CS2-RL CS2-F LINEARLY LINE SPEED / RPM CONTROLLER FREQUENCY CONTROLLER OPERATION MANUAL

■ DESCRIPTION

CS2-RL(F) controller has been designed high accuracy measurement, display, control and communication (Modbus RTU mode) of pulse(Frequency) or AC Frequency.

☑ The innovation feature is auto-range input from 0.01Hz~ 100KHz(~140KHz in option). The display resolution will be auto-changed to show the highest according to input frequency.

They are also building in 4 Relay outputs, 3 External Control Inputs, 1 Analogue output and 1 RS485(Modbus RTU Mode) interface with versatile functions such as control, alarm, re-transmission and communication for a wide range of testing and machinery control applications. Please refer to the detail description on pages 2/38~7/38.

There are not only controllers, but also an I/O interface in any system. ADtek built in difference ideal for External Control input and Relay output as like as I/O module of PLC. It's very connivance to achieve remote monitoring and control by CS2 series.

■ FEATURES

- Accuracy: ± 0.005%; Display range: 0~99999; Auto-range with Decimal Point auto changed according to input frequency.
- Optional 4 relay can be programmed individual to be a Hi / Lo / Hi Latch / Lo Latch / Go energized with Start Delay / Hysteresis / Energized & De-energized Delay functions, or to be a remote control.
- Analogue output and RS 485 communication port in option
- 3 external control inputs can be programmed individual to be Tare (Relative PV) / PV Hold / Maximum or Minimum Hold / DI (remote monitoring) / Reset for Relay Energized Latch…. In standard.
- EMC, EMI, LVD Approved & RoHS

【CS2-RL LINEARLY LINE SPEED / RPM CONTROLLER】

- Measuring RPM / Linearly line speed / Frequency AUTO RANGE 0.01~100KHz / ~140KHz(optional) / Contact, NPN, PNP, Voltage pulse can be switch on rear of meter.

【CS2-F FREQUENCY CONTROLLER】

- Measuring Frequency AUTO RANGE 0.01~100KHz / ~140KHz(optional) / Voltage pulse or sine wave(specify).

■ APPLICATIONS

■ Models

- **CS2-RL** Motor Control / Machinery / Testing Equipments for Measuring, Alarm and Communication with PC/PLC
  - ☑ Flexible 3 DI functions as like as Maximum/Minimum hold, PV hold and Relative PV.
  - ☑ On line testing station for appliance, check points of PCB as so on.
- **CS2-F** Switch Boards / Testing Equipments for Measuring, Alarm and Remote I/O with PC/PLC
  - ☑ Fantastic 4 Relay functions as like as Hi / Lo / Hi latch / Lo latch / DO(Remote control by PC/PLC).
  - ☑ Flexible 3 DI functions as like as Reset for Relay energized latch and Remote monitoring by PC/PLC.

■ Functions

- **Safety & Protection** Hi/Lo alarm and latch(H iHLd / LoHLd), Analogue output limited(AoLnt)
- **Testing & Measuring** Maximum/Minimum hold(nAXHd / n inHd), PV hold(PuHLd), Relative PV/Tare/ΔPV(rELPu)
- **Remote Monitoring & Control** RS485 communication port, Display function(rS485), ECI input status(di), Relay energized(do)

FUNCTION DEFINE

Character Symbol

A	b	C	d	E	F	G	H	i	J	K	L	M
A	b	C	d	E	F	G	H	ı	J	K	L	M

n	o	P	q	r	S	t	U	v	W	X	y	Z
n	o	P	q	r	S	t	U	u	u	X	y	Z

1	2	3	4	5	6	7	8	9	0	/	.
1	2	3	4	5	6	7	8	9	0	/	.

Input Range & Mode

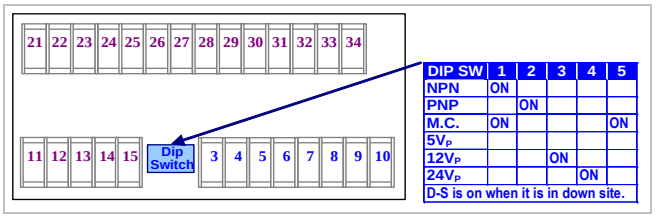
Input Range

The meter has been designed very wide input range from 0.01Hz~100.00KHz(Option: 0.01Hz~140.00KHz) that can cover almost any application for frequency measuring. User doesn't need to specify the input range.

Especially, they do not set the scale to relate the input range. Users are just set the measuring type(PutYP) in [inPUt GroUP]. The display of meter will show the value that user wants to show such as RPM, Linearly Line Speed or Frequency. Please refer to the description of Display Function.

Input mode Switchable

NPN / PNP / Voltage Pulse / Mech. Contact and amplitude can be switched by switches on rear of meter.



DIP SW	1	2	3	4	5
NPN	ON				
PNP		ON			
M.C.	ON				ON
$5V_P$					
$12V_P$			ON		
$24V_P$				ON	

D-S is on when it is in down site.

*The excitation supply of sensor can not be changed. Please specify in ordering code.

Display Functions

Multi-Display function

Programmable: LnSPd / rPn / rPS / H2 / kH2

The meter has desgined for mult-purpose. User can set the display purpose in [PutYP] of [inPUt GroUP] such as LnSPd(Linearly Line Speed), rPn(RPM), rPS(RPS), H2(Hz), kH2 (kHz) that the meter will display according to the input and setting to calculate. The meter will show the relation parameters as below,

- LnSPd: Pulse/rotation(PPr), Engineer Units(mrnn / Cmrnn / Ydrnn / Ftrnn), Diameter of rotor(d iAmt)
- rPn / rPS: Pulse/rotation(PPr)

Factor function:

Settable range: 0.001~9.999

Display = Value of math with setting x Factor

The display can be proportioned by factor.

The typical application is compensation for gear ratio.

Auto-range function:

Programmable: AUto / SEmi / MANUL

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

Ex.: RPM of Motor: 7200RPM，Encoder: 1000ppr

The meter setting

[PutYP]: rPn, [PPr]: 1000,

[rAnGE]: AUto

(7200rpm x 1000ppr) / 60 = 120.000kHz

Frequency range is from 0~120.000kHz

The table is between input and display as below,

Freq. Input	Display		
0Hz	0.0000	RPM	Auto change to keep highest resolution
166.65Hz	9.9999	RPM	
1666.5Hz	99.999	RPM	(Auto change)
16.665kHz	999.99	RPM	(Auto change)
16.666kHz	1000.0	RPM	(Auto change)
120kHz	7200.0	RPM	

The input goes down to

166.65Hz	9.9999	RPM	(Auto change)

- SEmi(Semi-Auto range): The decimal point will be auto changed according to the input frequency to keep the display in the highest resolution, but it must be under setting position of decimal point. It's possible to show "ouFL(overflow)", if the input frequency is too high to makeover the display range.

Ex.: RPM of Motor: 7200RPM，Encoder: 1000ppr as same as above,

The meter setting

[PutYP]: rPn ; [PPr] : 1000

[rAnGE]: SEmi ; [dP] : 0.00

The table is between input and display as below,

Freq. Input	Display		
0Hz	0.0000	RPM	Auto change to keep highest resolution
166.65Hz	9.9999	RPM	(Auto change)
1666.5Hz	99.999	RPM	(Auto change)
16.665kHz	999.99	RPM	(Auto change)
16.666kHz	ouFL	RPM	
120kHz	ouFL	RPM	

The input goes down to

16.665kHz	999.99	RPM	(Auto change)

In the case of input, the [dP] should set 0.0 to display full range of RPM and to get higher resolution in lower RPM.

● MANUL (Manual range): The decimal point will be fixed according to the setting of [dP]. The meter will show OUFL (overflow), once the input goes over the frequency that is relative 99999.

Ex.: RPM of Motor: 7200RPM，Encoder: 1000ppr as same as above,

The meter setting

[PUTYP]: rPM ; [PPr] : 1000

[rANGE]: MANUL ; [dP] : 0.00

The table is between input and display as below,

Freq. Input	Display	
0Hz	0.00	RPM
166.65Hz	9.99	RPM
1666.5Hz	99.99	RPM
16.665kHz	999.99	RPM
16.666kHz	OUFL	RPM
120kHz	OUFL	RPM

Fix decimal point resolution

The input goes down to

16.665kHz 999.9 RPM

In the case of input, the [dP] should set 0.0 to display full range of RPM.

■ Time out function

Programmable: AUTO / MANUL

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 display to be “0”.

There are two modes AUTO / MANUL can be programmed as below,

● MANUL (Manual): There is a period named ITO (input time out) can be set from 0.0sec~999.9sec. The display will be “0”, once the next pulse doesn’t input during the setting time.

● AUTO (Auto): The display will be “0”, once the next pulse doesn’t input during the time that gave by formula of meter’s firmware. Gerenally, the auto time out is 4 times of 1/ frequency of last input frequency.

■ Max / Mini recording

In order to review & trace the drifting PV, the meters will keep the values of maximum and minimum in [USER LEVEL] during power on.

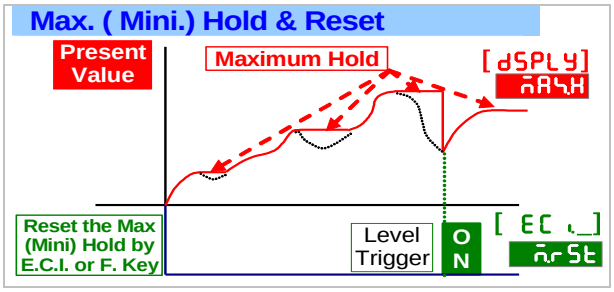
The maximum and minimum can be reset by [EC I] or front key function. Please refer to the operation on their description as below.

■ Maximum Hold or Minimum Hold for PV

When the [DSPLY] function in [INPUT GROUP] set to be MAXHD (Max. Hold) or MINHD (Mini. Hold), that the meter will still display the values of PV in maximum (or minimum) and the relative square orange LED will be bright during power on, until manual reset by front key in [USER LEVEL], Up/Down Key function has been done or ECI terminal had been closed, if the ECI has set RESET. The meter will update immediately new maximum(minimum) values after ECI is to be opened, or press Up/Down Key again.

The Reset functions will be described in ECI functions.

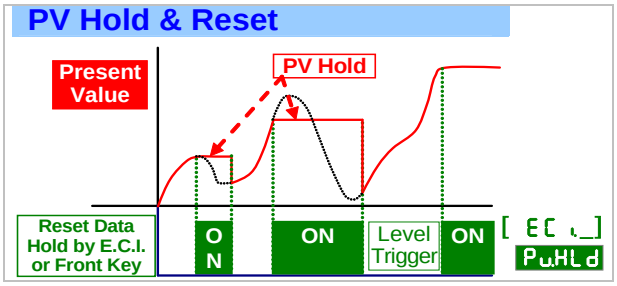
Please paste the sticker M.H on the right side of orange square LED to identify the status of display.



■ PV(Present value) Hold

When the [EC I](External Control input) set to be PVHLD(PV Hold) function in [EC I GROUP], that display will be hold & kept, and the relative green LED will be bright, when the ECI has been closed or Up/Down Key function has been done, until it is to be opened or press Up/Down Key again.

Please paste the sticker ECI PV.H on the right side of green square LED of ECI to identify the status of display.



■ Remote display by RS485 command

In past, The meter normally receive 4~20mA or 0~10V from AO card or BCD card of PLC. We built-in a new solution by RS485 remote display function which it can save costs of AO and wiring connecting to PLC simultaneously.

When the [DSPLY] function set to be rS485, the LED display no longer relative to the input signal on the meter then the PV screen will show the data from RS485 command. The data(number) will be same as PV which it will compare with set-point, relative to analogue output and ECI functions so that is to control analogue output, relay energized and so on.

