

DESCRIPTION

CS1-RL(F) controller has been designed simple and low cost with high accuracy measurement, display, control or communication (Modbus RTU mode) such as 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 have been designed optional 1 of 3 kinds for 1 Relay, 1 Analogue or 1 RS485 port with flexible display function such as max/mini hold, PV hold relative PV.....etc that very useful in testing equipment and others. Please refer to the detail description on pages 2/38~7/38.

FEATURES

- Accuracy: $\pm 0.005\%$; Display range: 0~99999; Auto-range with Decimal Point auto changed according to input frequency.
- 1 relay, 1 Analogue output or RS 485 communication port can be selected one in option
- Relay for Hi / Lo energized with Start Delay / Hysteresis / Energized & De-energized Delay / Relay Energized Latch...etc functions
- EMC, EMI, LVD Approved & RoHS



[CS1-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.

[CS1-F FREQUENCY CONTROLLER]

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

APPLICATIONS

Models

- **CS1-RL** Motor & Machinery / Testing Equipments for Measuring, Alarm or Communication with PC/PLC
☑ On line testing station for appliance, check points of PCB as so on.
- **CS1-F** Switch Boards / Testing Equipments for Measuring

Functions

- **Safety & Protection** Hi/Lo alarm and latch(HiHLd / LoHLd)
- **Testing & Measuring Front Key functiond** for Maximum/Minimum hold(MaxHd / MinHd), PV hold(PuHLd), Relative PV/Tare/ Δ PV(FELPu)
- **Remote Monitoring** RS485 communication port, Display function(F5485)

FUNCTION DEFINE

Character Symbol

A b C d E F G H i J K L M
 R b [d E F G H i j E L n̄
 n o P q r S t U v W X y Z
 n o P q r S t U u y z P
 1 2 3 4 5 6 7 8 9 0 / .
 i 2 3 4 5 6 7 8 9 0 r .

Input Range & Mode

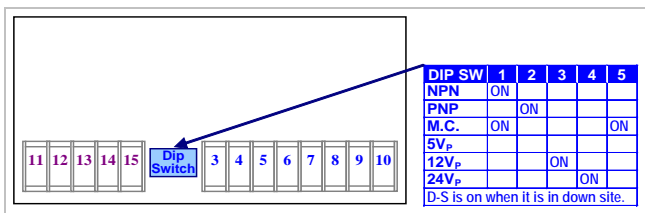
Input Range & Mode

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([P_u_t_Y_P]) in [i_n_P_U_t_G_r_o_U_P]. 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.



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

Display Functions

Multi-Display function

Programmable: [L_n_S_P_d] / [r_P_n] / [r_P_S] / [H_P] / [E_H_P]

The meter has designed for multi-purpose. User can set the display purpose in [P_u_t_Y_P] of [i_n_P_U_t_G_r_o_U_P] such as [L_n_S_P_d](Linearly Line Speed), [r_P_n](RPM), [r_P_S](RPS), [H_P](Hz), [E_H_P](kHz) that the meter will display according to the input and setting to calculate. The meter will show the relation parameters as below,

- [L_n_S_P_d]: Pulse/rotation([P_P_r]), Engineer Units ([n_r_n_n] / [E_n_r_n_n] / [y_d_r_n_n] / [E_t_r_n_n]), Diameter of rotor([d_i_A_n_t])
- [r_P_n] / [r_P_S]: Pulse/rotation([P_P_r])

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: [R_U_t_o] / [S_E_n_i] / [n_R_n_U_L]

- [R_U_t_o](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

[P_u_t_Y_P]: [r_P_n], [P_P_r]: [1000],

[r_A_n_G_E]: [R_U_t_o]

$(7200\text{rpm} \times 1000\text{ppr}) / 60 = 120.000\text{kHz}$

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	[1200.0] RPM	

The input goes down to

166.65Hz [9.9999] RPM (Auto change)

- [S_E_n_i](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 "[o_u_F_L](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

[P_u_t_Y_P]: [r_P_n] ; [P_P_r]: [1000]

[r_A_n_G_E]: [S_E_n_i] ; [d_P]: [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	
1666.5Hz	[99.999] RPM	(Auto change)
16.665kHz	[999.99] RPM	(Auto change)
16.666kHz	[o_u_F_L] RPM	
120kHz	[o_u_F_L] RPM	

The input goes down to

16.665kHz [999.99] RPM (Auto change)

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

- **MANUAL** (Manual range): The decimal point will be fixed according to the setting of [dP]. The meter will show (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

[PULS/P]: ; [PPr]:

[RANGE]: ; [dP]:

The table is between input and display as below,

Freq. Input	Display
0Hz	<input type="text" value="0.00"/> RPM
166.65Hz	<input type="text" value="9.99"/> RPM
1666.5Hz	<input type="text" value="99.99"/> RPM
16.665kHz	<input type="text" value="999.99"/> RPM
16.666kHz	<input type="text" value="ouFL"/> RPM
120kHz	<input type="text" value="ouFL"/> RPM

Fix decimal point resolution

The input goes down to

16.665kHz RPM

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

Time out function

Programmable: /

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 / can be programmed as below,

- **MANUAL** (Manual): There is a period named (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. Generally, 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 [USE LEVEL] during power on.

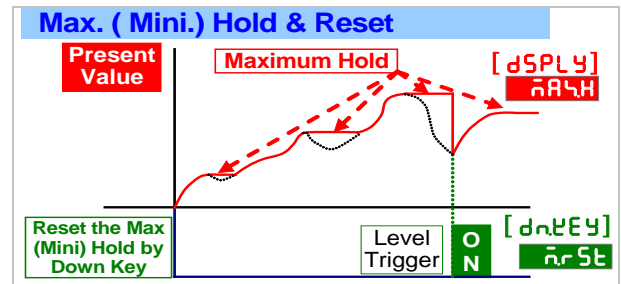
The maximum and minimum can be reset by front key function. Please refer to the operation on description as below.

orange LED will be bright during power on, until

Maximum Hold or Minimum Hold for PV

When the [DISPLAY] function in [INPUT GROUP] set to be (Max. Hold) or (Mini. Hold), that the meter will still display the values of PV in maximum (or minimum) and the relative square manual reset by front key in [USE LEVEL] or Down Key function has been done. The meter will update immediately new maximum (minimum) values after press Down Key to reset.

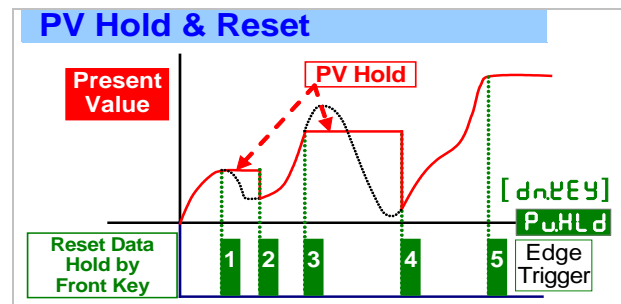
Please paste the sticker on the right side of orange square LED to identify the status of display.



PV (Present value) Hold

When the [DISPLAY] set to be (PV Hold) function in [INPUT GROUP], that display will be hold & kept, and the relative green LED will be bright, when user press Down Key, until press Down Key again.

Please paste the sticker on the right side of green square LED 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.

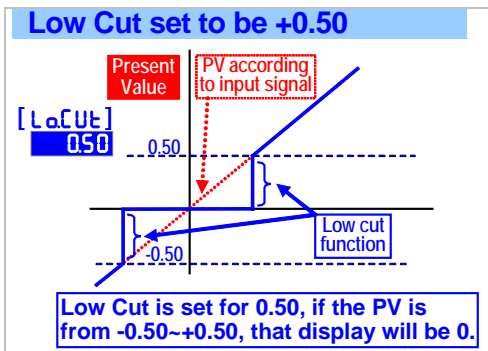
When the [DISPLAY] function set to be , the LED display no longer relative to the input signal then the PV screen will show the data from RS485 command.

Low Cut

Settable range from -19999~+29999 counts.

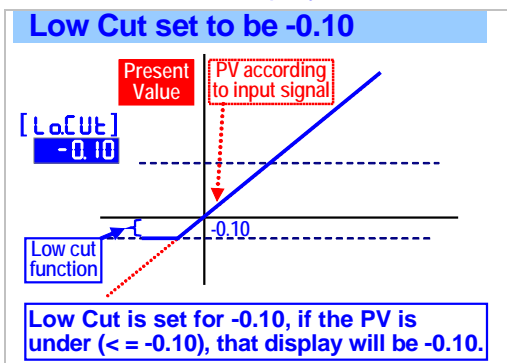
The users can set a value here to cut the display value to show "0".

