CM1   Programmable Meter   User Manual

■ DESCRIPTIONS

CM1 series Indicator has been designed in simple function and 4 digital 20.0mm LED displays with economic cost.

They are can be programmed by tack switches that are hidden in backside of front bezel.

They are also available 1 option of 2 Relay outputs, 1 Analogue output or 1 RS485(Modbus RTU Mode) interface with versatile functions such as control, alarm, re-transmission or communication for a wide range of industrial applications.

■ FEATURE

Common Function

- Optional output available for one of 2 relay, analogue or RS485
- Operation key built (in the front panel), can be set to display range;terminal straight into the design, no poor contact questions;installation depth of only 72mm
- CE CE Approved (EMC/EMI/LVD) & RoHS

〖 CM1-VA   ECNOMIC VOLT/CURRENT Meter 〗

- Measuring AC / DC Voltage 0~50.00mV/~600.0V / Current 0~1.999mA/~10.00A

〖 CM1-PR   4 Digital DC Process Meter 〗

- Measuring DC voltage 0(1)~5V/~10V OR DC current 0(4)~20 mA/0~10 mA
- Purchasing power to stimulateadditional **DC24V, 30mA**
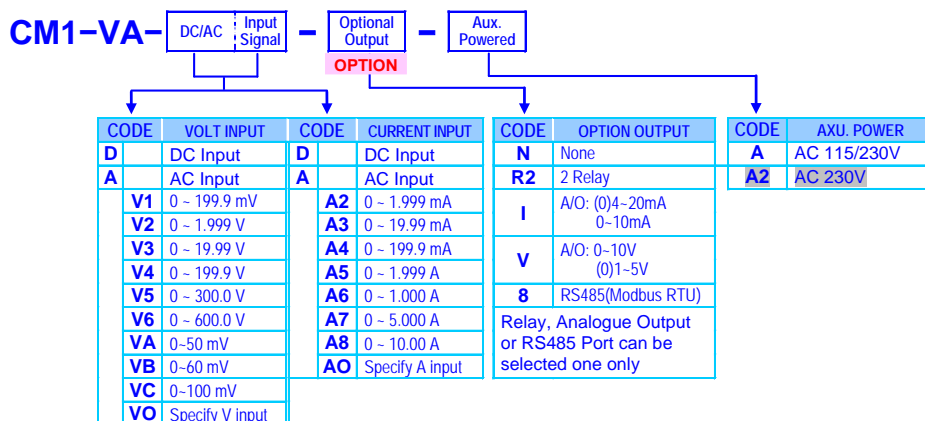
〖 CM1-RL   5 Digital RPM/Line speed   Meter 〗

- Measuring Frequency input 0.01Hz~6KHz，Do not need to specify the frequency range；Input Model(NPN、PNP、….) and Pulse level can be switch by DIP
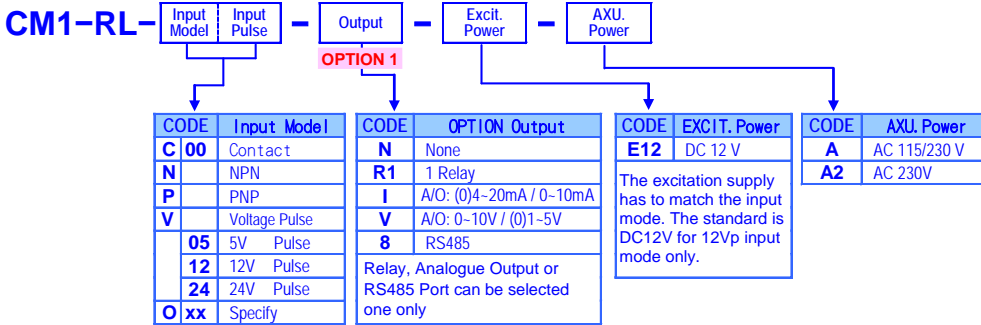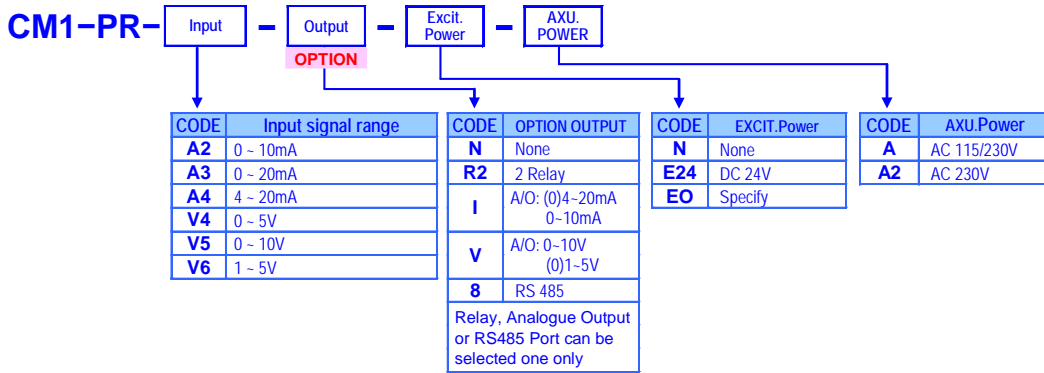- Optional excitation power DC12V, 30mA

■ APPLICATIONS

- **CM1-VA** High and low voltage power disk / motor control panel - Overload /mechanical voltage and current display / test equipment voltage / current display, alarm protection and computer connections
- **CM1-PR** Process in a variety of sensors (pressure transmitters, temperature and humidity transmitter ...) to do live shows,and computer alert to protect the connection
- **CM1-RL** Mechanical speed of the motor / speed limit on-sitedisplay, alarm protection and computer connections
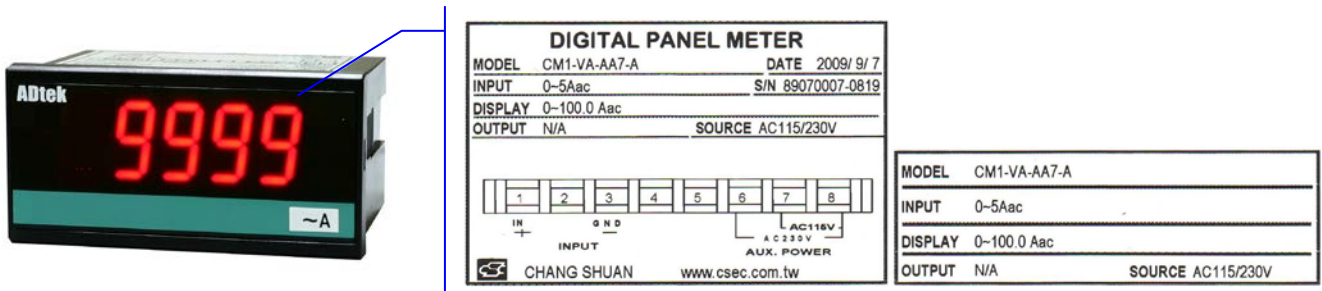
■ ORDERING INFORMATION: Please confirm specifications prior to installation
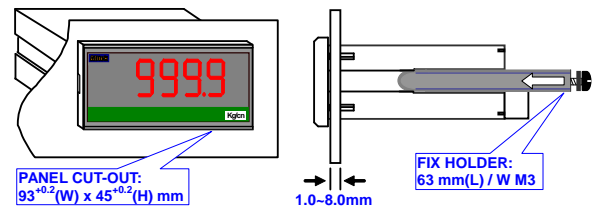
CM1−VA− [DC/AC] [Input Signal] − [Optional Output] **OPTION** − [Aux. Powered]

CODE	VOLT INPUT	CODE	CURRENT INPUT	CODE	OPTION OUTPUT	CODE	AXU. POWER
D	DC Input	D	DC Input	N	None	A	AC 115/230V
A	AC Input	A	AC Input	R2	2 Relay	A2	AC 230V
V1	0 ~ 199.9 mV	A2	0 ~ 1.999 mA	I	A/O: (0)4~20mA 0~10mA		
V2	0 ~ 1.999 V	A3	0 ~ 19.99 mA				
V3	0 ~ 19.99 V	A4	0 ~ 199.9 mA	V	A/O: 0~10V (0)1~5V		
V4	0 ~ 199.9 V	A5	0 ~ 1.999 A				
V5	0 ~ 300.0 V	A6	0 ~ 1.000 A	8	RS485(Modbus RTU)		
V6	0 ~ 600.0 V	A7	0 ~ 5.000 A	Relay, Analogue Output or RS485 Port can be selected one only			
VA	0~50 mV	A8	0 ~ 10.00 A				
VB	0~60 mV	AO	Specify A input				
VC	0~100 mV						
VO	Specify V input						

CM1-PR-

CM1−PR− [Input] − [Output] − [Excit. Power] − [AXU. POWER]

OPTION

CODE	Input signal range
A2	0 ~ 10mA
A3	0 ~ 20mA
A4	4 ~ 20mA
V4	0 ~ 5V
V5	0 ~ 10V
V6	1 ~ 5V

CODE	OPTION OUTPUT
N	None
R2	2 Relay
I	A/O: (0)4~20mA 0~10mA
V	A/O: 0~10V (0)1~5V
8	RS 485
Relay, Analogue Output or RS485 Port can be selected one only	

CODE	EXCIT.Power
N	None
E24	DC 24V
EO	Specify

CODE	AXU.Power
A	AC 115/230V
A2	AC 230V

CM1-RL-

CM1−RL− [Input Model][Input Pulse] − [Output] − [Excit. Power] − [AXU. Power]

OPTION 1

CODE	Input Model
C 00	Contact
N	NPN
P	PNP
V	Voltage Pulse
05	5V Pulse
12	12V Pulse
24	24V Pulse
O xx	Specify

CODE	OPTION Output
N	None
R1	1 Relay
I	A/O: (0)4~20mA / 0~10mA
V	A/O: 0~10V / (0)1~5V
8	RS485
Relay, Analogue Output or RS485 Port can be selected one only	

CODE	EXCIT. Power
E12	DC 12 V
The excitation supply has to match the input mode. The standard is DC12V for 12Vp input mode only.	

