CS1-T TEMPERATURE Indicator

ADtek

■ DESCRIPTION

CS1-T economic type Temperature Indicator has been designed with high accuracy measurement, display and communication of Thermocouple or Pt100Ω.
They are also available 1 option of 1 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 machinery and testing equipments applications.

■ FEATURE

- Measuring RTD: Pt100Ω; Thermocouple: K, J, E, T, R, S, B
- Option available 1 of 1 relay, 1 analogue output or RS485(Modbus RTU mode)
- 1 relay can be programmed individual to be a Hi / Lo / Hi Latch / Lo Latch energized with Start Delay / Hysteresis / Energized & De-energized Delay functions.
- Analogue output or RS 485 communication port in option
- CE Approved & RoHS

■ ORDERING INFORMATION

CS1−T [Input Signal] − [Optional Output] − [Aux. Powered]

OPTION

CODE	INPUT RANGE
P1	Pt100Ω -50.00~199.99 °C
P2	Pt100Ω -150.0~800.0 °C

CODE	INPUT RANGE
K1	Type K 0.0~1200.0 °C
J1	Type J 0.0~750.0 °C
E1	Type E 0.0~1000.0 °C
T1	Type T 0.0~400.0 °C
R1	T/C type R 400~1600 °C
S1	T/C type S 400~1600 °C
B1	T/C type B 400~1800 °C

CODE	OPTIONAL O/P
N	None
R1	1 Relay
V	0(1) ~ 5 V 0 ~ 10 V
I	0 ~ 10 mA 0(4) ~ 20 mA
8	RS 485

Relay, Analogue Output or RS485 Port can be selected one only

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

■ TECHNICAL SPECIFICATION

Input

	Measuring Range	Input Impedance	Excitation Supply
P1	Pt100Ω -50.00~199.99 °C	≥1M ohm	Sensing Current: 1.6mA
P2	Pt100Ω -150.0~800.0 °C	≥1M ohm	
K1	Type K 0.0~1200.0 °C	≥1M ohm	
J1	Type J 0.0~750.0 °C	≥1M ohm	
E1	Type E 0.0~1000.0 °C	≥1M ohm	
T1	Type T 0.0~400.0 °C	≥1M ohm	
R1	T/C type R 400~1600 °C	≥1M ohm	
S1	T/C type S 400~1600 °C	≥1M ohm	
B1	T/C type B 400~1800 °C	≥1M ohm	

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: Pt100Ω: ≤ ±0.1% of FS ± 1C;
Thermocouple: ≤ ±0.2% of FS ± 1C;
Sampling rate: 15 cycles/sec
Response time: ≤100 msec.(when the AvG = "1") in standard
Cold junction in T/C: 25 ± 10˚C, error ≤ 0.5˚C

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
E.C.I. 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: -19999~29999;
Scaling function: Fix range, please don't set.
Fix range, please don't set.
Decimal point: Programmable from 0 / 0.0 / 0.00 / 0.000 / 0.0000
Over range indication: **ovFL**, when input is over 120% of input range Hi
Under range indication: **-ovFL**, 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: -19999~29999 counts
Digital fine adjust: **Pv.Zro:** Settable range: -19999~+29999
Pv.SPn: 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: One set-point
Control relay: 1 Relay, 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): 0~9999counts
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

Analogue output(option)

Accuracy: ***≤±0.1% of F.S.;***
Ripple: ≤± 0.1% of F.S.
Response time: ≤100 msec. (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:	***Ao.HS****(output range high): Settable range: -19999~29999*
	Ao.LS*(output range Low): Settable range: -19999~29999*
Digital fine adjust:	**Ao.Zro:** Settable range: -38011~+27524
	Ao.SPn: 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
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

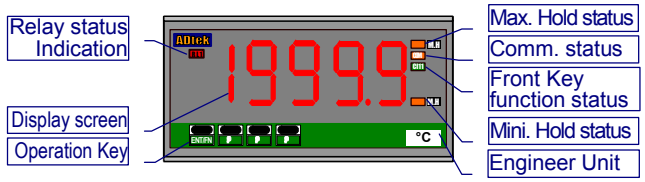
Mechanical

Dimensions:	96mm(W) x 48mm(H) x 72mm(D)
Panel cutout:	92mm(W) x 44mm(H)
Case materiel:	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(16~12AWG)
Weight:	350g / 300g(Aux. Power Code: ADH or ADL)