- If the setting value is positive, it expressed the PV will be 0 which it's within the range of absolute value;
PV < | Setting value |, 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; $PV < \text{Setting value}$, 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.



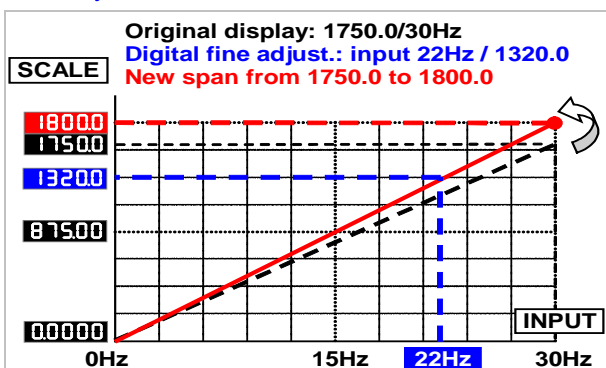
Digital Fine Adjustment

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

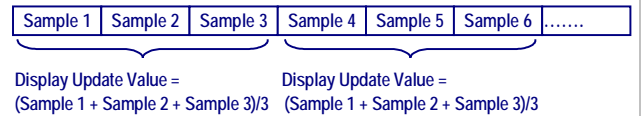
Settable range: 1~99 times;

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 [Ave] (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.

Average set to be 3

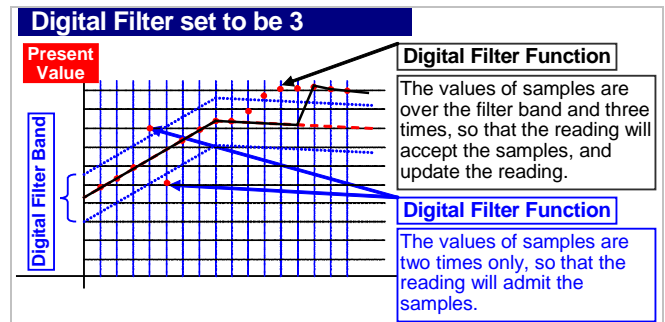


Digital filter

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

Users can set the down key of front panel to be the functions such as Relative PV(Tare) [RELPU] / PV Hold [PUHLd] / Reset for maxi(mini) hold [rSE] / Reset for relay energized latch [YrSE].

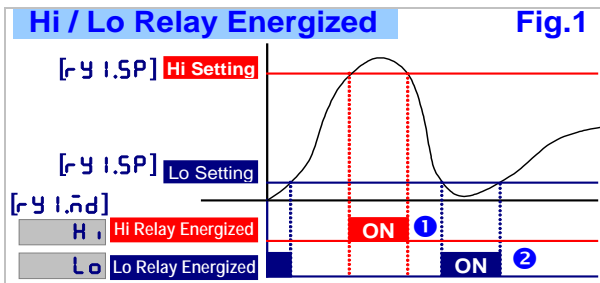
Ex. The [dPEY] function set to be [RELPU] in [input GROUP]. When user presses Key, the PV will show relative value until press Key again.

Relay Functions

CS1 series offer the 1 relay output with flexible and versatile functions. They can be programmed in [RELAY GROUP]. Please refer to the description as following;

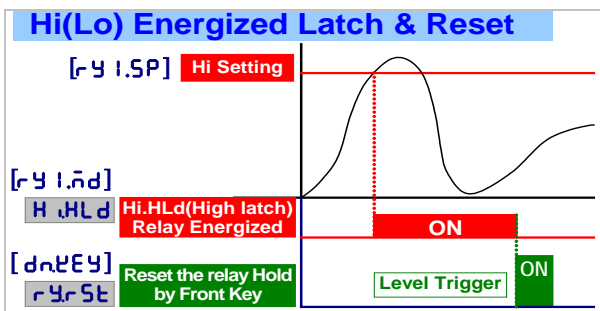
Relay energized mode Hi / Lo / Hi.HLd / Lo.HLd

- **Hi:** Relay will be energized when $PV > \text{Set Point}$ (Fig.1-①)
- **Lo:** Relay will be energized when $PV < \text{Set Point}$ (Fig.1-②)



● **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, mechanical dead lock, aging of insulation and so on. In the case of alarm of meter, if the user doesn't figure out the real reason and re-start the motor. It may damage the motor. The function is designed 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 [USE RESET].



■ **Start delay band and Start delay time**

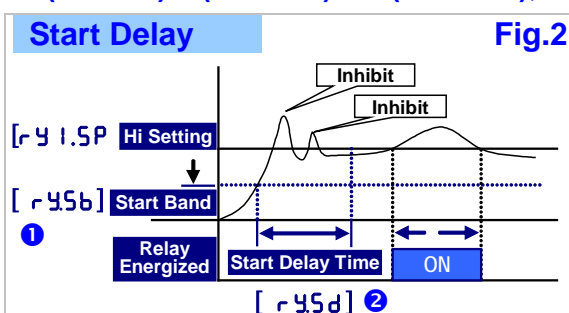
The functions have been designed for,
 1. To avoid alarm for the starting current of inductive motor(6 times of rated current).
 2. If the [rY_nD] relay energized mode has been set to be Lo or [Lo.HLd](Lo & latch), the relay will be energized, when the meter is power on and no input due to the "0" display.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

● **Start 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.

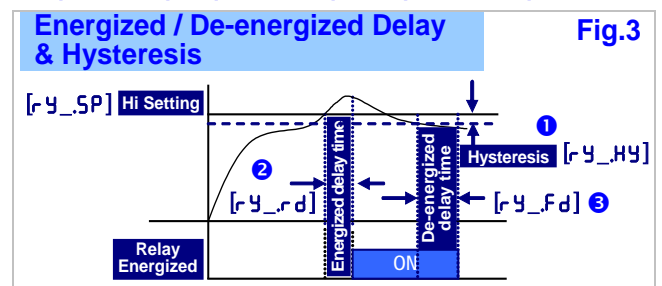
■ **Relay energized delay(Fig.3-②)**

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)



■ **Analogue Output Functions**

Please specify the output type either a 0~10V 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.

■ **[RoLS]**

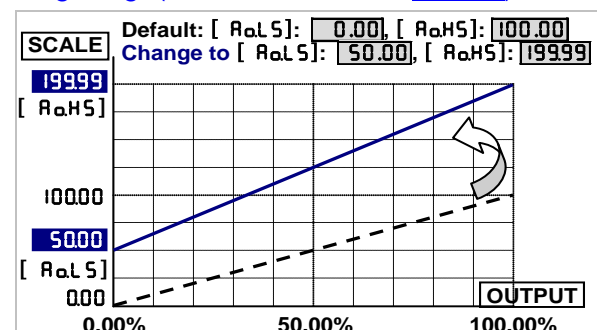
Settable range: -19999~+99999;

Setting the Display value Low to versus output range Low(as like as 4mA in [R4-20]).

■ **[RoHS]**

Settable range: -19999~+99999;

Setting the Display value High to versus output range High(as like as 20mA in [R4-20])



*The range between [RoHS] and [RoLS] 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.



■ Fine Zero & Span Adjustment for Analog Output

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.r.o]:** Fine Zero Adjustment for Analog Output;
Settable range: -38011~27524;
- **[Ao.s.p.n]:** Fine Span Adjustment for Analog Output;
Settable range: -38011~27524;

■ RS 485 Communication

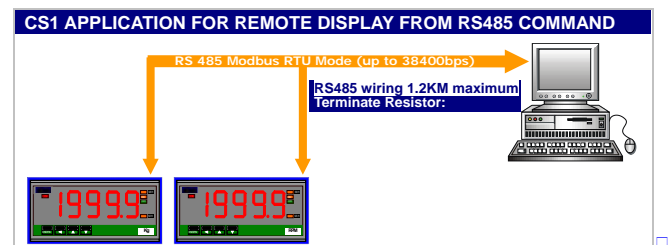
CS1 series can be used as Remote Terminal Unit (RTU) for monitoring and controlling in a SCADA (Supervisor Control And Data Acquisition) system.

