CS2-RS   RESISTANCE Indicator

■DESCRIPTION

CS2-RS Resistance Indicator has been designed with high accuracy measurement, display and communication of Ohm (2 wire) as like as <u>Coil of motor or transformer</u>.

☑ The meter supports Field Calibration function. It can be calibrated with sensor (Resistance) to meet machinery structure.

☑ We build flexible function as like as 3 bank (for multi-range scaling and set point) and 3 external control inputs meet to various testing equipment inquiry.

They are also building in 4 Relay outputs, 3 External Control Inputs, 1 Analogue output and 1 RS485(Modbus RTU Mode) interface with versatile functions such as control, alarm, re-transmission and communication for a wide range of machinery and testing equipments applications.
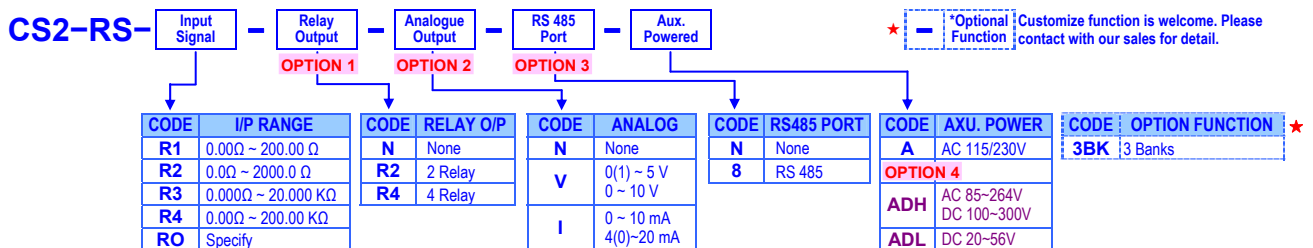
■FEATURE

- Measuring resistance 0~200Ω/2000Ω/20.0KΩ/200.0KΩ (2 wire)
- 4 banks pre-set for difference measuring range with all relay functions relative 4 difference scaling, and selectable by 3 External Control Inputs(E.C.I.) Or front key
- Field calibration with <u>resistance</u> to meet the system requirement
- 4 relay can be programmed individual to be a Hi / Lo / Hi Latch / Lo Latch / Go energized with Start Delay / Hysteresis / Energized & De-energized Delay functions, or to be a remote control.
- Analogue output and RS 485 communication port in option
- 3 external control inputs can be programmed individual to be Tare (Relative PV) / PV Hold / Maximum or Minimum Hold / DI (remote monitoring) / Reset for Relay Energized Latch….
- CE Approved & RoHS

■APPLICATIONS

- Testing Equipments for resistance (as like as coil of motor, transformer, relay ..) Measuring, Alarm, Control and Communication with PC/PLC.
- Components of resistance online testing station.

■ORDERING INFORMATION

CS2−RS− [Input Signal] − [Relay Output] (OPTION 1) − [Analogue Output] (OPTION 2) − [RS 485 Port] (OPTION 3) − [Aux. Powered] − ★ − [*Optional Function]

*Optional Function: Customize function is welcome. Please contact with our sales for detail.

CODE	I/P RANGE
R1	0.00Ω ~ 200.00 Ω
R2	0.0Ω ~ 2000.0 Ω
R3	0.000Ω ~ 20.000 KΩ
R4	0.00Ω ~ 200.00 KΩ
RO	Specify

CODE	RELAY O/P
N	None
R2	2 Relay
R4	4 Relay

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

CODE	RS485 PORT
N	None
8	RS 485

CODE	AXU. POWER
A	AC 115/230V
OPTION 4	
ADH	AC 85~264V DC 100~300V
ADL	DC 20~56V

CODE	OPTION FUNCTION ★
3BK	3 Banks

■TECHNICAL SPECIFICATION

Input

Measuring Range	Input Impedance
0.0 Ω ~ 200.00 Ω (2 wire)	≥ 1M ohm
0.0 Ω ~ 2000.0 Ω (2 wire)	
0.00 Ω ~ 20.000 KΩ (2 wire)	
0.00 Ω ~ 200.00 KΩ (2 wire)	

Calibration: Digital calibration by front key

Field calibration: Calibration with sensor input high & low to meet system structure. And field calibration reset is not change the accuracy & linear of factory calibration.

A/D converter: 16 bits resolution

Accuracy: ≤± 0.04% of FS ± 1C;

Sampling rate: 15 cycles/sec

Response time: ≤100 m-sec.(when the AvG = "1") in standard

Input range: Input High and Low programmable

A_{iHi}: Settable range: 0.00~100.00% of input range

A_{iLo}: Settable range: 0.00~100.00% of input range

Display & Functions

LED: **Numeric:** 5 digits, 0.8"(20.0mm)H red high-brightness LED

Relay output indication: 4 square red LED

RS 485 communication: 1 square orange LED

E.C.I. function indication: 3 square green LED

Max/Mini Hold indication: 2 square orange LED

Display range: -19999~29999;

Scaling function: LoSC : Low Scale; Settable range: -19999~+29999

H iSC : High Scale; Settable range: -19999~+29999

Decimal point: Programmable from 0 / 0.0 / 0.00 / 0.000 / 0.0000

Banks function: Extra 3 banks programmable for scaling & decimal point

Over range indication: ouFL, when input is over 20% of input range Hi

Under range -ouFL, when input is under -20% of input range Lo

Max / Mini recording: Maximum and Minimum value storage during power on.

Display functions: PV / Max(Mini) Hold / RS 485 Programmable

Front key functions: Up and down key can be set to be a function as ECI.

Low cut: Settable range: -19999~29999 counts

Digital fine adjust: PuPro: Settable range: -19999~+29999

PuSPn: Settable range: -19999~+29999

Reading Stable Function

Average: Settable range: 1~99 times

Moving average: Settable range: 1(None)~10 times

Digital filter: Settable range: 0(None)/1~99 times

Control Functions(option)

Set-points: Four set-points

Control relay: Four relays
Relay 2 & Relay 3: Dual FORM-C, 5A/230Vac, 10A/115V
Relay 1 & Relay 4: Dual FORM-A, 1A/230Vac, 3A/115V

Relay energized mode: Energized levels compare with set-points:
Hi / Lo / Go.12 / Go.23 / **Hi.HLd / Lo.HLd**; programmable
DO function: Energized by RS485 command of master.

