

APM489-5 Process Panel Meter / Controller

■ DESCRIPTION

- 5 Digit Red LED high-brightness Display.
- Standard input 0~10V 0(4)~20mA. Other ranges on request.
- Square Root function option available.
- 4 relays can be programmed individually to be Hi / Lo / Hi Latch / Lo Latch / Go energised with Start Delay / Hysteresis / Energised & De-energised Delay functions, or to be remote control.
- Analogue output fitted as standard with optional 1 RS485 (Modbus RTU Mode) interface with versatile functions such as control, alarm, re-transmission and communication for a wide range of industrial applications.
- 3 external control inputs can be programmed individually to be Relative PV (Tare) / PV Hold / Maximum or Minimum Hold / DI (remote monitoring) / Reset for Relay Energised Latch....
- Standard 115 / 230Vac supply
- (24V or 48Vdc supply options available on request)



■ TECHNICAL SPECIFICATION

Input

Input Range	Input Impedance	Input Range	Input Impedance
Voltage 0 ~ 10 V	≥ 1M ohm	Current 0(4)~20 mA	250 ohm

- Input 0~10V or 0~20mA can be selected by termination. (11 or 12)
- Other customer special ranges available on request

Calibration:	Digital calibration by front key
A/D converter:	16 bits resolution
Accuracy:	≤± 0.04% of FS ± 1C;
Sampling rate:	15 cycles/sec
Response time:	≤100 msec.(when the AvG = "1") in standard
Input type:	0~10V / 0~5V / 1~5V / 0~10mA / 0~20mA / 4~20mA Input range High and Low programmable Ai.Hi: Settable range: 0.00~100.00% of input range Ai.Lo: 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:	Lo.SC: Low Scale; Settable range: -19999~+29999 Hi.SC: High Scale; Settable range: -19999~+29999 Programmable from 0 / 0.0 / 0.00 / 0.000 / 0.0000
Decimal point:	
Square root function:	Option on Request-for differential pressure transducers
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:	Up and down key can be set to be a function as ECI.
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: None / 1~10 times
Digital filter:	Settable range: None / 1~99 times

Control Functions(option)

Set-points:	Four set-points
Control relay:	Four relays Relay 2 & Relay 3: SPCO, 5A/230Vac, 10A/115V Relay 1 & Relay 4: SPST, 1A/230Vac, 3A/115V
Relay energised mode:	Energised levels compare with set-points: Hi / Lo / Go.12 / Go.23 / Hi.HLd / Lo.HLd; programmable DO function: Energised by RS485 command of master.
Energising functions:	Start delay / Energised & De-energised delay / Hysteresis / Energised Latch Start band (Minimum level for Energising): 0~9999counts Start delay time: 0:00.0~9(Minutes):59.9(Second) Energised delay time: 0:00.0~9(Minutes):59.9(Second) De-energised 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 Energised latch
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 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

Ao.LMt(output High Limit): 0.00~110.00% of output High

Ao.Zro: Settable range: -38011~+27524

Ao.SPn: Settable range: -38011~+27524

Digital fine adjust:

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(16~12AWG)
550g / 350g(Aux. Power Code: ADH or ADL)

Weight:

Power

Power supply:

AC115/230V,50/60Hz;

Optional: AC/DC 85~264V or 20~90V(RoHS version)

Excitation supply:

DC24V/30mA maximum in standard

Power consumption:

5.0VA maximum

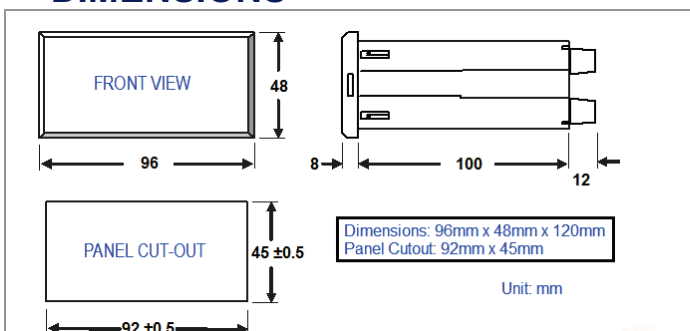
Back up memory:

By EEPROM

FRONT PANEL

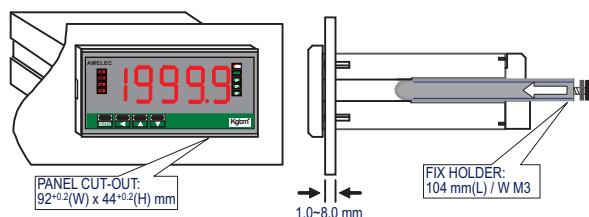


DIMENSIONS

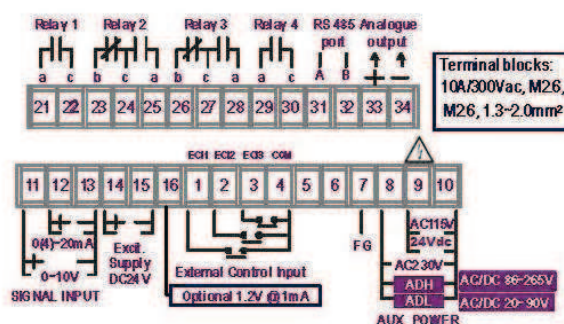


INSTALLATION

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

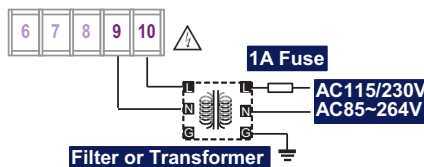


CONNECTION DIAGRAM



Please check the power supply voltage 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.

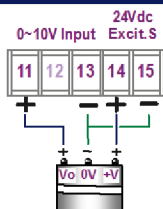
Power Supply



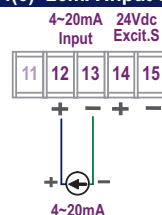
2 wire Transmitter connection



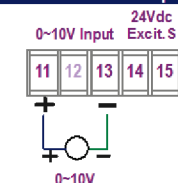
3 Wire Transmitter



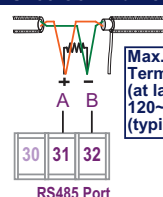
4(0)~20mA Input connection



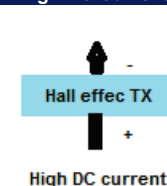
0~10V Source Input connection



RS485 Communication Port



High DC Current Input



ERROR MESSAGE

	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 high 20%)	ouFL		(Please check the input signal)
	-ouFL : ADC is negative-overflow (Signal is lower than input low 20%)	-ouFL		(Please check the input signal)
	EEP / FA IL : EEPROM occurs error	EEP	FA IL	(Please send back to manufactory for repaired)
	A I.C.nG / P U : Calibrating Input Signal do not process	A I.C.nG	P U	(Please process Calibrating Input Signal)
	A I.C. / FA IL : Calibrating Input Signal error	A I.C.	FA IL	(Please check Calibrating Input Signal)
	A oC.nG / P U : Calibrating Output Signal do not process	A oC.nG	P U	(Please process Calibrating Output Signal)
	A I.C. / FA IL : Calibrating Output Signal error	A I.C.	FA IL	(Please check Calibrating Output Signal)

■ FRONT PANEL:



■ 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

- EC1** display when E.C.I. 1 close(dry contact)
EC2 display when E.C.I. 2 close(dry contact)
EC3 display when E.C.I. 3 close(dry contact)

- **RS485 Communication:** 1 square orange LED

- COM** will flash when the meter receives or sends data, and **COM** flashing quickly means the data transient quicker.