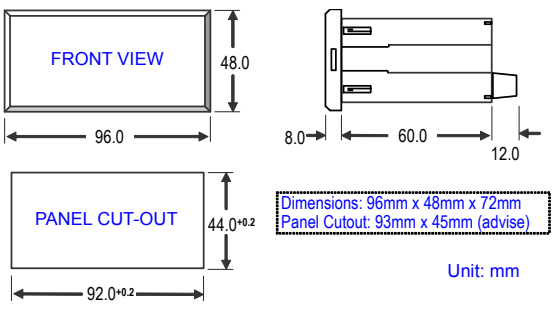
Power

Power supply:	AC115/230V,50/60Hz;
	Optional: AC/DC 85~264V or 20~90V(RoHS version)
Power consumption:	4.5VA maximum
Back up memory:	By EEPROM

■ FRONT PANEL

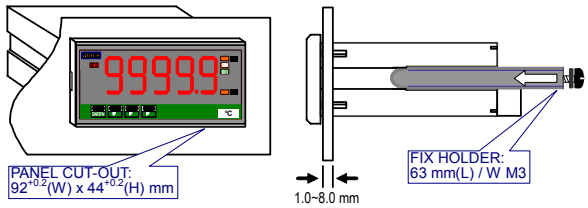


■ DIMENSIONS

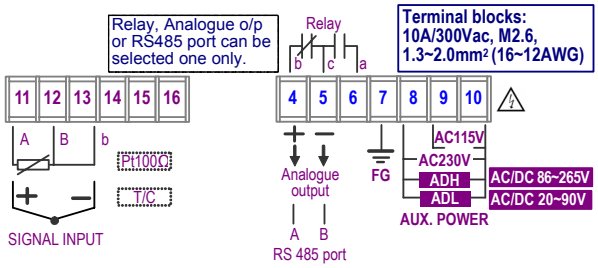


■ INSTALLATION

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

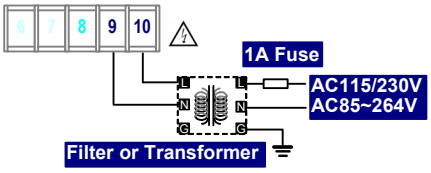


■ CONNECTION DIAGRAM

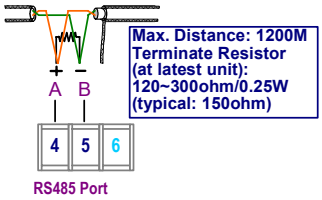


Please check the voltage of power supplied first, and then connect to the specified terminals. It is recommended that power supplied to the meter be protected by a fuse or circuit breaker.

Power Supply



RS485 Communication Port



■ FUNCTION DESCRIPTION

Display & Functions

Max / Mini recording: The meter will storage the maximum and minimum value in 【User Level】during power on in order to review drifting of PV.

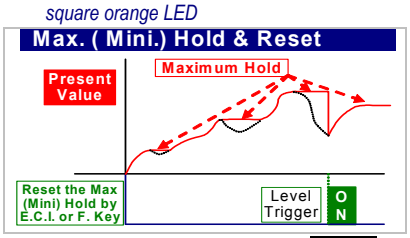
Display functions: *(Please refer to step A-09)*

PV / Max(Mini) Hold / RS 485 programmable in 【dSPLY】function of 【inPUt GroUP】

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

Maximum Hold **Max.H** ***/ Minimum Hold*** **Mini.H** **:** *The meter will keep display in maximum(minimum) value during power on, until press front key to reset (If the down key function in* **【inPUt GroUP】** *has been set to* **M.rSt** *.)*

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



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.*

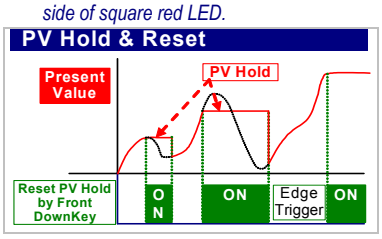
Front key functions: ***Relative PV / PV Hold / Reset for maxi(mini) hold / Reset for relay energized latch programmable in 【dn.KEY】function of 【inPUt GroUP】***

Relative PV **rEL.Pv** **:** **【dn.KEY】** *function can be set to be* **rEL.Pv** *function. When user press the* ▼ *key, the display will show the differential value(ΔPV), until press* ▼ *key again.*

➢ *Please find the* **R.PV** *sticker to stick on the right side of square red LED.*

PV Hold **Pv. HLd** **:** **【dn.KEY】** *function can be set to be* **Pv. HLd** *function. When user press the* ▼ *key, the display will be hold until press the* ▼ *key again.*

