tare:

The [EC_] can be set to be [FELPu] function. When the E.C.I. is closed, the reading will show the differential value.



PV Hold [PuHLd]:

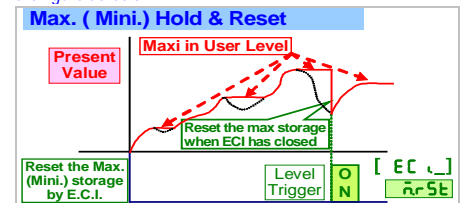
The [EC_] can be set to be [PuHLd] (PV Hold) function. The display will be hold when the ECI is closed, until the ECI is to be open. Please refer to the below figures,



Reset for Maximum or Minimum Hold [rSt]:

When the [dSPly] function in [inPUt GRouP] selected [rSt] or [mHd], the display will show Maximum or Minimum value.

The [EC_] 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.

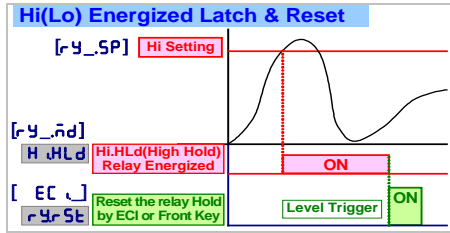


DI [d]:

The E.C.I can be set to be [d] 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 [r4r5t]:

If the relay energized mode has been set to be [H.HLd] (Energized latch), and the [EC] can be set to be [r4r5t] (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.

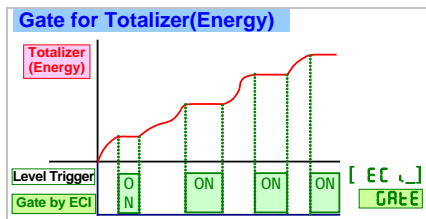


For Totalizer / Batch / Batch Counter

ECI Functions:

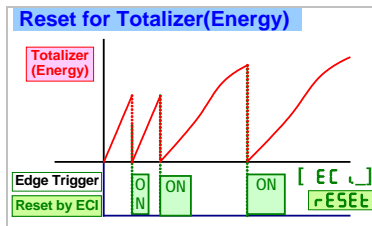
Gate function:

Gate / Reset
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.
 ▶ [PLSdu] 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.
 ▶ [PLSdu] 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 d):

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 [Ro 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
 Output High / Low scale, output limit, fine adjustment

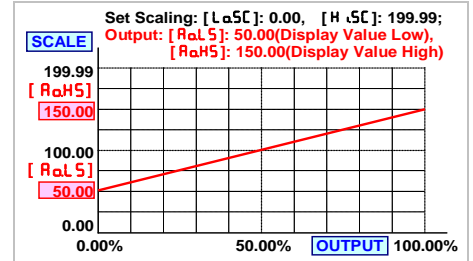
Functions:

Output range high [RaH5]:

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

Output range low [RaL5]:

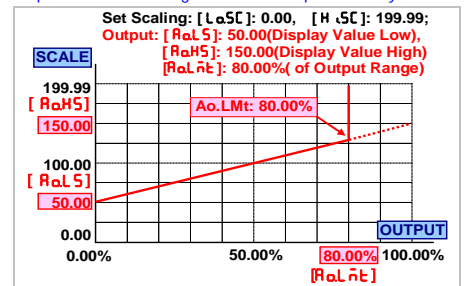
To setting the Display value Low to versus output range Low(as like as 4mA in 4-20)



The range between [RaH5] and [RaL5] should be over 20% of span at least; otherwise, it will be got less resolution of analogue output.

