

Description

CS1-PR economic type Process Indicator is equipped with high accuracy measurement, display, and communication.

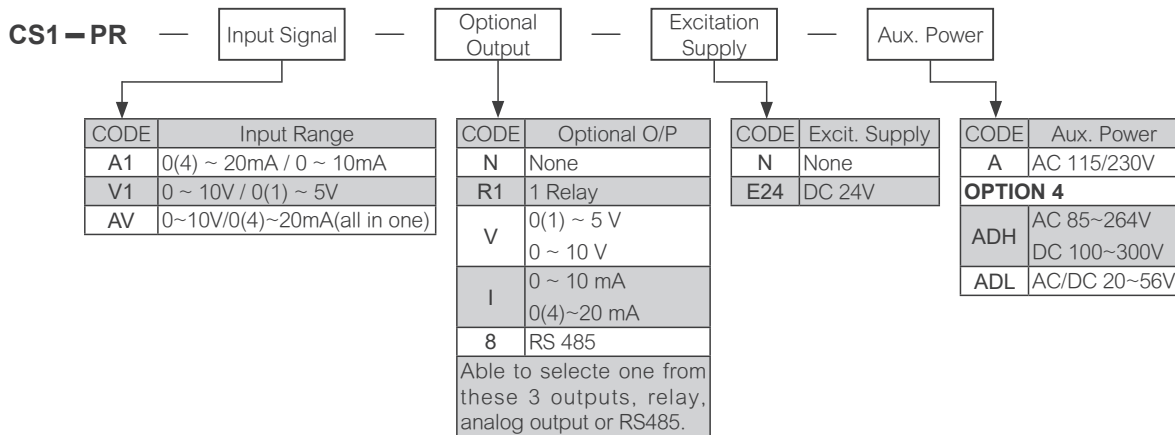
It is able to select one from these three functions, 1 relay output, 1 analog output, or 1 RS-485 (Modbus RTU Mode) interface; they provides many functions such as control, alarm, re-transmission, and communication.



Features

- Measuring DC signal, 0~10V and 4(0)~20mA (input code: AV)
- Able to select one from these 3 functions, 1 relay output, 1 analog output, or 1 RS485
- 1 relay output can be programmed individually to be a Hi / Lo / Hi Latch / Lo Latch energized with Start Delay / Hysteresis / Energized & De-energized Delay functions.
- Optional purchase: analog output or RS-485 communication port
- CE Approved & RoHS

Ordering Information



Technical Specification

Input

Input Range	Input Impedance	Input Range	Input Impedance
Voltage 0 ~ 10 V	$\geq 1M \Omega$	Current 4(0)~20 mA	250 Ω

Please refer to the wiring diagram and set the input range, the meter can be programmed to be 0~10V (voltage: #11& #13), and 0~20mA (current: #12 & #13).

Calibration: Digital calibration by front key
 A/D converter: 16-bit resolution
 Accuracy: $\pm 0.04\%$ of FS $\pm 1C$
 Sampling rate: 15 cycles/sec
 Response time: ≤ 100 ms (when the AvG = "1") in standard
 Input range: 0~10V / 0~5V / 1~5V / 0-10mA / 0~20mA / 4~20mA/ optional purchase: user-defined input range (code: AV)

Display & Functions

LED: Numeric: 5 digits,
 0.8" (20.0mm)H red high-brightness LED
 Relay output indication: 1 square red LED
 RS 485 communication: 1 square orange LED
 DI. function indication: 1 square green LED
 Max/Mini Hold indication: 2 square orange LED

Down key function indication (Reset for Max.(Mini.) Hold / PV Hold / Rel. PV): 1 square green LED
 Display range: -19,999~29,999
 L o S C : Low Scale; Settable range: -19,999~+29,999
 H i S C : High Scale; Settable range: -19,999~+29,999
 Programmable from 0 / 0.0 / 0.00 / 0.000 / 0.0000
 Over range indication: O u F L : when input is over 20% of input range Hi
 Under range indication: U n F L : 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: Relative PV / PV Hold / Reset for maxi(mini) hold / Reset for relay energized latch programmable
 Low cut: Settable range: -19,999~29,999
 Digital fine adjust: P u P o : Settable range: -19,999~+29,999
 P u S P o : Settable range: -19,999~+29,999

Reading stability 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(optional)