➢ *Please find the* **P.H** *sticker to stick on the right side of square red LED.*

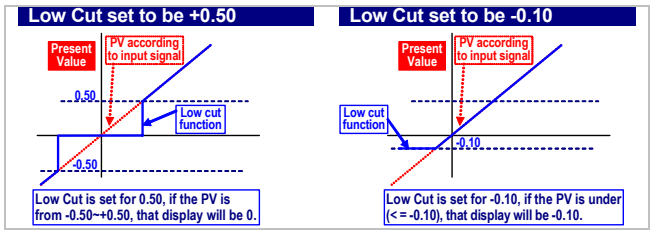


Reset for Max(Mini) Hold: when the **【dSPLY】** in **【inPUt GroUP】** set to be **Max.H** or **Mini.H** , **【dn.KEY】** function can be set to be **M.rSt** to reset the display when it is holding in maxim or mini value.

Reset for relay energized latch: when the **【rY1.Md】** in **【rELAY GroUP】** set to be **Hi.HLd** or **Lo.HLd** , **【dn.KEY】** function can be set to be **rY.rSt** to reset the relay when it is energizing and latching.

Low cut:

If the setting value is positive, it means when the absolutely value of PV ≤ Setting value, the display will be 0. If the setting value is negative, it means when the PV under setting value(PV≤ -Setting value), the display will be setting value.

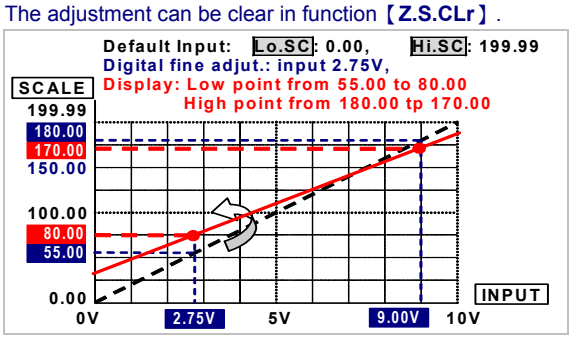


Digital fine adjustment:

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.Zro】** & **【Pv.SPn】** are not only in zero & span of PV, but also any lower point for **【Pv.Zro】** & higher point for **【Pv.SPn】**. The meter will be linearization for full scale.

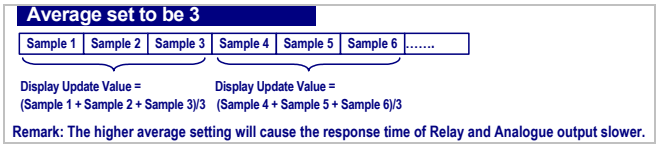
The adjustment can be clear in function **【Z.S.CLr】** .



Reading Stable Function

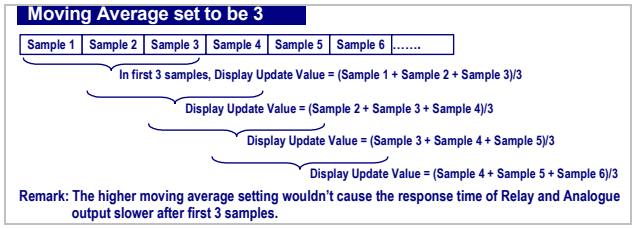
Average:

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



Moving average:

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



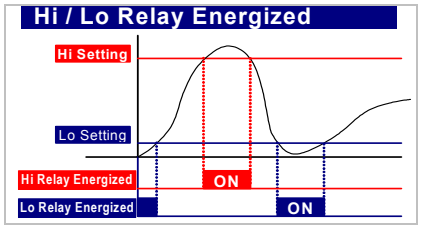
Digital Filter: The digital filter can reduce the magnetic noise in field.

Control Functions(option)

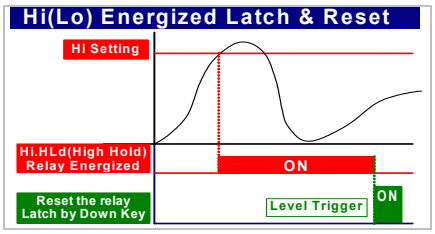
Relay energized mode: *Hi / Lo / **Hi.HLd** / **Lo.HLd** programmable*