Output High Limit [RaHt]:

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 [RaZro]:

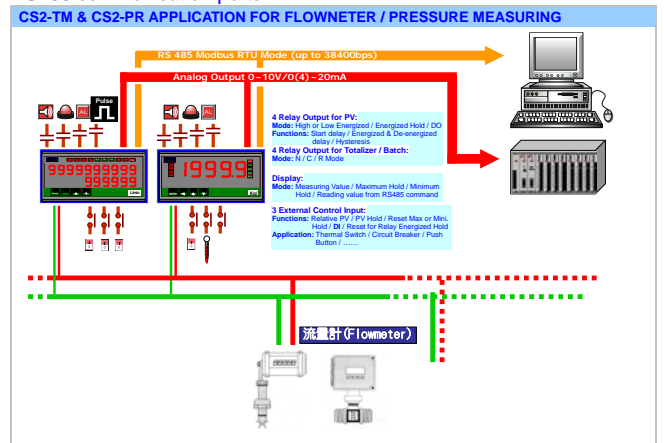
Fine Zero Adjustment for Analog Output;
 Settable range: -38011-27524;

Span adjust [RaSPn]:

Fine Span Adjustment for Analog Output;
 Settable range: -38011-27524;

RS 485 communication(option)

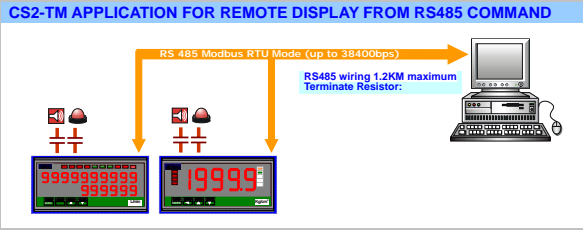
CS2 series supports Modbus RTU mode protocol to be used as Remote Terminal Unit (RTU) for monitoring and controlling in a SCADA (Supervisor Control And Data Acquisition) system. The baud rate can be up to 38400 bps. It's not only can be read the measured value and DI (external control inputs) status 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 [d5PL5] 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

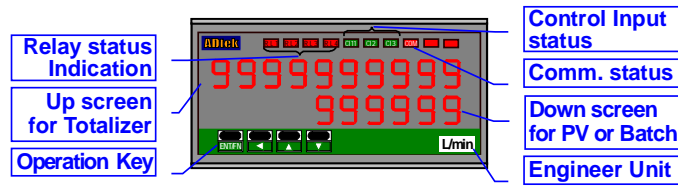
■ ERROR MESSAGE

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)
AiL.nG ↔ Pu	Calibrating Input Signal do not process	(Please process Calibrating Input Signal)
AiL ↔ FAiL	Calibrating Input Signal error	(Please check Calibrating Input Signal)
AoL.nG ↔ Pu	Calibrating Output Signal do not process	(Please process Calibrating Output Signal)
AoL ↔ 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
 - EC1** display when E.C.I. 1 close(dry contact)
 - EC12** display when E.C.I. 2 close(dry contact)
 - EC13** 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 [U5Er]:** 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 [RL]:** All lock. User can get into all level for checking but setting.