Set-points: 1 set points

Control relay: 1 relays
Relay 1, Dual FORM-C, 5A/230Vac, 10A/115V

Relay energized mode: Energized levels compare with set-points:
Hi / Lo / Hi.HLd / Lo.HLd programmable

Energizing functions: Start delay / Energized & De-energized delay /
Hysteresis / Energized Latch
Start band (Minimum level for Energizing): 0~9999 counts
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

Analogue output (optional)

Accuracy: $\pm 0.1\%$ of F.S.
Ripple: $\pm 0.1\%$ of F.S.
Response time: ≤ 100 mS. (10~90% of input)
Isolation: AC 2.0 KV between input and output
Output range: Specify either voltage or current output when ordering
Voltage: 0~5V / 0~10V / 1~5V programmable
Current: 0~10mA / 0~20mA / 4~20mA programmable

Output capability: Voltage: 0~10V: $\geq 1000\Omega$;
Current: 4(0)~20mA: $\leq 500\Omega$ max

Functions: R_{OH5} : output range high: -19,999~29,999
 R_{OL5} : output range Low: -19,999~29,999

Digital fine adjust: R_{OPRO} : Settable range: -38,011~+27,524
 R_{OSPn} : Settable range: -38,011~+27,524

RS 485 Communication (optional)

Protocol: Modbus RTU mode
Baud rate: 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: show the value from RS485 command of master
Distance: 1200M
Terminate resistor: 150 Ω at last unit

Safety

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

Insulation resistance: $\geq 100M\Omega$ at 500Vdc,
Between Power / Input / Output

Isolations: Between Power / Input / Relay / Analogue / RS485

EMC: EN 55011:2002; EN 61326:2003

Safety (LVD): EN 61010-1:2001

Work Environment

Operating temp.: 0~60 °C
Humidity rating: 20~95 %RH, Non-condensing
Temp. coefficient: ≤ 100 PPM/°C
Storage temp.: -10~70 °C
IP degree of protection: Front panel: IEC 529 (IP52); Housing: IP20

Mechanical Structure

Dimensions: 96mm(W) x 48mm(H) x 80mm(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: 350g

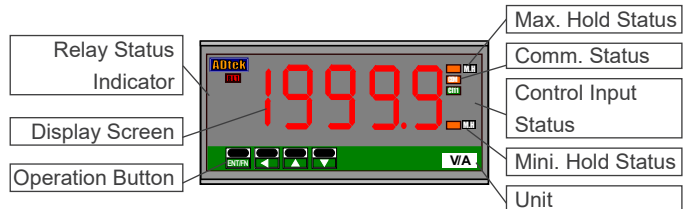
Power

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

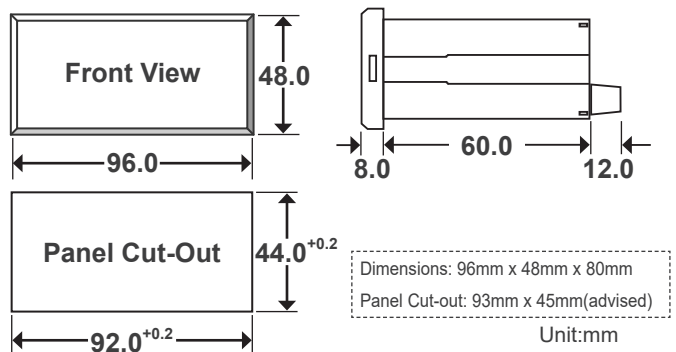
Power consumption: 4.5VA maximum, ADH/ADL: 8VA/4.0W