- **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
- **Device Number:** Settable 1~255

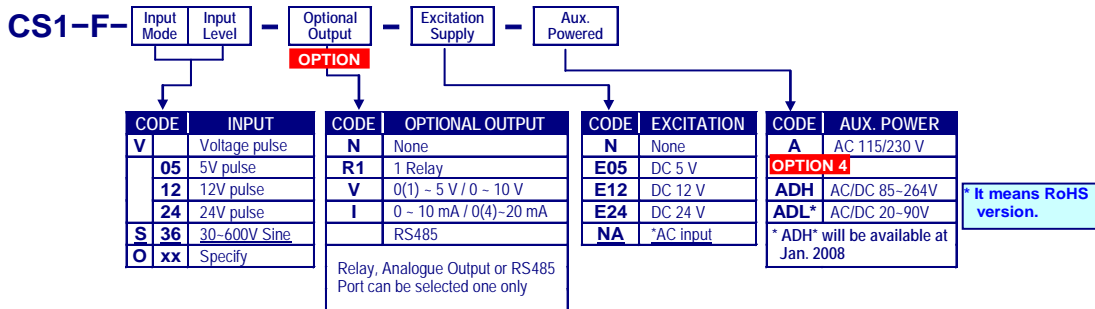
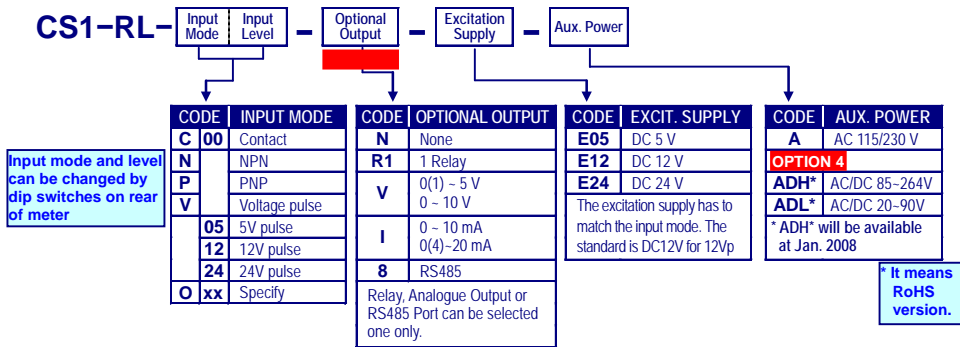
■ Remote Display function

CS1 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.




ORDERING INFORMATION



INSTALLATION

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



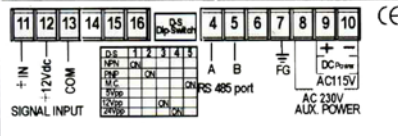
RPM/ LINE SPEED INDICATOR

MODEL CS1-RL-N12-8-E12-A DATE 2008/10/20

INPUT NPN , 12Vp S/N 7A160005-3013

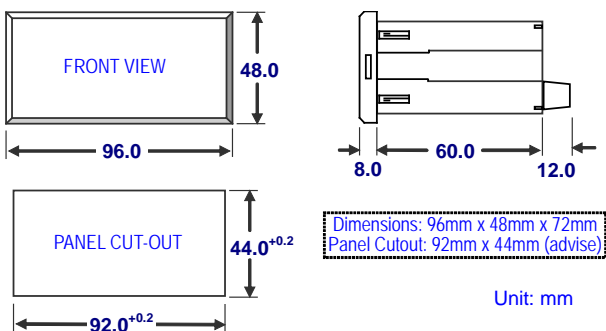
DISPLAY 0-99999 E.S. 12Vdc

OUTPUT RS485/ModBus RTU SOURCE AC 115/230V

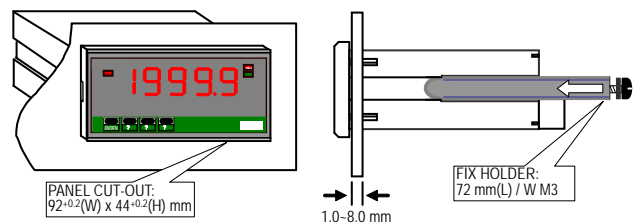


MODEL	CS1-RL-N12-8-E12-A
INPUT	NPN , 12Vp
DISPLAY	0-99999 E.S. 12Vdc
OUTPUT	RS485/ModBus RTU SOURCE AC 115/230V

Dimensions & Panel Cut Out



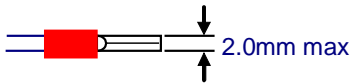
Installation



Wiring Diagram

Connector

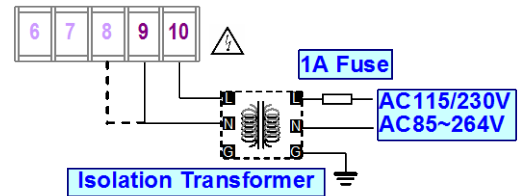
10A 300Vac, M2.6, 16~22AWG,
Max torque: 5Kg-cm
Please use cord end terminal.



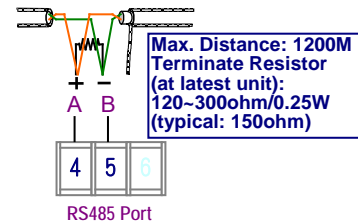
Please check the voltage of power supplied first, and then connect to the specified terminals. Herein, recommended that power supplied to the meter with protection by a fuse or circuit breaker.

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

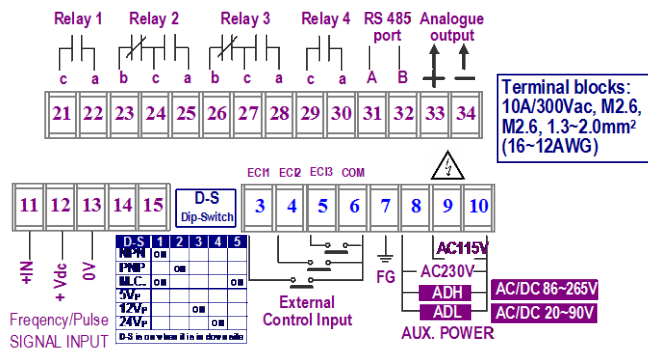
Power Supply



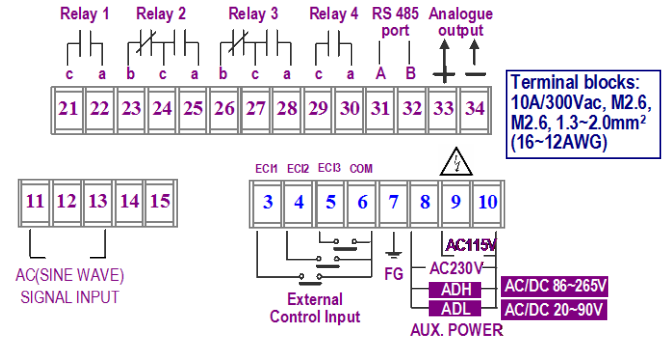
RS485 Communication Port



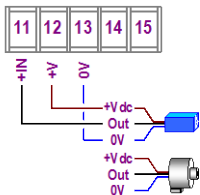
【 CS1-RL RPM/Linearly Line Speed/Freq.Controller 】



【 CS1-F Frequency Controller 】



Sensor input connection



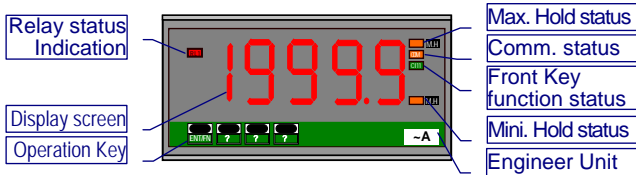
Please change the dip-switch on rear of meter to match the input mode and level.

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

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

OPERATIONS

Front Panel



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

88888 Numeric Screens

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

I/O Status Indicators

- **Relay Energized:** 1 square red LED
RL1 display once Relay 1 has been energized;
- **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:**
Hi Hi Energized Lo Lo Energized
Hi.H Hi Energized & Latch
Lo.H Lo Energized & Latch
- **Front key functions:**
PV.H PV Hold Tare Tare DI Digital Input
M.RS Maximum or Minimum Reset
R.RS Reset fo Relay Latch

- **Operating Key:** 4 keys for ENTER Enter(Function) / ESC Shift(Escape) / UP Up key / DN 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 DN Key can be set to be function as like as **Relative PV(Tare) / PV Hold / Reset for maxi(mini) hold / Reset for relay energized latch.**

Ex. The [dntey] function set to be REL.PU in [input GROUP]. When user presses DN Key, the PV will show relative value until press DN Key again.