■ Low Cut

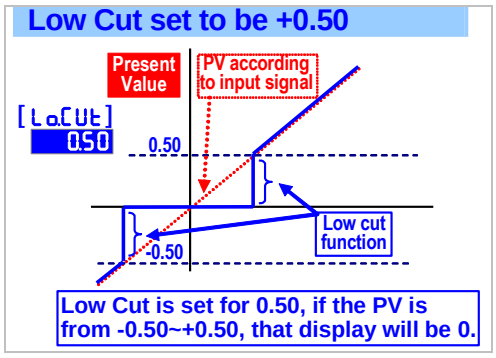
Settable range from -19999~+29999 counts.

The users can set a value here to cut the display value to show "0".

● If the setting value is positive, it expressed the PV will be 0 which it's within the range of absolute value;

PV< l Setting value l, the display will be 0

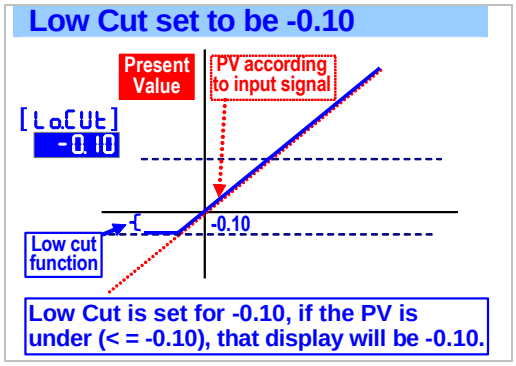
EX: Low Cut is set for 0.50, if the display is from -0.50~+0.50, that will be 0.



- If the setting value is negative, it expressed the PV will be X which it's under the setting value;

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

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



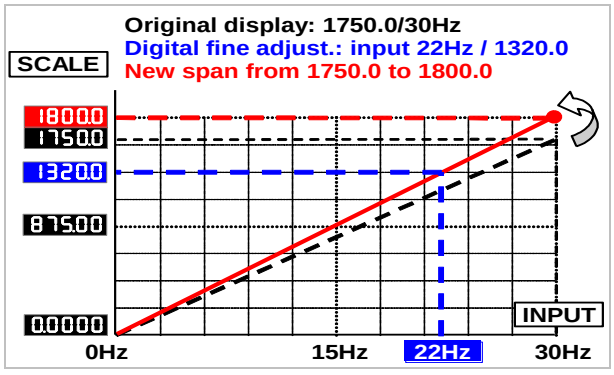
■ Digital Fine Adjustment

Settable range from 0~99999 ;

Users can get "Fine Adjustment PV" by front key on the meter for higher points, and if the user want to show the current input signals that “Just Key-In” the value.

Especially, the [PuSPn] is not only in span of PV, but also any higher point for [PuSPn]. The meter will be linearization automatively for full scale.

The adjustment can be cleared in function [SCLr].



*Please make sure that the [PuSPn] should be over 50% of input range. That may be made bigger error in span, if the interval is too narrow.

■ Reading Stable Functions

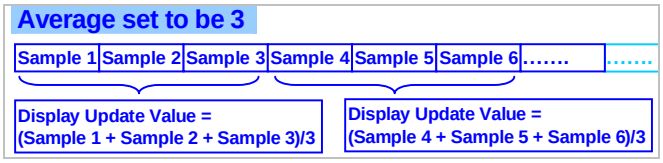
■ Average Display update

Settable range: 1~99 times;

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

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

The meter’s sampling is 15cycle/sec. If the [AuG](Average) set to be 3, the meter will express the sampling 3 readings and calculating the average then update the display once. At meantime, the display update will be 5 times/sec.

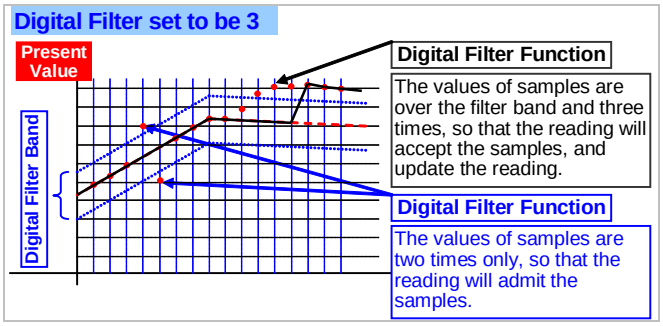


■ Digital filter

Settable range from 0(None)/1~99 times.

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.



■ Front Key Functions

- The Key can be set to be the same function as the setting of [EC .1](ECI.1).

  Ex. The [EC .1] 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 terminals of ECI1 close.

- The Key can be set to be the same function as the setting of [EC .2].

  Ex. The [EC .2] 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 terminals of ECI2 close.

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

■ Relay Functions

CS2 series offer the 4 relay outputs with flexible and versatile functions. They can be programmed individually in [rELAY GroUP]。Please refer to the description as following;

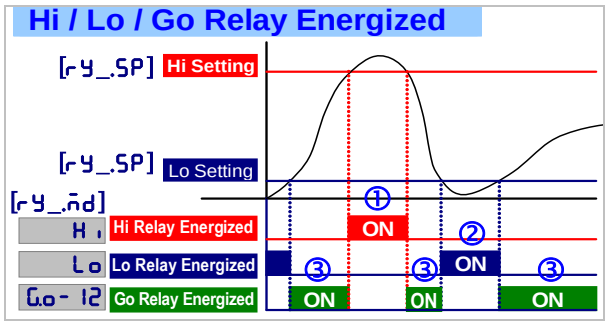
■ Relay energized mode Hi / Lo / Go-1.2 / Go-2.3 / Hi.HLd / Lo.HLd / DO

- **Hi(Fig.1-①):** Relay will be energized, when PV > Set Point
- **Lo(Fig.1-②):** Relay will be energized, when PV < Set Point
- **Go-1.2(Fig.1-③):** This function is programmable for Relay 3 or 4 only. If the Relay 4 set to be Go function, the relay will compare between [ry 1.SP] and [ry2.SP].

Go relay energized when the condition is [ry 1.SP](Hi) > PV > [ry2.SP] (Lo)

- **Go-2.3(Fig.1-③):**. This function is programmable for Relay 4 only. If the Relay 4 set to be Go function, the relay will compare between [ry2.SP] and [ry3.SP].

Go relay energized when the condition is [ry2.SP] (Hi) > PV > [ry3.SP] (Lo)

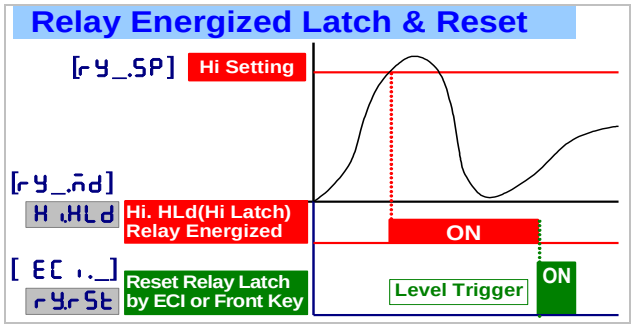


- **Hi.HLd (Lo.HLd)**

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

For example, a current meter installed for over current alarm of motor. Generally, over current of motor caused by over load, mechenical dead lock, aging of insulation and so on. In the case of alarm of meter, if the user doesn't figue out the real reason and re-start the motor. It may damage the motor. The function is desgined that must be manual reset the alarm after checking out and solving the issue. It's very important idea for electrical safety and human protection.

If the PV Higher (or lower) than set-point, the relay will be energized and latch until manual reset by from key in [USEr LEuEL] or [EC i](ECI) input.



- **DO**

The function has been desgined that is not only a meter but also a I/O inteface. In the case of motor control cabnet, it's normally can not get the remote function. It's very easly to get the status of switch and remote ON/OFF of the switch from CS2 series with RS485 function.

If the [ry_.Ad] has been set do, the relay will be energized by RS485 command directly, and no longer to compare with set-point.

■ Start delay band and Start delay time

The functions have benn desgined for,

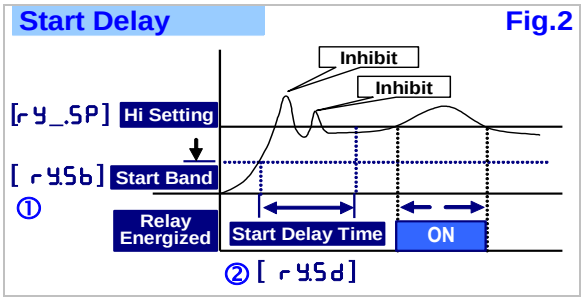
1. To avoid alarm for the starting current of inductive motor(6 times of rated current).
2. If the ry_.Ad relay energized mode has been set to be Lo(Lo) or LoHLd(Lo & latch), the relay will be energized, when the meter is power on and no input due to the "0" display. User can set a band and delay time to inhibit the energized of relay.

- **Start band(Fig.2-①):**

Settable range from 0~9999 Counts

- **Start delay time(Fig.2-②):**

Settable range from 0.0(second)~9(minutes)59.9(seconds);



■ Hysteresis(Fig.3-①)

Settable range from 0~9999 Counts

The function is to avoid the relay on and off frequently, when the display value is swing near by the set point. The typical application is to control a compressor. User can set a band to prevent the relay on and off frequently.

■ Relay energized delay(Fig.3-②)

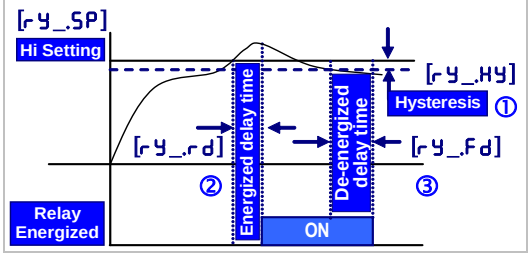
Settable range from 0.0(second)~9(minutes)59.9(seconds);

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

■ Relay de-energized delay(Fig.3-③)

Settable range from 0.0(second)~9(minutes)59.9(seconds)

Energized / De-energized Delay & Hysteresis Fig.3



3 External Control Inputs(ECI)

Reset for Relay Energized Latch

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

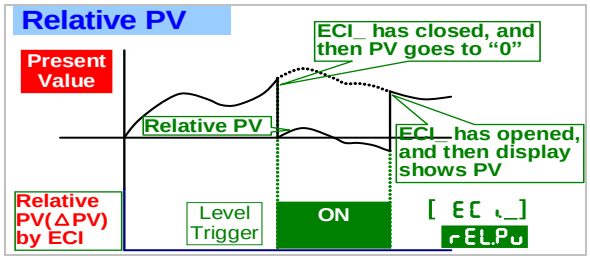
Analogue Output Functions

Please specify the output type either a 0~10V

CS2 series offer 3 point external control inputs. They can be programmed individual with versatile display and control functions. User programs easier in [EC i GroUP]. And front key function can be set to execute ECI function. At meantime, ECI terminals will be disable. Please refer to description as below;

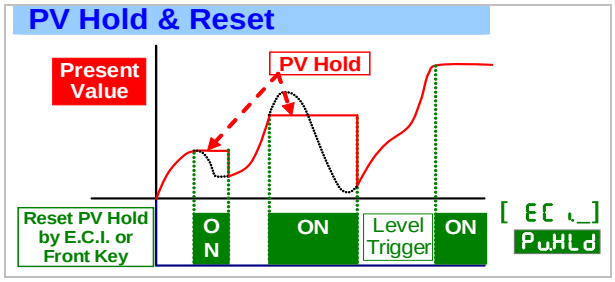
Relative PV or Tare

The [EC i_] can be set to be rELPu (Relative PV) function. When the ECI is closed, the reading will show the differential value with PV or Tare.



PV Hold

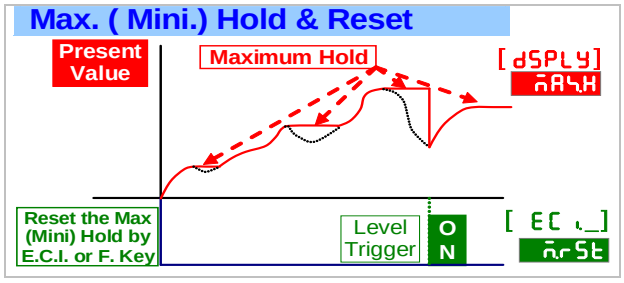
The [EC i_] can be set to be PuHLd (PV Hold) function. The display will be hold when the E.C.I. is closed, until the ECI is to be open. Please refer to the below figures.



