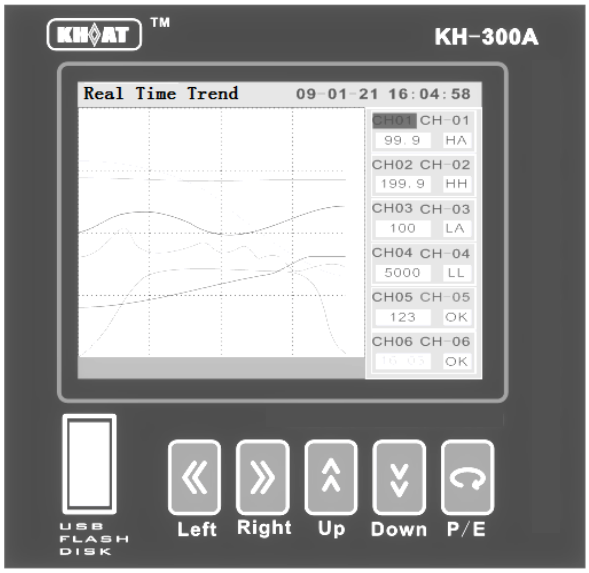
KH300AG/Paperless Recorder

Manual



Version V2.6

KH300AG/Mini Paperless Recorder Manual

1. Brief Introduction

1.1. Brief Introduction

Please read this manual before you use the instrument.

1.2、Parts List

Part Name	Qty.	Yes/No
Recorder	1	
Fixed Bracket	2	
USB flash drive	1	
CD	1	
manual	1	
Certificate	1	

1.3. Notice

- Please check whether the appearance your meter is ok and item no. same as ordered after open package. Please contact us to change your meter immediately if there are above problems.
- Please shall know the connections and operations of your meter first before testing and installing the meter.
- Please use your meter in its required conditions. Please do not open the meter arbitrarily in order to avoid danger. Please contact us to open the meter under the instruction and approval of our technical team if the meter has error.
- Please do not clean LCD screen of your meter by organic solution in order to avoid destroying the screen.
- Please connect the meter with ground in order to be sure of the safety of meter and persons.
- Please calibrate your meter one time every year. If the error is beyond its range, usually caused by moisture, dust and corrosive gas, please clean and dry the inner part of your meter. Please contact us if still any problems.

2. General Instruction

2.1. Feature

- Adopts 3.2 inch TFT color LCD, wide visual angle, high lightness and contrast.
- English Menu designed. Easy and clear screen, rich information, kind human-meter operation screen, friendly - user, easy operation
- Adopt SMT technology, more concise designed.
- Universal input for multi channels, adopt photoelectric isolation among channels in order to avoid the interference among channels.
- T.C and RTD input adopts nonlinear amendment with high accuracy and stable performance.
- Huge capacity storage: 8MB for long time record.

2.2、Specification

Analog Input Specification	
Input Signal	➢ Linear Voltage : 0 - 5V, 1 - 5V, standard range: -20000 to 20000. ➢ Linear current : 0 - 10mA ,should be external connection with 500Ω resistor; 4 - 20mA and should be external connection 250Ω precise resistor. Standard range: -20000 to 20000. ➢ Thermocouple Input: K (-50 ~ 1300℃)、S (-50 ~ 1700℃)、T (-200 ~ 350℃) 、E (0 800℃)、