■ 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)
A i.C.nG → Pu	Calibrating Input Signal do not process	(Please process Calibrating Input Signal)
A i.C → FAIL	Calibrating Input Signal error	(Please check Calibrating Input Signal)
AoC.nG → Pu	Calibrating Output Signal do not process	(Please process Calibrating Output Signal)
AoC → FAIL	Calibrating Output Signal error	(Please check Calibrating Output Signal)





















■ Operating Key:

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

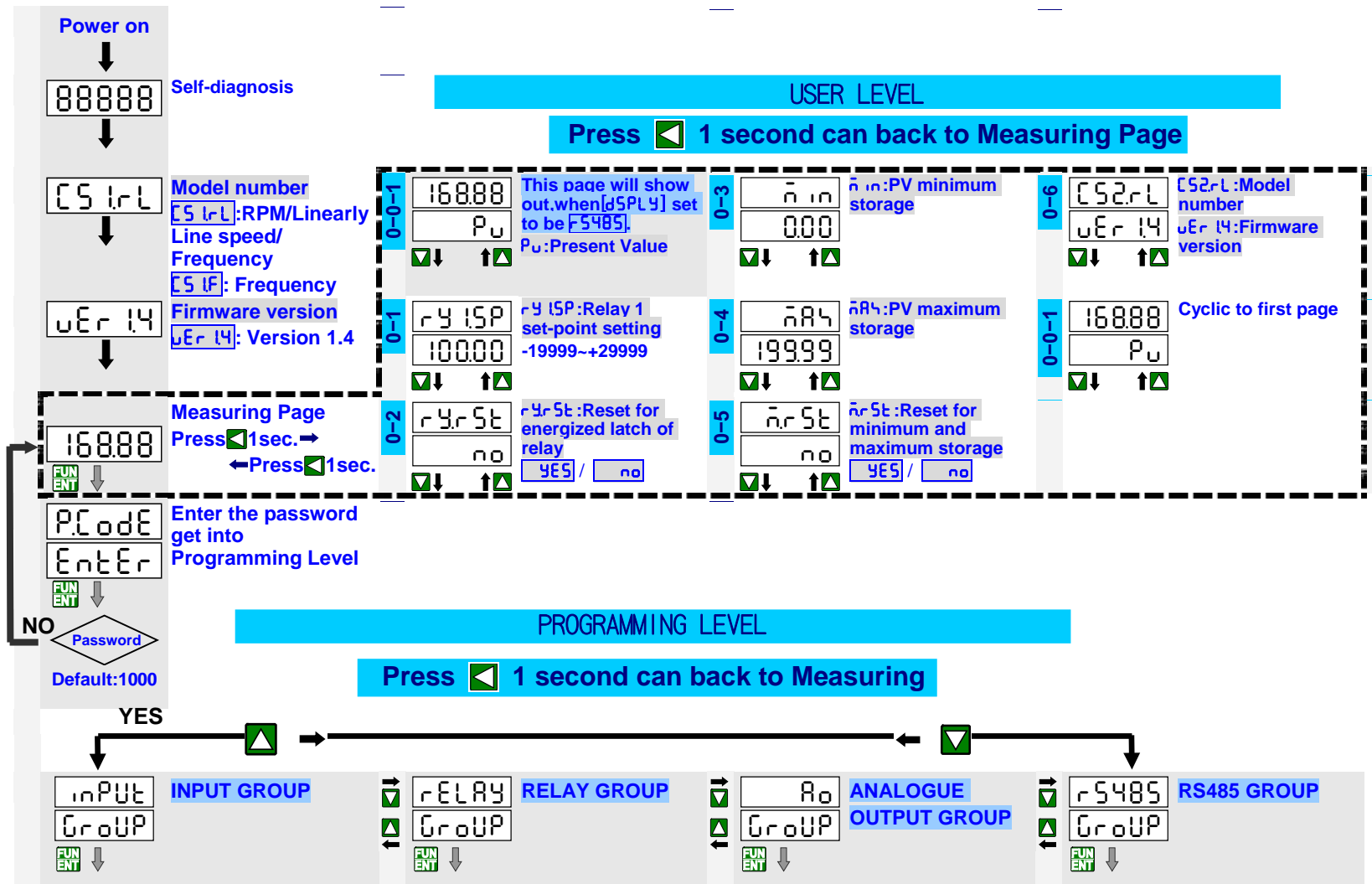
■ **Operating Key:** 4 keys for  Enter(Function) /  Shift(Escape) /  Up key /  Down key

■ The meter has desgined operation similar as PC's   and . In any page, press  key means "enter" or "confirm setting", and press  key means "escape()" 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.

OPERATING DIAGRAM:

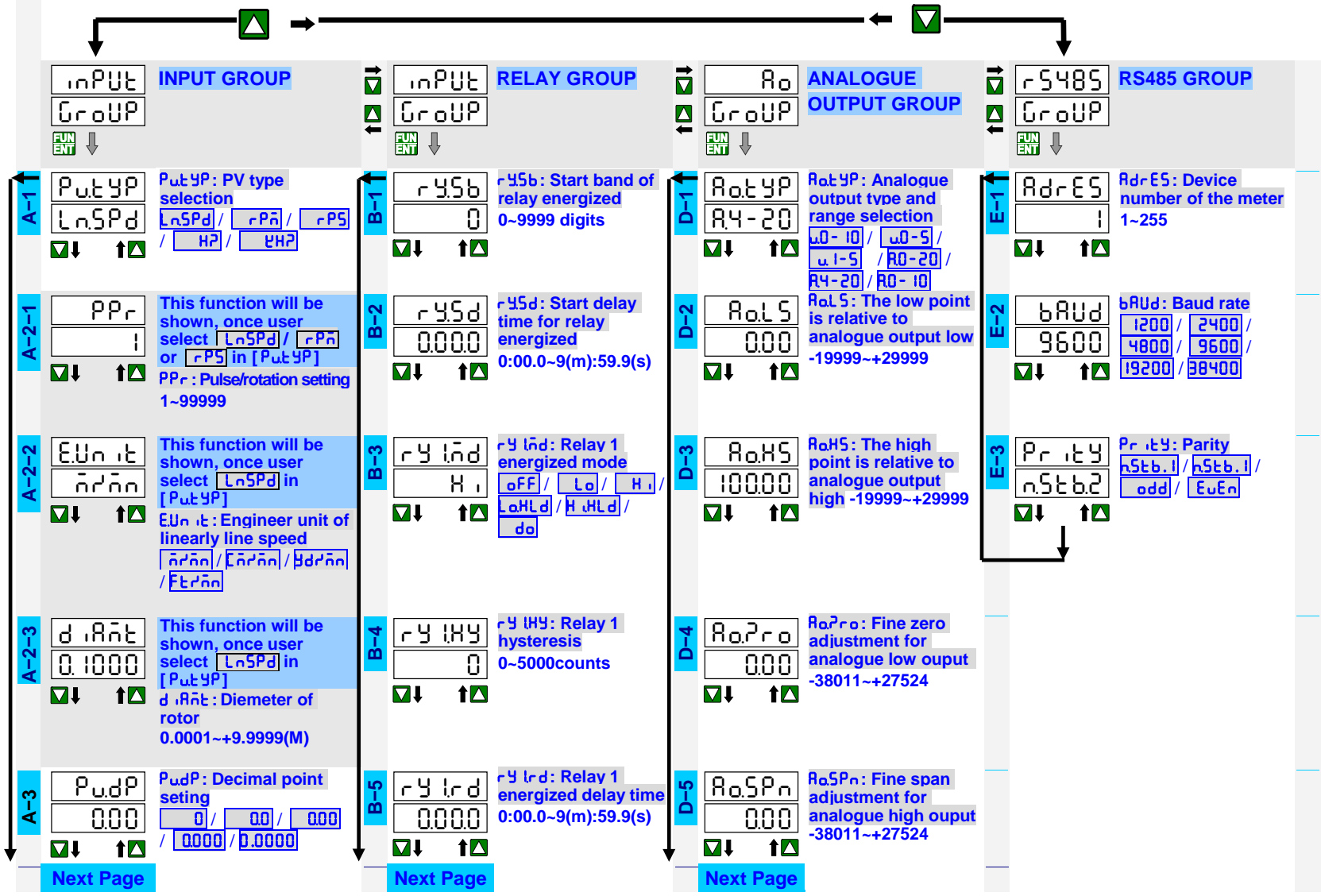


Password

Default:1000

PROGRAMMING LEVEL

Press 1 second can back to



A-4 **FACtr** FACtr: Factor of display value
10000
0.001~+9.999

A-5 **PuSPn** PuSPn: Fine high point adjustment for PV display
0
-19999~+29999

A-6 **SCLr** SCLr: Clear fine high points adjustment for PV display
no
YES / no

A-7 **dSPLY** dSPLY: Display function for PV screen
Pu
Pu / Fin.Hd / nARHd / F5485

A-8 **LoCUT** LoCUT: Low cut the PV
0.00
-19999~+29999

A-9 **itotnd** itotnd: Input time out mode
RUto
RUto / nRnUL

A-10 **itot** This function will be shown, once user select nRnUL in [itotnd]
0.0
itot: The time of input time out
0.0sec~999.9sec

A-11 **rRnGE** rRnGE: Display range mode
RUto
RUto / SEñ / nRnUL
※ When by the RS485 read present value(PV), can only choose nRnUL