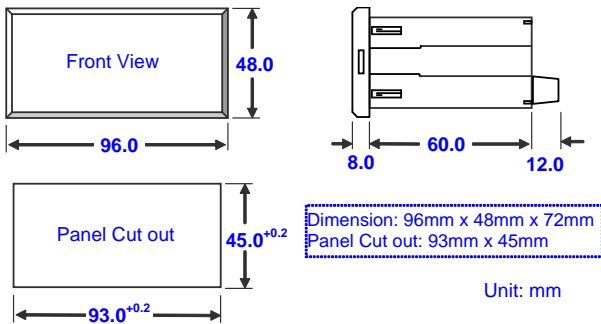| CODE	AXU. Power
A	AC 115/230 V
A2	AC 230V

■ INSTALLATION

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

DIGITAL PANEL METER

MODEL CM1-VA-AA7-A   DATE 2009/ 9/ 7
INPUT 0~5Aac   S/N 89070007-0819
DISPLAY 0~100.0 Aac
OUTPUT N/A   SOURCE AC115/230V

MODEL	CM1-VA-AA7-A	
INPUT	0~5Aac	
DISPLAY	0~100.0 Aac	
OUTPUT	N/A	SOURCE AC115/230V

■ DIMENSIONS & Panel Cut Out

Front View   48.0
96.0
8.0   60.0   12.0
Panel Cut out   45.0^{+0.2}
93.0^{+0.2}

Dimension: 96mm x 48mm x 72mm
Panel Cut out: 93mm x 45mm

Unit: mm

■ INSTALLATION

PANEL CUT-OUT:
93^{+0.2}(W) x 45^{+0.2}(H) mm

FIX HOLDER:
63 mm(L) / W M3

1.0~8.0mm

■ Wiring Diagram

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

⚠ Remark，PT can not short in secondary ; CT can not open in secondary

⚠ Wiring may be changed, follow the wiring diagram on theinstrument wiring

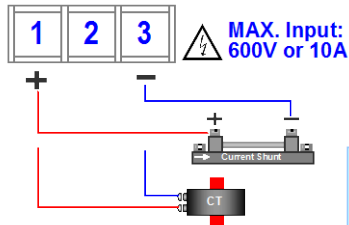## Terminals

20A/300Vac, M3.5, 12~22AWG;
Max torque: 13Kg-cm
(If the use of electric driver, please adjust the torque electric driver)

7.0mm max

7.0mm max

Input Signal Connection

Connect the input signal, use twisted-pair isolation ∘

CM1-VA Input Connection

1	2	3

⚠ MAX. Input: 600V or 10A

+ Current Shunt

CT

⚠ Remark:
PT can not short in secondary ;
CT can not open in secondary

CM1-PR Input Connection

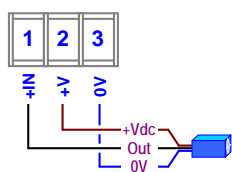#### 2-wire sensor transmitter connection

4~20mA Input   24Vdc EXCIT.Power

1	2	3	4	5

4(0)~20mA Input Connection

4~20mA Input   24Vdc EXCIT.Power

1	2	3	4	5

4~20mA
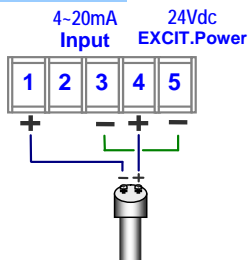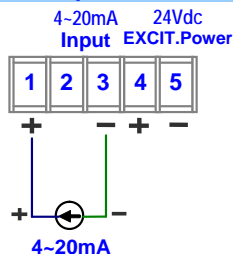
3-wire sensor transmitter connection

0~10V Input   24Vdc EXCIT.Power

1	2	3	4	5

Vo 0V +V

0~10V Input Connection

0~10V Input   24Vdc EXCIT.Power

1	2	3	4	5

0~10V

Sensor Input Connrction

1	2	3

+Vdc
Out
0V
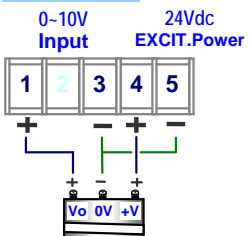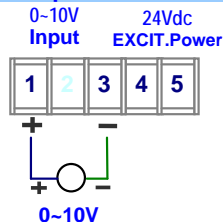
DIP switch to switch the input mode and pulse level but must beconsistent with the input signal

DIP D-S	1	2	3	4	5
NPN	ON				
PNP		ON			
CONTACT	ON				ON
Voltage pulse 5V$_P$					
Voltage pulse 12V$_P$			ON		
Voltage pulse 24V$_P$				ON	

DIP switch position cut to the bottom, behalf the DIP switch is ON

Terminals:
20A/600Vac, M3.5, 1.2~3.5mm^2 (22~12AWG)

9	10	11	12	13	14	15	16

1	2	3	4	5	6	7	8

+ −
Input Signal

AC115V.
AC230V
AXU.Power

Option output terminal

Power&Input Terminals

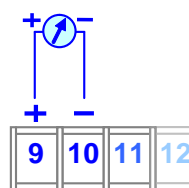If power supply noise interference, install an isolation transformer.∘

Power Supply

4	5	6	7	8	⚠

1A Fuse
AC115/230V

Filter or Transformer
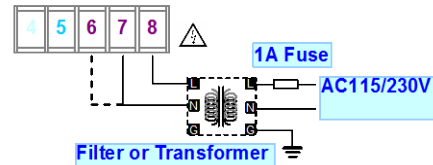
Output (one output available of Relay, Analogue or RS485)

Relay output

RELAY 1			RELAY 2		
b	c	a	b	c	a

9	10	11	12	13	14	15	16

Analogue Output

+ −

+ −

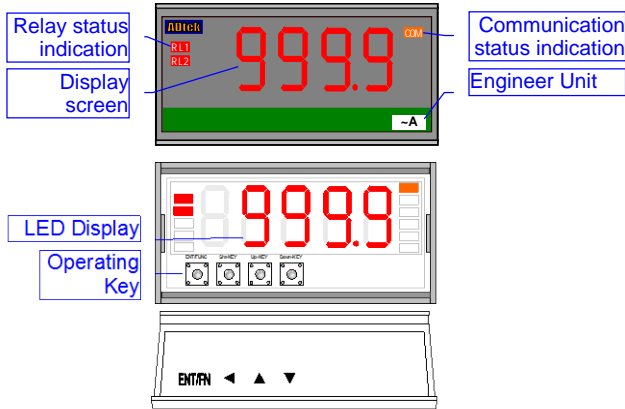| 9	10	11	12

RS485 port

A   B
+   −

9	10	11	12
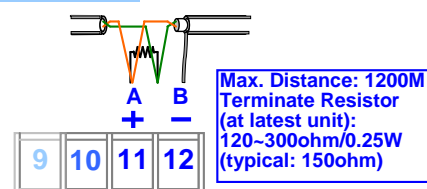
Max. Distance: 1200M
Terminate Resistor
(at latest unit):
120~300ohm/0.25W
(typical: 150ohm)

■ OPERATING

■ FRONT PANEL

- Relay status indication
- Display screen
- Communication status indication
- Engineer Unit

- LED Display
- Operating Key

EN/FN ◄ ▲ ▼

- **Stickers:**
  - **Hi** Hi Action
  - **Hi.H** Hi Action &Hold
- **Lo** Lo Action
  - **Lo.H** Lo Action &Hold
- **Unit stickers:** 106 kinds

~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	mmH₂O	mmHg	KPA	mmAq	PSI	mBar	PA
M³/min	ml/min	Ton/D	L/min	Torr	M³/hr	Kg-cm	cmHg	C.C
mm	cm	M	KM	ft	Yard	ppm	ppb	
g	KG	Ton	T-cm	NT-cm	PH	MPM	L	

■ Number screen:

- **8.8.8.8.8.:** red high-brightness LED for 5 digital present value.

■ Output LED:

- **Relay Energized:** 2 square red LED
  - **RL1** display when Relay 1 energized
  - **RL2** display when Relay 2 energized; ;
  - **COM** **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. 。

■ Stickers：Each instrument will be attached to the
relay function areengineeringunits stickers and stickers ; Please choose according to site usage label affixed to the front panel functions and units 。

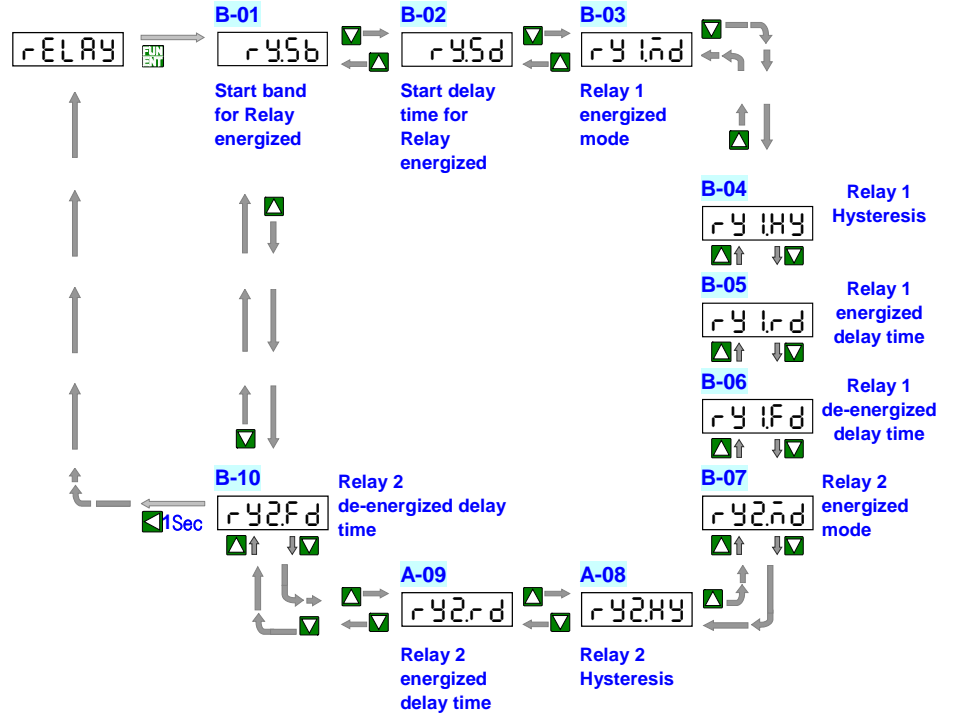### ■ Operating Key: 4 keys for ▣Enter(Function) / ◄Shift(Escape) / ▲Up key / ▼Down key

■ Pass Code:

4-digit password to set; To enter the parameter screen, you must enter the correct password, please remember the password. If youforget the password, please contact the company. This password can be in steps [P.CodE] to change

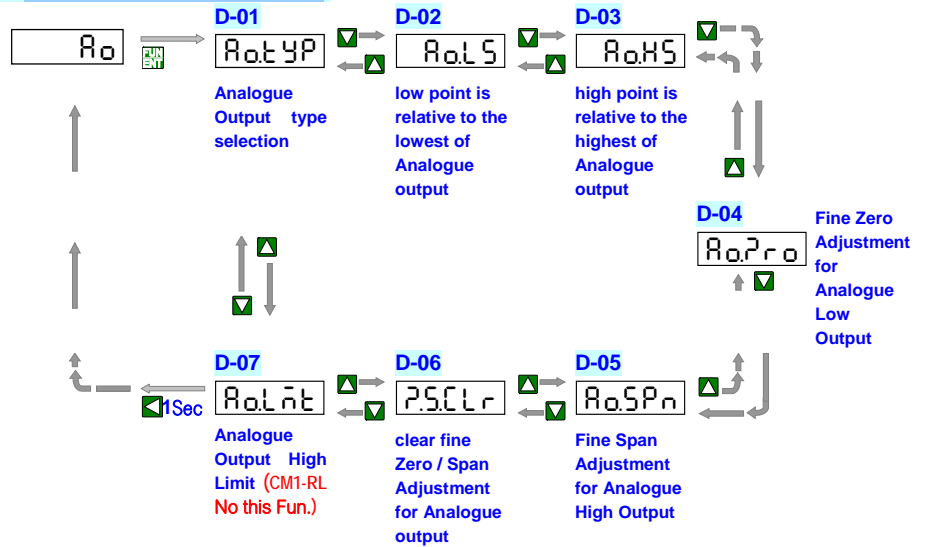## ■ OPERATING KEY：

*Please access to the Programming 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 designed 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 Programming 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
▣ (= FUN ENT) **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 setting status, press ◄ to Shift the setting position. (5) In setting 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 (The detail description of operation, please refer to operating manual.)