Front Key Function

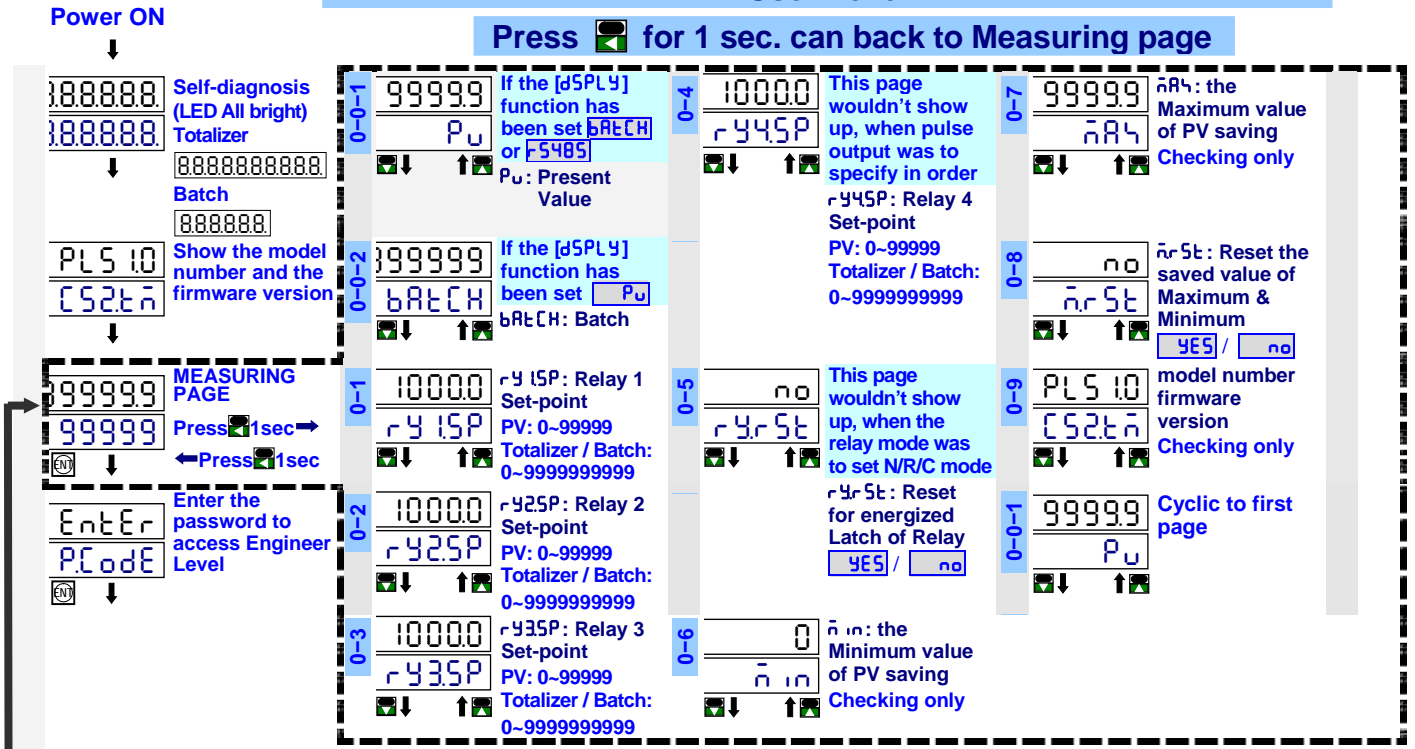
- The **Up** Key can be set to be the same function as the setting of EC11. Ex. The EC11 set to be **PuHLd** and the function **[E. I=UP]** set to be **YES** in **[EC + GroUP]**. When user presses **Up** Key, the PV will hold as like as EC11 close.
- The **Down** Key can be set to be the same function as the setting of EC12. Ex. The EC12 set to be **FELPu** and the function **[E.2=dn]** set to be **YES** in **[EC + GroUP]**. When user presses **Down** Key, the PV will show relative value as like as EC12 close.

► **If the front key function has been set, the terminal input for EC1 will be disabling.**