Back up memory: By EEPROM

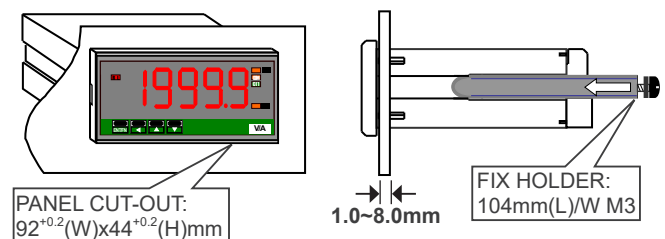
Front Panel



Dimensions

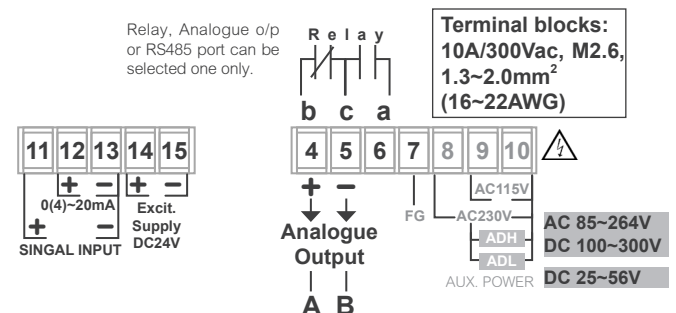


Installation



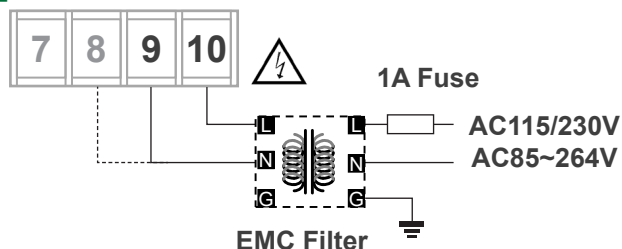
The meter should be installed in a place where it does not exceed the maximum operating temperature and provides good air circulation.

Connection Diagram

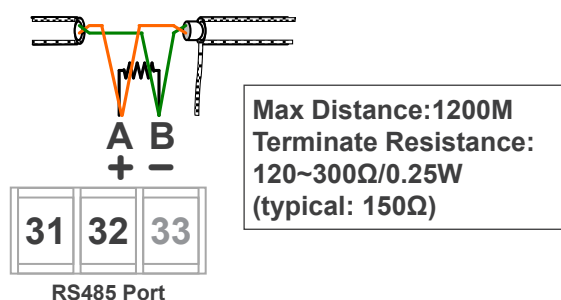


⚠ Please check the voltage of power supplied first, and then connect with the specified terminals. It is recommended that power supplied to the meter should be protected by a fuse or circuit breaker.

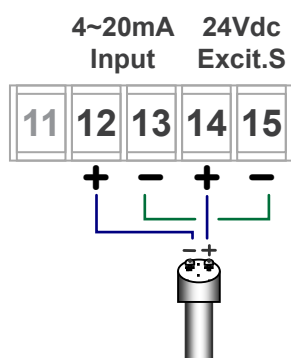
Power Connection



RS485 Communication Port



2 wire Transmitter Connection



Function Description

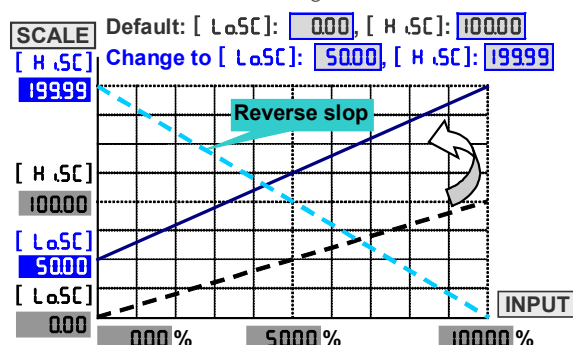
Input Functions

Dual input types: (option code: AV)

For input signal, it offers voltage and current; the users can adjust the input range of the meter to be 0~10V (voltage: #11 & #13), and 0~20mA (current: #12 & #13) with wiring diagram, and switch the input range by setting [R.E.Y.P] of [INPU.E.GR.O.U.P]. Also, the users can specify the input range with the code, AV (optional purchase).

Scaling Function

Setting the [L.S.C] (Low scale) and [H.S.C] (High scale) in [INPU.E.GR.O.U.P] to relative input signal. Reverse scaling will be done too. Please refer to the figure as below.



Display & Functions

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

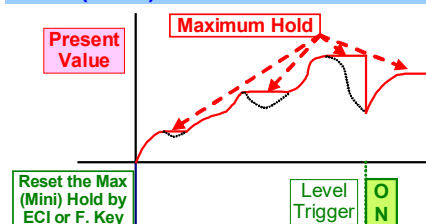
Display functions: PV / Max(Mini) Hold / RS 485 programmable in (Please refer to step A-07) [d.S.P.L.Y] function of [INPU.E.GR.O.U.P]

Present Value [P.V]: The display will show the value that is relative to input signal.

Maximum Hold [M.H] / Minimum Hold [M.H]:

The meter will keep display in maximum/ minimum value during power on until manual reset with front key (press Down key function in [INPU.E.GR.O.U.P]), and click [R.S.E].
► Please find the [M.H] enclosed in the package, and stick it to the right side of square orange LED.