Hi: Relay will energize when **PV > Set-Point**

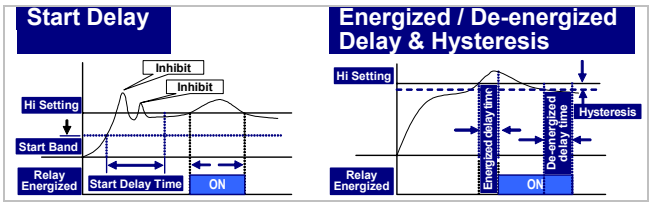
Lo: Relay will energize when **PV < Set-Point**



Hi.HLd (Lo.HLd): *When the PV is Higher (or lower) than set-point, the relay will be energized and latch until manual reset by from key in* **【User Level】** *or press down key to reset(If the* **【dn.KEY】** function set to be **rY.rSt**)



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

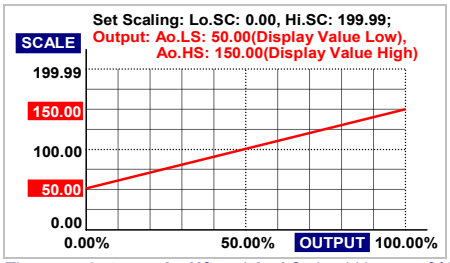


Analogue output(option)

Please specify the output type either an o~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: ***Ao.HS****(output range high): setting the Display value High to versus output range High(as like as 20mA in 4~20)*
Ao.LS*(output range Low): setting the Display value Low to versus output range Low(as like as 4mA in 4~20)*



*The range between **Ao.HS** and **Ao.LS** should be over 20% of span at least; otherwise, it will be got less resolution of analogue output.*

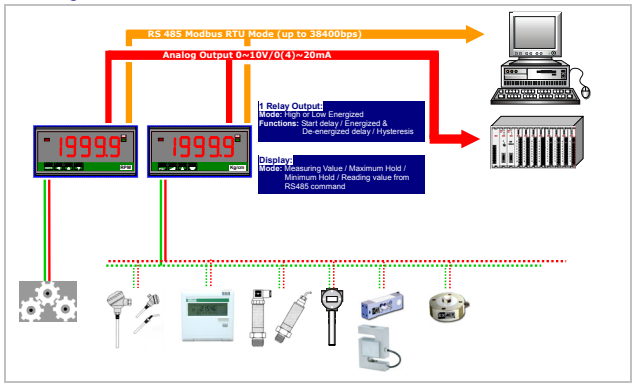
Fine zero & span adjustment:

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.

【**Ao.Zro**】: Fine Zero Adjustment for Analog Output;
Settable range: -38011~27524;
【**Ao.Spn**】: Fine Span Adjustment for Analog Output;
Settable range: -38011~27524;

RS 485 communication(optional)

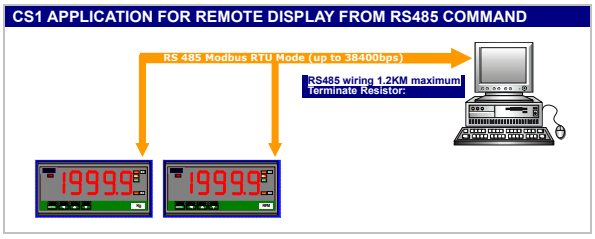
The RS485's protocol is Modbus RTU mode, and baud rate up to 38400 bps. It's convenience to remote monitoring, display for reading.



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

*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.



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

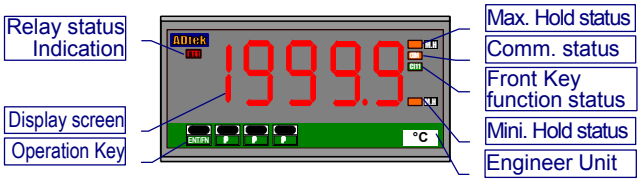
Optional Function

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.

■ ERROR MASAGE

DESCRIPTION	DISPLAY	FLASH	REMARK
BEFORE POWER ON, PLEASE CHECK THE SPECIFICATION AND CONNECTION AGAIN.			
SELF-DIAGNOSIS AND ERROR CODE:			
ouFL : Display is positive-overflow (Signal is over display range)	ouFL		(Please check the input signal)
-ouFL : Display is negative-overflow (Signal is under display range)	-ouFL		(Please check the input signal)
ouFL : ADC is positive-overflow (Signal is higher than input 120%)	ouFL		(Please check the input signal)
-ouFL : ADC is negative-overflow (Signal is lower than input -120%)	-ouFL		(Please check the input signal)
EEP / FAIL : EEPROM occurs error	EEP	FAIL	(Please send back to manufactory for repaired)
AIC.nG / Pu : Calibrating Input Signal do not process	AIC.nG	Pu	(Please process Calibrating Input Signal)
AIC. / FAIL : Calibrating Input Signal error	AIC.	FAIL	(Please check Calibrating Input Signal)
AoC.nG / Pu : Calibrating Output Signal do not process	AoC.nG	Pu	(Please process Calibrating Output Signal)
AIC. / FAIL : Calibrating Output Signal error	AIC.	FAIL	(Please check Calibrating Output Signal)

■ FRONT PANEL:



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

■ **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.