- **Max/Mini Hold indication:** 2 square orange LEDs

-  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)

- **Engineering 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/Function key	Setting Confirmed and save to EEPROM	From the function index to get into setting status

- **Pass Word:** Settable range:0000~9999; (Default 1000)
User has to key in the right pass word to 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.

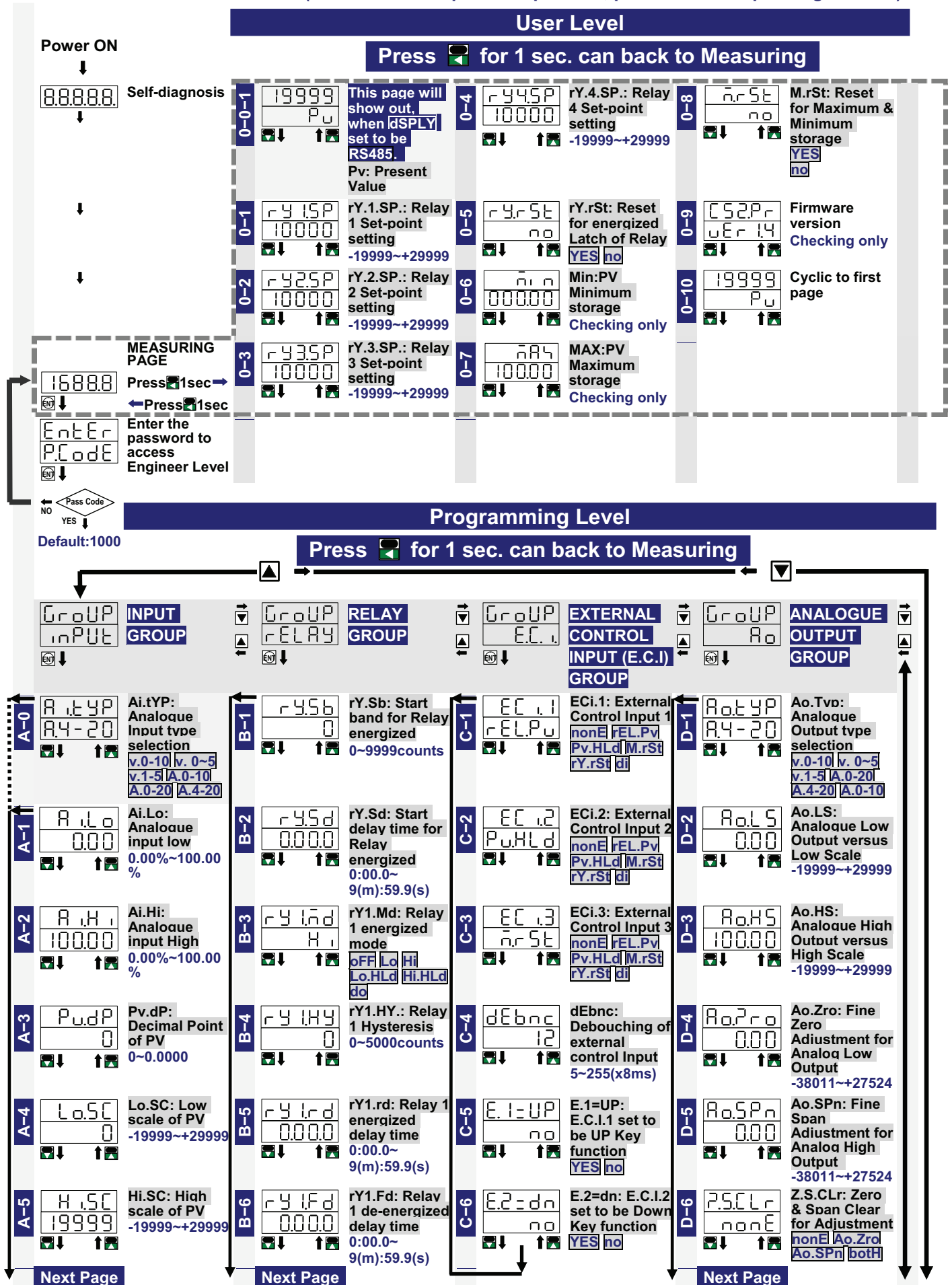
- **None**: no lock.
- **User Level**: User Level lock.