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

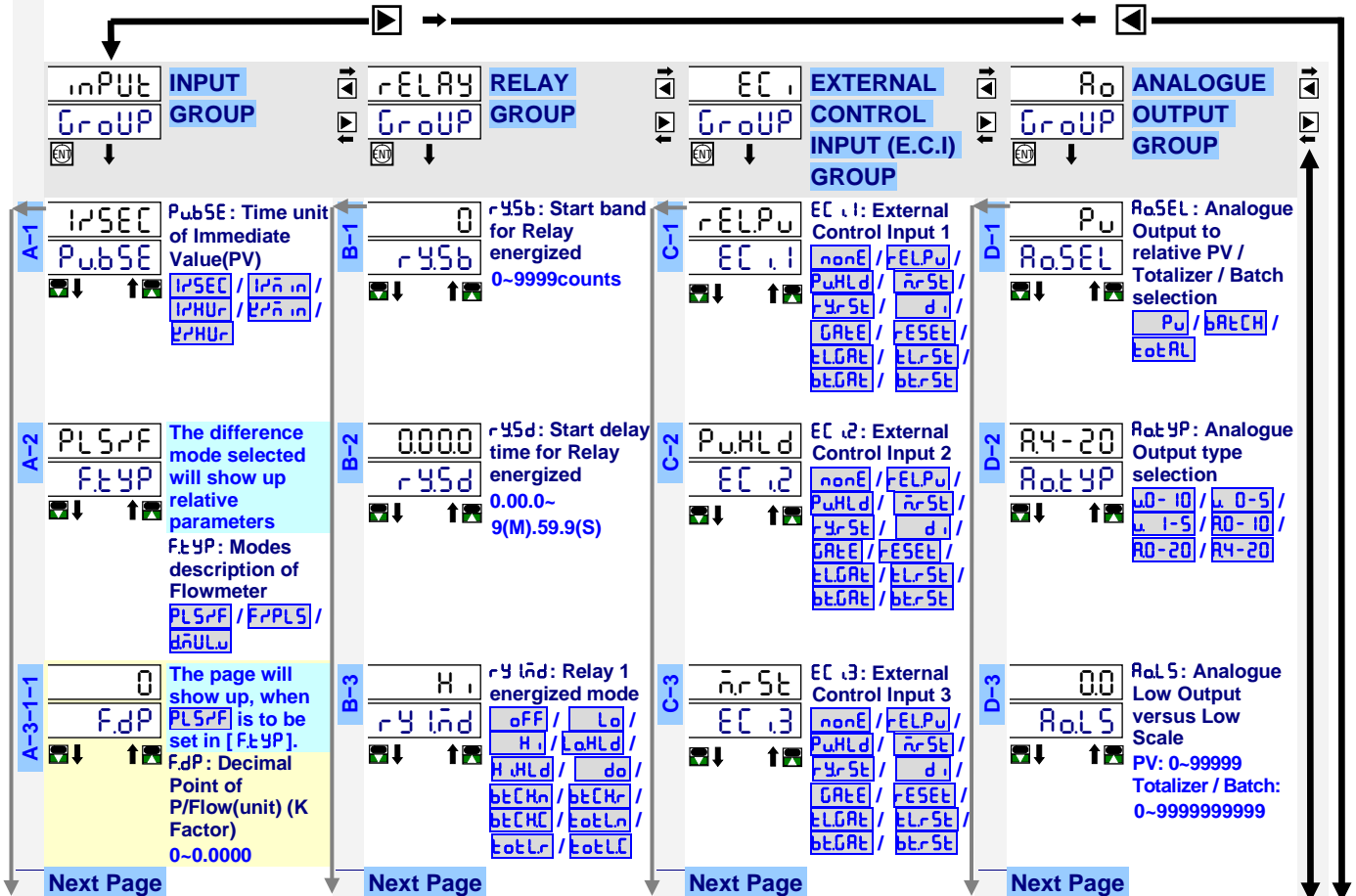
User Level

Press for 1 sec. can back to Measuring page



Programming Level

Press for 1 sec. can back to Measuring page



<p>A-3-1-2</p> <p>10000 PLSRF</p> <p>The page will show up, when PLSRF is to be set in [FtYP]. PLSRF: P/Flow(unit) (K Factor) Setting 0.0001~99999</p>	<p>B-4</p> <p>0 rYlHY</p> <p>The page will show up, when [rYlnd] set to be Hi / Lo mode rYlHY: Relay 1 Hysteresis 0~5000 counts</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>10000 RoHS</p> <p>RoHS: Analogue High Output versus High Scale PV: 0~99999 Totalizer / Batch: 0~999999999</p>
<p>A-3-2-1</p> <p>0 FdP</p> <p>The page will show up, when FdP is to be set in [FtYP]. FdP: Decimal Point of Flow/P (1/K Factor) 0~0.0000</p>	<p>B-4-1</p> <p>00000 rYlot</p> <p>The page will show up, when [rYlnd] set to be N/R/C mode rYlot: Relay 1 energizing time 0.00.0~9(M).59.9(S)</p>	<p>C-5</p> <p>no E1=UP</p> <p>E1=UP: ECI.1 set to be UP Key function YES / no</p>	<p>D-5</p> <p>0 RoPra</p> <p>RoPra: Fine Zero Adjustment for Analogue Low Output -38011~27524</p>
<p>A-3-2-2</p> <p>10000 FrPLS</p> <p>The page will show up, when FrPLS is to be set in [FtYP]. FrPLS: Flow/Pulse (1/K Factor) Setting 0.0001~99999</p>	<p>B-5</p> <p>00000 rYlrd</p> <p>The page will show up, when [rYlnd] set to be Hi / Lo mode rYlrd: Relay 1 energized delay time 0.00.0~9(M).59.9(S)</p>	<p>C-6</p> <p>no E2=dn</p> <p>E2=dn: ECI.2 set to be Down Key function YES / no</p>	<p>D-6</p> <p>0 RoSPn</p> <p>RoSPn: Fine Span Adjust. for Analogue High Output -38011~27524</p>