Power ON

```
88888
```
Self-diagnosis

```
Cn˙lwA
```
Show the model number
Cn˙lwA : Voltage and current
Cn˙lPr : 0~10V/4~20mA
Cn˙lrL : Speed / line speed

```
uEr 1.0
```
Show the firmware version

```
9999
```
MEASURING PAGE
◀1Sec Access User Leve
◀1Sec Escape User Leve

FUN/ENT ↓

```
P.CodE
```
Enter the password to access programming Level

```
EntEr
```
FUN/ENT ↓
NO
◇ Pass Code ◇
Default:1000

```
inPUt
```
FUN/ENT
```
GroUP
```
Into A [Input group], the related parameter

◀1Sec ▼↓ ↑▲

```
rELAY
```
FUN/ENT
```
GroUP
```
Into B [relay functional groups], the related parameter

◀1Sec ▼↓ ↑▲

```
Ao
```
FUN/ENT
```
GroUP
```
Into D [analog output group], the related parameter

◀1Sec ▼↓ ↑▲

```
rS485
```
FUN/ENT
```
GroUP
```
Into E [RS485 functional groups], the related parameter

◀1Sec ↑▲

. User Level

```
9999
```
◀1Sec

MEASURING PAGE

0-01
```
n˙in
```
Minimum value of PV saving

0-02
```
nAУ
```
Maximum value of PV saving

0-03
```
n˙rSt
```
Reset the saved value of Maximum & Minimum

0-04
```
rУ1SP
```
Relay1 Set-point

0-07
◀1Sec
```
Cn˙lwA
```
model of the meter firmware version
Checking only

0-06
```
rУ.rSt
```
Reset for energized Latch of Relay

0-05
```
rУ2.SP
```
Relay 2 Set-point

Programming Level

A. INPUT GROUP

【CM1-VA/CM1-PR】

```
inPUt
```
FUN/ENT

A-01
```
Pu.dP
```
Decimal Point of PV

A-02
```
Lo.SC
```
Low scale of PV

A-03
```
H.iSC
```
High scale of PV

A-04
```
Lo.CUt
```
Low Cut the PV

A-05
```
AuG
```
Average update for PV

A-08
◀1Sec
```
P.CodE
```
Pass Code setting for access to Programming Level

A-07
```
dFilt
```
Digital filter

A-06
```
nAuG
```
Moving Average update for PV

【CM1-RL】

```
inPUt
```
FUN/ENT

A-01
```
Pu.tУP
```
Select Display type line speed / rpm

A-02-1
```
PPr
```
Input pulse ratio setting;

A-02-2
```
E.Unit
```
Line Speed display units select

A-02-3
```
diAnt
```
Shaft Diameter set

A-03
```
dP
```
Display decimal point position select

A-04
```
FACtr
```
Ratio Factor

A-05
```
Lo.CUt
```
Display low cut

A-06
```
itond
```
Display set to zero

A-10
◀1Sec
```
P.CodE
```
Pass Code setting for access to Programming Level

A-09
```
dFilt
```
Digital filter

A-08
```
AuG
```
Average update for PV

A-07
```
ito
```
Display zero time setting

B. RELAY GROUP

B-01 `rY.Sb` — Start band for Relay energized

B-02 `rY.Sd` — Start delay time for Relay energized

B-03 `rY1.nd` — Relay 1 energized mode

B-04 `rY1.HY` — Relay 1 Hysteresis

B-05 `rY1.rd` — Relay 1 energized delay time

B-06 `rY1.Fd` — Relay 1 de-energized delay time

B-07 `rY2.nd` — Relay 2 energized mode

A-08 `rY2.HY` — Relay 2 Hysteresis

A-09 `rY2.rd` — Relay 2 energized delay time

B-10 `rY2.Fd` — Relay 2 de-energized delay time

`rELAY`

1Sec

D. ANALOGUE OUTPUT GROUP

`Ao`

D-01 `Ao.tYP` — Analogue Output type selection

D-02 `Ao.LS` — low point is relative to the lowest of Analogue output

D-03 `Ao.HS` — high point is relative to the highest of Analogue output

D-04 `Ao.Pro` — Fine Zero Adjustment for Analogue Low Output

D-05 `Ao.SPn` — Fine Span Adjustment for Analogue High Output

D-06 `P.S.CLr` — clear fine Zero / Span Adjustment for Analogue output

D-07 `Ao.Lnt` — Analogue Output High Limit (CM1-RL No this Fun.)

1Sec

E. RS485 GROUP

`rS485`

E-01 `AdrES` — Device number of the meter

E-02 `bAUd` — Baud rate

E-03 `Prity` — Parity

1Sec

■ OPERATING DIAGRAM (Into the User Level)

MEASURING PAGE	9999
0-01	Minimum value of PV saving
0-02	Maximum value of PV saving
0-03	Reset the saved value of Maximum & Minimum
0-04	Relay1 Set-point
0-05	Relay 2 Set-point
0-06	Reset for energized Latch of Relay
0-07	model of the meter firmware version

INDEX	Step	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)	
Cī 1.uA ↓		**Model** Cī 1.uA : Voltage / Current Cī 1.Pr : DC 0~10V/0~20mA Cī 1.rL : RPM / Line speed		
uEr 1.0 ↓		**Firmware version**		
9999		**Measuring Page**		
↵ ◁	Press ◁ for 1 second return to Measuring Page			
0-01 ī in / 0.0 ▽↓ ↑△		**ī in (PV Minimum storage):** the Minimum value of PV saving When the meter power is turned on, both began to record shows that the minimum value had occurred ; Except by [ī.rSt] (step 0-03) to perform cleanupfunctions or instrument off; otherwise been recordedand stored automatically update the new value.	Checking only	
0-02 īA⅄ / 999.9 ▽↓ ↑△		**īA⅄ (PV Maximum storage):** the Maximum value of PV saving When the meter power is turned on, both began torecord shows that the maximum value has occurred;Except through [ī.rSt] (step 0-03) to perform cleanupfunctions or instrument off; otherwise will always be recorded and stored the new value is automatically updated	Checking only	
0-03 ī.rSt / no ▽↓ ↑△	FUN/ENT ↱ no ↓▽△ YES ↵ FUN/ENT NEXT	**ī.rSt (Maximum & Minimum reset):** Reset the saved value of Maximum & Minimum Be stored maximum / minimum values, this functioncan be removed. This meter will be removedimmediately after the relatively new storage maximum/ minimum values °	Setting Range: YES / no **YES(Yes):** Clear the stored maximum /minimum value **no(No):** Does not clear the storedmaximum / minimum values ▽&△ Cycle selection FUN/ENT Determine	
NEXT				

INDEX	Step	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
0-04 rY1SP 100.0 ▽↓ ↑△	FUN/ENT ↴ 100.0 ↓ △ 100.9 ↓ ◁ 999.9 FUN/ENT NEXT	**rY1SP (Set-point of relay 1):** Relay 1 Set-point	**Setting Range:** **-1999~9999** **(CM1-RL:-19999~99999)** ◁ Shift △ Up ▽ Down FUN/ENT Enter	
0-05 rY2SP 100.0 ▽↓ ↑△	FUN/ENT ↴ 100.0 ↓ △ 100.9 ↓ ◁ 999.9 FUN/ENT NEXT	**rY2SP (Set-point of relay 2):** Relay 2 Set-point	**Setting Range:** **-1999~9999** **(CM1-RL:-19999~99999)** ◁ Shift △ Up ▽ Down FUN/ENT Enter	
0-06 rY.rSt no ▽↓ ↑△	FUN/ENT ↴ no ↓ △ YES FUN/ENT NEXT	**rY.rSt (Reset relay hold):** Reset for energized Latch of Relay	**Setting Range:** NO/YES ◁ Shift △ Up ▽ Down FUN/ENT Enter	
0-07 Cm1.VA uEr 1.0 ▽↓ ↑△		**Cm1.VA:** model of the meter firmware version **Cm1.VA** (CM1-VA)**:** Voltage / Current **Cm1.tPr** (CM1-PR)**:** DC 0~10V/0~20mA **Cm1.trL** (CM1-RL)**:** RPM / line speed **uEr 1.0** (Ver 1.0)**:** firmware version	**Checking only** ; The model number and softwareversion will differaccording to different models	
0-01 m̄ in 0.0 ▽↓ ↑△		**Cyclic to first page** Under the screen in any of the above	**Press** ◁ **for 1 sec. back to Measuring**	