Reset for Maximum or Minimum Hold

The [EC i_] function can be set to be rSt function to reset the maximum and minimum value by terminal of ECI.

Especially, the [dSPLY] function in [inPUt GroUP] can be set to be to MAXHd or MininHd to operate in coordination with DO of PLC. It is easier to achieve the maximum value testing in automation. Please refer to the below figures.



DI(Digital Input)

The [EC i_] can be set to be di i (Digital Input) function, when the meter building in RS485 port. The computer is easier to get a switch status through the meter as like as DI of PLC.

Fine Zero & Span Adjustment for Analog Output

or 4(0)~20mA in ordering. The output low and high can be programmable which it's related to various display values. Reverse slope output is possible by reversing point positions.

Output low corresponds to display Low[AoLS]

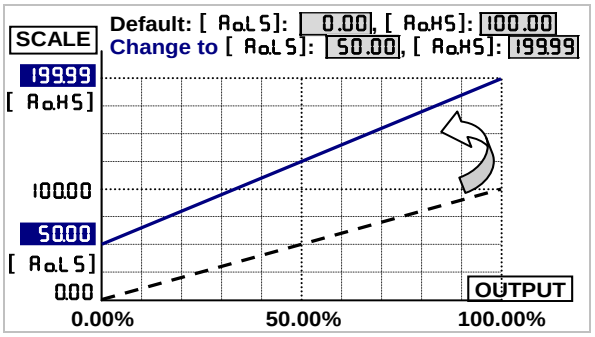
Settable range: -19999~+99999;

Setting the Display value Low to versus output range Low(as like as 4mA in A4-20).

Output high corresponds to display High[AoHS]

Settable range: -19999~+99999;

Setting the Display value High to versus output range High(as like as 20mA in A4-20)

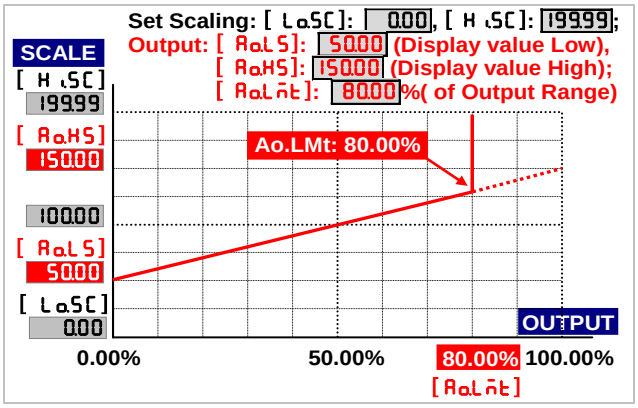


*The range between [AoHS] and [AoLS] should be over 20% of span minimum; otherwise, it will reflect the less resolution of analogue output.

High Limited for Analog Output

Settable range: 0.00~110.00% of output High;

User can set the high limit of output to avoid destroying the receiver or protection system.



RS 485 Communication

Users can get Fine Adjustment of analogue output by front key on the meter. Please connect standard meter to the terminals of analogue output. To press the front key(up or down key) of meter for adjusting and checking the output.

- **[Ao.Pro]: Fine Zero Adjustment for Analog Output;**
  Settable range: -38011~27524;
- **[Ao.SPn]: Fine Span Adjustment for Analog Output;**
  Settable range: -38011~27524;

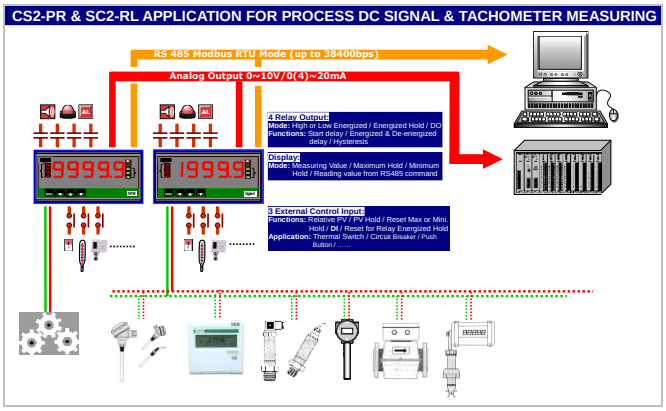
Unit (RTU) for monitoring and controlling in a SCADA (Supervisor Control And Data Acquisition) system. It's not only can be read the measured value and DI (external control inputs) status but also controls the relays output (DO) via RS485 communication ports.

- **Protocol:** ModBus RTU Mode
- **Baud Rate:** Programmable 1200/2400/4800/ 9600/19200/38400
- **Data Bits:** 8 bits
- **Stop Bits:** Programmable 1 bit or 2 bits
- **Parity:** Programmable Even / Odd / None
- **Divice Number:** Settable 1~255

■ Remote Display function

CS2 series has been built in an innovation function call remote display function.

In past, The meter normally receive 4~20mA or 0~10V from AO card or BCD card of PLC. We support a new solution by RS485 remote display function so that can save cost of AO and wiring into PLC.



The data(number) will be same as PV that will compare with set-point, relative to analogue output and ECI functions so that is to control analogue output, relay energized and so on

■ ORDERING INFORMATION

CS2-RL- [Input Mode] [Input level] – [Relay Output] – [Analogue Output] – [RS 485 Port] – [AUX. POWER]

[–] [*Optional Function] Customize function is welcome. Please contact with our sales for detail.

OPTION 1 | OPTION 2 | OPTION 3

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

CODE		INPUT MODE
C	00	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 OUTPUT
N	None
R2	2 Relay
R4	4 Relay

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

CODE	RS 485 PORT
N	None
8	RS 485

CODE	AUX. POWER
A	AC 115/230 V
OPTION 4	
ADH*	AC/DC 85~264V
ADL*	AC/DC 20~90V

* ADH* will be available at Jan. 2008

* It means RoHS version.

CS2-F- [Input Mode] [Input level] – [Relay Output] – [Analogue Output] – [RS 485 Port] – [AUX. POWER]

★ [–] [*Optional Function] Customize function is welcome. Please contact with our sales for detail.

OPTION 1 | OPTION 2 | OPTION 3

CODE		INPUT MODE
V		Voltage Pulse
	05	5V pulse
	12	12V pulse
	24	24V pulse
S	36	30~600Vac
O	xx	Specify

CODE	REALY OUTPUT
N	None
R2	2 Relay
R4	4 Relay

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

CODE	RS 485 PORT
N	None
8	RS 485

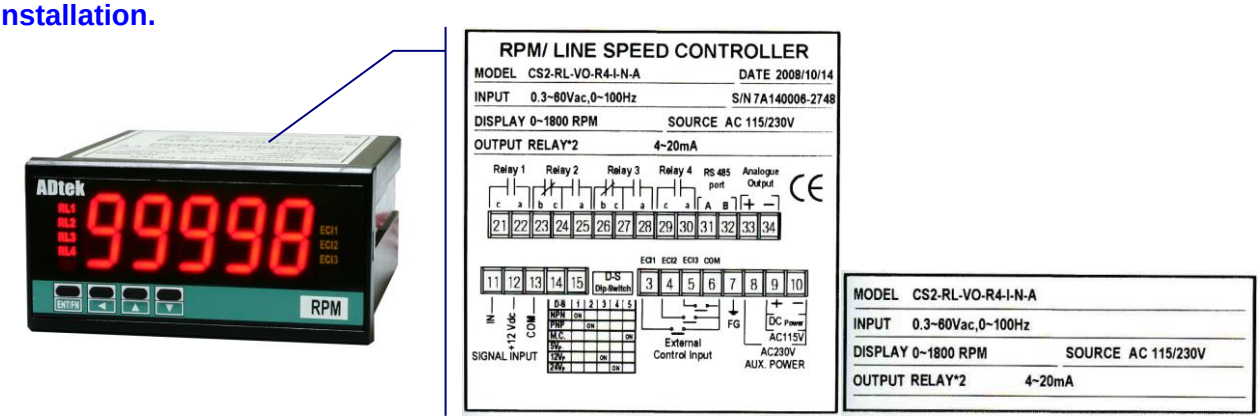
CODE	AUX. POWER
A	AC 115/230 V
OPTION 4	
ADH*	AC/DC 85~264V
ADL*	AC/DC 20~90V

* ADH* will be available at Jan. 2008

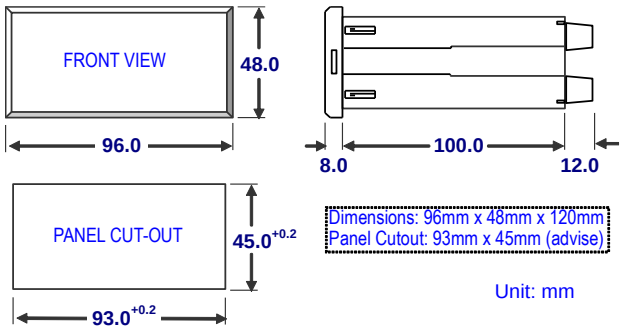
* It means RoHS version.

■ INSTALLATION

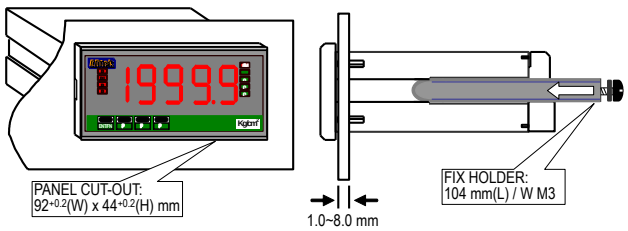
Please check the specification, wire diagrams and functions on the lable of the meter before installation.



■ Dimensions & Panel Cut Out



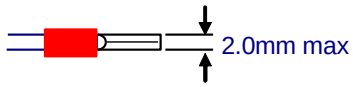
■ Installation



■ Wiring Diagram

Connector

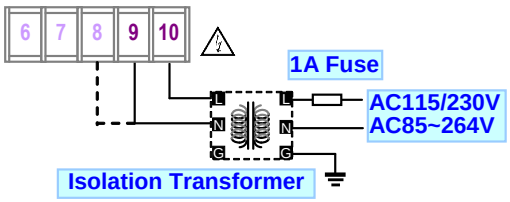
10A 300Vac, M2.6, 16~22AWG,
Max torque: 5Kg-cm
Please use cord end terminal.



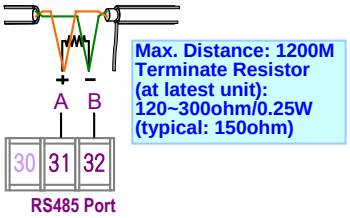
Please check the voltage of power supplied first, and then connect to the specified terminals. Herein, recommended that power supplied to the meter with protection by a fuse or circuit breaker.

For input, RS485 and ECI wiring, Herein recommended to use twin with shielding wire.