Banks pre-set: **4 banks pre-set for all relay functions to relative 4 difference scaling, and selectable by 3 External Control Inputs(E.C.I.) Or front key**

Energizing functions: Start delay / Energized & De-energized delay / Hysteresis / Energized Latch
Start band(Minimum level for Energizing): 0~9999counts
Start delay time: *0:00.0~9(Minutes):59.9(Second)*
Energized delay time: 0.00.0~9(Minutes):59.9(Second)
De-energized delay time: 0.00.0~9(Minutes):59.9(Second)
Hysteresis: 0~5000 counts

External Control Inputs(ECI)

Input mode: 3 ECI points, Contact or open collect input, Level trigger

Functions: Relative PV (Tare) / PV Hold / Reset for Max or Mini. Hold / **DI** / Reset for Relay Energized latch / 4 Banks selection

Debouncing time: Settable range 5 ~255 x (8m seconds)

Analogue output(option)

Accuracy: **≤± 0.1% of F.S.; 16 bits DA converter**

Ripple: ≤± 0.1% of F.S.

Response time: ≤100 m-sec. (10~90% of input)

Isolation: AC 2.0 KV between input and output

Output range: Specify either Voltage or Current output in ordering
Voltage: 0~5V / 0~10V / 1~5V programmable
Current: 0~10mA / 0~20mA / 4~20mA programmable

Output capability: **Voltage: 0~10V: ≥ 1000Ω;**
Current: 4(0)~20mA: ≤ 600Ω max

Functions: AoHS (output range high): Settable range: -19999~29999
AoLS (output range Low): Settable range: -19999~29999
AoLmt (output High Limit): 0.00~110.00% of output High

Digital fine adjust: AoPro: Settable range: -38011~+27524
AoSPn: Settable range: -38011~+27524

RS 485 Communication(option)

Protocol: Modbus RTU mode

Baud rate: 1200/2400/4800/9600/19200/38400 programmable

Data bits: 8 bits

Parity: Even, odd or none (with 1 or 2 stop bit) programmable

Address: 1 ~ 255 programmable

Remote display: **to show the value from RS485 command of master**

Distance: 1200M

Terminate resistor: 150Ω at last unit.

Electrical Safety

Dielectric strength: AC 2.0 KV for 1 min, Between Power / Input / Output / Case

Insulation resistance: ≥100M ohm at 500Vdc, Between Power / Input / Output

Isolation: Between Power / Input / Relay / Analogue / RS485 / E.C.I.

EMC: EN 55011:2002; EN 61326:2003

Safety(LVD): EN 61010-1:2001

Environmental

Operating temp.: 0~60 ˚C

Operating humidity: 20~95 %RH, Non-condensing

Temp. coefficient: ≤100 PPM/˚C

Storage temp.: -10~70 ˚C

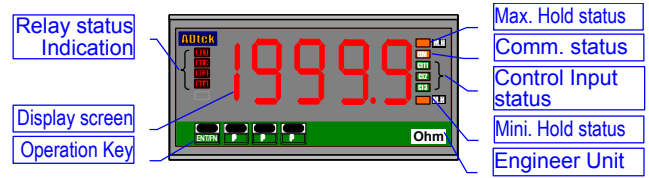**Enclosure:** Front panel: IEC 549 (IP54); Housing: IP20

Mechanical

Dimensions: 96mm(W) x 48mm(H) x 120mm(D)

Panel cutout: 92mm(W) x 44mm(H)

Case material: ABS fire-resistance (UL 94V-0)

Mounting: Panel flush mounting

Terminal block: Plastic NYLON 66 (UL 94V-0)
10A 300Vac, M2.6, 1.3~2.0mm²(16~22AWG)
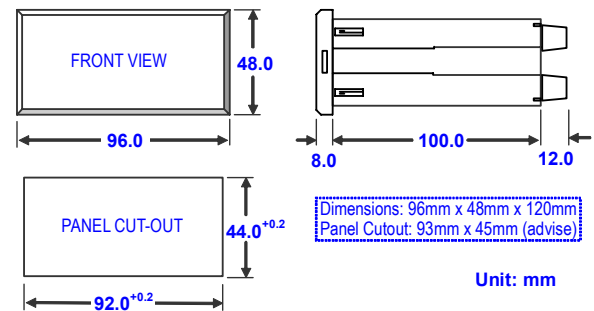
Weight: 550g / 350g(Aux. Power Code: ADH or ADL)

Power

Power supply: AC115/230V,50/60Hz;
Optional: AC 85~264V, DC 100~300V, DC 20~56V

Power consumption: 5.0VA maximum

Back up memory: By EEPROM

■FRONT PANEL

Relay status Indication
Display screen
Operation Key
Max. Hold status
Comm. status
Control Input status
Mini. Hold status
Engineer Unit

■DIMENSIONS

FRONT VIEW — 48.0 — 96.0
PANEL CUT-OUT — 44.0⁺⁰·² — 92.0⁺⁰·²
8.0 — 100.0 — 12.0

Dimensions: 96mm x 48mm x 120mm
Panel Cutout: 93mm x 45mm (advise)

Unit: mm

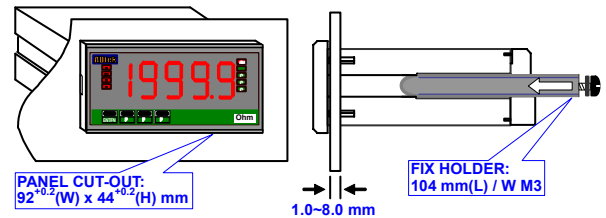# ■INSTALLATION

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

PANEL CUT-OUT:
92⁺⁰·²(W) x 44⁺⁰·²(H) mm

1.0~8.0 mm

FIX HOLDER:
104 mm(L) / W M3

■CONNECTION DIAGRAM

Terminal blocks:
10A/300Vac, M2.6,
M2.6, 1.3~2.0mm²
(16~22AWG)
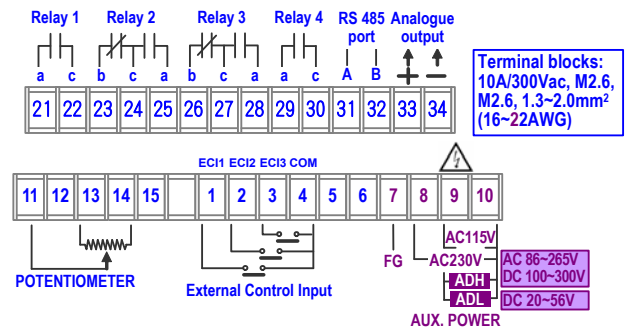
Please check the voltage of power supplied first, and then connect to the specified terminals. It is recommended that power supplied to the meter be protected by a fuse or circuit breaker.