■ **Into the Programming Level**

INDEX	Step	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
999.9 FUN/ENT↓		Measuring display		
EntEr P.CodE Default:1000	FUN/ENT ↴ 0000 ↓ ◁ 0000 ↓ △ 1000 FUN/ENT NEXT	Pass code screen	To change the password set to Step A-8, and do not forget the password	
◇ Pass Code ↓ YES		Pass code input		
Press FUN/ENT Into Programming Level		**Press** ◁ **1 Sec Can back to** Measuring display		
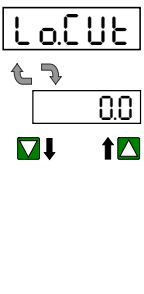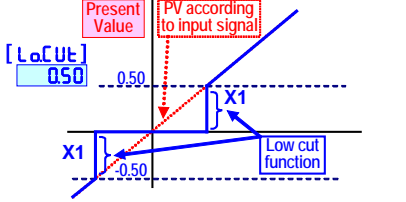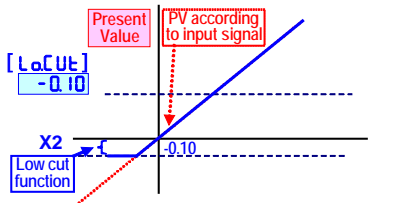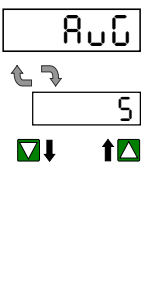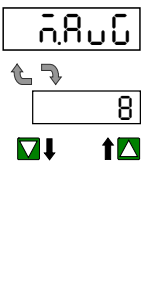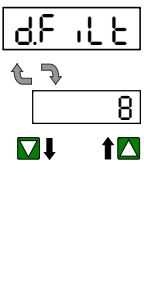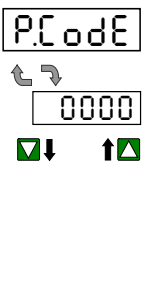
■ Input parameter group

CM1-VA/CM1-PR

	INDEX	Step	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
	Pass Code ◇ ↓ YES		Pass code input		
	inPut GroUP FUN ENT ↓		Input function group promptscreen		
			Any of the following screen Press ◀ 1Sec，back Input group		
A–1	PudP ↰↱ 0 ▽↓ ↑△	FUN ENT ↱ 0 ↓▽△ 000.0 ↩ FUN ENT NEXT	PudP (Decimal Point of PV): Decimal Point of PV	Setting Range： 0 / 0.0 / 0.00 / 0000 ▽&△ Cycle selection FUN ENT Enter	
A–2	Lo.SC ↰↱ 0.0 ▽↓ ↑△	FUN ENT ↱ 000.0 ↓ ◀ . . . . 000.0 ↓ △ 000.0 ↩ FUN ENT NEXT	Lo.SC (Low scale): Low scale of PV	Setting Range： -1999~9999 (CM1-RL:-19999~99999) ◀ Shift △ Up ▽ Down FUN ENT Enter SCALE Default: [LoSC]: 000, [H iSC]: 5000 [H iSC] Changed: [LoSC]: 2500, [H iSC]: 9999 9999 Negative Slope [H iSC] 5000 [LoSC] 2500 [LoSC] 000 INPUT 0.00 % 50.00 % 100.00 %	
A–3	H iSC ↰↱ 999.9 ▽↓ ↑△	FUN ENT ↱ 999.9 ↓▽ 999.0 ↓ . . . . 900.0 ↓▽ 200.0 ↩ FUN ENT NEXT	H iSC (High scale): High scale of PV	Setting Range： -1999~9999 (CM1-RL:-19999~99999) ◀ Shift △ Up ▽ Down FUN ENT Enter	
	NEXT				
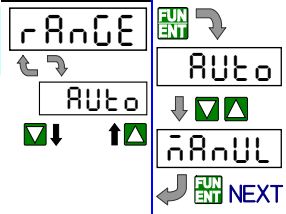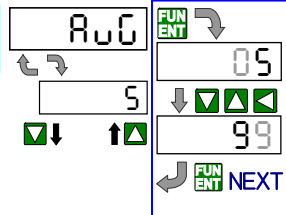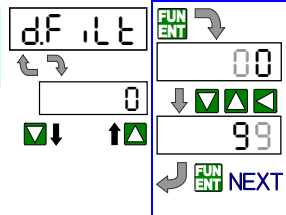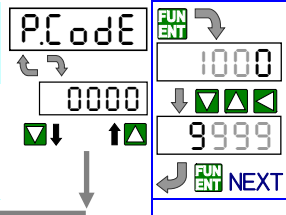
A-4 LoCUt ↳↰ 0.0 ▽↓ ↑△	**FUN/ENT** ↱ 000.0 ↓ ◁ 000.0 ↓ △ 001.0 ↵ **FUN/ENT** NEXT	**LoCUt (Low Cut):** Low Cut the PV **Low Cut set to be +0.50** Low Cut is set for 0.50, if the PV is from -0.50~+0.50, that display will be 0.	**Setting Range**: -1999~9999 counts ◁ Shift △ Up ▽ Down **FUN/ENT** Enter **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.	
A-5 AuG ↳↰ 5 ▽↓ ↑△	**FUN/ENT** ↱ 5 ↓ △ 09 ↓ ◁ 09 ↓ △ 99 ↵ **FUN/ENT** NEXT	**AuG (Average):** Average update for PV The meter's sampling is 15cycle/sec. If the [AuG](Average) set to be 3 to express the display update with 5 times/sec. The meter will calculate the sampling 1-3 and update the display value. At meantime, the sampling 4-6 will be processed to calculate.	**Setting Range**: 1(NONE)~99 times ◁ Shift △ Up ▽ Down **FUN/ENT** Enter	
A-6 ñAuG ↳↰ 8 ▽↓ ↑△	**FUN/ENT** ↱ 8 ↓ △ 09 ↓ ◁ 09 ↓ △ 99 ↵ **FUN/ENT** NEXT	**ñAuG (Moving Average):** Moving Average update for PV In the first updated display value will be same as average function. In the next updated display value, the function will get the new fourth sample (sample 4) then throw away the first sample (sample 1) that the newest 3 samples(sample 2,3,4) will be calculated for the updated display value.	**Setting Range**: 1(NONE)~99 times ◁ Shift △ Up ▽ Down **FUN/ENT** Enter	
A-7 dF·Lt ↳↰ 8 ▽↓ ↑△	**FUN/ENT** ↱ 08 ↓ △ 09 ↓ ◁ 09 ↓ △ 99 ↵ **FUN/ENT** NEXT	**dF·Lt (Digital filter):** Digital filter The digital filter can reduce the influence of spark noise by magnetic of coil. If the values of samples are over digital filter band(fixed 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.	**Setting Range**: 1(NONE)~99 times ◁ Shift △ Up ▽ Down **FUN/ENT** Enter	
A-8 P.CodE ↳↰ 0000 ▽↓ ↑△	**FUN/ENT** ↱ 1000 ↓ △ 1009 ↓ ◁ . . . . 1999 ↓ △ 9999 ↵ **FUN/ENT** NEXT	**P.CodE (Pass Code):** Pass Code setting for access to programming level Please remind and write down the new pass code so that access to programming level.	**Setting Range**: 0000~9999 ◁ Shift △ Up ▽ Down **FUN/ENT** Enter	

Flowchart labels:

- inPUt
- A-01 PutYP — DisplayType Line speed/RPM Selection
- A-02-1 PPr — Input Pulse precedes set ;
- A-02-2 E.Unit — Line Speed Display units selection
- A-02-3 diAnt — Shaft diameter set
- A-03 dP — Decimal Point set
- A-04 FACtr — Ratio Factor of PV
- A-05 LoCUt — Low Cut the PV
- A-06 itond — Zero mode setting
- A-07 ito — Zero tine setting
- A-08 AuG — Average update for PV
- A-09 d.FiLt — Digital filter
- A-10 P.CodE — Pass Code setting foraccess to programming level
- ◀ 1秒