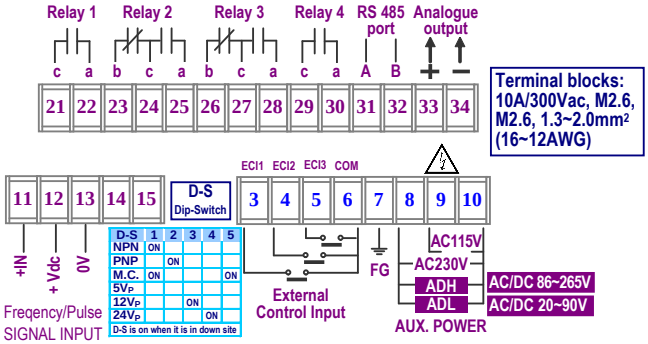
Power Supply



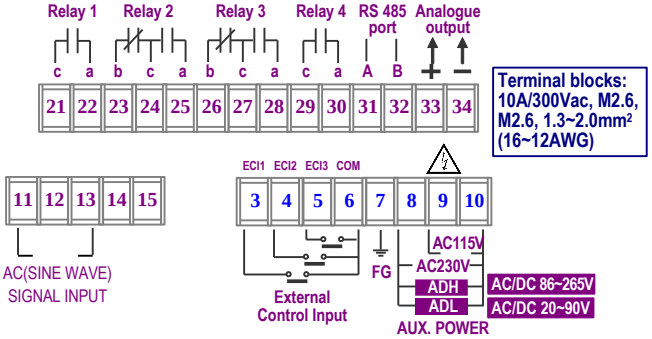
RS485 Communication Port



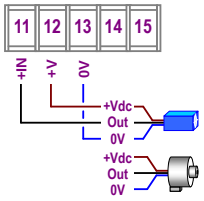
【CS2-RL RPM/Linearlly Line Speed/Freq.Controller】



【CS2-F Frequency Controller】



Sensor input connection



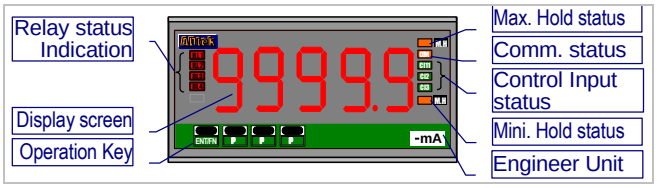
Please change the dip-switch on rear of meter to match the input mode and level.

D-S	1	2	3	4	5
NPN	ON				
PNP		ON			
M.C.	ON				ON
$5V_P$					
$12V_P$			ON		
$24V_P$				ON	

D-S is on when it is in down site

OPERATIONS

Front Panel



Numeric Screens

0.8"(20.0mm) red high-brightness LED for 5 digital present value.

I/O Status Indicators

- **Relay Energized:** 4 square red LED
  - RL1 display once Relay 1 has been energized;
  - RL2 display once Relay 2 has been energized;
  - RL3 display once Relay 3 has been energized;
  - RL4 display once Relay 4 has been energized;
- **External Control Input Energized:** 3 square green LED
  - ECI1 display once ECI.1 has been closed(dry contact)
  - ECI2 display once ECI.2 has been closed(dry contact)
  - ECI3 display once ECI.3 has been closed(dry contact)
- **RS485 Communication:** 1 square orange LED
  - COM will flash when the meter is receive or send data, and COM flash quickly means the data transient quicker.
- **Max/Mini Hold indication:** 2 square orange LEDs
  - M.H displayed: To display function which expressed it has been selected in Maximum or Minimum Hold function.

Stickers:

Each meter with a sticker to describe what are the functions and engineer label enclosure.

Functions stickers

HH	HI	LO	LL	D.L	D.H	DO	D.H	M.H	Tare
GO	Hi.H	Lo.H	R.PV	R.RS	M.RS	PV.H	BK1	BK2	BK3
DI	RST	DO1	DO2	DO3	DO4	DI1	DI2	DI3	

- **Relay energized:**
  - HH HH Energized
  - Hi Hi Energized
  - Lo Lo Energized
  - LL LL Energized
  - GO Go Energized
  - Hi.H Hi Energized & Latch
  - DO RS485 Energized
  - Lo.H Lo Energized & Latch
- **ECI functions:**
  - PV.H PV Hold
  - Tare Tare
  - DI Digital Input
  - M.RS Maximum or Minimum Reset
  - R.RS Reset fo Relay Latch

- **Engineer Label:** over 80 types.

~μA	~mA	~A	~KA	⎓μA	⎓mA	⎓A	⎓KA	
~μV	~mV	~V	~KV	⎓μV	⎓mV	⎓V	⎓KV	
A hr	A min	A sec	A rms	V rms	A/mA	W/A	Var/A	
W	KW	MW	WH	KWH	MWH	W/WH	W/Var	
Var	KVar	MVar	QH	KQH	MQH	COSθ	Var/VarH	
VA	KVA	MVA	VAH	KVAH	MVAH	θ	KVarH	
Hz	PF	KA	KV	KHz	MVarH	KM/hr		
A	mA	V	mV	Ω	KΩ	°C	°F	%RH
RPM	M/min	Y/min	F/min	M/sec	%	°	MΩ	
Kg/cm²	Bar	mmH₂0	mmHg	KPA	mmAq	PSI	mBar	PA
M³/min	ml/min	Ton/D	L/min	Torr	M³/hr	Kg-cm	cmHg	
mm	cm	M	KM	ft	Yard	ppm	ppb	C.C
g	KG	Ton	T-cm	NT-cm	PH	MPM	L	

Operating Key:

- **Operating Key:** 4 keys for ENTER Enter(Function) / Shift(Escape) / Up key / Down key
- **Pass Code:**

  Settable range:0000~9999;

  User must key-in the exactly pass cord for access to **[Programming Level]**. Otherwise, the meter will return to measuring page. If user forget the pass code, please contact with your service window.
- **Function Lock:** There are 4 levels programmable.
  - nonE (None): no lock at all. User can access to all level for checking and setting.
  - USEr (User Level): User Level lock. User can access to User Level for checking, but can not setting.
  - EnG (Programming Level): Programming level lock. User can access to programming level for checking, but can not setting.
  - ALL (ALL): All lock. User can access to all level for checking but can not setting.
- **Front Key Function**
  - The Key can be set to be the same function as the setting of [EC .1](ECI).

    Ex. The [EC .1] 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 terminals of ECI1 close.
  - The Key can be set to be the same function as the setting of [EC .2].

    Ex. The [EC .2] set to be rEL..Pu 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 terminals of ECI2 close.
  - **If the front key function has been set, the terminal input for ECI will be disabling.**

*Please access to the Engineer Level to check and set the parameters when users start to run the meter

- Operating Key: 4 keys for Enter(Function) / Shift(Escape) / Up key / Down key
- The meter has desgined operation similar as PC's and Enter. In any page, press key means "enter" or "confirm setting", and press key means "escape(Esc)" or "shift".
- In Engineer Level, the screen will return to Measuring Page after do not press any key over 2 minutes, or press for 1 second.

	Function Index	Setting Status
(=) **Enter/Fun key**	(1) In any page, press to access the level or function index (2) From the function index to access setting status	(3) Setting Confirmed, save to EEProm and go to next function index
(=) **Shift key**	(1) In measuring page, press for 1 second to access user level. (2) In function index, press for 1 second to go back upper level. (3) In function group index, press for 1 second to go back measuring page	(4) In seting status, press to Shift the setting position. (5) In seting status, press for 1 second to abort setting and go back this function index.
(=) **Up key**	(1) In function index, press to go back to previous function index	(2) In setting status for function, press to select function (3) During number Setting, press can roll the digit up
(=) **Down key**	(1) In Function Index Page, press will go to the next Function Index Page.	(2) In setting status for function, press to select function (3) During number Setting, press can roll the digit down.

Error Masage

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 120%)	(Please check the input signal)
-ouFL	ADC is negative-overflow (Signal is lower than input -120%)	(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)

■ Operating Steps:

■ User Level

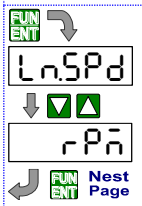
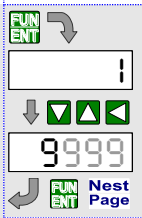
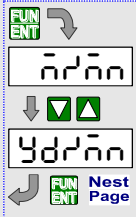
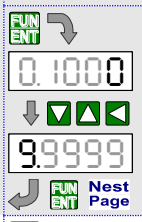
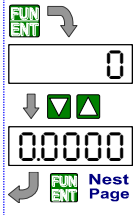
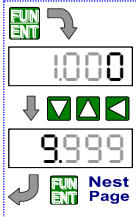
INDEX		FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
POWER ON		**Please check the specification and wiring diagrams firstly.**		
8.8.8.8.8.		**Self-diagnosis (LED All bright)**		
CS2rL		**Model** CS2rL: RPM/Linearlly Line Speed/ Frequency CS2F: Frequency		
uEr 1.4		**Firmware version**		
16888		**Measuring Page** **Press ◀ for 1 second to access [User Level]**		
0-0-1 Pu / 16888		**This page will show out, when [dSPLY](step A-7) function has not set to be Pu .** **Pu(Pv): Present Value;**	**Press ◀ for 1 second return to Measuring Page**	
0-1 rY 1SP / 10000	FUN ENT → 10000 → ▼▲◀ → 20000 → FUN ENT Nest Page	**rY 1SP (rY1.SP):Relay 1 Set-point** ▪ Please confirm the energized mode of relay 1 before setting.	**Settable range: 0~99999** **◀Shift ▲Up ▼Down FUN ENT Enter**	
0-2 rY2SP / 10000	FUN ENT → 10000 → ▼▲◀ → 10000 → FUN ENT Nest Page	**rY2SP (rY2.SP):Relay 2 Set-point** ▪ Please confirm the energized mode of relay 2 before setting.	**Settable range: 0~99999** **◀Shift ▲Up ▼Down FUN ENT Enter**	
0-3 rY3SP / 10000	FUN ENT → 10000 → ▼▲◀ → 8000 → FUN ENT Nest Page	**rY3SP (rY3.SP):Relay 3 Set-point** ▪ Please confirm the energized mode of relay 3 before setting.	**Settable range: 0~99999** **◀Shift ▲Up ▼Down FUN ENT Enter**	
0-4 rY4SP / 10000	FUN ENT → 10000 → ▼▲◀ → 5000 → FUN ENT Nest Page	**rY4SP (rY4.SP):Relay 4 Set-point** ▪ Please confirm the energized mode of relay 4 before setting.	**Settable range: 0~99999** **◀Shift ▲Up ▼Down FUN ENT Enter**	
0-5 rY.rSt / no	FUN ENT → no → ▼▲ → YES → FUN ENT Nest Page	**rY.rSt (rY.rSt): Reset for energized latch of Relay;** If the [rY_.nd](step B-3/7/11/15) set to be H.HLd or LoHLd, and the present value(PV) reach to the condition of relay energising, the relay will be energized and latching. At mean time, user can reset the relay latching in here.	**Programmable: YES / no** **YES(Yes):** reset the relay latching. **no(No):** abort to reset the relay latching. **▲&▼Selection FUN ENT Enter** ▪ Be careful, the relay has been energizing and latching, if the PV still reach to the condition of relay energized, enven user had set here to reset the relay latching.	
Next Page				

0-6	MIn 0.0		**MIn(Min): the Minimum value of PV saving;** The meter will save the minimum of PV during power on, until reset in [rSt](step 0-8). It will save newest minimum PV after reset.	**Review only**
0-7	MAX 29999		**MAX(Max): the Maximum value of PV saving;** The meter will save the maximum of PV during power on, until reset in [rSt](step 0-8). It will save newest maximum PV after reset.	**Review only**
0-8	rSt no no YES Nest Page		**rSt (M.rSt): reset the saved value of Maximum & Minimum;** The values of maximum and minimum can be reset in here. It will save newest maximum and minimum after reset.	**Programmable: YES / no** **YES(Yes):** to reset the saved value of maximum and minimum. **no(No):** abort to reset the saved values of maximum and minimum. **▲&▼Selection FUN ENT Enter**
0-9	CS2rL Ver 1.4		**Model of the meters** CS2rL: RPM/Linearlly Line Speed/ Frequency CS2F: Frequency **Ver 1.4(Ver 1.4):** Firmware version	**Review only** **It will be announced in our website www.adtek.com.tw, when it had been versions updated.**
0-10	Pu 1688.8		**Return to the first page**	
			Press ◀ for 1 second to back to	**Measuring Page in any page.**

■ Programming Level

INDEX		FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
1688.8 FUN ENT		**MEASURING PAGE**		
EntEr PCodE **Default:1000**	FUN ENT 0000 1000 Nest Page	**Enter the pass code to access Programming Level**	**If user wants to change the pass code, please go to step A-15 to set. Please remind the new pass code.**	
NO ◀ Pass Code ▼ YES		**Press ◀ for 1 second to back Measuring Page**		