Power Supply

7 8 9 10 ⚠

1A Fuse

AC115/230V
AC85~264V

Filter or Transformer

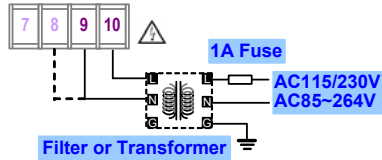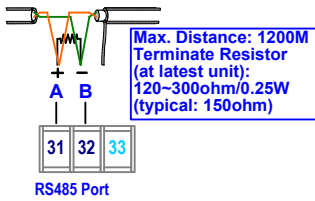## RS485 Communication Port

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

A B

31 32 33

RS485 Port

■ FUNCTION DESCRIPTION

Input & Scaling Functions

Input range: Analogue input High and Low programmable

The meter has to be specified and fixed according to ordering code (ex. 0~2000Ω) in factory. If the meter has to install in difference range of input, the meter can be set in function `A.Lo` and `A.Hi` of input group to meet the input signal.

For example: The meter is 0~2000Ω input, and the signal from sensor is 0~1500Ω. Please get into `[inPut GroUP]` to set `A.Hi` (Analogue input High) to be 75.00% (2000 x 75.00% = 1500), then the meter has been changed the input range to 0~1500 and the all relative parameters will work base on 0~1500. The meter doesn't need re-calibration after change the `A.Lo` and `A.Hi`.

Default Input: `A.Lo`: 0.00%, `A.Hi`: 100.00%
`LoSC`: 0.0, `Hi.SC`: 1500.0
Change to `A.Lo`: 0.00%, `A.Hi`: 75.00%

SCALE

1999.9
1500.0
1000.0

0.0

0.0   1000.0   1500.0   2000.0
0.00%   50.00%   75.00%   100.00%
INPUT

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

Scaling function:

Setting the `[ LoSC ]` (Low scale) and `[ Hi.SC ]` (High scale) in `[inPut GroUP]` to relative input signal. **Reverse scaling will be done too.**
Please refer to the figure as below,

SCALE   Default: `[ LoSC ]`: `0.00`, `[ Hi.SC ]`: `100.00`
`[ Hi.SC ]`   Change to `[ LoSC ]`: `50.00`, `[ Hi.SC ]`: `199.99`

`199.99`

Reverse slop

`[ Hi.SC ]`
`100.00`

`[ LoSC ]`
`50.00`

`[ LoSC ]`
`0.00`
INPUT

0.00 %   50.00 %   100.00 %

Display & Functions

**Max / Mini recording:**   The meter wills storage the maximum and minimum value in **[user level]** during power on in order to review drifting of PV.

Display functions: PV / Max(Mini) Hold / RS 485 programmable in **[dSPLY]**
(Please refer to step A-07)   function of **[inPut GroUP]**

Present Value `Pv`:   The display will show the value that Relative to Input signal.

Maximum Hold `SAvHd` **/ Minimum Hold** `MinHd` :

The meter will keep display in maximum(minimum) value during power on, until manual reset by front key in **[User level]**, rear terminal is close **[External Control Input(ECI)]** or press front down or up key to reset (according to setting, please refer to the function of the ECI Group)

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

Max. (Mini.) Hold & Reset

Present Value   Maximum Hold

Reset the Max (Mini) Hold by ECI or F. Key   Level Trigger   ON
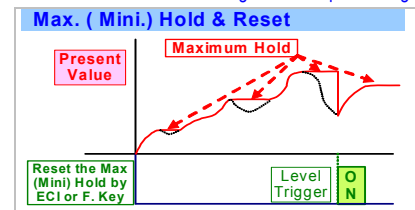
Remote Display by RS485 command `rS485` :

The meter will show the value that received from RS485 sending. In past, The meter normally receive 4~20mA or 0~10V from AO or digital output from BCD module of PLC. We support a new solution that PV shows the value from RS485 command of master can so that can be **save cost and wiring** from PLC.

Other functions :   **The meter is also support relative PV (ΔPV) and PV hold functions that set in [ECI GroUP]. Please refer to explain of ECI functions.**
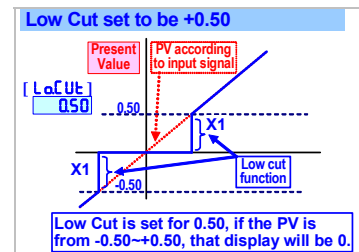
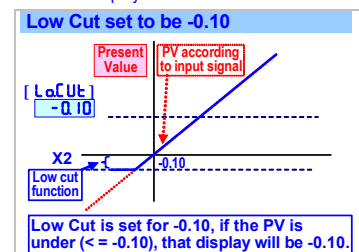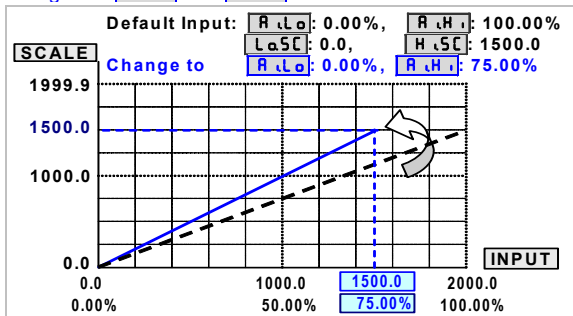**Low cut:**   Settable range from -19999~+99999 counts.
The users can set the value range.