A-12 **AUG** AUG: Average update for PV
5
1(None)~99times

B-6 **rYIFd** rYIFd: Relay 1 de-energized delay time
0.000
0:00.0~9(m):59.9(s)

D-6 **PSClr** PSClr: Clear the fine zero/span adjustment for analogue output
nonE
nonE / PuPra / PuSPn / botH

D-7 **RoLnt** RoLnt: Analque output high limit
110.00
0.00~110.00%

Next Page

↑	A-13	dF iLt	dF iLt: Digital filter 0(None)/1~99times
		0	
		↕	
		↕	
	A-14	dnKEY	dnKEY: Down key function
		nonE	nonE / FFLPu / PuHLd / nrSt / FrSt
		↕	
		↕	
	A-15	P.CodE	P.CodE: Password setting for access to programming level
		0000	0000~9999
		↕	
		↕	
	A-16	F.LoCk	F.LoCk: Function level lock
		nonE	nonE / USEr / EnG / ALL
		↕	
		↕	

■ Operating Steps:

■ User Level

INDEX	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
POWER ON	Please check the specification and wiring diagrams firstly.		
88888	Self-diagnosis (LED All bright)		
CS IrL	Model CS IrL: RPM/Linearly Line Speed/ Frequency CS IF: Frequency		
uEr 14	Firmware version		
16888	Measuring Page Press for 1 second to access [User Level]		
0-0-1 Pu	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	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 Enter	
0-2 rY rSt	rY rSt(rY.rSt): Reset for energized latch of Relay; If the [rY 1.nD](step B-3) set to be or , and the present value(PV) reach to the condition of relay energizing, the relay will be energized and latching. At mean time, user can reset the relay latching in here.	Programmable: / (Yes): reset the relay latching. (No): abort to reset the relay latching. & Selection Enter Be careful, the relay has been energizing and latching, if the PV still reach to the condition of relay energized, even user had set here to reset the relay latching.	
0-3 n n	n n (Min): the Minimum value of PV saving; The meter will save the minimum of PV during power on, until reset in [nr 5t](step 0-5). It will save newest minimum PV after reset.	Review only	
0-4 n n	n n (Max): the Maximum value of PV saving; The meter will save the maximum of PV during power on, until reset in [nr 5t](step 0-5). It will save newest maximum PV after reset.	Review only	
Next Page			

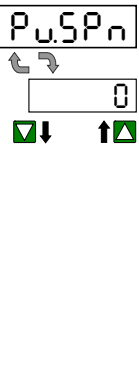
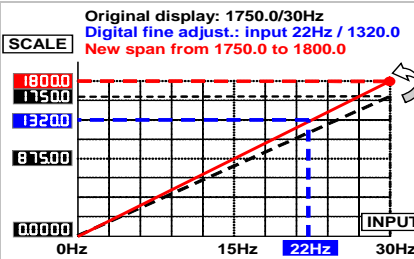
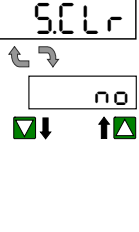


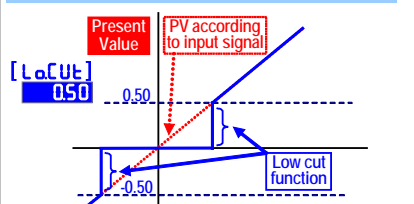
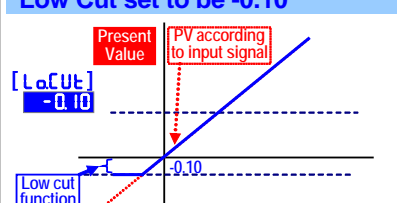
		M.rSt (M.rSt): reset the saved value of Maximum & Minimum; The values of maximum and minimum can be reset in here. It will save newest maximum and minimum after reset.	Programmable: <input checked="" type="checkbox"/> YES / <input type="checkbox"/> no <input checked="" type="checkbox"/> YES(Yes): to reset the saved value of maximum and minimum. <input type="checkbox"/> no(No): abort to reset the saved values of maximum and minimum. & Selection Enter
		Model of the meters CS IrL: RPM/Linearly Line Speed/ Frequency CS IF: Frequency uEr 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.
		Return to the first page Press for 1 second to back to Measuring Page in any page.	

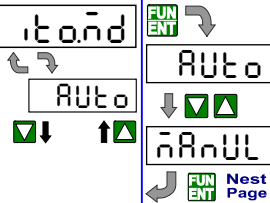
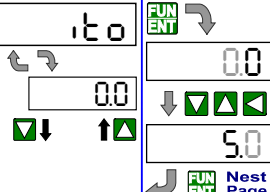
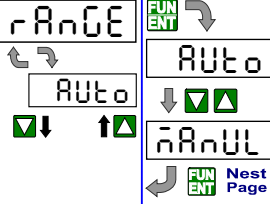
■ Programming Level

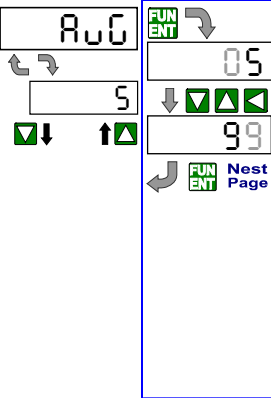
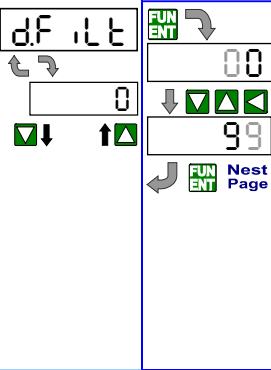
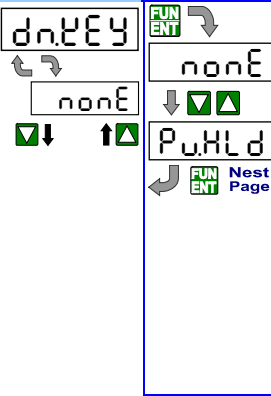
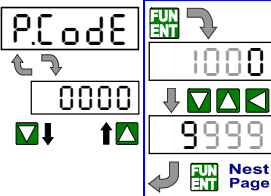
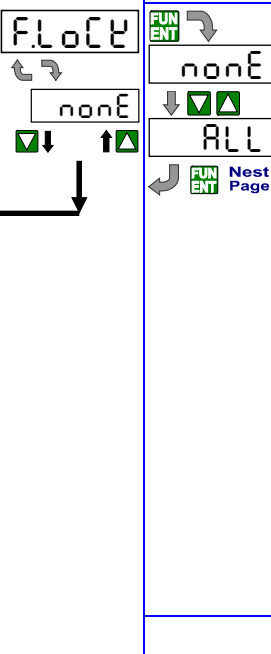
INDEX	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
	MEASURING PAGE		
	Enter the pass code to access Programming Level	If user wants to change the pass code, please go to step A-15 to set. Please remind the new pass code.	
	Press for 1 second to back Measuring Page		

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 LnSPd 	PuTYP: PV type selection The meter has designed for multi-purpose. User can set the display purpose in [PuTYP] of [inPUT GROUP] such as LnSPd(Linearly Line Speed), rPn(RPM), rPS(RPS), Hz(Hz), kHz(kHz). The meter will show the relation parameters as below,	Programmable: LnSPd:Linearly Line Speed; rPn:RPM(Rotation/Minute) rPS:RPS(Rotation/Second) Hz:Hz(Frequency) kHz:kHz(Frequency) Selection 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 Enter	
A-2-2 EUnit 	This function will be shown, once user selects LnSPd in [PuTYP] EUnit: Engineer Unit of linearly line speed	Programmable: m/min / cm/min / yd/min / ft/min m/min(M/min): Meter/Minute cm/min(CM/min): Centimeter/Minute yd/min(Yd/min): Yard/Minute ft/min(Ft/min): Feet/ Minute Selection Enter	
A-2-3 diaRnt 	This function will be shown, once user selects LnSPd in [PuTYP] diaRnt: Diameter of rotor	Settable range: 0.0001~9.9999M Shift Up Down Enter	
A-3 PudP 	PudP: Decimal Point setting; There are two meaning as below, 1.The setting of decimal point is for set-point of relay energized level, when user sets to be RuLo in [rRnGE] function. 2.The setting of decimal point is for display value and set-point of relay energized level, when user sets to be rRnUL or SEi in [rRnGE] function.	Programmable: 0 / 00 / 000 / 0000 / 00000 Selection 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 Enter	
Next Page			