INDEX	Step	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
Pass Code ↓ YES		Pass code input		
inPUt GroUP FUN ENT ↓		Input function group promptscreen		
		Any of the following screen Press ◀ 1sec，back Input group		
A-1 PutYP LnSPd ▽↓ ↑△	FUN ENT ↴ LnSPd ↓▽△ rPn FUN ENT NEXT	PutYP (PV type selection): DisplayType Line speed/RPM Selection The meter has a measurement line speed, RPM and frequency functions. Users can simply set the display purposes, the meter will start the function of the corresponding。	Setting Range： LnSPd Linearly Line Speed：; rPn RPM: **Revolution(s) Per Minute** rPS (RPS): **R**evolution(s) **P**er **S**econds HZ (Hz): **Frequency** bHZ (kHz): **Frequency** ▽&△ Cycle selection FUN ENT Enter r	
A-2-1 PPr 1 ▽↓ ↑△	FUN ENT ↴ 1 ↓▽△◀ 99999 FUN ENT NEXT	PutYP selected (rPn / rPS) / (LnSPd)，the fun. will display PPr (Pulse/rotation): Input Pulse precedes set	Setting Range: 1~99999 ◀ Shift △ Up ▽ Down FUN ENT Enter	
NEXT				
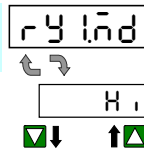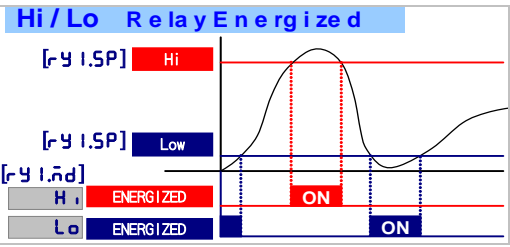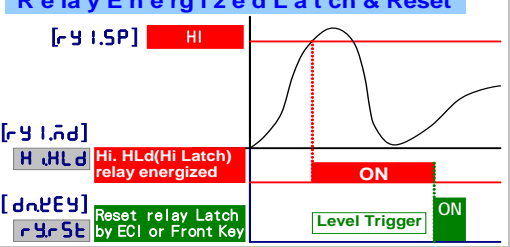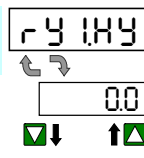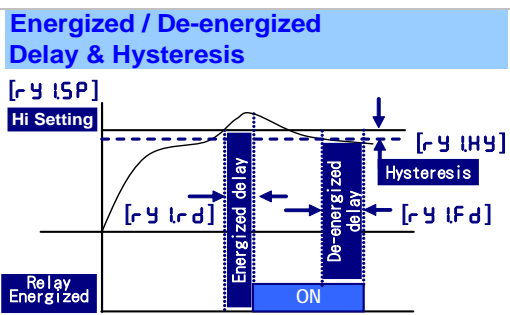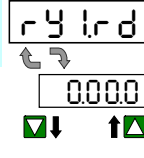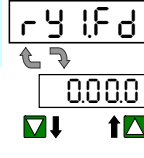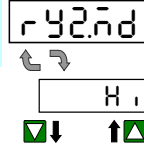
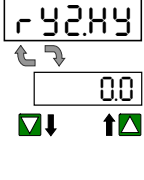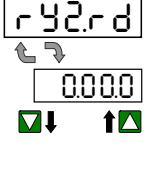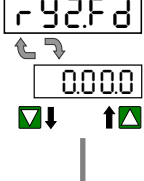|			
A-2-2 E.Un it ↺↻ n̄d̄n̄ ☑↓ ↑☑	FUN/ENT ↘ n̄d̄n̄ ↓☑△ Ydd̄n̄ ↙ FUN/ENT NEXT	**PutYP selected (Ln.SPd)**, **the fun. will display** **E.Un it (Engineer Unit):** Line speed display unit selection	**Setting Range:** n̄d̄n̄: (M/min) Cn̄d̄n̄: (CM/min) Ydd̄n̄: (Yd/min) Ftd̄n̄: (Ft/min) ▽&△ Cycle selection FUN/ENT Enter
A-轉速 2-3 d iAn̄t ↺↻ 0.1000 ☑↓ ↑☑	FUN/ENT ↘ 0.1000 ↓☑△◁ 9.9999 ↙ FUN/ENT NEXT	**PutYP selected (Ln.SPd)**, **the fun. will display** **d iAn̄t (Diemeter):** Shaft diameter s et	**Setting Range:** 0.0001~9.9999M(公尺) ◁ Shift △ Up ▽ Down FUN/ENT Enter
A-3 PudP ↺↻ 0 ☑↓ ↑☑	FUN/ENT ↘ 0 ↓☑△ 0.0000 ↙ FUN/ENT NEXT	**PudP:Decimal Point of PV;** There are two definitions for thissetting: **1.If fun. setting is AUto**, the PudP set point for the relay output of decimal places set; **2.If fun. setting is SEn i or n̄AnUL**, the PudP set point for the relay output & PV of decimal places set;	**Setting Range:** 0 / 0.0 / 0.00 / 0.000 / 0.0000 ▽&△ Cycle selection FUN/ENT Enter
A-4 FACtr ↺↻ 1.000 ☑↓ ↑☑	FUN/ENT ↘ 1.000 ↓☑△◁ 9.999 ↙ FUN/ENT NEXT	**FACtr (Factor):** Display scale factor; Display value = calculated value x scale factor	**Setting Range:** 0.001~9.999 ◁ Shift △ Up ▽ Down FUN/ENT Enter
A-5 LoCUt ↺↻ 0 ☑↓ ↑☑	FUN/ENT ↘ 00000 ↓☑△◁ 00 100 ↙ FUN/ENT NEXT	**LoCUt (Low Cut):** Low Cut the PV [LoCUt]is setting 0.50, when PV between -0.50~+0.50, Display is "0"。	**Setting Range:** -19999~+29999 counts ◁ Shift △ Up ▽ Down FUN/ENT Enter [LoCUt]is setting -0.10, PVLess than equal to (< = -0.10), Display is "-0.10"。
A-6 iton̄d ↺↻ AUto ☑↓ ↑☑	FUN/ENT ↘ AUto ↓☑△ n̄AnUL ↙ FUN/ENT NEXT	**iton̄d:Input Time Out Mode** When the frequency is too low, this table shows the calculation based on this function to set the time zero value。	**Setting Range:** AUto(Auto): Automatic calculation zero display timo。 n̄AnUL(Manual): Manually calculation zero display timo。 ▽&△ Cycle selection FUN/ENT Enter
A-7 ito ↺↻ 0.0 ☑↓ ↑☑	FUN/ENT ↘ 0.0 ↓☑△◁ 5.0 ↙ FUN/ENT NEXT	**iton̄d selected n̄AnUL**, **the Fun. desplay** **ito(Input Time Out):** Zero time setting。When the frequency is too low to display zero value(TIME OUT) time setting	**Setting Range:** 0.0 sec~999.9sec ◁ Shift △ Up ▽ Down FUN/ENT Enter
NEXT			

A-8	rAnGE / Auto	FUN/ENT ↘ Auto / ↓▽△ / ¯AnUL / FUN/ENT NEXT	**rAnGE :Display Range Mode**	**Setting Range:** **Auto** (Auto)**:** Automatically adjust the decimal point position;according to the size of the input frequency,automatically switching the decimal point position。 **SEñı** (Semi-Auto)**:** Semi-automatic adjustment of the decimal pointposition; according to the size of the input frequency,automatically switching the decimal point position;but no more than set the value of decimal placesdecimal point position set。 **¯AnUL** (Manual)**:** Fixed display range; display decimal point according to the set position when the input frequency exceedsfull scale, it will display ovfl overflow。 ▽&△ Cycle selection FUN Enter	
A-9	AuG / 5	FUN/ENT ↘ 05 / ↓▽△◁ / 99 / FUN/ENT NEXT	**AuG (Average):** **Average update for PV** The meter's sampling is 15cycle/sec If the [AuG](Average) set to be 3 to express the display update with 5 times/sec. The meter will calculate the sampling 1-3 and update the display value. At meantime, the sampling 4-6 will be processed to calculate.	**Setting Range:** 1(None)~99 times ◁ Shift △ Up ▽ Down FUN/ENT Enter	
A-10	d.F ıLt / 0	FUN/ENT ↘ 00 / ↓▽△◁ / 99 / FUN/ENT NEXT	**d.F ıLt :Digital filter** The digital filter can reduce the influence of spark noise by magnetic of coil. If the values of samples are over digital filter band(fixed 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.	**Setting Range:**0(None)/1~99 times ◁ Shift △ Up ▽ Down FUN/ENT Enter	
A-11	P.CodE / 0000	FUN/ENT ↘ 1000 / ↓▽△◁ / 9999 / FUN/ENT NEXT	**P.CodE (Pass Code):** **Pass Code setting for access to programming level** Please remind and write down the new pass code so that access to programming level.	**Setting Range:** 0000~9999 ◁ Shift △ Up ▽ Down FUN/ENT Enter	

■ Relay function parameter group (If you do not specify this function, this group will notappear related functions)

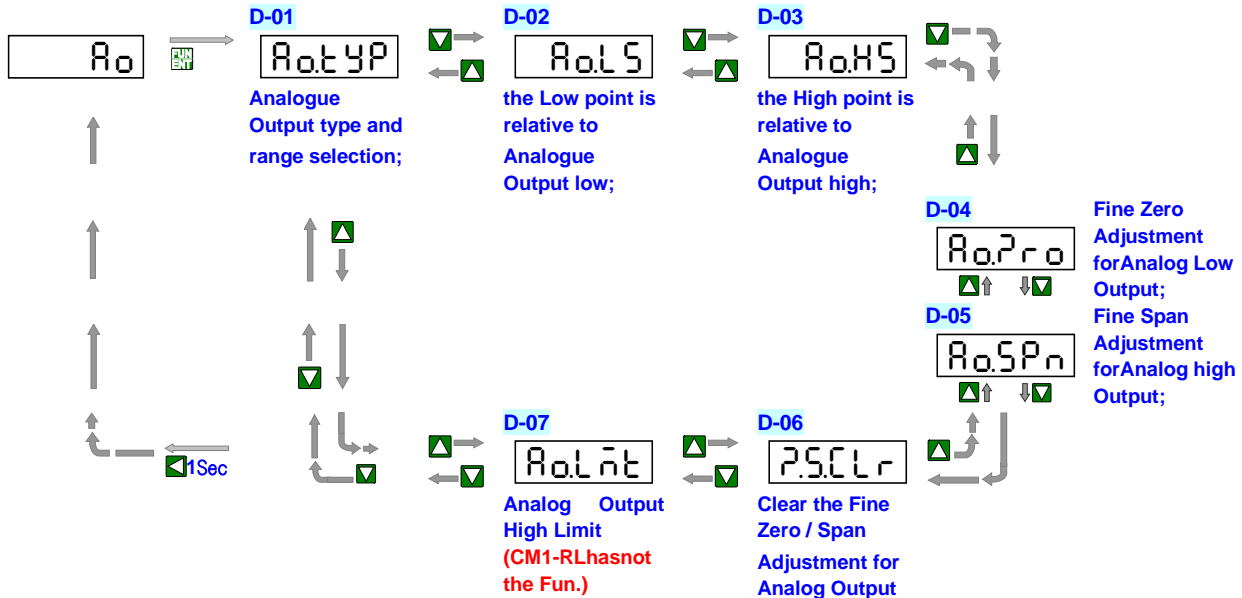**B-01** `rY.Sb` Start band for Relay energized
B-02 `rY.Sd` Start delay time for Relay energized
B-03 `rY1.nd` Relay 1 energized mode
B-04 `rY1.HY` Relay 1 Hysteresis
B-05 `rY1.rd` Relay 1 energized delay time
B-06 `rY1.Fd` Relay 1 de-energized delay time
B-07 `rY2.nd` Relay 2 energized mode
B-08 `rY2.HY` `rY2HY`: Relay 2 Hysteresis
B-09 `rY2.rd` Relay 2 energized delay time
B-10 `rY2.Fd` Relay 2 de-energized delay time

INDEX	Step	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
`rELAY` `GroUP`		Relay function group promptscreen	Any of the following screen Press ◀ 1 sec , Back to Relay function group	
`rY.Sb` 0.0 (B-1)	NEXT	`rY.Sb`: **Start band of Relay Output** When the value exceeds the action does not startwith, then the start-up delay time (Start delay time), the relay will start the PV value compared with theoutput setvalue **Start Delay**	Setting Range: 0~9999 counts ◀ Shift ▲ Up ▼ Down Enter	
`rY.Sd` 0.00.0 (B-2)	NEXT	`rY.Sd` : **Relay Output start delay time**	Setting Range: 0:00.0~9m:59.9s ◀ Shift ▲ Up ▼ Down Enter	
NEXT				
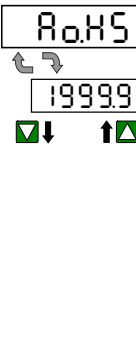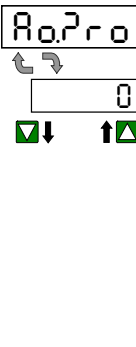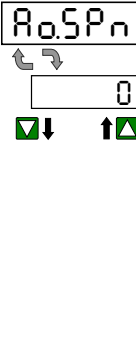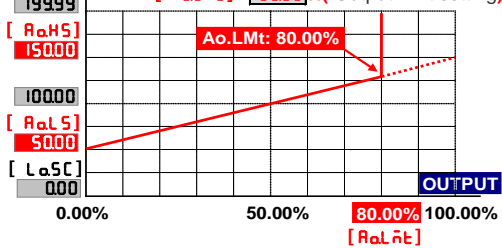
B-3	ry1.md	FUN/ENT ↴	ry1.md :Relay 1 energized mode	Programmable:

B-3 — `ry1.md` : Relay 1 energized mode

Display: Hi → Hi.HLd (▼▲) → NEXT (FUN/ENT)

Programmable:
- **oFF** (Turn off the Relay)： Turn off the Relay andindication LED.
- **Lo** (Low Level Energized)： Low Level Energized;Relay will energize when PV <Set-Point.
- **Hi** (High Level Energized)： High Level Energized;Relay will energize when PV >Set-Point.
- **Hi.HLd / Lo.HLd** (High / Low Level energized hold)： High / Low Level energize andlatch; As the PV Higher (or lower) than set-point, the relay will be energized to latch except manual reset by from key in [**User Level**], front key function or terminals of **E.C.I.** closed

▼&▲ Cycle selection   FUN/ENT Enter

B-4 — `ry1.HY` : Relay 1 Hysteresis

Display: 000.0 → 0.0 → 500.0 (▼▲◄) → NEXT

Energized / De-energized Delay & Hysteresis

Setting Range: 0~5000 counts
◄ Shift ▲ Up ▼ Down FUN/ENT Enter

B-5 — `ry1.rd` : Relay 1 energized delay time

Display: 0.00.0 → 0.00.0 → 9.59.9 (▼▲◄) → NEXT

Setting Range: 0:00.0~9(m):59.9(s)
◄ Shift ▲ Up ▼ Down FUN/ENT Enter

B-6 — `ry1.Fd` : Relay 1 de-e6nergized delay time

Display: 0.00.0 → 0.00.0 → 9.59.9 (▼▲◄) → NEXT

Setting Range: 0:00.0~9(m):59.9(s)
◄ Shift ▲ Up ▼ Down FUN/ENT Enter

B-7 — `ry2.md` : Relay 2 energized mode

Display: Hi → Hi.HLd (▼▲) → NEXT

Setting Range:
the same as `ry1.md`
oFF   Lo   Hi   Hi.HLd   Lo.HLd
▼&▲ Cycle selection   FUN/ENT Enter

NEXT

B-8 ⌐Y2.HY 0.0 ▽↓ ↑△	FUN/ENT ↘ 0000 ↓▽△◁ 5000 FUN/ENT NEXT	⌐Y2.HY:Relay 2 Hysteresis	**Setting Range**: 0~5000 counts the same as ⌐Y2.HY ◁ Shift △ Up ▽ Down FUN/ENT Enter
B-9 ⌐Y2.⌐d 0.00.0 ▽↓ ↑△	FUN/ENT ↘ 0.00.0 ↓▽△◁ 9.59.9 FUN/ENT NEXT	⌐Y2.⌐d :Relay 2 energized delay time	**Setting Range**: 0:00.0~9 分:59.9 秒 the same as ⌐Y2.⌐d ◁ Shift △ Up ▽ Down FUN/ENT Enter
B-10 ⌐Y2.Fd 0.00.0 ▽↓ ↑△	FUN/ENT ↘ 0.00.0 ↓▽△◁ 9.59.9 FUN/ENT NEXT	⌐Y2.Fd :Relay 2 de-energized delay time	**Setting Range**: 0:00.0~9 分:59.9 秒 the same as ⌐Y2.Fd ◁ Shift △ Up ▽ Down FUN/ENT Enter

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

D-01 **Ao.tYP** Analogue Output type and range selection;

D-02 **Ao.LS** the Low point is relative to Analogue Output low;

D-03 **Ao.HS** the High point is relative to Analogue Output high;

D-04 **Ao.Pro** Fine Zero Adjustment forAnalog Low Output;

D-05 **Ao.SPn** Fine Span Adjustment forAnalog high Output;

D-07 **Ao.Lmt** Analog Output High Limit (CM1-RLhasnot the Fun.)

D-06 **P.S.CLr** Clear the Fine Zero / Span Adjustment for Analog Output

INDEX	Step	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
Ao **GroUP** **FUN ENT↓**		**AO GRIOP INDEX PAGE**	In following pages, press **◄** for 1 second to return the AO GROUP INDEX PAGE.	
D-1 **Ao.tYP** **A.4-20** **▼↓ ↑▲**	**FUN ENT↰** **A.4-20** **↓▼▲** **u.0-10** **↵ FUN ENT** NEXT	**Ao.tYP :Analogue Output type** Analogue output type had been fixed in mA or V as customer ordering requested. Therefore, the type selection is only for the ranges in same type(Voltage or Current). ◦	Programmable: **Voltage Output:** **u.0-10**(0~10V) / **u.0-5**(0~5V) / **u.1-5**(1~5V) **Current Output:** **A.0-10**(0~10mA) / **A.0-20**(0~20mA) / **A.4-20**(4~20mA) **▼&▲** Cycle selection **FUN ENT** Enter	
D-2 **Ao.LS** **0.0** **▼↓ ↑▲**	**FUN ENT↰** **0000.0** **↓▼▲◄** **500.0** **↵ FUN ENT** NEXT	**Ao.LS :Analogue Output relative Low Scale** Ex. Output range set to be **A.4-20** (4~20mA) is relative to display 0~199.99 ; User can set the **Ao.LS** (Ao.LS) to be **50.00** ，At meantime, the output signal will be 4mA	Setting Range: -19999~29999 **(CM1-RL:-19999~99999)** **◄** Shift **▲** Up **▼** Down **FUN ENT** Enter	
NEXT				

D-3 `Ao.HS` / `1999.9` ▽↓ ↑△	FUN ENT ↘ `1999.9` ↓▽△◄ `1500.0` ↵ FUN ENT NEXT	**`Ao.HS` :Analogue Output relative High Scale** Ex. Output range set to be `A.4-20` (4~20mA) is relative to display 0~199.99 ; User can set the [`Ao.HS`] (Ao.HS) to be `150.00` ，At meantime, the output signal will be 20mA 。	**Setting Range**: -19999~29999 **(CM1-RL:-19999~99999)** ◄ **Shift** △ **Up** ▽ **Down** FUN ENT **Enter**	
D-4 `Ao.Zro` / `0` ▽↓ ↑△	FUN ENT ↘ `00000` ↓▽△◄ `-999` ↵ FUN ENT NEXT	**`Ao.Zro` :Fine Zero Adjustment for Analog Output ;** Users can get Fine zero Adjustment for analogue output by front key. Please connect standard meter to the terminal of analogue output for measuring the output value. To press the front key(up or down key) to adjust and check the output of meter. 。	**Setting Range**: -1999~9999 ◄ **Shift** △ **Up** ▽ **Down** FUN ENT **Enter**	
D-5 `Ao.SPn` / `0` ▽↓ ↑△	FUN ENT ↘ `00000` ↓▽△◄ `9999` ↵ FUN ENT NEXT	**`Ao.SPn` :Fine Span Adjustment for Analog Output ;** Users can get Fine span Adjustment for analogue output by front key of the meter as like as [`Ao.Zro`] (Ao.Zro).	**Setting Range**: -1999~9999 ◄ **Shift** △ **Up** ▽ **Down** FUN ENT **Enter**	
D-6 `ZS.CLr` / `nonE` ▽↓ ↑△	FUN ENT ↘ `nonE` ↓▽△ `botH` ↵ FUN ENT NEXT	**`ZS.CLr` :Clear Fine Zero / Span Adjustment for Analog Output**	**Programmable:** `nonE`**(None):** Do not clear `Ao.Zro`**(Ao.Zro):** Clear low adjust `Ao.SPn`**(Ao.SPn):** Clear high adjust `botH`**(both):** Clear low & high adjust ▽**&**△ Cycle selection FUN ENT Enter	
D-7 `Ao.LMt` / `110.00` ▽↓ ↑△	FUN ENT ↘ `110.00` ↓▽△◄ `100.00` ↵ FUN ENT NEXT	**`Ao.LMt` :Analog Output High Limit**	**Setting Range**: 0.00~110.00% of FS **(CM1-RL has no the Fun.)** ◄ **Shift** △ **Up** ▽ **Down** FUN ENT **Enter**	

■ RS485 Group (The group will be hidden, if the relay function is not to be specify)

E-01 `AdrES` Device number of the meter.
E-02 `bAUd` Baud rate
E-03 `Prity` Parity
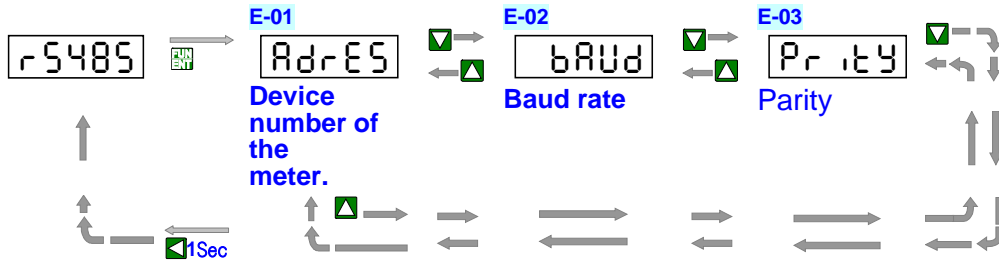
INDEX	Step	FUNCTION DESCRIPTION	PARAMETERS & SETTING	SET
`rS485` `GroUP` 🔽		RS485 GROUP INDEX PAGE	In following pages, press ◀ for 1 second to return the RS485 GROUP INDEX PAGE.	
E-1 `AdrES` `1` 🔽↕🔼	`001` ↓🔽🔼◀ `255` NEXT	AdrES :Device number of the meter	Setting Range: 1~255 ◀ Shift 🔼 Up 🔽 Down Enter	
E-2 `bAUd` `9600` 🔽↕🔼	`9600` ↓🔽🔼 `38400` NEXT	bAUd :Baud rate	Settable range: `1200` / `2400` / `4800` / `9600` / `19200` / `38400` 🔽&🔼 Cycle selection Enter	
E-3 `Prity` `n.Stb2` 🔽↕🔼	`n.Stb2` ↓🔽🔼 `EuEn` NEXT	Prity :Parity	Programmable: `n.Stb.1`(n.Stb.1): None, 1 stop bit `n.Stb2`(n.Stb.2): None, 2 stop bit `odd`(odd): odd `EuEn`(EvEn): Even 🔽&🔼 Cycle selection Enter	

■ 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	i	J	K	L	n̄

n	o	P	q	r	S	t	U	v	W	X	y	Z
n	o	P	q	r	S	t	U	u	u̲	५	५	₴

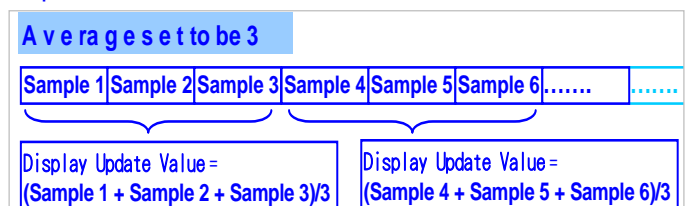| 1	2	3	4	5	6	7	8	9	0	/	.
1	2	3	4	5	6	7	8	9	0	↲	.