Max. (Mini.) Hold & Reset



Remote Display by RS485 command [R.S.485]:

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 come up with a cost saving solution that PV shows the value through RS485 command of master.

Front key functions: Relative PV / PV Hold / Reset for maxi(mini) hold / Reset for relay energized latch programmable in [d.N.E.Y] function of [INPU.E.GR.O.U.P]

Front key functions: Relative PV / PV Hold / Reset for maxi(mini) hold / Reset for relay energized latch programmable in [d.N.E.Y] function of [INPU.E.GR.O.U.P]

Relative PV [R.E.P.V]: The [d.N.E.Y] function can be set to be [R.E.P.V] function. When user presses the [R.P.V] key, the display will show the differential value (ΔPV), until press [R.P.V] key again.

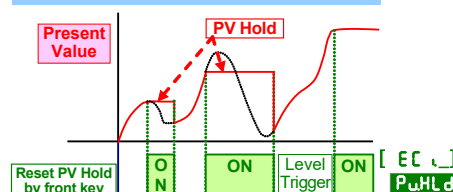
► Please find the [R.P.V] sticker, and stick it to the right side of square green LED.

PV Hold [P.V.H.L.D]: The [d.N.E.Y] function can be set to be [P.V.H.L.D] function.

When user presses the [P.V.H.L.D] key, the display will be hold until press the [P.V.H.L.D] key again.

► Please find the [P.V.H.L.D] sticker, and stick it to the right side of square green LED.

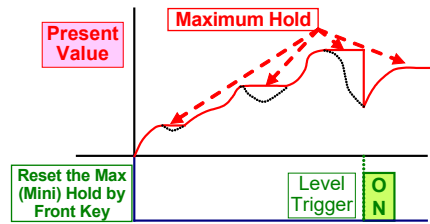
PV Hold & Reset



Reset for Max(Mini) Hold **[HrSt]**:

When the **[dSPly]** in **[INPUt GRoUP]** set to be **[HrHd]** or **[MiniHd]**, **[dntEY]** function can be set to be **[HrSt]** to reset the display when it is holding in maxi or mini value.

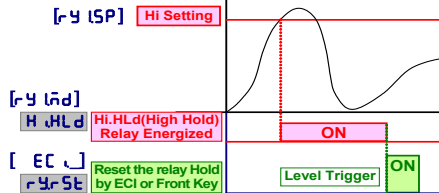
Max. (Mini) Hold & Reset



Reset for relay energized latch **[YrSt]**:

When the **[rY lnd]** in **[RELAY GRoUP]** set to be **[HrHd]** or **[LoHd]**, **[dntEY]** function can be set to be **[YrSt]** to reset the relay when it is energizing and latching.

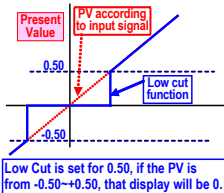
Hi or Lo Energized Latch & Reset



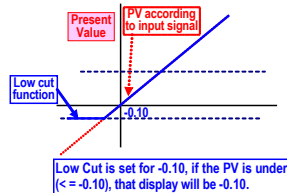
Low cut:

If the setting value is positive, it shows "0", $|PV| \leq \text{setting value}$; if the setting value is negative, it shows "setting value", $|PV| \leq \text{setting value}$.

Low Cut set to be +0.50



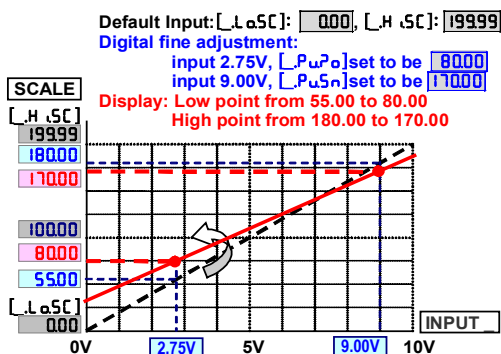
Low Cut set to be -0.10



Digital fine adjustment:

In the past, the engineers had to spend lots of time on adjusting high/low values to meet the requirement.

With the functions of **[PwrPn]** & **[PwSpn]**, the users can set the corresponding values with "Just Key in Values" according to actual needs. Also, users can clear the adjusted value with the function of **[PScLr]**.