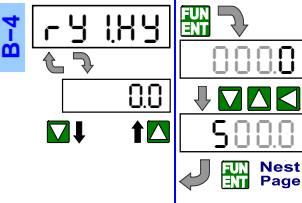
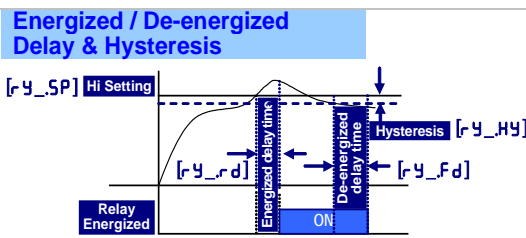

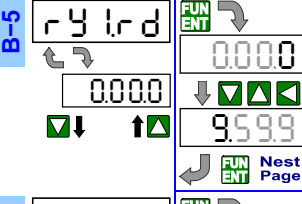

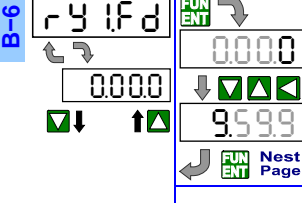

<p>A-5</p> 	<p>PuSPn (Pv.SPn): Fine high point Adjustment for PV display;</p> <p>For Span of PV, users can get the "Fine Adjustment" by front key. It's an easy way to "Just Key-In" the value that the user want to show in the current input signal. Especially, the [PuSPn] is not only in span of PV, but also any higher point for [PuSPn]. The meter will linearize for full scale.</p>	<p>Settable range: 0~99999</p> <p>◀Shift ▲Up ▼Down FUN ENTEnter</p> 
<p>A-6</p> 	<p>SCLR (S.CLR): Clear Fine High points Adjustment for PV display;</p>	<p>Programmable: <input type="checkbox"/>no / <input checked="" type="checkbox"/>YES</p> <p><input type="checkbox"/>no(No): Do not clear the fine High adjustment.</p> <p><input checked="" type="checkbox"/>YES(YES): To clear the fine High adjustment.</p> <p>▲&▼Selection FUN ENTEnter</p>
<p>A-7</p> 	<p>dSPLY (dSPLY): Display Function for PV screen</p> <p>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.</p>	<p>Programmable: <input type="checkbox"/>Pu / <input type="checkbox"/>Mini.Hd / <input type="checkbox"/>MAX.Hd / <input checked="" type="checkbox"/>RS485</p> <p><input type="checkbox"/>Pu(PV): shows PV</p> <p><input type="checkbox"/>Mini.Hd(Mini.H): Minimum Hold of PV</p> <p><input type="checkbox"/>MAX.Hd(MAX.H): Maximum Hold of PV</p> <p><input checked="" type="checkbox"/>RS485(RS485): Remote displayed from RS485 command of master.</p> <p>▲&▼Selection FUN ENTEnter</p>
<p>A-8</p> 	<p>Lo.CUT (Lo.CUT): Low Cut the PV</p> <p>If the setting value is positive, it means the PV is in the range of absolute value will be 0; <u>PV ≤ I Setting value I, the display will be 0.</u></p> <p>If the setting value is negative, it expressed the PV will be X which it's under the setting value; <u>PV < Setting value, the display will be X(Setting value).</u></p>	<p>Settable range: -19999~+29999</p> <p>◀Shift ▲Up ▼Down FUN ENTEnter</p> <p>Low Cut set to be +0.50</p>  <p>Low Cut set to be -0.10</p> 
<p>Next Page</p>		

<p>A-9</p> 	<p>t.o.n.d: Input Time Out Mode;</p>	<p>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".</p>	<p>Programmable: AUt.o / h.A.n.U.L</p> <p>AUt.o(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.</p> <p>h.A.n.U.L(Manual): There is a period named t.o(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.</p> <p>& Selection Enter</p>
<p>A-10</p> 	<p>This function will be shown, once user set to be h.A.n.U.L in [t.o.n.d] function</p> <p>t.o: the time of Input Time Out;</p>	<p>0.0</p> <p>5.0</p>	<p>Settable range: 0.0 sec~999.9sec</p> <p>Shift Up Down Enter</p>
<p>A-11</p> 	<p>r.A.n.G.E: Display Range Mode</p>	<p>※ When by the RS485 read present value(PV), can only choose h.A.n.U.L</p>	<p>Programmable: AUt.o / SE.n. / h.A.n.U.L</p> <p>AUt.o(Auto range): The decimal point will be auto changed according to the input frequency so that keep the display in the highest resolution.</p> <p>SE.n.(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.</p> <p>h.A.n.U.L(Manual range): The decimal point will be fixed according to the setting of [d.P]. The meter will show ouFL(overflow), once the input goes over the frequency that is relative 99999.</p> <p>& Selection Enter</p>
<p>Next Page</p>			

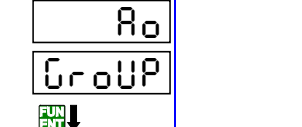

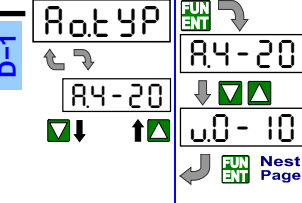

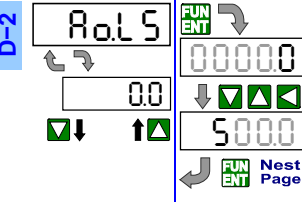

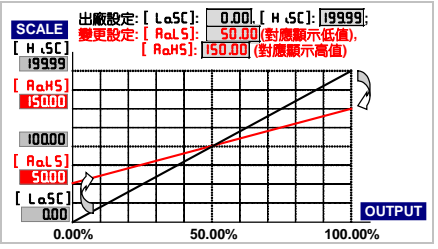
<p>A-12</p> 	<p>AVG (AvG): Average update for PV</p>	<p>Jittery Display caused by the noise or unstable signal. User can set number to average the readings to get smoothly display.</p> <p>The meter's sampling is 15 cycles/sec. If the [AVG](Average) set to be the <input type="text" value="3"/>, which 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.</p>	<p>Settable range: 1(no function)~99 times <input type="checkbox"/>Shift <input type="checkbox"/>Up <input type="checkbox"/>Down <input type="checkbox"/>FUN ENT Enter</p>	
<p>A-13</p> 	<p>dF iLt (d.FiLt): Digital filter</p>	<p>The digital filter can reduce the magnetic noise or EMI in the field.</p> <p>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.</p>	<p>Settable range: 0(no function)/1~99 times. <input type="checkbox"/>Shift <input type="checkbox"/>Up <input type="checkbox"/>Down <input type="checkbox"/>FUN ENT Enter</p>	
<p>A-14</p> 	<p>dn.kEy (dn.key): Down key function</p>	<p>Users can set the <input checked="" type="checkbox"/>down key of front panel to be the functions as like as Relative PV(Tare) / PV Hold / Reset for maxi(mini) hold / Reset for relay energized latch.</p>	<p>Programmable: <input type="checkbox"/>nonE (None): No function <input type="checkbox"/>PvHLd (PV.HLd): PV Hold <input type="checkbox"/>rELPv (Rel.PV): Relative PV(ΔPV) / Tare <input type="checkbox"/>M.rSt (M.rSt): Reset for Maximum or Minimum Hold. <input type="checkbox"/>rY.rSt (rY.rSt): Reset for Relay energized & latch. <input type="checkbox"/>Up <input checked="" type="checkbox"/>Down <input type="checkbox"/>FUN ENT Enter</p>	
<p>A-15</p> 	<p>P.CodE (P.CodE): Pass Code setting for access to programming level</p>	<p>Please remind and write down the new pass code so that access to programming level.</p>	<p>Settable range: 0000~9999 <input type="checkbox"/>Shift <input type="checkbox"/>Up <input type="checkbox"/>Down <input type="checkbox"/>FUN ENT Enter</p>	
<p>A-16</p> 	<p>F.LoCk (F.LoCk): Function level Lock</p>	<p>There are 4 levels programmable for lock that the function is to avoid mis-setting.</p>	<p>Programming: <input type="checkbox"/>nonE (None): no lock at all. User can access to user level for checking and setting. <input type="checkbox"/>USEr (User Level): User level lock. User can access to user level for checking, but can not setting. <input type="checkbox"/>EnG (Programming Level): Programming level lock. User can access to programming level for checking, but can not setting. <input type="checkbox"/>ALL (All Level): All lock. User can access to all level for checking, but can not setting. <input checked="" type="checkbox"/>&<input checked="" type="checkbox"/>Selection <input type="checkbox"/>FUN ENT Enter</p>	