■ Input & Scaling

■ Scaling Function

Setting Range: -1999~+9999 counts ;

Users can set the parameters in the class is free to set the input signal display low [LoSC] (Low

Reading stable functions
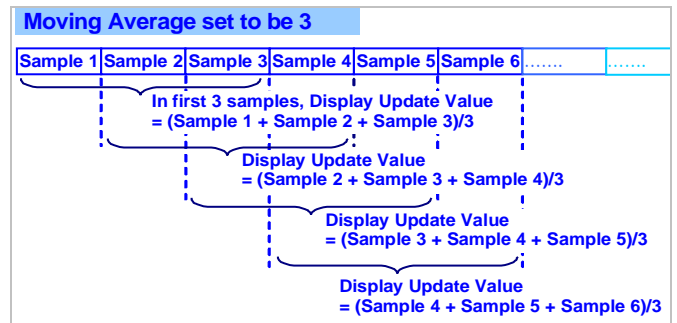
■ Average Display update (Average):

Settable range:1~99 times ;

Jittery Display caused by the noise or unstable signal. User can set the times to average the readings, and to get smoothly display. The meter's sampling is 15cycle/sec ; [AuG] set to be `3` to express the display update with 5 times/sec

A v e r a g e s e t to be 3

| Sample 1 | Sample 2 | Sample 3 | Sample 4 | Sample 5 | Sample 6 | ……. | |

Display Update Value = (Sample 1 + Sample 2 + Sample 3)/3

Display Update Value = (Sample 4 + Sample 5 + Sample 6)/3

scale corresponding to the input lower limit)
and show high values [H.SC] (High scalelimit on
the corresponding input); can be set to negative slope.
Please refer to the following description

SCALE Default: [LoSC]: 0.00, [H.SC]: 5000
Change: [LoSC]: 25.00, [H.SC]: 99.99
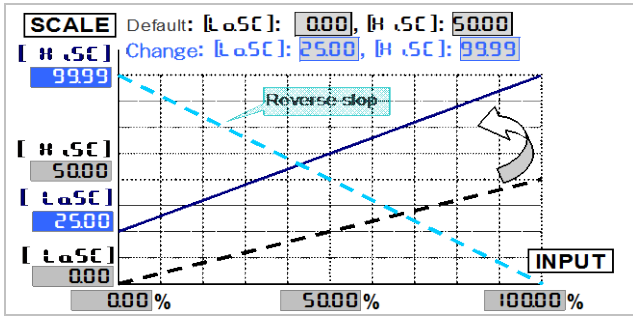
Moving Average update [กินติเวอ]:

Settable range : 1~99 times ;

Jittery Display caused by the reasons as like as noise or unstable signal. User can set the times to average the readings, and get smoothly display.。

The meter's sampling is 15cycle/sec ; [กินติเวอ] set to be 3 expressed。

the display update with 15 times/sec，

In the first updated display value will be same as average function. In the next updated display value, the function will get the new fourth sample (sample 4) then throw away the first sample (sample 1) that the newest 3 samples(sample 2,3,4) will be calculated for the

updated display value.

Moving Average set to be 3							
Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	....	....

In first 3 samples, Display Update Value
= (Sample 1 + Sample 2 + Sample 3)/3

Display Update Value
= (Sample 2 + Sample 3 + Sample 4)/3

Display Update Value
= (Sample 3 + Sample 4 + Sample 5)/3

Display Update Value
= (Sample 4 + Sample 5 + Sample 6)/3

■ Digital filter [dF.lt]

Settable range : 1~99 times ;

The digital filter can reduce the influence of spark noise by magnetic of coil.

If the values of samples are over digital filter band(fixed in firmware and about 5% of stable reading) 3

DISPLAY FUNCTIONS

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. User can reset the values by [m̄rSt] in [**user level**]. And it'll record new maximum and minimum value immediately after reset 。
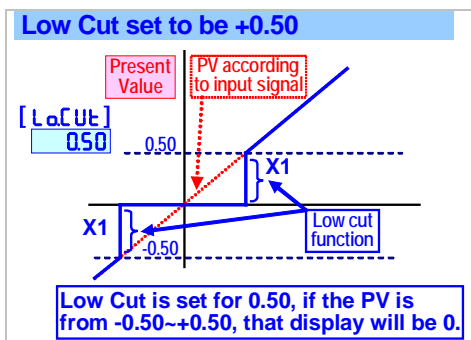
Low Cut [LoCUt]

Settable range from -19999~+29999 digits

Usually caused by interference, system factors or natural phenomena when there are small values near zero point, this feature displays zero 。

If[LoCUt] Setting is positive, it means that the displayed value in [LoCUt] settingsare within the absolute value is displayed as [LoSC] settings；

I displayed I ≤ [LoCUt] settings，

and displayed all are [LoSC] settings。

Low Cut set to be +0.50

[LoCUt] 0.50

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

If [LoCUt] setting show that the value is negative in [LoCUt] The following settings are displayed as [LoCUt] setting；

Display value ≤ Set value display are all set value 。
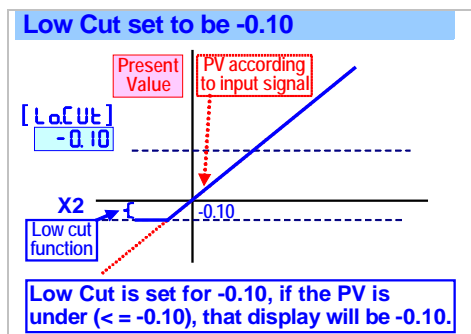
Low Cut set to be -0.10

[LoCUt] -0.10

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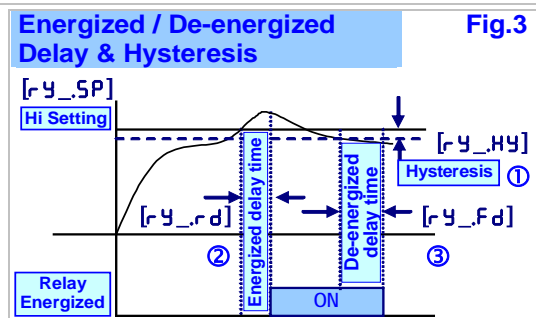
Relay Functions

CM1 series offer the 2 relay outputs，Different control functions can be individually planned its related functions can be set at the button panel . Details are as follows；
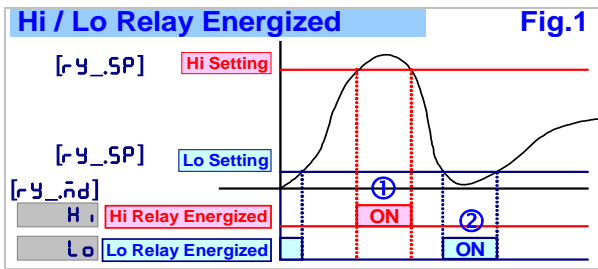
Relay energized mode [rY_m̄d]

selection：Hi / Lo

Hi (H) (Fig.1-①): Relay will be energized, when PV > Set Point

Lo (Lo) (Fig.1-②): Relay will be energized,

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. 。

Energized / De-energized Delay & Hysteresis **Fig.3**

[rY_.SP]
Hi Setting
[rY_.HY]
Hysteresis ①
[rY_.rd] ②
[rY_.Fd] ③
Energized delay time
De-energized delay time
Relay Energized
ON

Relay energized delay and Relay de-energized delay

when PV < Set Point

Hi / Lo Relay Energized   **Fig.1**

Start delay band and Start delay time

The functions have Been designed for

1. To avoid starting current of inductive motor (6 times of rated current) with alarm.。
2. If the [rY_.nd] relay energized mode had been set to be [Lo](Lo) or [LoHLd](Lo & latch). As the meter is power on and no input to display the "0" caused the relay will be energized. User can set a band and delay time to inhibit the energized of relay。
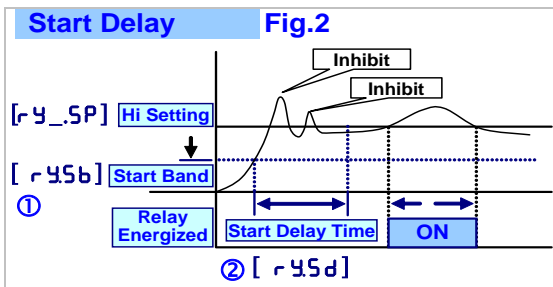
● **Start of band of Relay energized [rYSb] (Fig.2-①)**

 Settable range from 0~9999 Digits；

 When displaying the value exceeds started after no action, and then after startup delay time, the relay will start the PV value is compared with the set value output。

● **Start band [rYSd] (Fig.2-②)**

 Settable range: 0.0 Sec~9(m)59.9(s)。

Start Delay   **Fig.2**

Hysteresis [rY_.HY] (Fig.3)

Settable range: 0~5000 Counts；

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

 User can set a band to prevent from the relay on and off frequently。

Settable range: 0.0(s)~9(m)59.9(s)；

This function is primarily to avoid instrument disruption or instability of input signals and relay misoperation。

● **Relay energized delay [rY_.rd] (Fig.4-②):** When the value　is reached when the　conditions　of the relay, the relaywill delay action until；

 EX: Relay 1 setting

 [rY1.nd]: [Hi]；[rY1.rd]: [005.0]；[rY1SP]: [100.0]

When (PV) over [100.1] (PV>[rY1SP])and keep over 5 sec，Relay output will be Action (ON)。

● **Relay de-energized delay [rY_.Fd] (Fig.4-③):**

If the display value to leave therelay of the conditions and set lasting more than this,the relay will reset

EX: Relay 1set

[rY1.nd]: [Hi]；[rY1Fd]: [002.0]；[rY1SP]: [100.0]