<p>A-3-3-1</p> <p>0 dindP</p> <p>The page will show up, when dindP is to be set in [FtYP]. dindP: Decimal Point of diameter of pipe 0~0.0000</p>	<p>B-6</p> <p>00000 rYlFd</p> <p>The page will show up, when [rYlnd] set to be Hi / Lo mode rYlFd: Relay 1 de-energized delay time 0.00.0~9(M).59.9(S)</p>		<p>D-7</p> <p>none PSClr</p> <p>PSClr: Zero & Span Clear for Adjustment none / RoPra / RoSPn / both</p>
<p>A-3-3-2</p> <p>10000 dinRt</p> <p>The page will show up, when dinRt is to be set in [FtYP]. dinRt: Diameter of pipe setting 0.0001~99999 (Unit)</p>	<p>B-7</p> <p>Hi rY2nd</p> <p>rY2nd: Relay 2 energized mode off / Lo / Hi / LoHLd / do / btCHKn / btCHKr / btCHKC / btELn / btELr / btELC</p>		<p>D-8</p> <p>11000 RoLnt</p> <p>RoLnt: Analog Output High Limit 0.00~110.00%</p>
<p>A-3-3-3</p> <p>0 uLdP</p> <p>The page will show up, when uLdP is to be set in [FtYP]. uLdP: Decimal Point of Flow speed (Length/sec) 0~0.0000</p>	<p>B-8</p> <p>0 rY2HY</p> <p>The page will show up, when [rY2nd] set to be Hi / Lo mode rY2HY: Relay 2 Hysteresis 0~5000 counts</p>		
<p>A-3-3-4</p> <p>0 uLrHP</p> <p>The page will show up, when uLrHP is to be set in [FtYP]. uLrHP: Volume/Hz, Flow speed setting 0.0001~99999 (Unit)</p>	<p>B-8-1</p> <p>00000 rY2ot</p> <p>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)</p>		
<p>A-4</p> <p>0 dP</p> <p>dP: Decimal point of set-point for Really energized 0~0.0000</p>	<p>B-9</p> <p>00000 rY2rd</p> <p>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)</p>		
<p>A-5</p> <p>0 ttLdP</p> <p>ttLdP: Decimal point of totalizer 0~0.0000</p>	<p>B-10</p> <p>00000 rY2Fd</p> <p>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)</p>		

Next Page

Next Page

CS2-TM(Pulse)