■ **Operating Key:** 4 keys for 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/Fun key	Setting Confirmed and save to EEProm	From the function index to get into setting status

■ **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.

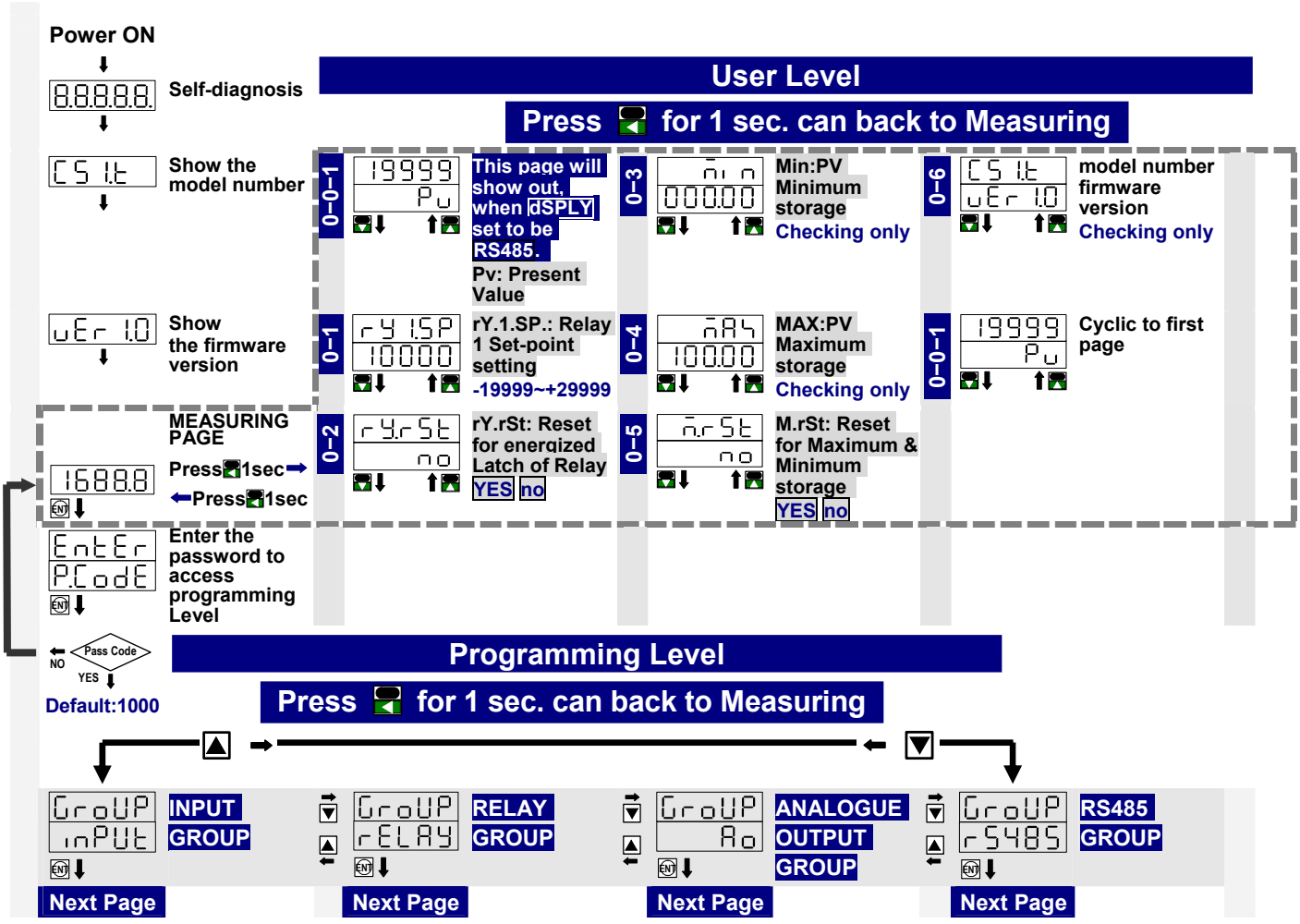
■ **Function Lock:** There are 4 levels programmable.