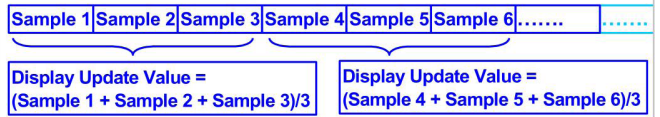


Reading Stable Function

Average:

Basically, the sampling rate of meter is 15cycles/sec. If the function set to be 3 times, It means the meter will update the reading 5 times/sec.

Average set to be 3

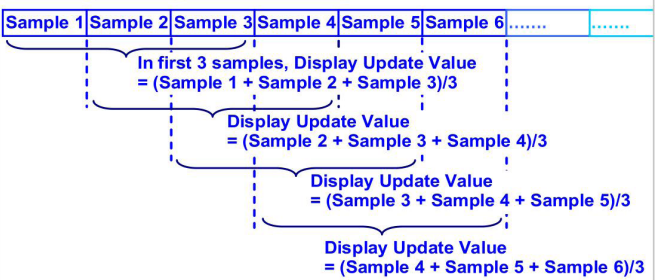


Remark: The higher average setting will cause the response time of Relay and Analogue output slower.

Moving average:

If the function was set to be 3 times, the meter will update delay in first 3 samples, then update 15 times/sec continuously.

Moving Average set to be 3



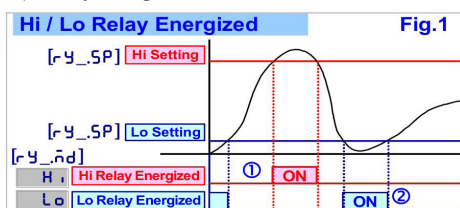
Digital filter :

The digital filter can reduce the magnetic noise in field.

Control Functions(Optional)

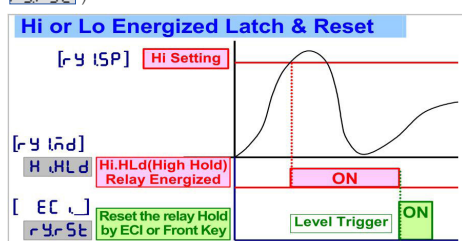
Relay operation mode: Hi / Lo / Hi.HLd / Lo.HLd / do / Go-1.2 / Go-2.3 programmable

Hi **[H]** (Fig.1-①): Relay energizes when PV > Set Point
Lo **[L]** (Fig.1-②): Relay energizes when PV < Set Point

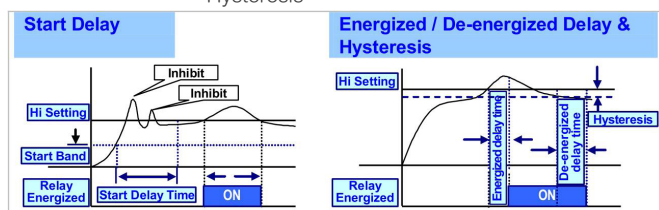


Hi.HLd **[H.HLd]** (Lo.HLd **[L.HLd]**):

When the PV is Higher (or lower) than set-point, the relay will be energized and latch until manual reset by front key in [user level] or press down key to reset (If the [dPEY] function set to be [YrSt]).



Energized functions: Start delay / Energized & De-energized delay / Hysteresis

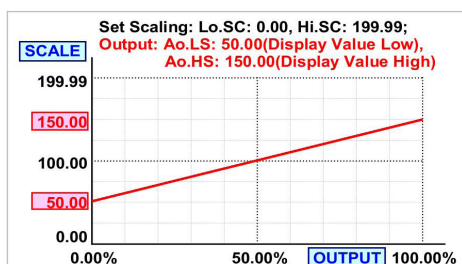


Analog Output(Optional)

Please specify the output type, 0~10V or 4(0)~20mA when ordering. The programmable output will correspond to low value and high value according to the setting value. The users can also set reverse output value (lower limit of the signal to high value; higher limit of the signal to low value).

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

Functions: Output range high **[AoHS]**: Setting the Display value High to versus output range High(as like as 20mA in 4~20)
Output range low **[AoLS]**: 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 analog output.