When (PV) less than [99.9] (PV<[rY1SP]) and keep over 2 sec，Relay reset(OFF)。

Energized / De-energized Delay & Hysteresis   **Fig.3**
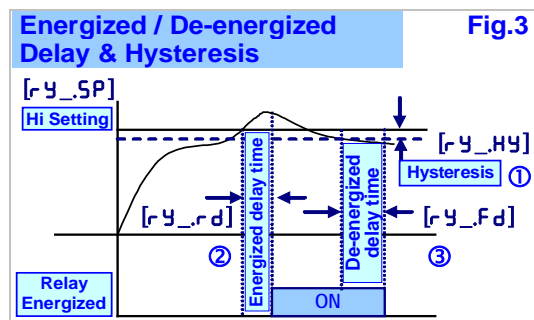
■ Analogue Output Functions

 Please specify the output type either 0~10V or 4(0)~20mA in ordering code. The output low and high can be programmable which it's related with various display values. Reverse slope output is decided by reversing point positions

● **Output range selection**

 Voltage output specified, Programming：

 ： [u.0- 10](0~10V) / [u.0- 5](0~5V) / [u.1- 5](1~5V)

 Currnet output specified Programming：

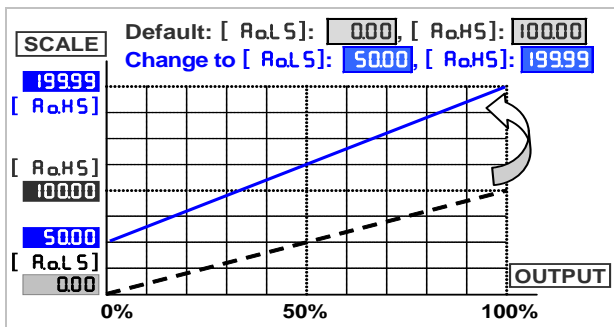 **：** [A.4- 20](4~20mA) / [A.0- 20](0~20mA) / [A.0- 10](0~10mA)

■ Output signal corresponds to display value

 Settable range: -19999~+29999/99999;

 Low Output corresponds to Low display value
 [AoLS]: Setting the Low Display value versus Low output range (as like as 4mA in [A.4-20])。

 Analogue Output relative High Scale) [AoLS]: Setting the High Display value versus High output range (as like as 20mA in [A.4-20])

*The interval between [AoHS] and [AoLS] should be with minimum over 50% of span; otherwise, it will reflect the less resolution of analogue output.。

■ Fine Zero & Span Adjustment for Analog Output
Setting Range: -38011~27524;

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

● Fine Zero Adjustment for Analog Output) [AoPro]: ;

When the analog output and display the correspondingminimum value (low) when there is error, this parametercan be operated directly to increase / decrease on theshift key or ▲ up / ▼ down keys to make fine-tuning

● Fine Span Adjustment for Analog Output) [AoSPn]: ;

When the analog output and display the correspondingmaximum value (high value) when there is error, thisparameter can be operated directly to increase /decrease on the shift key or ▲ up / ▼ down keys to make fine-tuning.

■ High Limited for Analog Output) [AoLñt]
Setting Range: 0.00~110.00%;

User can set the output in high limit to avoid destroying the receiver or protection system。
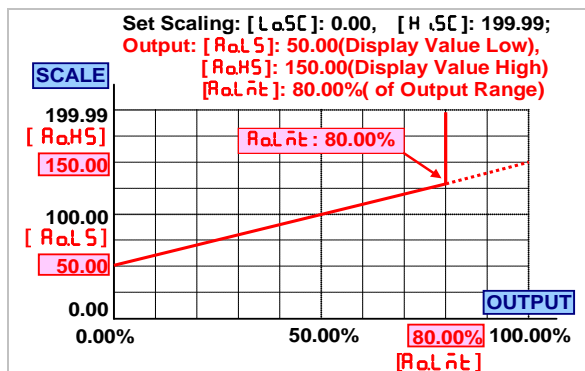
■ RS 485 Communication

CM1 series offers a Modbus RTU mode protocol.Communication speed up to 38400 bps; users can useRS485 set parameters, read the display. 。

- **Protocol:** Modbus RTU Mode
- **Baud Rate) [bAUd]:** Programmable:1200/2400/4800/9600/19200/38400
- **Data Bits:** 8 bits
- **Stop Bits:** Programmable 1 bit or 2 bits
- **Parity [Pr.tY]:** Programmable Even / Odd / None
- **Device Number [AdrES]:** 1~255

■ ERROR MASSAGE

SELF-DIAGNOSIS AND ERROR CODE:

DISPLAY	DESCRIPTION	REMARK
`ouFL` `-ouFL`	**1.input specification type (V / A / mA ..) are correct and match the signal range field?**	Replace the correct match signal meter, or by mail to the company to modify the specifications
	3. Input signal exceeds the range (upper limit of +110% input specifications?	A. Make sure the correct input signal B. Replace the correct match signal meter, or by mail to the company to modify the specifications
	4. Shows the corresponding input signal value is Less than `LoSC`?	If the input signal Less than the corresponding display low(`LoSC` set value), the display will appear-`ouFL` A. Replace the correct match signal meter, or by mail to the company to modify the specifications
	4.Wiring access terminal and accessthe right solid?	A. Please confirm the wiring diagram on the instrumentwiring correct? And confirm whether a signal line (two lines) is not connected to the terminals 。 B. Choose the appropriate crimp terminals to reduce thebad or the wiring is not strong 。
Displayed value not correspond	1.Input signal range and field size is correct?	Replace the correct match signal meter, or by mail to the company to modify the specifications
	2. Shows the high value and low display settings are correct?	Re-confirm show high values [`HiSC`] (A-03) and show low[`LoSC`] (A-02) setting
Display unstable	1.Input signal isunstable (If there will be harmonics or noise components?	A. For the rapid up and down continuously, try to set a larger[avg] (A-05) or [Mavg] (A-06) shows the average value 。 B. For the moment the beat from time to time (the loadmovement caused by the coil), try setting a larger [`dFiLt`]**(A-07)** 。 C. Connect signal wires should be away from the powerload, and use shielded twisted pair of metal mesh andmetal mesh shield termination of a metal chassis(g round) 。
	3. Inputsignal stable, stable display	A. For the rapid up and down continuously, try to set a larger[`AuG`] (A-05) or [`MAuG`] (A-06) shows the average value 。 B. For the moment the beat from time to time (the loadmovement caused by the coil), try setting a larger [Dfilt] (A-07) 。 C. Connect the power supply wire should be away from the power load, and use the isolating transformer D. If the electromagnetic field interference, please contact us 。
Slow to respond to the displayed value		Set too much [avg] (A-05) or [Mavg] (A-06)

■ RS485(Modbus RTU Mode)

■ Modbus RTU Mode Communications protocol

一、Read instructions by Function 03H (Read Holding Registers)

Request Data Frame ex: Read the display data (0000H start aWord)

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: reading"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: Read 10 consecutive data 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	--	--

二、Written 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	05H	00H	01H	58H	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	05H	00H	01H	58H	0BH

■ ADDRESS TABLE **Address number are Hexadecimal

CM1-VA/CM1-PR

■ User Level

Name	Address	Range	Explain	Initial	Write/Read	Note
PV	0000h	-1999~9999	Present Value		R	
n.in	0001h	-1999~9999	The Minimum of PV	0	R	
n.AH	0002h	-1999~9999	The Maximum of PV	0	R	

■ Engineer Level

【Input Group】

Name	Address	Range	Explain	Initial	Write/Read	Note
Pu.dP	0003h	0~3	PV Decimal Point **0:** 0000 **1:** 000.0 **2:** 000.0 **3:** 0.000	0	R/W	
Lo.SC	0004h	-1999~9999	Low Scale	0	R/W	
H.iSC	0005h	-1999~9999	High Scale	9999	R/W	
Lo.CUt	0006h	-1999~9999	Low Cut	0	R/W	
AuG	0007h	1~99	Average	5	R/W	
n.AuG	0008h	1~99	Moving Average	8	R/W	
dF.ilt	0009h	1~99	Digital Filter	8	R/W	
P.CodE	000Ah	0000~9999	Pass Code	1000	R/W	

【RS485 Group】

Name	Address	Range	Explain	Initial	Write/Read	Note
AdrES	000Bh	1~255	RS485 address	1	R/W	
bAUd	000Ch	0~5	RS485 baud rate **0:**1200 **1:**2400 **2:**4800 **3:**9600 **4:**19200 **5:**38400	4	R/W	
Prity	000Dh	0~3	RS485 parity **0:** n-8-1 **1:** n-8-2, **2:** odd-8-1, **3:** even-8-1,	1	R/W	

CM1-RL

■ User Level

Name	Address	Range	Explain	Initial	Write/Read	Note
PV	0000h	0~99999	Present Value (*High word)		R	
	0001h		Present Value (*Low word)			
min	0002h	0~99999	The Minimum of PV (*High word)	0	R	
	0003h		The Minimum of PV (*Low word)			
mAh	0004h	0~99999	The Maximum of PV (*High word)	0	R	
	0005h		The Maximum of PV (*Low word)			

■ Engineer Level

【Input Group】

Name	Address	Range	Explain	Initial	Write/Read	Note
Pu.tYP	0006H	0~4	Choose display type: wire-speed / speed / frequency 0: Linear Speed 1: RPM 2:RPS3: HZ 4 : KHZ	0	R/W	
PPr	0007h 0008h	1~99999	Input Pulse	1	R/W	
E.Unit	0009h	0~3	Straight line speed display unitselection 0: M/min 1: CM/min 2:Yard/min 3: Feet/min	0	R/W	
diAmt	000Ah 000Bh	0.1000~9.9999(M)	Shaft diameter	1000	R/W	
dP	000Ch	0~4	Decimal point 0:00000 1:0000.0 2:000.00 3:00.000 4:0.0000	0	R/W	
FACtr	000Dh	0.0001~9.999	Display factor	1000	R/W	
LoCUt	000Eh	-19999~19999	Low Cut	0	R/W	
itomd	00Fh	0~1	Input signal time out model **0**: Auto **1**: Manual	0	R/W	
ito	0010h	1~9999(x0.1Sec)	time out setting	10	R/W	
AuG	0011h	1~99	Average	1	R/W	
dFilt	0012h	1~99	Digital filtering	5	R/W	
P.CodE	0013h	0000~9999	Pass Code	1000	R/W	

【RS485 Group)】

Name	Address	Range	Explain	Initial	Write/Read	Note
AdrES	0014h	1~255	RS485 Station Address No.	1	R/W	
bAUd	0015h	0~5	RS485 Communication rate 0:1200 1:2400 2:4800 3:9600 4:19200 5:38400	3	R/W	
Prity	0016h	0~3	RS485 Parity 0:n-8-1 1:n-8-2 2:odd-8-1 3:even-8-1	1	R/W	

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