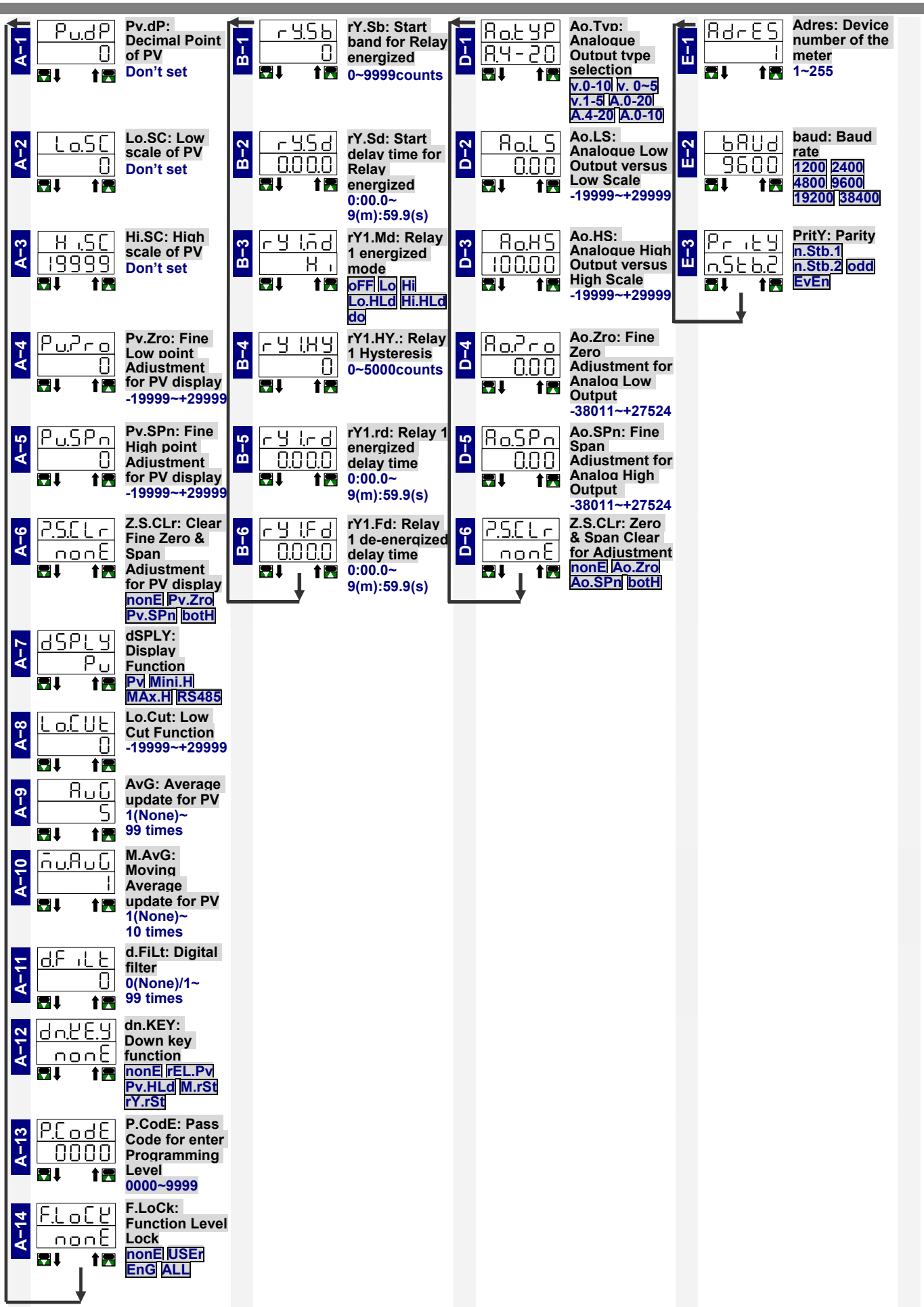
- **None:** no lock all.
- **User Level:** User Level lock. User can get into User Level for checking but setting.
- **Programming Level:** Programming level lock. User can get into programming level for checking but setting.
- **ALL:** All lock. User can get into all level for checking but setting.

■ **Front Key Function**

- The Key can be set to be rEL.Pv / Pv.HLd / M.rSt / rY.rSt programmable.

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





➢ Plesae refer to operating manual for detail description