	J (0 ~ 1000℃)、B (300 ~ 1800℃)、N (0 ~ 1300℃), R(-50-1700℃) , WRE526 (-0 ~ 2300℃), WRE235 (0 ~ 2300℃) ➢ RTD Input : Cu50 (-50 ~ 150℃) , Pt100 (-200 ~ 600℃), Cu100 (-50 ~ 150℃) ➢ Other linear input: 0 - 20mV,0-60mV, 0-100mV, 0-500mV, standard range : -20000 to 20000.
Accuracy	➢ 0.2 grade when RTD, linear voltage, linear current and T.C input ➢ 0.2%FS±2.0℃ when T.C input with cold junction compensation by internal part of recorder.
Sampling Rate	≤1 s
Temperature Shift Coefficient	Standard value: 50PPM
CMR Ratio	85-110dB
Input Independence	500Kω when standard voltage input; 250Ω (4-20mA). Or 500Ω (0-10mA) when standard current input More than 20MΩ when other signal input
Isolation	Isolated voltage between channels and ground: 1000VAC.Isolated voltage between channels:400VAC
Thermocouple	Internal resistor: not more than 1000Ω. Cold junction compensation tolerance: maximum +-2℃
RTD	Current 2.5mA, three wire, each wire with same resistance: max.10ohm per each wire.
Input Error Action	When T.C., RTD,1-5VDC, 4-20mA input and there is open or short circle, there are three ways available: measured value as maximum, minimum or hold
Power Supply Specification	
Power supply	VAC: 100-240VAC, frequency: 47-63 HZ, max. power consumption: 5VA VDC: 24VDC,max power consumption: 5VA (please advise when order)
Insulation	When power insulation to ground is higher than 1500VAC, leakage current: 10mA for one minute When power insulation to housing is higher than 1500VAC, leakage current: 10mA for one minute
Output Specification	
Aux. power supply	24VDC, 50mA, auxiliary power supply
Alarm Output	Up to 2 alarm output, 250VAC, 3A relay contact output: NO or NC
Retransmission	Up to 2 channels, 4-20mA output, max. tolerance: +-0.2%
Others	
Processor	32 bits, high performance, high integrated ARM CPU
Hardware guider	CPU inner integration for long time, stable and safe operation
Hardware Clock	Adopt hardware real clock with high stability. Clock accuracy: +-5ppm. After power off, Li battery for continual power supply. The validity of battery is 30days.
Data Memory	All data will be stored in FLASH memory, not need reserve battery in order to ensure that all the history data and configuration parameters will be not lost when power off.
Comm. Port	Photoelectrical isolated RS485 communication interface
Comm. Protocol	Standard MODBUS- RTU comm. protocol, can communicate with modern HMI and DCS directly.
Printing Port	Photoelectrical isolated RS232C print port, Baudrate: 9600bps. Maximum print resolution:240dot/line
Record Time	≈46.9 days ÷channel no. x Record interval time
Display	3.2inch TFT color LCD
Net Weight	Maximum 0.5kg

Size	Dimension: 96mm*96mm*70mm , Install Size: 92mm*92mm
Panel Thickness	>1.0mm
Ambient	Working Temperature:0-50C, relative humidity; 10%-85%(now dew) Transport and storage: Temperature: -20-60℃, relative humidity : 5%-95%(no dew) Sea Height: 2000m

2.3. Order Code

Function	Code and Description											
Basic Code	KH3											KH300 Paperless Recorder
Channel No.	01											One Channel
	02											Two Channels
	…											……
	06											Six Channels
Size		A										96*96mm(L*W)
LCD Color			B									Blue
			G									Color
OUT1				N								None
				R2A								Relay alarm: NO ,30VDC/3A, 220VAC/3A
				R2B								Relay alarm: NC ,30VDC/3A, 220VAC/3A
				U3								Isolated auxiliary 24VDC power supply for transmitter, sensor and other device, max.50mA
				S1								Isolated RS485 communication interface, expand
				T								Isolated linear current retransmission output
OUT2					N							None
					R2A							Relay alarm: NO ,30VDC/3A, 220VAC/3A
					R2B							Relay alarm: NC ,30VDC/3A, 220VAC/3A
					U3							Isolated auxiliary 24vdc power supply for transmitter, sensor and other device, max.100mA
					P							RS232 printing port for mini printer, WH-A5 mini printer as default. Please advise the printer no. if the mini printer is customized
					T							Isolated linear current retransmission output
Communication						N						None
						S1						RS485 communication port
USB							N					None
							U					USB flash drive for download data
Power Supply								N				220VAC, 50HZ ,85-240VAC
								A				110VAC, 60HZ,85-240VAC
								D				24VDC
PC Support Software									N			Free data analysis software for USB to PC, no communication application

	E			Extensive DCS software RS485 communication
Mini Printer		N		None
		W		Yes, Kehao mini dot-matrix printer
				Customized mini printer
Metal housing for desktop type			N	None
			1	Just for recorder
			2	both for recorder and mini printer together

Note: In order code, if the parameter is all "N" after the parameter "power supply", the code "N" can be not written.

For example: KH-306AG-R2A-U3-S1-U-N-C-N-N-N

Item No.: KH300 Channel No.: 06: 6 channels

Size: A': 96*96mm(l*w) LCD Color: G: colored

Out1: R2A, relay alarm , NO Out2: U3: Isolated auxiliary 24vdc power supply

S1: RS85 communication port, U: USB function

C: Circular Chart Display.

3. Installation

3.1. Installation Ambient

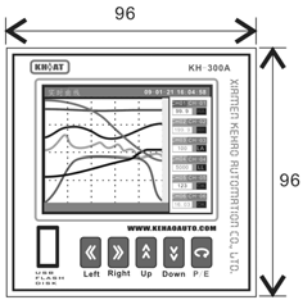
1.Ambient temperature : 0 - 50 , Ambient humidity:10%-85% (No dew)

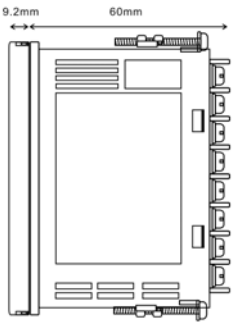
2. Keep away from places with sunlight, steam, caustic gas and electromagnetism.