1. If set the positive value (X1) here to display "0" which it expressed to be low-cut the PV between "+X1 (plus)" & "-X1(minus)" /absolute value

   PV< I Setting value (X1) I, the display will be shown 0
   EX: Low Cut is set for 0.50. If the display is from -0.50~+0.50, that will be 0.

   Low Cut set to be +0.50

   Present Value   PV according to input signal

   `[ LoCut ]`
   `0.50`   0.50

   X1

   X1   Low cut function

   -0.50

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

2. If set the negative value (X2) here to display "X2" which it expressed to be low-cut the PV that it's under the X2 setting value;

   PV< Setting value(X2), the display will be shown X2.
   EX: Low Cut is set for -0.01. If the display is < -0.01, and all the display will be -0.01.

   Low Cut set to be -0.10

   Present Value   PV according to input signal

   `[ LoCut ]`
   `-0.10`

   X2   -0.10

   Low cut function

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

Digital fine adjust: Settable range: -19999~+29999

Users can get Fine Adjustment for Zero & Span of PV by front key of the meter, and "**Just Key In**" the value which user want to show in the current input signals.

Especially, the `[Pv.Pro]` & `[Pv.SPn]` are not only in zero & span of PV, but also any lower point for `[Pv.Pro]` & higher point for `[Pv.SPn]`. The meter will be linearization for full scale.

CS2- RS

Default Input:[LoSC]: 0.00, [HiSC]: 19999
Digital fine adjustment:
input 2.75mV, [PuPro]set to be 80.00
input 9.00mV, [PuSPn]set to be 170.00
Display: Low point from 55.00 to 80.00
High point from 180.00 to 170.00

SCALE
[HiSC]
19999
180.00
170.00
100.00
80.00
55.00
[LoSC]
0.00

Excit. Pw.
10Vdc
Sensor
1.0mV/V

INPUT

0V   2.75mV   5.0mV   9.00mV   10.0mV

Reading Stable Function

Average display:

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

The meter's sampling is 15cycle/sec. If the [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.

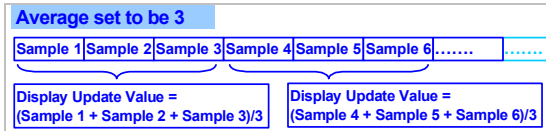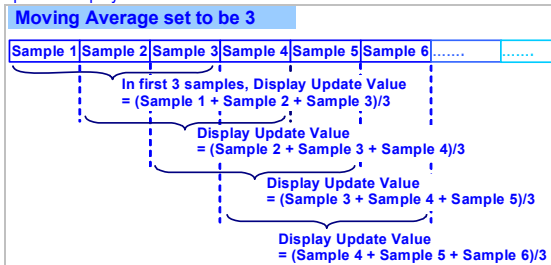| Average set to be 3						
Sample 1	Sample 2	Sample 3	Sample 4	Sample 5	Sample 6	....

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

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

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

Moving average:

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. If the [ṁAuG](Moving Average) 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

Remark: The higher moving average setting wouldn't cause the response time of Relay and Analogue output slower after first 3 samples.

Digital Filter:
The digital filter can reduce the magnetic noise in field.

The digital filter can reduce the influence of spark noise caused by magnetic of coil.
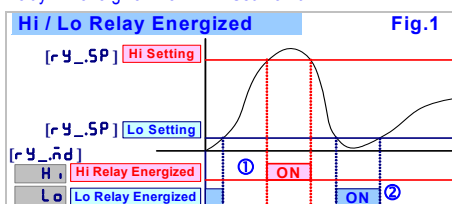
If the values of samples are over digital filter band (fix in firmware and about 5% of stable reading) 3 times (Digital Filter set to be 3) continuously, the meter will admit the samples and update the new reading. Otherwise, it will be as treat as a noise and skip the samples.

Control Functions(option)

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

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

Hi / Lo Relay Energized   Fig.1

[rY_.SP] Hi Setting
[rY_.SP] Lo Setting
[rY_.ṁd]
Hi Hi Relay Energized   ①   ON
Lo Lo Relay Energized   ON ②

Go-1.2 Go-12:   This function is programmable in Relay 4 only.
If the Relay 4 set to be Go function, the relay will compare with [rY1SP] and [rY2SP].
Go relay energized when the condition is
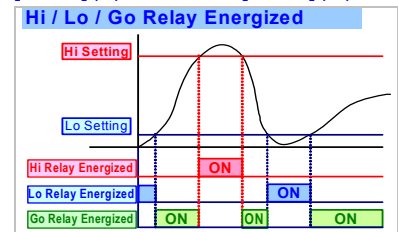[rY1SP] (Hi) > PV > [rY2SP] (Lo)

Go-2.3 Go-23:   This function is programmable in Relay 4 only.
If the Relay 4 set to be Go function, the relay will compare with [rY2SP] and [rY3SP].
Go relay energized when the condition is
[rY2SP] (Hi) > PV > [rY3SP] (Lo)

Hi / Lo / Go Relay Energized

Hi Setting
Lo Setting
Hi Relay Energized   ON
Lo Relay Energized   ON
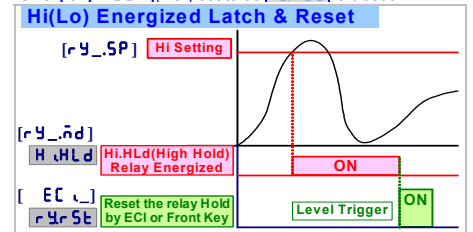Go Relay Energized   ON   ON   ON

Hi.HLd Hi.HLd (Lo.HLd Lo.HLd) :

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

For example, a current meter relay installed for the over current alarm of motor. Generally, over current of motor caused by over load, mechanical dead lock, aging of insulation and so on.

Above cases will alarm in the meter, if the user doesn't figure out the real reason and re-start the motor. It may damage the motor. The functions of Hi.HLd & Lo.HLd are designed must be manual reset the alarm after checking out and solving the issue. It's very important idea for electrical safety and human protection.

As the PV Higher (or lower) than set-point, the relay will be energized to latch except manual reset by from key in [user level] or [ECi](ECI) set to be rYrSt is closed.