- **Programming Level:** Programming level lock.
- **ALL:** All lock.

■ Programming Front Key with a Function

- The  Key can be set to be the same function as the setting of ECI1.
Ex. The ECI1 set to **Pv.HLD** and the function **【E.1=UP】** set to **YES** in **【ECI Group】** . When user presses  Key, the PV will hold.
 - The  Key can be set to the same function as the setting of ECI2.
Ex. The ECI2 set to **rEL.Pv** and the function **【E.2=dn】** set to **YES** in **【ECI GroUP】** . When user presses  Key, the PV will show relative value.
- **If the front key function has been selected, the terminal input for ECI will be disabled.**

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



A-6	Sq.roT no	Sq.roT: Square Root function yes no	B-7	rY2.nd H	rY.2.Md: Relay 2 energized mode oFF Lo Hi Lo.HLd Hi.HLd dc
A-7	Pv.Zro 0	Pv.Zro: Fine Low point Adjustment for PV display -19999~+29999	B-8	rY2.HY 0	rY.2.HY: Relay 2 Hysteresis 0~5000counts
A-8	Pv.SPn 0	Pv.SPn: Fine High point Adjustment for PV display -19999~+29999	B-9	rY2.rd 000.0	rY2.rd: Relay 2 energized delay time 0:00.0~9(m):59.9(s)
A-9	Z.S.CLr none	Z.S.CLr: Clear Fine Zero & Span Adjustment for PV display none Pv.Zro Pv.SPn both	B-10	rY2.Fd 000.0	rY2.Fd: Relay 2 de-energized delay time 0:00.0~9(m):59.9(s)
A-10	dSPly Pv	dSPly: Display Function Pv Mini.H MAX.H RS485	B-11	rY3.nd Lo	rY3.Md: Relay 3 energized mode oFF Lo Hi Lo.HLd Hi.HLd dc
A-11	Lo.Cut 0	Lo.Cut: Low Cut Function -19999~+29999	B-12	rY3.HY 0	rY3.HY: Relay 3 Hysteresis 0~5000counts
A-12	AvG S	AvG: Average update for PV 1(None)~99 times	B-13	rY3.rd 000.0	rY3.rd: Relay 3 energized delay time 0:00.0~9(m):59.9(s)
A-13	M.AvG 1	M.AvG: Moving Average update for PV 1(None)~10 times	B-14	rY3.Fd 000.0	rY3.Fd: Relay 3 de-energized delay time 0:00.0~9(m):59.9(s)
A-14	d.FiLT 0	d.FiLT: Digital filter 0(None)~99 times	B-15	rY4.nd Lo	rY4.Md: Relay 4 energized mode oFF Lo Hi Lo.HLd Hi.HLd dc Go.12 Go.23
A-15	P.CodE 0000	P.CodE: Pass Code for enter Programming Level 0000~9999	B-16	rY4.HY 0	rY4.HY: Relay 4 Hysteresis 0~5000counts
A-16	F.LoCk none	F.LoCk: Function Level Lock none USEr EnG ALL	B-17	rY4.rd 000.0	rY4.rd: Relay 4 energized delay time 0:00.0~9(m):59.9(s)
			B-18	rY4.Fd 000.0	rY4.Fd: Relay 4 de-energized delay time 0:00.0~9(m):59.9(s)

D-7	Ao.LMt 110.00	Ao.LMt: Analog Output High Limit 0.00~110.00%
E-1	AdrES 1	Adres: Device number of the meter 1~255
E-2	bAUD 9600	baud: Baud rate 1200 2400 4800 9600 19200 38400
E-3	PritY n.Stb.2	PritY: Parity n.Stb.1 odd EvEn