Input Group

INDEX		FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
inPUt GroUP		**INPUT GROUP INDEX PAGE**	**In following pages, press ◀ for 1 second to back INPUT GROUP INDEX PAGE.**	
A-1 PutYP		**PutYP: PV type selection** The meter has desgined for mult-purpose. User can set the display purpose in [PutYP] of [inPUt GroUP] such as LnSPd(Linearly Line Speed), rPn(RPM), rPS(RPS), HP(Hz), kHP (kHz). The meter will show the relation parameters as below,	**Programmable:** LnSPd:Linearly Line Speed; rPn:RPM(Rotation/Minute) rPS:RPS(Rotation/Second) HP:Hz(Frequency) kHP:kHz(Frequency) ▲&▼**Selection** FUN ENT**Enter**	
A-2-1 PPr		**This function will be shown, once user selects rPn / rPS or LnSPd in [PutYP]** **PPr : Pulse/rotation setting**	**Settable range: 1~9999** ◀**Shift** ▲**Up** ▼**Down** FUN ENT**Enter**	
A-2-2 EUnit		**This function will be shown, once user selects LnSPd in [PutYP]** **EUnit: Engineer Unit of linearly line speed**	**Programmable:** mrmn / Cmrmn / Ydrmn / Ftrmn mrmn(M/min): Meter/Minute Cmrmn(CM/min): Centimeter/Minute Ydrmn(Yd/min): Yard/Minute Ftrmn(Ft/min): Feet/ Minute ▲&▼**Selection** FUN ENT**Enter**	
A-2-3 diAmt		**This function will be shown, once user selects LnSPd in [PutYP]** **diAmt :Diemeter of rotor**	**Settable range: 0.0001~9.9999M** ◀**Shift** ▲**Up** ▼**Down** FUN ENT**Enter**	
A-3 PudP		**PudP: Decimal Point setting;** There are two meanning as below, **1.**The setting of decimal point is for set-point of relay energized level, when user sets to be AUto in [rAnGE] function. **2.**The setting of decimal point is for display value and set-point of relay energized level, when user sets to be rAnUL or SEn i in [rAnGE] function.	**Programmable:** 0 / 0.0 / 0.00 / 0.000 / 0.0000 ▲&▼**Selection** FUN ENT**Enter**	
A-4 FACtr		**FACtr : Factor of display value** Display = Value of math with setting x Factor The display can be proportioned by factor.The typical application is compensation for gear ratio.	**Settable range: 0.001~9.999** ◀**Shift** ▲**Up** ▼**Down** FUN ENT**Enter**	
Next Page				

A-5

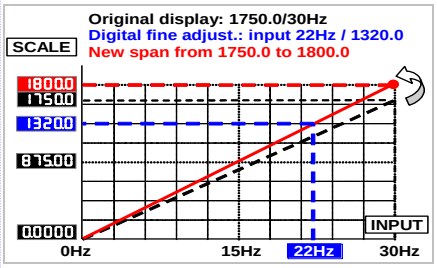
PuSPn(Pv.SPn): Fine high point Adjustment for PV display;

For Span of PV, users can get the "Fine Adjustment" by front key. It's an easy way to “Just Key-In” the value that the user want to show in the current input signal.

Especially, the [PuSPn] is not only in span of PV, but also any higher point for [PuSPn]. The meter will linearizate for full scale.

Settable range: 0~99999

Shift Up Down Enter



A-6

SCLr (S.CLr): Clear Fine High points Adjustment for PV display;

Programmable: no / YES

no (No): Do not clear the fine High adjustment.

YES (YES): To clear the fine High adjustment.

&Selection Enter

A-7

dSPLY(dSPLY): Display Function for PV screen

When the [dSPLY] function set to be rS485, At meantime, the display is no longer express the input signal. The PV screen will show the number from RS485 command & data. The data(number) will be same as PV that it will compare with set-point, analogue output and ECI functions so that is to control analogue output, relay energized and so on.

Programmable: Pu / n inHd / nAXHd / rS485

Pu (PV): shows PV

n inHd (Mini.H): Minimum Hold of PV

nAXHd (MAX.H): Maximum Hold of PV

rS485 (RS485): Remote displayed from RS485 command of master.

&Selection Enter

A-8

LoCUt (Lo.CUt): Low Cut the PV

If the setting value is positive, it means the PV is in the range of absolute value will be 0;

PV≤ I Setting value I, the display will be 0.

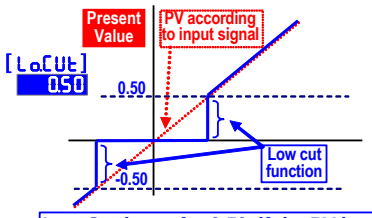
If the setting value is negative, it expressed the PV will be X which it's under the setting value;

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

Settable range: -19999~+29999

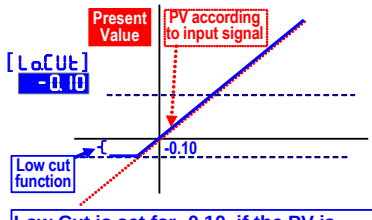
Shift Up Down Enter

Low Cut set to be +0.50



Low Cut is set for 0.50, if the PV is from -0.50~+0.50, that display will be 0.

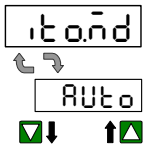
Low Cut set to be -0.10

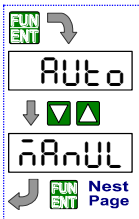


Low Cut is set for -0.10, if the PV is under (< = -0.10), that display will be -0.10.

Next Page

A-9





itand: Input Time Out Mode;

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 display to be “0”.

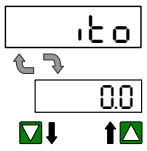
Programmable: AUto / nAnUL

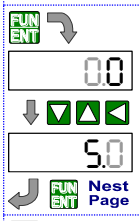
AUto(Auto)**:** The display will be “0”, once the next pulse doesn’t input during the time that gave by formula of meter’s firmware. Gerenally, the auto time out is 4 times of last frequency of input.

nAnUL(Manual)**:** There is a period named ito(input time out) can be set from 0.0sec~999.9sec. The display will be “0”, once the next pulse doesn’t input during the setting time.

▲&▼Selection FUN ENT Enter

A-10





This function will be shown, once user set to be nAnUL in [itand] function

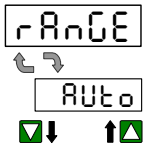
ito: the time of Input Time Out;

Settable range:

0.0 sec~999.9sec

◀Shift ▲Up ▼Down FUN ENT Enter

A-11



rAnGE: Display Range Mode

Programmable: AUto / SEMi / nAnUL

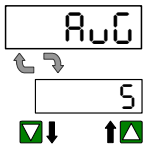
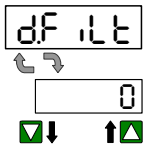
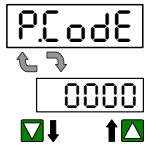
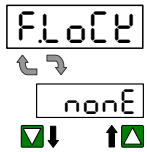
AUto(Auto range)**:** The decimal point will be auto changed according to the input frequency so that keep the display in the highest resolution.

SEMi(Semi-Auto range)**:** The decimal point will be auto changed according to the input frequency to keep the display in the highest resolution, but it must be under setting position of decimal point. It’s possible to show “ouFL(overflow)”, if the input frequency is over the display range.

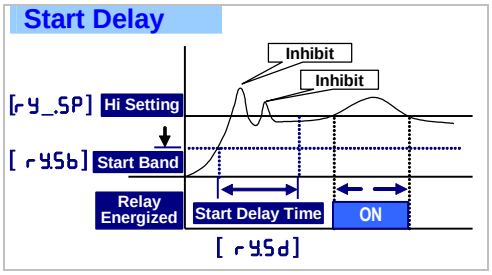
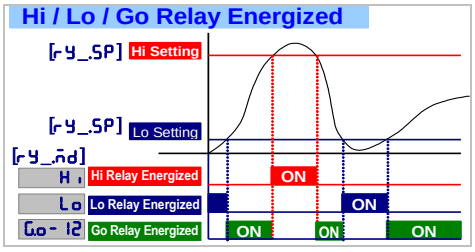
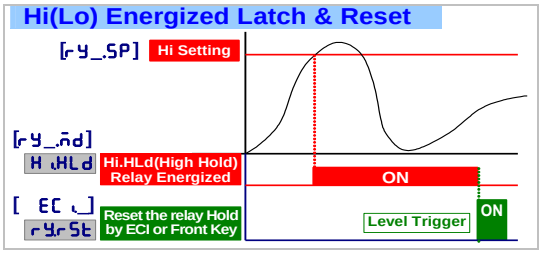
nAnUL(Manual range)**:** The decimal point will be fixed according to the setting of [dP]. The meter will show ouFL(overflow), once the input goes over the frequency that is relative 99999.

▲&▼Selection FUN ENT Enter

Next Page

A-12		**AvG(AvG): Average update for PV** Jittery Display caused by the noise or unstable signal. User can set number to average the readings to get smoothly display. The meter's sampling is 15 cycles/sec. If the [AvG](Average) set to be the 3, which means the meter is sampling 3 readings, and calculating the average to update display once. At meantime, the display update will be 5 times/sec.	**Settable range:** **1(no function)~99 times** **◀Shift ▲Up ▼Down FUN ENT Enter**
A-13		**dF iLt (d.FiLt): Digital filter** The digital filter can reduce the magnetic noise or EMI in the field. 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.	**Settable range:** **0(no function)/1~99 times.** **◀Shift ▲Up ▼Down FUN ENT Enter**
A-14		**PCodE (P.CodE): Pass Code setting for access to programming level** Please remind and write down the new pass code so that access to programming level.	**Settable range: 0000~9999** **◀Shift ▲Up ▼Down FUN ENT Enter**
A-15		**FLoCK (F.LoCk): Function level Lock** There are 4 levels programmable for lock that the function is to avoid mis-setting.	**Programming:** **nonE (None):** no lock at all. User can access to user level for checking and setting. **USEr (User Level):** User level lock. User can access to user level for checking, but can not setting. **EnG (Programming Level):** Programming level lock. User can access to programming level for checking, but can not setting. **ALL (All Level):** All lock. User can access to all level for checking, but can not setting. **▲&▼Selection FUN ENT Enter**

■ Relay Group (The group will not be displayed except the relay function is to be specified)

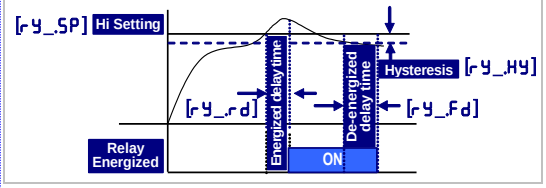
INDEX		FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
rELAY GroUP		**RELAY GROUP INDEX PAGE**	**In following pages, press ◀ for 1 second to return the RELAY GROUP INDEX PAGE.**	
B-1 rY.Sb	FUN ENT → 000.0 → ▼▲◀ → 999.9 → FUN ENT Nest Page	**rY.Sb(rY.Sb): Start band of Relay energized** The functions have benn desgined for, 1. To avoid alarm for the starting current of inductive motor(6 times of rated current). 2. If the rY_Md relay energized mode has been set to be Lo(Lo) or Lo.HLd(Lo & latch), the relay will be energized, when the meter is power on and no input due to the "0" display. User can set a band and delay time to inhibit the energized of relay. **Start Delay** 	**Settable range: 0~9999 digits** ◀Shift ▲Up ▼Down FUN ENTEnter	
B-2 rY.Sd	FUN ENT → 000.0 → ▼▲◀ → 9.59.9 → FUN ENT Nest Page	**rY.Sd(rY.Sd): start delay time for Relay energized**	**Settable range: 0:00.0~9(M):59.9(S)** ◀Shift ▲Up ▼Down FUN ENTEnter	
B-3 rY1.Md	FUN ENT → Hi → ▼▲ → Hi.HLd → FUN ENT Nest Page	**rY1.Md(rY1.Md): Relay 1 energized mode** **Hi / Lo / Go Relay Energized**  **Hi(Lo) Energized Latch & Reset** 	**Programmable:** oFF**(Off):** Turn off the Relay and indication LED. Lo**(Lo):** Low Level Energized; Relay will energize when PV < Set-Point. Hi**(Hi):** High Level Energized; Relay will energize when PV > Set-Point. Hi.HLd**(Hi.HLd)/**Lo.HLd**(Lo.HLd):** High / Low Level energize and latch; When the PV Higher (or lower) than set-point, the relay will be energized and latch until manual reset by from key in **[User Level]**, front key function or terminals of **E.C.I.** closed do**(DO):** Digital Output; Relay is energized by RS485 command directly, and no longer to compare with set-point of relay. ▲&▼Selection FUN ENTEnter	
Next Page				

B-4

rY1.HY(rY1.HY): Relay 1 Hysteresis

The function is to avoid the relay on and off frequently, when the display value is swing near by the set point. The typical application is to control a compressor. User can set a band to prevent the relay on and off frequently.