Hi(Lo) Energized Latch & Reset

[rY_.SP] Hi Setting
[rY_.ṁd]
Hi.HLd   Hi.HLd(High Hold) Relay Energized   ON
[ECi_]
rYrSt   Reset the relay Hold by ECI or Front Key   Level Trigger   ON

DO function   do: The function has been designed not only a meter but also an I/O interface. In the case of motor control cabinet can't get the remote function. It's very easily to get the ON/OFF status of switch from CS2 series with RS485 function.

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

Start delay band and Start delay time:

The functions have Been designed for,

► To avoid starting current of inductive motor (6 times of rated current) with alarm.

► If the rY_.ṁd relay energized mode had been set to be   Lo (Lo) or LoHLd (Lo & latch). As the meter is power on and no input to display the "0" caused the relay will be energized. User can set a band and delay time to inhibit the energized of relay.

Start band   rYSb (Fig.2-①): Settable range from 0~9999 Counts
Start delay time   rYSd (Fig.2-②): Settable range from 0.0(s)~9(m)59.9(s);

Start Delay   Fig.2

Inhibit
Inhibit
[rY_.SP] Hi Setting
[rYSb] Start Band
①
Relay Energized   Start Delay Time   ON
② [rYSd]

CS2-RS
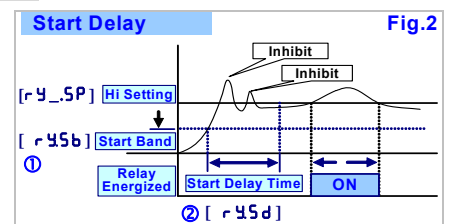
Hysteresis `rY_.HY` **(Fig.3-①):** Settable range from 0~9999 Counts

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

Relay energized delay `rY_.rd` **(Fig.3-②):** Settable range from 0.0(s)~9(m)59.9(s);

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

Relay de-energized delay `rY_.Fd` **(Fig.3-③):** Settable range from 0.0(s)~9(m)59.9(s);

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

External Control Inputs(ECI)

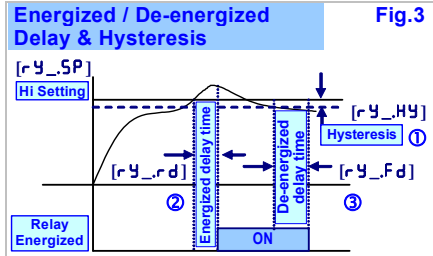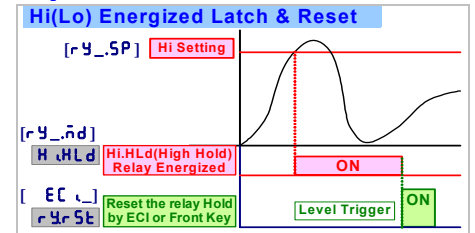The three external control inputs are individually programmable to perform specific meter control or display functions. All E.C.I. have been designed in level trigger actions. Please pay attention, the ECI1 or ECI2 input will be disable while UP or Down Key has been set to be " `YES` ".

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

Relative PV `rEL.Pu` **or Tare:**

The [`ECI_`] can be set to be `rEL.Pu` function. When the E.C.I. is closed, the reading will show the differential value.

Relative PV
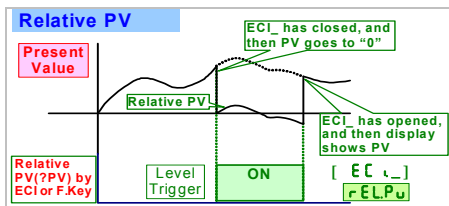
PV Hold `PuHLd` **:**

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

PV Hold & Reset
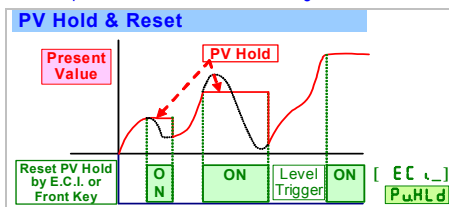
Reset for Maximum or Minimum Hold `mrSt` **:**

When the [`dSPLY`] function in [`inPUt GroUP`] selected `mAxHd` or `minHd`, the display will show Maximum or Minimum value.

The [`ECI_`] function can be set to be `mrSt` function to reset the maximum and minimum value in [**User Level**] by terminals of ECI (close). Please refer to the figure as below.

Max. (Mini.) Hold & Reset

DI `di` **:**
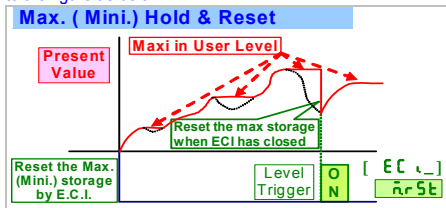
The E.C.I can be set to be `di` function, when the meter building in RS485 port. It is easier to get remote monitoring a switch status through the meter as like as DI of PLC.

Reset for Relay Energized Latch `rYrSt` **:**

If the relay energized mode has been set to be `HiHLd` (Energized latch), and the [`ECI_`] can be set to be `rYrSt` (Reset the Relay energized latch). When the PV meets the condition of relay energizing, the relay will be energized and latch until the ECI is to be closed.

Hi(Lo) Energized Latch & Reset

Debouncing time:

The function is for avoiding noise signal to into the meter. And The basic period is 8mseconds. It means you set the number that has to multiple 8 m-seconds.

For example: [`dEbnC`]set to be 5, it means 5 x 8mseconds = 40mseconds

Analogue output(option)

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

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

Functions: Output High / Low scale, output limit, fine adjustment

Output range high [`AoHS`]:

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

Output range low [`AoLS`]:

To setting the Display value Low to versus output range Low(as like as 4mA in 4~20)
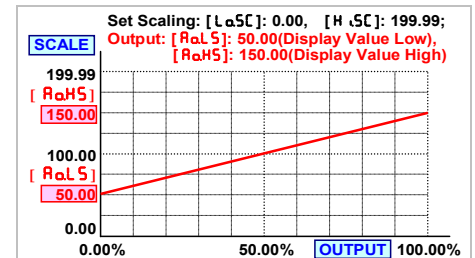
The range between [`AoHS`] and [`AoLS`] should be over 20% of span at least; otherwise, it will be got less resolution of analogue output.