A-6 UP.dSP: Up screen displays totalizer or batch Counter
 tEtL / bEtCnt

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

A-8 PS.tuE S.iGn: Sign of accumulate up or down
 S.iGn PS.tuE / dURL

A-9 0 Pu.SPn: Fine High point Adjustment for PV display
 Pu.SPn 0~99999

A-10 nonE SCLr: Clear Fine Span Adjustment for PV display
 SCLr nonE / Pu.SPn

A-11 Pu dSPLY: Display Function
 dSPLY Pu / rAnHd / rARhHd / rS485 / bAtECH

A-12 0 Lo.CUt: Low Cut Function
 Lo.CUt -19999~29999

A-13 AU.tO i.tOnd: Input time out Mode
 i.tOnd AU.tO / rAnUL

A-14 00 i.tO If [i.tOnd] has been selected rAnUL, This function will be showed out
 i.tO i.tO: How long will be time out 0.0~999.9sec

A-15 AU.tO rAnGE: Reading Range with decimal point switching.
 rAnGE AU.tO / SEr / rAnUL

Next Page

B-11 H. rY3nd: Relay 3 energized mode
 rY3nd oFF / Lo / H / LoHLd / H.HLd / do / bEtCHn / bEtCHr / bEtCHL / bEtLn / bEtLr / bEtLL

B-12 0 The page will show up, when [rY3nd] set to be Hi / Lo mode
 rY3HY rY3HY: Relay 3 Hysteresis 0~5000 counts

B-12-1 0.000 The page will show up, when [rY3nd] set to be N/R/C mode
 rY3ot rY3ot: Relay 3 energizing time 0.00.0~9(M).59.9(S)

B-13 0.000 The page will show up, when [rY3nd] set to be Hi / Lo mode
 rY3rd rY3rd: Relay 3 energized delay time 0.00.0~9(M).59.9(S)

B-14 0.000 The page will show up, when [rY3nd] set to be Hi / Lo mode
 rY3Fd rY3Fd: Relay 3 de-energized delay time 0.00.0~9(M).59.9(S)

B-15 H. rY4nd: Relay 4 energized mode
 rY4nd oFF / Lo / H / LoHLd / H.HLd / do / bEtCHn / bEtCHr / bEtCHL / bEtLn / bEtLr / bEtLL

B-16 0 The page will show up, when [rY4nd] set to be Hi / Lo mode
 rY4HY rY4HY: Relay 4 Hysteresis 0~5000 counts

B-16-1 0.000 The page will show up, when [rY4nd] set to be N/R/C mode
 rY4ot rY4ot: Relay 4 energizing time 0.00.0~9(M).59.9(S)

B-17 0.000 The page will show up, when [rY4nd] set to be Hi / Lo mode
 rY4rd rY4rd: Relay 4 energized delay time 0.00.0~9(M).59.9(S)

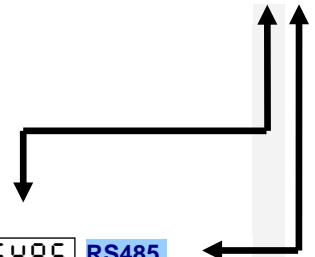
B-18 0.000 The page will show up, when [rY4nd] set to be Hi / Lo mode
 rY4Fd rY4Fd: Relay 4 de-energized delay time 0.00.0~9(M).59.9(S)

Next Page

E-1 1 Rdr.E5: Device number of the meter
 Rdr.E5 1~255

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

E-3 nStEb2 Pr.tY: Parity
 Pr.tY nStEb1 / nStEb2 / odd / EvEn



A-16	5 AUG	AUG: Average update for PV 1(None)-99 times
A-17	0 dF iLt	dF iLt: Digital filter 0(None)/1-99 times
A-18	1 PLSdu	The page will show up, when pulse output has specified PLSdu: Pulse divider 0000-9999
A-19	0 PCode	PCode: Pass Code for enter Engineer Level 0000-9999
A-20	nonE FLoCk	FLoCk: Function Level Lock nonE / USEr / EnG / ALL

▶ Please refer to operating manual for detail description