Energized / De-energized Delay & Hysteresis



Settable range: 0~19999 digits
Shift Up Down Enter

B-5

rY1.rd (rY1.rd): Relay 1 energized delay time

Settable range: 0:00.0~9(M):59.9(S)
Shift Up Down Enter

B-6

rY1.Fd (rY1.Fd): Relay 1 de-energized delay time

Settable range: 0:00.0~9(M):59.9(S)
Shift Up Down Enter

B-7

rY2.Md(rY2.Md): Relay 2 energized mode

….as same as Relay 1 Energized Mode…

Programmable: oFF(off) / Lo(Lo) / Hi(Hi) / Hi.HLd(Hi.HLd) / Lo.HLd(Lo.HLd) / do(DO)
&Selection Enter

B-8

rY2.HY(rY2.HY): Relay 2 Hysteresis

Settable range: 0~19999 digits
Shift Up Down Enter

B-9

rY2.rd (rY2.rd): Relay 2 energized delay time

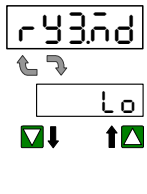
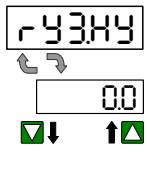
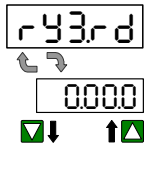
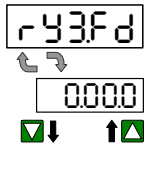
Settable range: 0:00.0~9(M):59.9(S)
Shift Up Down Enter

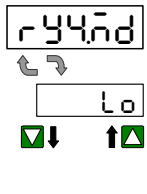
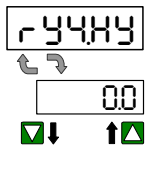
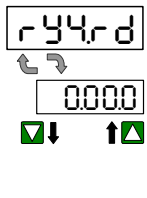
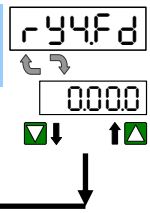
B-10

rY2.Fd (rY2.Fd): Relay 2 de-energized delay time

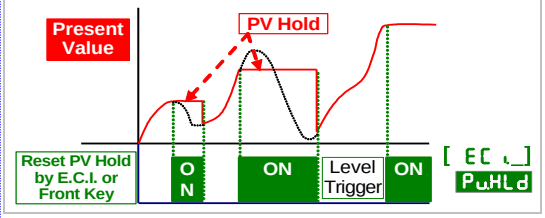
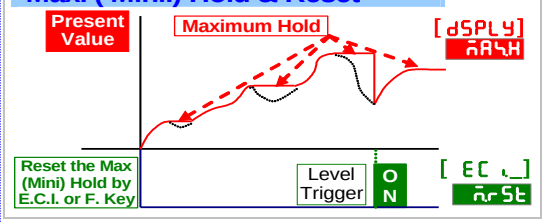
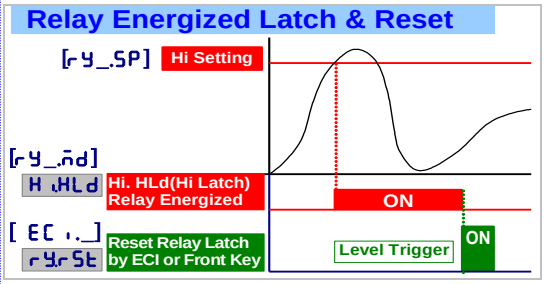
Settable range: 0:00.0~9(M):59.9(S)
Shift Up Down Enter

Next Page

B-11			**rY3.Md(rY3.Md): Relay 3 energized mode**	**Programmable:** oFF**(off) /** Lo**(Lo) /** Hi**(Hi) /** Hi.HLd**(Hi.HLd) /** Lo.HLd**(Lo.HLd) /** do**(DO),** These fcunctions are same as** rY1.Md **and add** Go-12 Go-12**(Go-12):** This function is programmable in Relay 3 or 4 only. If the Relay 3 or 4 set to be Go-12 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) **▲&▼Selection FUN ENT Enter**
B-12			**rY3.HY(rY3.HY): Relay 3 Hysteresis**	**Settable range: 0~19999 digits** **◀Shift ▲Up ▼Down FUN ENT Enter**
B-13			**rY3.rd (rY3.rd): Relay 3 energized delay time**	**Settable range:** **0:00.0~9(M):59.9(S)** **◀Shift ▲Up ▼Down FUN ENT Enter**
B-14			**rY3.Fd (rY3.Fd): Relay 3 de-energized delay time**	**Settable range:** **0:00.0~9(M):59.9(S)** **◀Shift ▲Up ▼Down FUN ENT Enter**
Next Page				

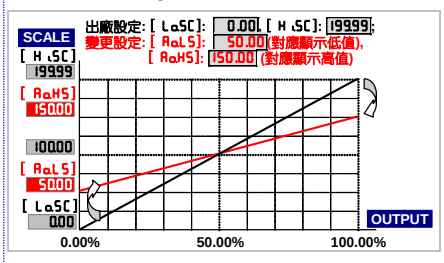
B-15		**rY4.Md(rY4.Md): Relay 4 energized mode**	**Programmable:** oFF**(off) /** Lo**(Lo) /** Hi**(Hi) /** Hi.HLd**(Hi.HLd) /** Lo.HLd**(Lo.HLd) /** do**(DO),** **These fcunction are same as** rY1.Md **and more** Go-12 **/** Go-23 Go-12**(Go-1.2):** This function is programmable in Relay 3 or 4 only. If the Relay 3 or 4 set to be Go-12 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-23**(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-23 relay energized when the condition is [rY2.SP](Hi)>PV>[rY3.SP](Lo) **&Selection Enter**
B-16		**rY4.HY(rY4.HY): Relay 4 Hysteresis**	**Settable range: 0~19999 digits** **Shift Up Down Enter**
B-17		**rY4.rd (rY4.rd): Relay 4 energized delay time**	**Settable range:** **0:00.0~9(M):59.9(S)** **Shift Up Down Enter**
B-18		**rY4.Fd (rY4.Fd): Relay 4 de-energized delay time**	**Settable range:** **0:00.0~9(M):59.9(S)** **Shift Up Down Enter**

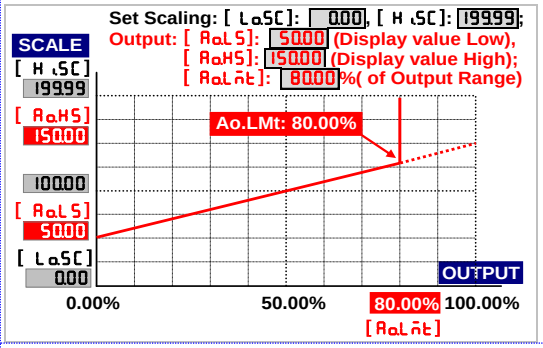
External Control Input(E.C.I.) Group (standard function)

INDEX		FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
EC i GroUP		**EXTERNAL CONTROL INPUT GROUP INDEX PAGE**	**In following pages, press ◀ for 1 second to return the ECI GROUP INDEX PAGE.**	
C-1 EC i.1	rELPu PuHLd rYrSt Nest Page	**EC i.1(ECi.1): External Control Input 1** **PuHLd(Pv.HLd)** PV Hold & Reset  **MrSt(M.rSt)** Max. (Mini.) Hold & Reset  **rYrSt(rY.rSt)** Relay Energized Latch & Reset  	**Programmable:** **nonE(None):** No function; **rELPu(rEL.Pv):** Relative PV function; the reading will show the differential value(ΔPV) as the ECI has closed. **PuHLd(Pv.HLd):** The ECI can be set to be PV Hold function. The display will be hold when the ECI has closed, until the ECI has to be open. Please refer to the left figure. **MrSt(M.rSt):** Reset for max./mini. Hold in PV screen; When the [dSPLY](dsply) function set to be MiHd / MAXHd or max./mini value which figures are saving in **[User level]**, the values saved can be reset in this function. **rYrSt(rY.rSt):** If [rY_Md](relay energized mode) was set to be HiHLd / LoHLd(Hi or Lo Energized latch), the ECI can be set to be Reset the Relay Latching when the PV meets the condition of relay energizing, the relay will be energized and latching until the ECI has closed. **di(DI):** Digital Input; The E.C.I can be set to be Digital Input function, when the meter building in RS485 port. The master is easier to get a switch status through the meter as like as DI module of PLC. **▲&▼Selection FUN ENT Enter**	
C-2 EC i.2	PuHLd rYrSt Nest Page	**EC i.2(ECi.2): External Control Input 2**	**...as same as EC i.1** **Programmable:** nonE / rELPu / PuHLd / MrSt / rYrSt / di **▲Up ▼Down FUN ENT Enter**	
C-3 EC i.3	MrSt di Nest Page	**EC i.3(ECi.3): External Control Input 3**	**...as same as EC i.1** **Programmable:** nonE / rELPu / PuHLd / MrSt / rYrSt / di **▲&▼Selection FUN ENT Enter**	
Next Page				

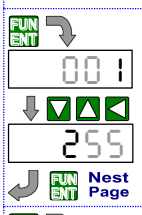
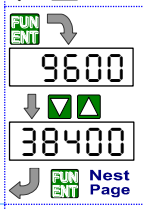
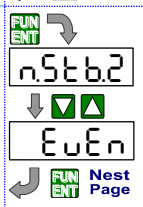
C-4	dEbnC 12	FUN ENT 012 ▼▲◀ 255 FUN ENT Nest Page	**dEbnC (dEbnc): Debouncing of external control Input**	**Settable range: 5~255(x 8ms)** **◀Shift ▲Up ▼Down FUN ENT Enter**
C-5	E.1=UP no	FUN ENT no ▼▲ YES FUN ENT Nest Page	**E.1=UP (E.1=UP): The ▲Up Key can be set to be the same function as the setting for [EC.1].** Ex. The [EC.1] set to be PuHLd (Pv.HLd) and the function [E.1=UP] set to be YES. When user presses ▲Up Key, the PV will hold as like as ECI1 closed by terminals. If the front key function has been set, the terminal input for ECI will be disabling.	**Programmable:** YES **(YES): ▲Up Key is to be same function as ECI1** no **(NO) : ▲Up Key isn't to be same function as ECI1** **▲&▼Selection FUN ENT Enter**
C-6	E.2=dn no	FUN ENT no ▼▲ YES FUN ENT Nest Page	**E.2=dn (E.2=DN): The ▼Down Key can be set to be the same function as the setting for [EC.2].**	**Programmable:** YES **(YES): ▼Down Key is to be same function as ECI2.** no **(NO): ▼Down Key isn't to be same function as ECI2.** **▲&▼Selection FUN ENT Enter**

Analogue Output Gruop (The group will not be displayed except the AO function is to be specified)