Fine zero & span adjustment:

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

Zero adjust **[Ao.Pzo]**: Fine Zero Adjustment for Analog Output;

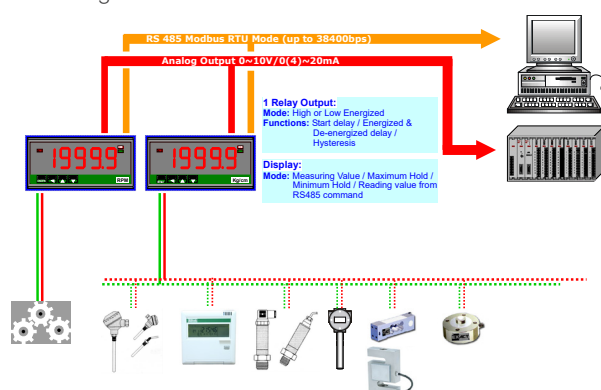
Settable range: -38011~27524;

Span adjust **[Ao.SPn]**: Fine Span Adjustment for Analog Output;

Settable range: -38011~27524;

RS 485 Communication(Option)

The RS485's protocol is Modbus RTU mode, and baud rate up to 38400 bps. It's convenience to remote monitoring, display for reading.

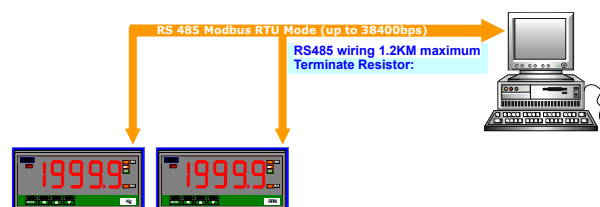


Remote display:

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 come up with a cost saving solution that PV value shows on the panel through RS485 command of master.

When the **[dPEY]** is set to be RS485, it means the screen will show the values through RS485 command & data. The data is the same as PV that will be compared with the set-point for relay action; analog output corresponding to the outputs.

CS1 APPLICATION FOR REMOTE DISPLAY FROM RS485 COMMAND



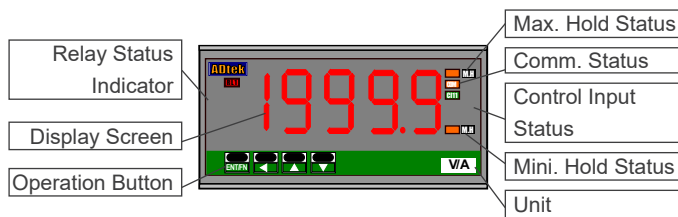
Error Message

Please check the specification and connection, and turn on the meter to proceed self-inspection.

Self-diagnosis and error code:

Display	Description	Remark
ouFL	Display is positive-overflow (Signal is over display range)	(Please check the input signal)
-ouFL	Display is negative-overflow (Signal is under display range)	(Please check the input signal)
ouFL	ADC is positive-overflow (Signal is higher than input 120%)	(Please check the input signal)
-ouFL	ADC is negative-overflow (Signal is lower than input -120%)	(Please check the input signal)
EEP	EEPROM occurs error	(Please send back to manufactory for repaired)
R.I.nC	Calibrating Input Signal do not process	(Please process Calibrating Input Signal)
R.I.C	Calibrating Input Signal error	(Please check Calibrating Input Signal)
R.o.nC	Calibrating Output Signal do not process	(Please process Calibrating Output Signal)
R.o.C	Calibrating Output Signal error	(Please check Calibrating Output Signal)

Front Panel



Numeric Screens:

0.8"(20.0mm) red high-brightness LED for 4 2/3 digital present values.

I/O Status Indication

- Relay Energized: 1 square red LED
RL1 display when Relay 1 energized;
- RS485 Communication: 1 square orange LED
COM will flash when the meter is receive or send data, and COM flash quickly means the data transient quicker.
- Max/Mini Hold indication: 2 square orange LEDs
M.H displayed: 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
- Down key 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

Pass Word: 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 Enr: 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 F.F.Pw / Pw.Hld / n.rSt / F.yrSt programmable.