Output High Limit [`AoLmt`]:

0.00~110.00% of output High User can set the high limit of output to avoid a damage of receiver or protection system.
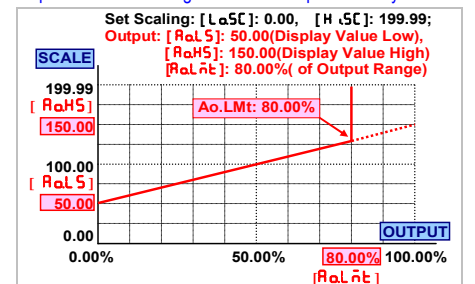
Fine zero & span adjustment:

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

Zero adjust [`AoZro`]: Fine Zero Adjustment for Analog Output;
Settable range: -38011~27524;

Span adjust [`AoSPn`]: Fine Span Adjustment for Analog Output;
Settable range: -38011~27524;

RS 485 communication(option)

CS2 series supports Modbus RTU mode protocol to be used as Remote Terminal Unit (RTU) for monitoring and controlling in a SCADA (Supervisor Control And Data Acquisition) system. The baud rate can be up to 38400 bps. It's not only can be read the measured value and DI (external control inputs) status but also controls the relays output (DO) by RS485 communication ports.

CS2-PM & SC2-RL APPLICATION MEASURING & RS485 COMMUNICATION

RS485 wiring 1.2KM maximum
Terminate Resistor:
RS 485 Modbus RTU Mode (up to 38400bps)
Analog Output 0~10V/0(4)~20mA

4 Relay outputs:
Functions: Hi(Lo) alarm / Hi(Lo) energized hold / Go function / DO function

3 External Control Inputs:
Functions: Relative PV / PV hold / Reset for Max(Mini) / Reset for relay latch / DI
Application: Leakage test / Thermal Switch / Circuit Breaker / Push Button / ...

Remote Display:

The meter will show the value that received from RS485 command. In past, The meter normally receive 4~20mA or 0~10V from AO or digital output from BCD module of PLC .We support a new solution that PV shows the value from RS485 command of master so that can be **save cost and wiring** from PLC.

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

CS2 APPLICATION FOR REMOTE DISPLAY FROM RS485 COMMAND

RS 485 Modbus RTU Mode (up to 38400bps)
RS485 wiring 1.2KM maximum
Terminate Resistor:
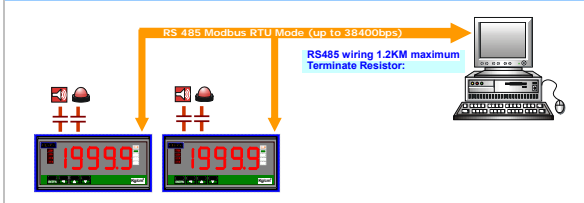
Field Calibration

In pass time, engineers have taken a lot of time to adjust meters or converter to meet the structure of machinery zero and span for the potentio-meter measuring. Now, our **CS2-RS** support easier process to do it called "**Field Calibration**".

Banks function: (appendix code: -3BK)

- The function is for CS2 to control difference process with a same meter.
- For example; A pressure testing equipment; it has to measure multi-range with difference pressure transducers. The meter can be pre-set 4 groups parameter to show difference scale and relay energized in difference set-points. The operator just selects the bank number (bank1) by **[External Control Input(ECI)]** or front key operating in **[User Level]** to meet the process. To make easier operating and to avoid mistake in process.

Calibration

System calibration by front key. The process of calibration, please refer to the operating manual

Optional Function

Customize function with quantities is welcome. Please contact with our sales for detail. The appendix code of optional function will be added behind the code of auxiliary power as like as xxx-A-HSM.

CS2-RS

■ ERROR MESSAGE

BEFORE POWER ON, PLEASE CHECK THE SPECIFICATION AND CONNECTION AGAIN.

SELF-DIAGNOSIS AND ERROR CODE:

DISPLAY	DESCRIPTION	REMARK
`ouFL`	Display is positive-overflow (Signal is over display range)	(Please check the input signal)
`-ouFL`	Display is negative-overflow (Signal is under display range)	(Please check the input signal)
`ouFL`	ADC is positive-overflow (Signal is higher than input range high 20%)	(Please check the input signal)
`-ouFL`	ADC is negative-overflow (Signal is lower than input range low -20%)	(Please check the input signal)
`EEP` ⇄ `FAiL`	EEPROM occurs error	(Please send back to manufactory for repaired)
`AiC.nG` ⇄ `Pu`	Calibrating Input Signal do not process	(Please process Calibrating Input Signal)
`AiC` ⇄ `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)

■ FRONT PANEL:

Relay status Indication
Display screen
Operation Key

Max. Hold status
Comm. status
Control Input status
Mini. Hold status
Engineer Unit

■ Numeric Screens
0.8"(20.0mm) red high-brightness LED for 4 2/3 digital present value.

■ I/O Status Indication
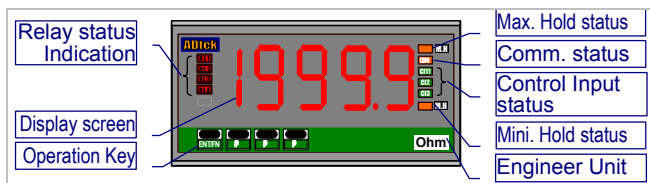● **Relay Energized:** 4 square red LED
  `RL1` display when Relay 1 energized;
  `RL2` display when Relay 2 energized;
  `RL3` display when Relay 3 energized;
  `RL4` display when Relay 4 energized;
● **External Control Input Energized:** 3 square green LED
  `ECI1` display when E.C.I. 1 close(dry contact)
  `ECI2` display when E.C.I. 2 close(dry contact)
  `ECI3` display when E.C.I. 3 close(dry contact)
● **RS485 Communication:** 1 square orange LED
  `COM` will flash when the meter is receive or send data, and `COM` flash quickly means the data transient quicker.
● **Max/Mini Hold indication:** 2 square orange LEDs
  `M.H` displayed: When the display function has been selected in Maximum or Minimum Hold function.