INDEX		FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
Ao GroUP FUN ENT		**AO GROUP INDEX PAGE**	**In following pages, press ◀ for 1 second to return the AO GROUP INDEX PAGE.**	
D-1 AotYP 4-20	FUN ENT 4-20 ▼▲ 0-10 FUN ENT Nest Page	**AotYP (Ao.tYP): Analogue Output type and range selection;** Analogue output type had been fixed in mA or V as customer ordering requested.Therefore, the type selection is for ranges in same type(Voltage or Current).	**Programmable:** **Voltage Output:** 0-10 **(0~10V) /** 0-5 **(0~5V) /** 1-5 **(1~5V)** **Current Output:** 0-10 **(0~10mA) /** 0-20 **(0~20mA) /** 4-20 **(4~20mA)** **▲&▼Selection FUN ENT Enter**	
D-2 AoLS 0.0	FUN ENT 0000 ▼▲◀ 5000 FUN ENT Nest Page	**AoLS (Ao.LS): the Low point is relative to Analogue Output low;** To set the lower display value to versus output range low(as like as 4mA in 4-20) Ex. Ourput range set to be 4-20 (4~20mA) is relative to display 0~199.99. User can set the [AoLS] (Ao.LS) to be 5000. At meantime, the output signal will be 4mA when the present value is 50.00.	**Settable range: -19999~99999** **◀Shift ▲Up ▼Down FUN ENT Enter** 	
Next Page				

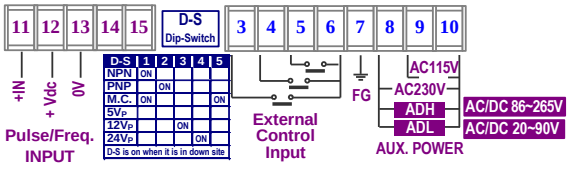
D-3	AoHS 19999 15000 Nest Page According to the setting of H.SC		**AoHS(Ao.HS): the High point is relative to Analogue Output high;** To set the higher display value to versus output range high(as like as 20mA in 4-20) Ex. Ourput range set to be 4-20 (4~20mA) is relative to display 0~199.99. User can set the [AoHS] (Ao.HS) to be 15000. At meantime, the output signal will be 20mA when the present value(PV) is 150.00.	**Settable range: -19999~99999** Shift Up Down Enter
D-4	AoZro 0 00000 -7233 Nest Page		**AoZro(Ao.Zro): Fine Zero Adjustment for Analog Low Output;** Users can get Fine zero Adjustment for analogue output by front key. Please connect standard meter to the terminal of analogue output. To press the front key(up or down key) to adjust and check the output of meter.	**Settable range: -38011~27524** Shift Up Down Enter
D-5	AoSPn 0 00000 32767 Nest Page		**AoSPn(Ao.SPn): Fine Span Adjustment for Analog high Output;** Users can get Fine span Adjustment for analogue output by front key of the meter as like as [AoZro] (Ao.Zro).	**Settable range: -38011~27524** Shift Up Down Enter
D-6	ZSCLr nonE nonE botH Nest Page		**ZSCLr (Z.S.CLr): Clear the Fine Zero / Span Adjustment for Analog Output**	**Programmable:** nonE **(None):** Do not clear AoZro **(Ao.Zro):** Clear low adjust AoSPn **(Ao.SPn):** Clear high adjust botH **(both):** Clear low & high adjust &Selection Enter
D-7	AoLMt 110.00 100.00 Nest Page		**AoLMt (Ao.LMt): Analog Output High Limit** 	**Settable range:** **-0.00~ 110.00% of FS** Shift Up Down Enter

RS485 Group (The group will not be displayed except the RS485 function is to be specified)

INDEX		FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
rS485 GroUP		RS485 GROUP INDEX PAGE	In following pages, press ◀ for 1 second to return the RS485 GROUP INDEX PAGE.	
E-1 AdrES		AdrES(Adress): Device number of the meter.	Settable range: 1~255 ◀Shift ▲Up ▼Down ENTEnter	
E-2 bAUd		bAUd(bAUd): Baud rate	Programmable: 1200 / 2400 / 4800 / 9600 / 19200 / 38400 ▲&▼Selection ENTEnter	
E-3 PrtY		PrtY(PritY): Parity	Programmable: n.Stb.1(n.Stb.1): None, 1 stop bit n.Stb.2(n.Stb.2): None, 2 stop bit odd(odd): odd EvEn(EvEn): Even ▲&▼Selection ENTEnter	

TROUBLE SHOOTING

Display Issue:

PROBLEM	CHECKING LIST	REMEDY
Display shows ouFL	**1.**To inspect the input range of meter whether did match with range in the field or not?	**A.**The input range of CS2-RL(F) is 0.01~100kHz(optional: 0.01~140kHz). Please make sure input of field is between this range. **B.**Please check the setting of [rAnGE] function whether did it correct or not? If user sets the [rAnGE](A-11)function to be SEn1 or nAnUL, the display maybe shows ouFL, when the input frequency is over so that the display is over 99999(with decimal point). Please change the setting to AUto. The decimal point will be auto changed according to the input frequency.
Display shows 0 **and didn't change**	**1.**To inspect whether did the wires connecting correct and secure or not?	**A.**Please checks carefully the connection diagram of label on the meter. There are 3 terminals for signal(+), signal(-) and excitation power supply(+). Please confirm that are correct. **B.**Please uses the terminals(cord end terminal) to avoid the risk of insecure.
	2.To inspect whether did the amplitude of pulse correct or not?	**A.**Please check the auxilliary power of **s**ensor and output level. The input amplitude of meter can be changed by the dip switchs on rear of meter. Please refer to the drawing as below,  *Remark: The meter builds in a excitation power for sensor that can not be changed. Please specified in ordering code.
Incorrection display value or out of accuracy	**1.**To inspect the settings of relation parameters whether did it correct or not?	**A.**Please check the PuLYP(A-01) whether did it correct or not? LnSPd(Linearly Line Speed), rPn / rPS(Rotation Speed), HZ / YHZ(Frequency) Linearly Line Speed: PPr(A-2-1) / EUn it(A-2-2) / d iAnt(A-2-3) Rotation Speed: PPr(A-2-1) **B.**Please check the FACtr(A-04) whether did it correct or not?
	2.To inspect the fine adjustments of PV is changed or not?	Please check the [PuSPn](A-05) in [inPUt GroUP] whether did the values correct or not? The [PuSPn]can be cleared in [SCLr](A-06).
Jittery Display	**1.**To inspect the input signal and it jittery.	**A.**Please check the installation of sensor whether did it balance and stable or not? The vibration of sensor will make the signal unstable. **B.**If the input signal is jittery continuously, please set higher value in [AuG](A-12). **C.**If the input signal is jittery uncertain period that caused by the inductive load actions, please set higher value in [dF iLt](A-13). **D.**Please does not lay the wires of input together with high-voltage lines or power lines. As a general rule, wire the meter in a separate system, use an independent metal conduit, or use shielded cable.

	2.To inspect the input signal and it is stable.	**A.**Please try to set higher value in [AuG](A-12). **B.**Please try to set higher value in [dF iLt](A-13). **C.**Please connects a isolation transformer as close as meter in power lines.
Display shows "-----"	To inspect display function [dSPLY]. It's maybe to be set to rS485	Please check the [dSPLY](A-07) in [inPUt GroUP] and change the function setting from rS485 to Pu.
display value dosen't change	**1.**To inspect display function [dSPLY]. It's maybe to be set to AAHd(maxmum hold) or AinHd(minimum hold)	**A.**Please check the [dSPLY](A-07) in [inPUt GroUP] and hange the function set from AAHd or AinHd to Pu.
	2.To inspect external control input function [EC i]. It's maybe to be set to PuHLd.	**A.**Please check the [EC i](C-01/02/03) in [EC i GroUP] and change the function setting from PuHLd to Pu. **B.**ECI function has been energized by terminals close. Please open the terminals.

Relay Output Issue:

PROBLEM	CHECKING LIST	REMEDY
The perameters of Relay dosen't shown	Check if the label of meter for detail specification.	**A.**Please check the product number and output(O/P:_____) description again for confirmation the relay output is specified or not? **B.**Please send back to our sales window, or order another meter with relay function.
Relay cans not action.	**The relay energized, but square red LED doesn't bright**	
	1.Check the energized mode	Please check the [rY Ind](B-03/07/11/15) in the [rELAY GroUP]
	2.Check the delay time and delay band in the start delay function.	Please check whether did the [rYSb](B-01) is too wide and [rYSd](B-02) is too long in [rELAY GroUP] or not?
	3.Check the energized delay time	Please check whether did the [rY Ird](B-05/09/13/17) is too long in [rELAY GroUP] or not?
	The relay energized, but square red LED dose bright	
	1.Check the wiring of relay output	According to the label of meter, please check again the connection wire of relay. Be careful to check the number of relay is matching the setting.
	2.Check the voltage of supply power	

Analogue Output Issue:

PROBLEM	CHECKING LIST	REMEDY
Incorrection analogue output value or out of accuracy	**1.**To inspect the output signal type (V/A/mA..) or range of meter whether did match with signal in the field or not?	**A.**Please check the product number and output(O/P:_____) description again for confirmation the analogue output is specified or not? ; **B.**Please confirm the output type is correct and check the range in [AotYP](D-01) of [Ao GroUP]
	2.Check the Analogue output high and low setting.	**A.**Please check the [AoLS](D-02) and [AoHS](D-03) in [Ao GroUP].

PROBLEM	CHECKING LIST	REMEDY
Jittery Analogue Output	**Analogue output is according to the display**	
	1.Check if the display is jittery	**A.**If the input signal was jittery continuously, please set higher value in [AuG](A-12). **B.**If the input signal is jittery uncertain period that caused by the inductive load actions, please set higher value in [dF iLt](A-14). **C.**Please does not lay the wires of input together with high-voltage lines or power lines. As a general rule, wire connecting with the meter has to be in a separate system, use an independent metal conduit, or use shielded cable.
	2.Check if the display is stable	Please do not lay the wires of output together with high-voltage lines or power lines. As a general rule, wire connecting with the meter has to be in a separate system, use an independent metal conduit, or use shielded cable.

RS485 Communication Issue:

PROBLEM	CHECKING LIST	REMEDY
Can not link	Check if the square orange LED of RS485 dosen't bright.	**A.**Please check the [AdrES](E-01)、[bAUd](E-02) and [Pr itY](E-03) in [rS485 GroUP] that both have to match the Host. **B.**Please check the wiring A(+) and B(-) are correct or not? **C.**If user uses a converter (RS485/RS232 or RS485/USB..), please check the setting and wiring of converter is correct. **D.**Please check the protocol of host is Modbus RTU Mode
Reply wrong data from the meter	**1.**Check if the square orange LED of RS485 dose bright, but no reply.	**A.**Please confirms the CHECH SUM program is correct. **B.**Please check the interval of each command has to over 3.5byte.
	2.Check if the square orange LED of RS485 dose bright, but reply Error.	**A.**Please check the address table of RS485 to make sure that is right address. **B.**Please checks the start address and data format are correct. **C.**Please do not lay the wires of RS485 together with high-voltage lines or power lines. As a general rule, wire the meter in a separate system, use an independent metal conduit, or use shielded cable.