Operating Key

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

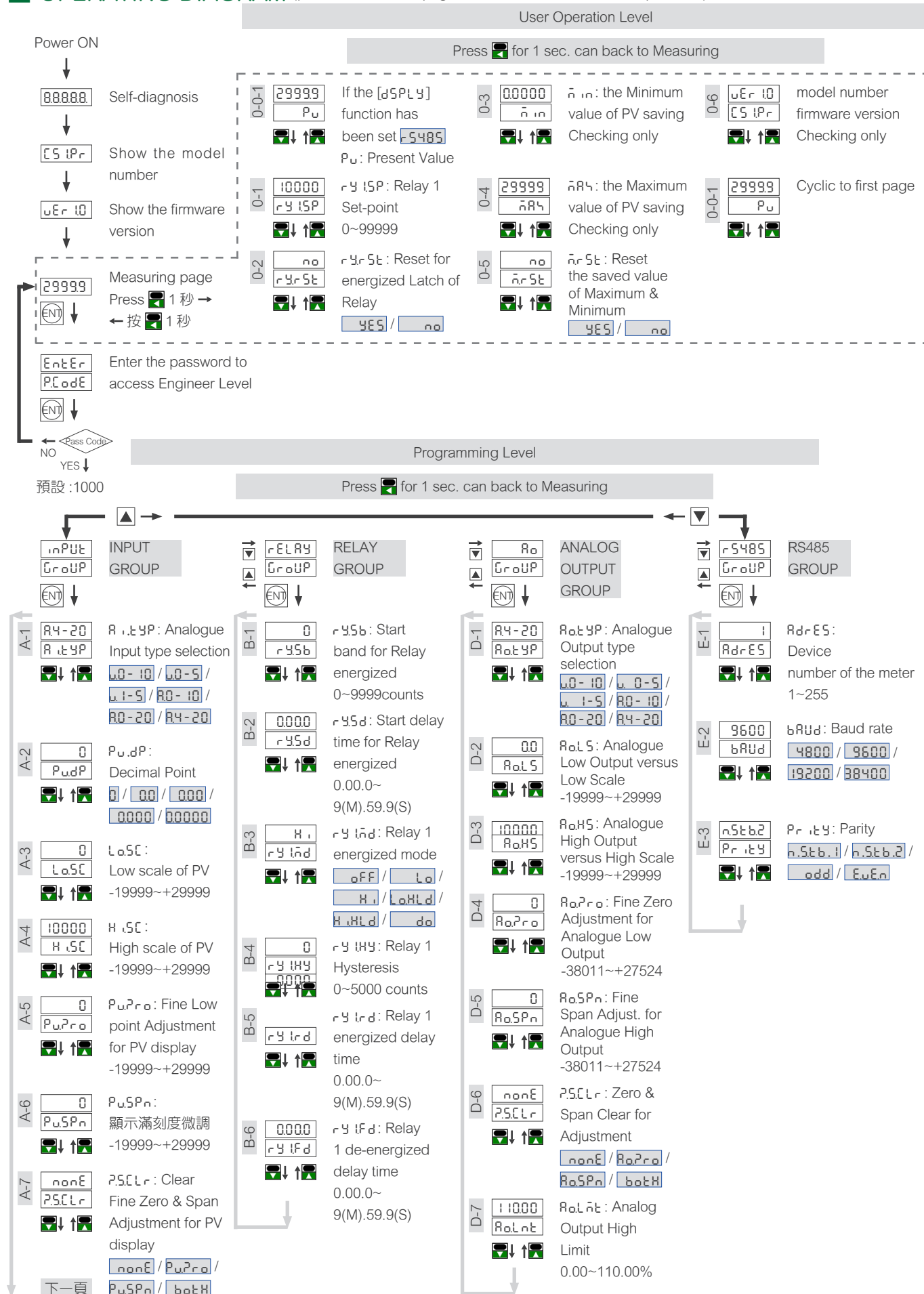
Operating Key: 4 keys for Enter(Function) / Shift(Escape) / Up key / Down key

The meter has designed operation similar as PC's <Left> <Right> and <Enter>. In any page, press <Enter> key means "enter" or "confirm setting", and press <Shift> 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 <Shift> for 1 second.

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

OPERATING DIAGRAM (please refer to last pages for more details about the operation.)



A-8	PU dSPLY Display Function ↓ ↑ PU / FinHd / hR4Hd / F5485 /
A-9	0 LoCut Low Cut Function ↓ ↑ -19999~+29999
A-10	5 RG Average update for PV ↓ ↑ 1(None)~99 times
A-11	1 RG Moving Average update for PV ↓ ↑ 1(None)~10 times
A-12	0 dF iLt Digital filter ↓ ↑ 0(None)/ 1~99 times
A-13	nonE dnpEEY Down key function ↓ ↑ nonE / FELPW / PuH4d / hrSt / F4rSt
A-14	0 PCode Pass Code for enter ↓ ↑ 0000~9999
A-15	nonE FLoCL Function Level Lock ↓ ↑ nonE / USEr / EnG / ALL

► Please refer to operating manual for more details.