■ Stickers:
Each meter has a sticker what are functions and engineer label enclosure.
● **Relay energized mode:** `HH` `Hi` `Lo` `LL` `DO`
● **E.C.I. functions mode:**
  `PV.H` PV.H(PV Hold) / `Tare` Tare / `DI` DI(Digital Input)
  `M.RS` M.RS(Maximum or Minimum Reset) /
  `R.RS` R.RS(Reset for Relay Latch)
● **Engineer Label:** over 80 types.

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

	Setting Status	Function Index
`▲`**Up key**	Increase number	Go back to previous function index
`▼`**Down key**	Decrease number	Go to next function index
`◄`**Shift key**	Shift the setting position	Go back to this function index, and abort the setting
`ENTER`**Enter/Fun key**	Setting Confirmed and save to EEProm	From the function index to get into setting status

■ Pass Word `PCodE`: Settable range: 0000~9999;
User has to key in the right pass word so that get into 【Programming Level】. Otherwise, the meter will go back to measuring page. If user forgets the password, please contact with the service window.

■ Function Lock: There are 4 levels programmable.
● **None** `nonE` : no lock all.
● **User Level** `USEr` : User Level lock. User can get into User Level for checking but setting.
● **Programming Level** `EnG`: Programming level lock. User can get into programming level for checking but setting.
● **ALL** `ALL` : All lock. User can get into all level for checking but setting.

■ Front Key Function
● The `▲`Key can be set to be the same function as the setting of ECI1. Ex. The ECI1 set to be `PuHLd` and the function 【E.1=UP】 set to be `YES` in 【ECi GroUP】. When user presses `▲`Key, the PV will hold as like as ECI1 close.
● The `▼`Key can be set to be the same function as the setting of ECI2. Ex. The ECI2 set to be `rELPu` and the function 【E.2=dn】 set to be `YES` in 【ECi GroUP】. When user presses `▼`Key, the PV will show relative value as like as ECI2 close.
  ▶ If the front key function has been set, the terminal input for ECI will be disabling.

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

User Level

Power ON

↓

Press 🔲 **for 1 sec. can back to Measuring**

`8.8.8.8.8`	**Self-diagnosis**	
↓		
`C52.rS`	**Show the model number**	
↓		
`uEr 1.4`	**Show the firmware version**	
↓		

0-0-1 `29999` / `Pu` : If the [dSPLY] function has been set rS485 / Pu : Present Value

0-1 `10000` / `rY1.SP` : Relay 1 Set-point -19999~29999

0-2 `10000` / `rY2.SP` : Relay 2 Set-point -19999~29999

0-3 `10000` / `rY3.SP` : Relay 3 Set-point -19999~29999

0-4 `10000` / `rY4.SP` : Relay 4 Set-point -19999~29999

0-5 `no` / `rYr.St` : Reset for energized Latch of Relay YES / no

0-6 `0.0000` / `ñ in` : the Minimum value of PV saving Checking only

0-7 `29999` / `ñAY` : the Maximum value of PV saving Checking only

0-8 `no` / `ñrSt` : Reset the saved value of Maximum & Minimum YES / no

0-9 `uEr 1.4` / `C52.rS` : model number firmware version Checking only

0-10 `bnY-1` / `bAnY` : Optional Bank selection bnY-0 / bnY-1 / bnY-2 / bnY-3 /

0-0-1 `29999` / `Pu` : Cyclic to first page

`29999` **MEASURING PAGE** Press ◁ 1sec → ← Press ◁ 1sec

`EnTEr` / `P.CodE` **Enter the password to access Engineer Level**

NO ← Pass Code → **YES** **Default:1000**

Programming Level

Press 🔲 **for 1 sec. can back to Measuring**

▲ → ← ▼

INPUT GROUP	RELAY GROUP	EXTERNAL CONTROL INPUT (E.C.I) GROUP	ANALOGUE OUTPUT GROUP
`inPUt` / `GroUP`	`rELAY` / `GroUP`	`EC i` / `GroUP`	`Ao` / `GroUP`

A-1 `0.00` / `A iLo` : Analogue input low 0.00~100.00%

A-2 `100.00` / `A iH i` : Analogue input High 0.00~100.00%

A-3 `0` / `PudP` : Decimal Point 0 / 0.0 / 0.00 / 0.000 / 0.0000

A-4 `0` / `Lo.SC` : Low scale of PV -19999~29999

A-5 `10000` / `H i.SC` : High scale of PV -19999~29999

A-6 `0` / `PuPro` : Fine Low point Adjustment for PV display -19999~29999

Next Page

B-1 `0` / `rY.Sb` : Start band for Relay energized 0~9999counts

B-2 `0.00.0` / `rY.Sd` : Start delay time for Relay energized 0.00.0~9(M).59.9(S)

B-3 `H i` / `rY1.ñd` : Relay 1 energized mode oFF / Lo / H i / LoHLd / H iHLd / do

B-4 `0` / `rY1.HY` : Relay 1 Hysteresis 0~5000 counts

B-5 `0.00.0` / `rY1.rd` : Relay 1 energized delay time 0.00.0~9(M).59.9(S)

B-6 `0.00.0` / `rY1.Fd` : Relay 1 de-energized delay time 0.00.0~9(M).59.9(S)

Next Page

C-1 `rEL.Pu` / `EC i1` : External Control Input 1 nonE / rEL.Pu / PuHLd / ñrSt / rYr.St / d i / *bnY-1

C-2 `PuHLd` / `EC i2` : External Control Input 2 nonE / rEL.Pu / PuHLd / ñrSt / rYr.St / d i / *bnY-2

C-3 `ñrSt` / `EC i3` : External Control Input 3 nonE / rEL.Pu / PuHLd / ñrSt / rYr.St / d i / *bnY-3

C-4 `12` / `dEbnC` : Debouching of external control Input 5~255(x8ms)

C-5 `no` / `E.1=UP` : ECI.1 set to be UP Key function YES / no

C-6 `no` / `E.2=dn` : ECI.2 set to be Down Key function YES / no

D-1 `A4-20` / `Ao.tYP` : Analogue Output type selection u.0-10 / u.0-5 / u.1-5 / A0-10 / A0-20 / A4-20