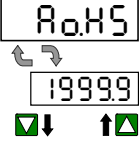
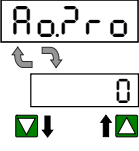
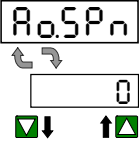
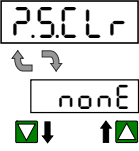
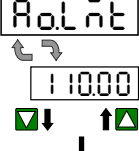
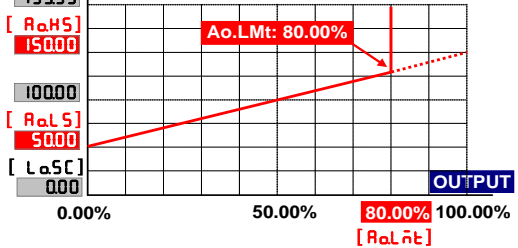
Relay Group (The group will not be displayed except the relay function is to be specified)

INDEX	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
<p>rELAY</p> <p>GrOUP</p> <p>FUN ENT ↓</p> <p>B-1</p>	<p>RELAY GROUP INDEX PAGE</p>	<p>In following pages, press ◀ for 1 second to return the RELAY GROUP INDEX PAGE.</p>	
<p>rY.Sb</p> <p>00</p> <p>9999</p> <p>FUN ENT ↻</p> <p>FUN ENT Nest Page</p>	<p>rY.Sb(rY.Sb): Start band of Relay energized</p> <p>The functions have been designed for,</p> <ol style="list-style-type: none"> To avoid alarm for the starting current of inductive motor(6 times of rated current). If the rY_n̄d 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. <p>Start Delay</p>	<p>Settable range: 0~9999 digits</p> <p>◀Shift ▲Up ▼Down FUN ENT Enter</p>	
<p>B-2</p> <p>rY.Sd</p> <p>0000</p> <p>9999</p> <p>FUN ENT ↻</p> <p>FUN ENT Nest Page</p>	<p>rY.Sd(rY.Sd): start delay time for Relay energized</p>	<p>Settable range: 0:00.0~9(M):59.9(S)</p> <p>◀Shift ▲Up ▼Down FUN ENT Enter</p>	
<p>B-3</p> <p>rY.l̄nd</p> <p>H</p> <p>H.HLd</p> <p>FUN ENT ↻</p> <p>FUN ENT Nest Page</p>	<p>rY.l̄nd(rY1.Md): Relay 1 energized mode</p> <p>Hi / Lo / Go Relay Energized</p> <p>Hi(Lo) Energized Latch & Reset</p>	<p>Programmable:</p> <ul style="list-style-type: none"> oFF(Off): Turn off the Relay and indication LED. Lo(Lo): Low Level Energized; Relay will energize when PV < Set-Point. H(Hi): High Level Energized; Relay will energize when PV > Set-Point. H.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. <p>▲&▼Selection FUN ENT Enter</p>	
<p>Next Page</p>			

<p>B-4</p> 	<p>rY.HY (rY1.HY): Relay 1 Hysteresis</p> <p>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.</p> <p>Energized / De-energized Delay & Hysteresis</p> 	<p>Settable range: 0~19999 digits</p> <p>◀Shift ▲Up ▼Down Enter</p>
<p>B-5</p> 	<p>rY.lrd (rY1.rd): Relay 1 energized delay time</p>	<p>Settable range: 0:00.0~9(M):59.9(S)</p> <p>◀Shift ▲Up ▼Down Enter</p>
<p>B-6</p> 	<p>rY.lFd (rY1.Fd): Relay 1 de-energized delay time</p>	<p>Settable range: 0:00.0~9(M):59.9(S)</p> <p>◀Shift ▲Up ▼Down Enter</p>

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

INDEX	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
<p>R0</p> <p>GROUP</p> 	<p>AO GROUP INDEX PAGE</p>	<p>In following pages, press  for 1 second to return the AO GROUP INDEX PAGE.</p>	
<p>D-1</p> <p>R0.tYP</p> 	<p>R0.tYP (Ao.tYP): Analogue Output type and range selection;</p> <p>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).</p>	<p>Programmable:</p> <p>Voltage Output:</p> <p>u.0-10 (0~10V) / u.0-5 (0~5V) / u.1-5 (1~5V)</p> <p>Current Output:</p> <p>R0-10 (0~10mA) / R0-20 (0~20mA) / R4-20 (4~20mA)</p> <p>▲&▼Selection Enter</p>	
<p>D-2</p> <p>R0.L5</p> 	<p>R0.L5 (Ao.LS): the Low point is relative to Analogue Output low;</p> <p>To set the lower display value to versus output range low (as like as 4mA in R4-20)</p> <p>Ex. Ourput range set to be R4-20 (4~20mA) is relative to display 0~199.99. User can set the [R0.L5] (Ao.LS) to be 50.00. At meantime, the output signal will be 4mA when the present value is 50.00.</p>	<p>Settable range: -19999~99999</p> <p>◀Shift ▲Up ▼Down Enter</p> 	
<p>Next Page</p>			

<p>D-3</p> 	<p>FUN ENT</p> <p>19999</p> <p>15000</p> <p>Nest Page</p> <p>According to the setting of [H.SC]</p>	<p>R0.HS (Ao.HS): the High point is relative to Analogue Output high;</p> <p>To set the higher display value to versus output range high(as like as 20mA in R4-20)</p> <p>Ex. Ourput range set to be R4-20 (4~20mA) is relative to display 0~199.99. User can set the [R0.HS] (Ao.HS) to be 15000. At meantime, the output signal will be 20mA when the present value(PV) is 150.00.</p>	<p>Settable range: -1999~9999</p> <p>◀Shift ▲Up ▼Down FUN ENT Enter</p>
<p>D-4</p> 	<p>FUN ENT</p> <p>00000</p> <p>17233</p> <p>Nest Page</p>	<p>R0.Zro (Ao.Zro): Fine Zero Adjustment for Analog Low Output;</p> <p>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.</p>	<p>Settable range: -38011~27524</p> <p>◀Shift ▲Up ▼Down FUN ENT Enter</p>
<p>D-5</p> 	<p>FUN ENT</p> <p>00000</p> <p>32167</p> <p>Nest Page</p>	<p>R0.SPn (Ao.SPn): Fine Span Adjustment for Analog high Output;</p> <p>Users can get Fine span Adjustment for analogue output by front key of the meter as like as [R0.Zro] (Ao.Zro).</p>	<p>Settable range: -38011~27524</p> <p>◀Shift ▲Up ▼Down FUN ENT Enter</p>
<p>D-6</p> 	<p>FUN ENT</p> <p>nonE</p> <p>botH</p> <p>Nest Page</p>	<p>Z.S.Clr (Z.S.Clr): Clear the Fine Zero / Span Adjustment for Analog Output</p>	<p>Programmable:</p> <p>nonE (None): Do not clear</p> <p>R0.Zro (Ao.Zro): Clear low adjust</p> <p>R0.SPn (Ao.SPn): Clear high adjust</p> <p>botH (both): Clear low & high adjust</p> <p>▲&▼ Selection FUN ENT Enter</p>
<p>D-7</p> 	<p>FUN ENT</p> <p>11000</p> <p>10000</p> <p>Nest Page</p>	<p>Ao.LMt (Ao.LMt): Analog Output High Limit</p> <p>Set Scaling: [LoSC]: 000, [H.SC]: 19999;</p> <p>Output: [R0.S]: 5000 (Display value Low), [R0.HS]: 15000 (Display value High); [Ao.LMt]: 8000% (of Output Range)</p> 	<p>Settable range: -0.00~ 110.00% of FS</p> <p>◀Shift ▲Up ▼Down FUN ENT Enter</p>

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

INDEX	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
RS485 GROUP FUN ENT ↓	RS485 GROUP INDEX PAGE	In following pages, press ◀ for 1 second to return the RS485 GROUP INDEX PAGE.	
E-1 AdRES FUN ENT ↶ 001 ↓ 255 FUN ENT Nest Page ↶	AdRES (Adress): Device number of the meter.	Settable range: 1~255 ◀Shift ▲Up ▼Down FUN ENT Enter	
E-2 bAUD FUN ENT ↶ 9600 ↓ 38400 FUN ENT Nest Page ↶	bAUD (bAUd): Baud rate	Programmable: 1200 / 2400 / 4800 / 9600 / 19200 / 38400 ▲&▼ Selection FUN ENT Enter	
E-3 Pr itY FUN ENT ↶ nStb.2 ↓ EvEn FUN ENT Nest Page ↶	Pr itY (PritY): Parity	Programmable: nStb.1 (n.Stb.1): None, 1 stop bit nStb.2 (n.Stb.2): None, 2 stop bit odd (odd): odd EvEn (EvEn): Even ▲&▼ Selection FUN ENT Enter	