■ RS485 MODBUS RTU MODE

■ Modbus RTU Mode protocol

1. Function 03H (Read Holding Registers)

Request Data Frame; EX: Read the data of display value(0000H starts from 1 Word)

SLAVE Address	FUNCTION	Starting Address Hi	Starting Address Lo	No. of Word Hi	No. of Word Lo	CRC Lo	CRC Hi
01H	03H	00H	00H	00H	01H	84H	0AH

Response Data Frame; EX: The response value is ”0”

SLAVE Address	FUNCTION	Byte count	Data Hi	Data Lo	CRC Lo	CRC Hi
01H	03H	02H	00H	00H	B8H	44H

Request Data Frame (EX: Continue to request the data of 10 points)

SLAVE Address	FUNCTION	Starting Address Hi	Starting Address Lo	No. of Word Hi	No. of Word Lo	CRC Lo	CRC Hi
01H	03H	00H	00H	00H	0AH	C5H	CDH

Response Data Frame

SLAVE Address	FUNCTION	Byte count	Data(1) Hi	Data(1) Lo	…	…	Data(10) Hi	Data(10) Lo	CRC Lo	CRC Hi
01H	03H	14H	00H	00H	…	…	01H	00H	--	--

2. Writing Command by Function 06H (Preset Single Register)

Request Data Frame

SLAVE Address	FUNCTION Code	Starting Address Hi	Starting Address Lo	Preset DATA Hi	Preset DATA Lo	CRC Lo	CRC Hi
01H	06H	00H	00H	00H	02H	08H	0BH

Response Data Frame

SLAVE Address	FUNCTION Code	Starting Address Hi	Starting Address Lo	Preset DATA Hi	Preset DATA Lo	CRC Lo	CRC Hi
01H	06H	00H	00H	00H	02H	08H	0BH

■ ADDRESS TABLE **Address number are Hexadecimal

■ User level

Name	Address	Range	Explain	Initial	Write/Read	Note
	2 Words					
PV_H*	0000h		Present Value***(High Word)**		R	
PV_L*	0001h		Present Value***(Low Word)**		R	
r1SP_H*	0002h	-19999~99999	Relay1 Set Point***(High Word)**	0000h	R/W	
r1SP_L*	0003h		Relay1 Set Point***(Low Word)**	C350h	R/W	
r2SP_H*	0004h	-19999~99999	Relay2 Set Point***(High Word)**	0000h	R/W	
r2SP_L*	0005h		Relay2 Set Point***(Low Word)**	C350h	R/W	
r3SP_H*	0006h	-19999~99999	Relay3 Set Point***(High Word)**	0000h	R/W	
r3SP_L*	0007h		Relay3 Set Point***(Low Word)**	C350h	R/W	
r4SP_H*	0008h	-19999~99999	Relay4 Set Point***(High Word)**	0000h	R/W	
r4SP_L*	0009h		Relay4 Set Point***(Low Word)**	C350h	RW	
PvHLd_H*	000Ah		PV Hold***(High Word)**		R	
PvHLd_L*	000Bh		PV Hold***(Low Word)**		R	
Min_H*	000Ch		The Minimum of PV***(High Word)**		R	
Min_L*	000Dh		The Minimum of PV***(Low Word)**		R	
MAX_H*	000Eh		The Maximum of PV***(High Word)**		R	
MAX_L*	000Fh		The Maximum of PV***(Low Word)**		R	

■ Programming Level

[Input Group]

Name	Address	Range	Explain	Initial	Write/Read	Note
d iAntr_H*	0010h	0.0001~9.9999	Diameter of rotor***(High Word)**	0000h	RW	
d iAntr_L*	0011h		Diameter of rotor***(Low Word)**	03E8h	RW	
FACtr_H*	0012h	0.001~9.999	Factor of compensation***(High Word)**	0000h	R/W	
FACtr_L*	0013h		Factor of compensation***(Low Word)**	03E8h	R/W	
Pu.SPn_H*	0014h	-19999~+19999	PV Span***(High Word)**		RW	
Pu.SPn_L*	0015h		PV Span***(Low Word)**		RW	
rS485_H*	0016h	-19999~+19999	PV controlled by RS 485 command ***(High Word)**		RW	
rS485_L*	0017h		PV controlled by RS 485 command ***(Low Word)**		RW	
Ao.LS_H*	0018h	-19999~99999	AO Low Scale***(High Word)**	0000h	RW	
Ao.LS_L*	0019h		AO Low Scale***(Low Word)**	0000h	RW	
Ao.HS_H*	001Ah	-19999~99999	AO High Scale***(High Word)**	0001h	RW	
Ao.HS_L*	001Bh		AO High Scale***(Low Word)**	869Fh	RW	
	1 Word					
dP	001Ch	0~4	Decimal Point of Setting **0:** 00000 **1:** 0000.0 **2:** 000.00 **3:** 00.000 **4:** 0.0000	0000h	RW	
Pu.dP	001Dh	0~4	Decimal Point of PV **0:** 00000 **1:** 0000.0 **2:** 000.00 **3:** 00.000 **4:** 0.0000		R	
n in.dP	001Eh	0~4	Decimal Point of minimum PV **0:** 00000 **1:** 0000.0 **2:** 000.00 **3:** 00.000 **4:** 0.0000		R	
nAX.dP	001Fh	0~4	Decimal Point of maximum PV **0:** 00000 **1:** 0000.0 **2:** 000.00 **3:** 00.000 **4:** 0.0000		R	
Pu.HLd.dP	0020h	0~4	Decimal Point of PV hold **0:** 00000 **1:** 0000.0 **2:** 000.00 **3:** 00.000 **4:** 0.0000		R	
Relay Status	0021h		RELAY STATUS **bit0~bit3:** Relay1~Relay4; **0**=Relay off **1**=Relay on	0000h	R/W	
ECI Status	0022h		ECI STATUS **bit0~bit2:** ECI.1~ECI.3; **0**=untriged **1**:triged		R	
System Status	0023h		SYSTEM STATUS **bit0**=1 EEP fail; **bit1**=1 No Used **bit2**=1 No Used **bit3**=1 Analogue Output calibration fail; **bit4**=1 Analogue Output calibration NG	0000h	R	
n.rSt	0024h	0~1	Reset Maximum & Minimum Value **0:**No **1:**Yes	0000h	R/W	
Pu.tYP	0025h	0~4	PV Type **0:** Linear Speed **1:** RPM **2:**RPS **3:**Hz 4:KHz	0000h	R/W	
PPr	0026h	1~9999	Pulse per Rotation	0001h	R/W	
E.Unit	0027h	0~3	Engineer Unit **0:** M/min **1:** CM/min **2:**Yard/min **3:** Feet/min	0000h	R/W	
itO.Md	0028h	0~1	Input Time Out Mode **0:** Auto **1:** Manual	0000h	R/W	

Name	Address	Range	Explain	Initial	Write/Read	Note
ito	0029h	1~9999(0.1 seccond)	Input Time Out	03E8h	R/W	
rAnGE	002Ah	0~2	Input Range **0:** Auto **1:** Semi-Auto **2:** Manual	0000h	R/W	
S.CLr	002Bh	0~1	Clear of PV Span **0:** No **1:** Yes	0000h	R/W	
Lo.CUt	002Ch	-19999~19999	Low Cut	0000h	R/W	
dSPLY	002Dh	0~3	Display Function **0:** PV **1:** Min. hold **2:** Max. hold **3:** RS 485	0000h	R/W	
AuG	002Eh	1~99	Average	0005h	R/W	
d.F iLt	002Fh	0~99	Digital Filter	0000h	R/W	
P.CodE	0030h	0000~9999	Pass Code	03E8h	R/W	
F.LoCY	0031h	0~3	Function Lock **0:** None **1:** User Level **2:** Engineer Level **3:** All	0000h	R/W	

[Relay Group]

Name	Address	Range	Explain	Initial	Write/Read	Note
ry.Sb	0032h	00000~19999	Start Band of Relay	0000h	R/W	
ry.Sd	0033h	0~5999 (0.1second)	Start Delay Time of Relay	0000h	R/W	
ry1.md	0034h	0~5	Relay 1 Energized Mode **0: oFF**(no use); **1: Lo**(Low Energized); **2: Hi**(High Energized) **3: Lo Hold**(Low Energized Hold) **4: High Hold**(High Energized Hold) **5: DO**(Digital Output);	0002h	R/W	
ry1.HY	0035h	0000~19999	Hysteresis of Relay 1	0000h	R/W	
ry1.rd	0036h	0~5999 (0.1second)	Energized Delay Time of Relay 1	0000h	R/W	
ry1.Fd	0037h	0~5999 (0.1second)	De-Energized Delay Time of Relay 1	0000h	R/W	
ry2.md	0038h	0~5	Relay 2 Energized Mode **0: oFF**(no use); **1: Lo**(Low Energized); **2: Hi**(High Energized) **3: Lo Hold**(Low Energized Hold) **4: High Hold**(High Energized Hold) **5: DO**(Digital Output);	0002h	R/W	
ry2.HY	0039h	0000~19999	Hysteresis of Relay 2	0000h	R/W	
ry2.rd	003Ah	0~5999 (0.1second)	Energized Delay Time of Relay 2	0000h	R/W	
ry2.Fd	003Bh	0~5999 (0.1second)	De-Energized Delay Time of Relay 2	0000h	R/W	
ry3.md	003Ch	0~5	Relay 3 Energized Mode **0: oFF**(no use); **1: Lo**(Low Energized); **2: Hi**(High Energized) **3: Lo Hold**(Low Energized Hold) **4: High Hold**(High Energized Hold) **5: DO**(Digital Output); **6: Go-1.2**(Go function compare with SP1 & SP2);	0001h	R/W	
ry3.HY	003Dh	0000~19999	Hysteresis of Relay 3	0000h	R/W	
ry3.rd	003Eh	0~5999 (0.1second)	Energized Delay Time of Relay 3	0000h	R/W	

Name	Address	Range	Explain	Initial	Write/Read	Note
rY3.Fd	003Fh	0~5999 (0.1second)	De-Energized Delay Time of Relay 3	0000h	R/W	
rY4.Md	0040h	0~5	Relay 4 Energized Mode **0: oFF**(no use); **1: Lo**(Low Energized); **2: Hi**(High Energized) **3: Lo Hold**(Low Energized Hold) **4: High Hold**(High Energized Hold) **5: DO**(Digital Output); **6: Go-1.2**(Go function compare with SP1 & SP2); **7: Go-2.3**(Go function compare with SP2 & SP3);	0001h	R/W	
rY4.HY	0041h	0000~19999	Hysteresis of Relay 4	0000h	R/W	
rY4.rd	0042h	0~5999 (0.1second)	Energized Delay Time of Relay 4	0000h	R/W	
rY4.Fd	0043h	0~5999 (0.1second)	De-Energized Delay Time of Relay 4	0000h	R/W	
rY.rSt	0044h	0~1	Reset of Relay Hold **0:** No **1:** Yes	0000h	R/W	

[ECI Group]

Name	Address	Range	Explain	Initial	Write/Read	Note
EC i.1	0045h	0~5	External Control Input 1 **0:nonE** (None); **1:rEL.PV**(Relative PV); **2:PV.HLd**(PV Hold); **3: M.rSt**(Reset for Maximum & Minimum); **4:rY.rSt**(Reset for Relay Hold); **5:di**(Digital Input);	0001h	R/W	
EC i.2	0046h	0~5	External Control Input 2 **0:nonE** (None); **1:rEL.PV**(Relative PV); **2:PV.HLd**(PV Hold); **3: M.rSt**(Reset for Maximum & Minimum); **4:rY.rSt**(Reset for Relay Hold); **5:di**(Digital Input);	0002h	R/W	
EC i.3	0047h	0~5	External Control Input 3 **0:nonE di**(Digital Input); **1:rEL.PV**(Relative PV); **2:PV.HLd**(PV Hold); **3: M.rSt**(Reset for Maximum & Minimum); **4:rY.rSt**(Reset for Relay Hold); **5:di**(Digital Input);	0003h	R/W	
dEbnC	0048h	5~255	ECI debouncing 5~255 *8mSec	000Ch	R/W	

[AO Group]

Name	Address	Range	Explain	Initial	Write/Read	Note
Ao.tYE	0049h	0~5	Analog Output Type **0:** 0~10V **1:** 0~5V **2:**1~5V **3:** 0~20mA **4:** 4~20mA **5:** 0~10mA	0000h	R/W	
P.S.CLr	004Ah	0~3	The clear of AO_ZERO and AO_SPAN **0:** None **1:** AO_ZERO **2:** AO_SPAN **3:** Both	0000h	R/W	
Ao.L in	004Bh	00.00%~ 110.00%	Analogue Output High Limit	2AF8h	R/W	

[RS485 Group]

Name	Address	Range	Explain	Initial	Write/Read	Note
AdrES	004Ch	1~255	RS485 address	0001h	R/W	
bAUd	004Dh	0~5	RS485 baud rate **0:**1200 **1:**2400 **2:**4800 **3:**9600 **4:**19200 **5:**38400	0003h	R/W	
Pr tY	004Eh	0~3	RS485 parity **0:** n-8-1 **1:** n-8-2, **2:** odd, **3:** even,	0001h	R/W	

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