D-2 `0.0` / `Ao.LS` : Analogue Low Output versus Low Scale -19999~29999

D-3 `10000` / `Ao.HS` : Analogue High Output versus High Scale -19999~29999

D-4 `0` / `Ao.Pro` : Fine Zero Adjustment for Analogue Low Output -38011~27524

D-5 `0` / `Ao.SPn` : Fine Span Adjust. for Analogue High Output -38011~27524

D-6 `nonE` / `P.S.CLr` : Zero & Span Clear for Adjustment nonE / Ao.Pro / Ao.SPn / botH

Next Page

CS2-RS

A-7 | `0` `Pu.SPn` | **PuSPn**: Fine High point Adjustment for PV display -19999~29999

A-8 | `nonE` `?S.CLr` | **?S.CLr**: Clear Fine Zero & Span Adjustment for PV display
[nonE / PuPro / PuSPn / botH]

A-9 | `Pu` `dSPLY` | **dSPLY**: Display Function
[Pu / ñinHd / ñAYHd / rS485]

A-10 | `0` `Lo.CUt` | **LoCUt**: Low Cut Function -19999~29999

A-11 | `5` `AuG` | **AuG**: Average update for PV 1(None)~ 99 times

A-12 | `1` `ñ.AuG` | **ñAuG**: Moving Average update for PV 1(None)~ 10 times

A-13 | `0` `dF iLt` | **dFiLt**: Digital filter 0(None)/1~ 99 times

A-14 | `0` `P.CodE` | **PCodE**: Pass Code for enter Engineer Level 0000~9999

A-15 | `nonE` `F.LoCY` | **FLoCY**: Function Level Lock
[nonE / USEr / EnG / ALL]

B-7 | `Hi` `rY2.ñd` | **rY2ñd**: Relay 2 energized mode
[oFF / Lo / Hi / LoHLd / HiHLd / do]

B-8 | `0` `rY2.HY` | **rY2HY**: Relay 2 Hysteresis 0~5000 counts

B-9 | `0.00.0` `rY2.rd` | **rY2rd**: Relay 2 energized delay time 0.00.0~ 9(M).59.9(S)

B-10 | `0.00.0` `rY2.Fd` | **rY2Fd**: Relay 2 de-energized delay time 0.00.0~ 9(M).59.9(S)

B-11 | `Hi` `rY3.ñd` | **rY3ñd**: Relay 3 energized mode
[oFF / Lo / Hi / LoHLd / HiHLd / do]

B-12 | `0` `rY3.HY` | **rY3HY**: Relay 3 Hysteresis 0~5000 counts

B-13 | `0.00.0` `rY3.rd` | **rY3rd**: Relay 3 energized delay time 0.00.0~ 9(M).59.9(S)

B-14 | `0.00.0` `rY3.Fd` | **rY3Fd**: Relay 3 de-energized delay time 0.00.0~ 9(M).59.9(S)

B-15 | `Hi` `rY4.ñd` | **rY4ñd**: Relay 4 energized mode
[oFF / Lo / Hi / LoHLd / HiHLd / do / Go-12 / Go-23]

B-16 | `0` `rY4.HY` | **rY4HY**: Relay 4 Hysteresis 0~5000 counts

B-17 | `0.00.0` `rY4.rd` | **rY4rd**: Relay 4 energized delay time 0.00.0~ 9(M).59.9(S)

B-18 | `0.00.0` `rY4.Fd` | **rY4Fd**: Relay 4 de-energized delay time 0.00.0~ 9(M).59.9(S)

▶ Plesae refer to operating manual for detail description

D-7 | `110.00` `Ao.Lñt` | **AoLñt**: Analog Output High Limit 0.00~110.00%

`rS485` `GroUP` | **RS485 GROUP**

E-1 | `1` `AdrES` | **AdrES**: Device number of the meter 1~255

E-2 | `9600` `bAUd` | **bAUd**: Baud rate
[1200 / 2400 / 4800 / 9600 / 19200 / 38400]

E-3 | `n.Stb.2` `Pr itY` | **PritY**: Parity
[nStb1 / nStb2 / odd / EuEn]

CS2-RS

■FIELD CALIBRATION

`168.88` **MEASURING PAGE**

↓

`P.CodE`
`EntEr` **Enter the password to access Programming Level**

& ↓

`EntEr`
`F.CodE` **Enter the password to access Field Calibration Level**

NO

◇ Pass Code **YES**

default=2000 **Press** →

❑ Once the user select field calibration, the [`LoSC`](step A-2) and [`H iSC`](A-3) will be instead of [`CAL.LS`] and [`CAL.HS`], and can not to be change. If user has to change the scaling, it's the only way to access field calibration level to set in [`CAL.LS`](step F-2) and [`CAL.HS`](step F-4).

❑ Please double check the [`LoSC`](step A-2) and [`H iSC`](A-3) are correct after selection the `dEFLt` or `F iEld`

F-1
`CAL.Lo`
`00000`
↓ ↑ **Adjust the structure to be a lower signal output status (or any lower status) and keep it in stable.**
`CAL.Lo`: Field Calibration Low
▶ Press ▢ to read signal of the lower status.
▶ Press ▢ again to finish the calibration lower point, and go to next page.

F-2
`CAL.LS`
`00000`
↓ ↑ `CAL.LS`: the value to be set is relative to Field Calibration lower point
▶ Press ▢ to set the value of lower scale

F-3
`CAL.H i`
`00000`
↓ ↑ **Adjust the structure to be a higher signal output status (or any higher status) and keep it in stable.**
`CAL.H i`: Field Calibration High
▶ Press ▢ to read signal of the higher status
▶ Press ▢ again to finish the calibration higher point, and go to next page.

F-4
`CAL.HS`
`00000`
↓ ↑ `CAL.HS`: the value to be set is relative to Field Calibration higher point
▶ Press ▢ to set the value of Higher scale

F-5
`C.SEL`
`dEFLt`
↓ ↑ `C.SEL` : Calibration parameter selection
▶ Press ▢ to access the function and stand by selection
▶ Press ▢ or ▢ to select
(default: `dEFLd`);
Settable: `dEFLd` / `F iEld`
`dEFLd` (default calibration) `F iEld` (Field calibration)