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?	<p>A.The input range of CS1-RL(F) is 0.01~100kHz(optional: 0.01~140kHz). Please make sure input of field is between this range.</p> <p>B.Please check the setting of [rRnGE] function whether did it correct or not?</p> <p>If user sets the [rRnGE](A-11)function to be SEñ or ñRnUL, 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 RUt0. The decimal point will be auto changed according to the input frequency.</p>
Display shows 0 and didn't change	1.To inspect whether did the wires connecting correct and secure or not?	<p>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.</p> <p>B.Please uses the terminals(cord end terminal) to avoid the risk of insecure.</p>
	2.To inspect whether did the amplitude of pulse correct or not?	<p>A.Please check the auxilliary power of sensor and output level. The input amplitude of meter can be changed by the dip switches on rear of meter. Please refer to the drawing as below,</p> <div style="text-align: center;"> <p>The diagram shows the rear panel of the meter with terminals 11 through 15 labeled as Pulse/Freq. INPUT. Terminal 11 is +IN, 12 is +Vdc, and 13 is 0V. Terminal 14 is M.G. and 15 is 24Vp. A Dip-Switch (D-S) is located between terminals 14 and 15, with positions 1 (NPN), 2 (PNP), 3 (M.G.), 4 (5Vp), and 5 (12Vp). Terminals 3 through 10 are labeled as External Control Input. AUX. POWER is provided via AC115V, AC230V, AC/DC 86-265V (ADH), and AC/DC 20-90V (ADL). A note states 'D-S is on when it is in down side'.</p> </div> <p>*Remark: The meter builds in a excitation power for sensor that can not be changed. Please specified in ordering code.</p>
Incorrection display value or out of accuracy	1.To inspect the settings of relation parameters whether did it correct or not?	<p>A.Please check the [PuLYP](A-01) whether did it correct or not?</p> <p>LnSPd(Linearly Line Speed), rPñ / rPS(Rotation Speed), HP / PHP(Frequency)</p> <p>Linearly Line Speed: PPr(A-2-1) / EUn tE(A-2-2) / d rñtE(A-2-3)</p> <p>Rotation Speed: PPr(A-2-1)</p> <p>B.Please check the [FRCtE](A-04) whether did it correct or not?</p>
	2.To inspect the fine adjustments of PV whether did it changed or not?	<p>Please check the [PuSPn](A-05) in [rPUtE Group] whether did the values correct or not?</p> <p>The [PuSPn]can be cleared in [SLr](A-06).</p>
Jittery Display	1.To inspect the input signal and it jittery.	<p>A.Please check the installation of sensor whether did it balance and stable or not? The vibration of sensor will make the signal unstable.</p> <p>B.If the input signal is jittery continuously, please set higher value in [RuG](A-12).</p> <p>C.If the input signal is jittery uncertain period that caused by the inductive load actions, please set higher value in [dF tE](A-13).</p> <p>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.</p>

	2.To inspect the input signal and it is stable.	A.Please try to set higher value in [RUG](A-12). B.Please try to set higher value in [dF L E](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 [F5485]	Please check the [dSPLY](A-07) in [INPUt GrOUP] and change the function setting from [F5485] to [PU].
display value dosen't change	1.To inspect display function [dSPLY]. It's maybe to be set to [hRHd](maxmum hold) or [h inHd](minimum hold)	A.Please check the [dSPLY](A-07) in [INPUt GrOUP] and hange the function set from [hRHd] or [h inHd] to [PU].
	2.To inspect Down key function [dnKEY]. It's maybe to be set to [PuHLd].	A.Please check the [dnKEY](A-14) in [INPUt GrOUP] and change the function setting from [PuHLd] to [PU].

Relay Output Issue:

PROBLEM	CHECKING LIST	REMEDY
The parameters 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 h d](B-03) in the [rELAY GrOUP]
	2.Check the delay time and delay band in the start delay function.	Please check whether did the [rY5b](B-01) is too wide and [rY5d](B-02) is too long in [rELAY GrOUP] or not?
	3.Check the energized delay time	Please check whether did the [rY l r d](B-05) 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
Incorection 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 [Ro tYP](D-01) of [Ro GrOUP]
	2.Check the Analogue output high and low setting.	A.Please check the [RoL5](D-02) and [RoH5](D-03) in [Ro GrOUP].

PROBLEM	CHECKING LIST	REMEDY
Jittery Analogue Output	Analogue output is according to the display	
	1.Check if the display is jittery	<p>A.If the input signal was jittery continuously, please set higher value in [R00](A-12).</p> <p>B.If the input signal is jittery uncertain period that caused by the inductive load actions, please set higher value in [dF .L t](A-13).</p> <p>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.</p>
	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.	<p>A.Please check the [Rd r E5](E-01) \ [bRUd](E-02) and [Pr .tY](E-03) in [r 5485 Gr oUP] that both have to match the Host.</p> <p>B.Please check the wiring A(+) and B(-) are correct or not?</p> <p>C.If user uses a converter (RS485/RS232 or RS485/USB..), please check the setting and wiring of converter is correct.</p> <p>D.Please check the protocol of host is Modbus RTU Mode</p>
Reply wrong data from the meter	1.Check if the square orange LED of RS485 dose bright, but no reply.	<p>A.Please confirms the CHECH SUM program is correct.</p> <p>B.Please check the interval of each command has to over 3.5byte.</p>
	2.Check if the square orange LED of RS485 dose bright, but reply Error.	<p>A.Please check the address table of RS485 to make sure that is right address.</p> <p>B.Please checks the start address and data format are correct.</p> <p>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.</p>

■ 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	
PuHLd_H*	0002h		PV Hold*(High Word)		R	
PuHLd_L*	0003h		PV Hold*(Low Word)		R	
n_in_H*	0004h		The Minimum of PV*(High Word)		R	
n_in_L*	0005h		The Minimum of PV*(Low Word)		R	
nRy_H*	0006h		The Maximum of PV*(High Word)		R	
nRy_L*	0007h		The Maximum of PV*(Low Word)		R	
d rRnr_H*	0008h	0.0001~9.9999	Diameter of rotor*(High Word)	0000h	RW	
d rRnr_L*	0009h		Diameter of rotor*(Low Word)	03E8h	RW	
Pu.SPn_H*	000Ah	-19999~+19999	PV Span*(High Word)		RW	
Pu.SPn_L*	000Bh		PV Span*(Low Word)		RW	
rS485_H*	000Ch	-19999~+19999	PV controlled by RS 485 command *(High Word)		RW	
rS485_L*	000Dh		PV controlled by RS 485 command *(Low Word)		RW	

■ Programming Level

[Input Group]						
Name	Address	Range	Explain	Initial	Write/Read	Note
	1 Word					
dP	000Eh	0~4	Decimal Point of Setting 0: 00000 1: 0000.0 2: 000.00 3: 00.000 4: 0.0000	0000h	RW	
rESErUEd	000Fh					
rESErUEd	0010h					
rESErUEd	0011h					
rESErUEd	0012h					
System Status	0013h		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	0014h	0~1	Reset Maximum & Minimum Value 0:No 1:Yes	0000h	RW	
Pu.tYP	0015h	0~3	PV Type 0: Linear Speed 1: RPM 2:RPS 3: Frequency	0000h	RW	
PPr	0016h	1~9999	Pulse per Rotation	0001h	RW	
FRctr	0017h	0.001~9.999	Factor of compensation	0000h	RW	
E.Un it	0018h	0~3	Engineer Unit 0: M/min 1: CM/min 2:Yard/min 3: Feet/min	0000h	RW	
ito.nd	0019h	0~1	Input Time Out Mode 0: Auto 1: Manual	0000h	RW	
ito	001Ah	1~9999(0.1 second)	Input Time Out	03E8h	RW	
rRnGE	001Bh	0~2	Input Range 0: Auto 1: Semi-Auto 2: Manual	0000h	RW	
S.Clr	001Ch	0~1	Clear of PV Span 0: No 1: Yes	0000h	RW	
Lo.CUt	001Dh	-19999~19999	Low Cut	0000h	RW	
dSPLY	001Eh	0~3	Display Function 0: PV 1: Min. hold 2: Max. hold 3: RS 485	0000h	RW	
RuG	001Fh	1~99	Average	0005h	RW	
d.F ilt	0020h	0~99	Digital Filter	0000h	RW	
P.CoDE	0021h	0000~9999	Pass Code	03E8h	RW	
F.LoCk	0022h	0~3	Function Lock 0: None 1: User Level 2: Engineer Level 3: All	0000h	RW	

[RS485 Group]

Name	Address	Range	Explain	Initial	Write/Read	Note
RdrES	0023h	1~255	RS485 address	0001h	R/W	
bRUD	0024h	0~5	RS485 baud rate 0: 1200 1: 2400 2: 4800 3: 9600 4: 19200 5: 38400	0003h	R/W	
Pr itY	0025h	0~3	RS485 parity 0: n-8-1 1: n-8-2, 2: odd, 3: even,	0001h	R/W	