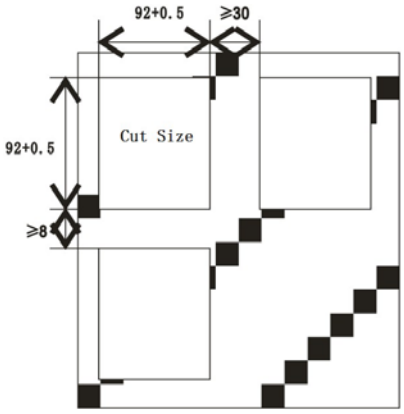
3. The thickness of steel plate of the meters must be no less than 1mm in order to avoid shaking

4. Please keep the good venting around meters to make sure the cooling for the meter itself.

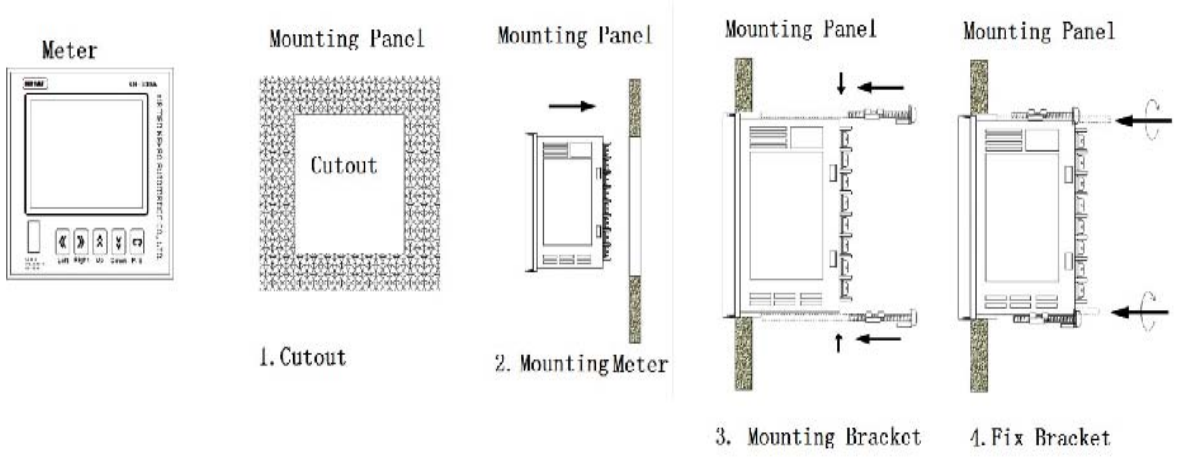
3.2. Dimension (unit : mm)



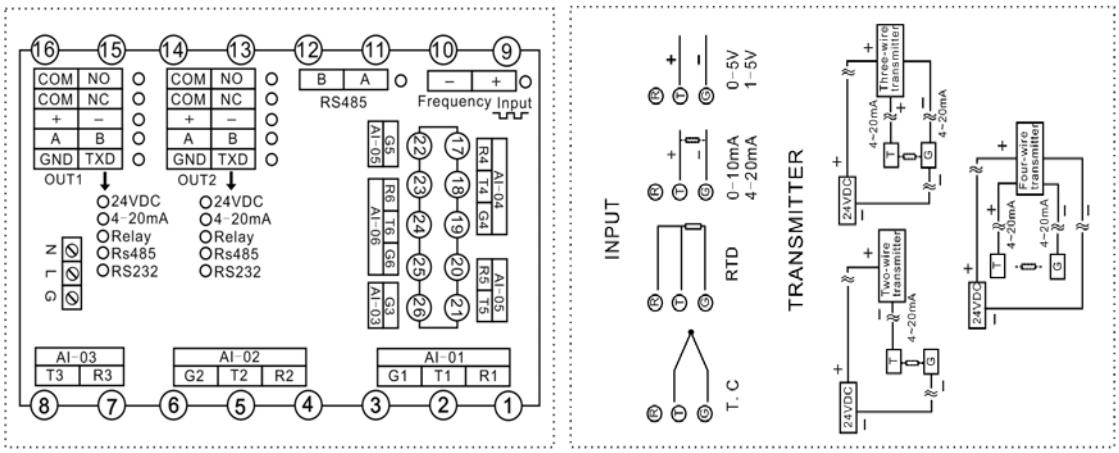




3.3 Installation Method

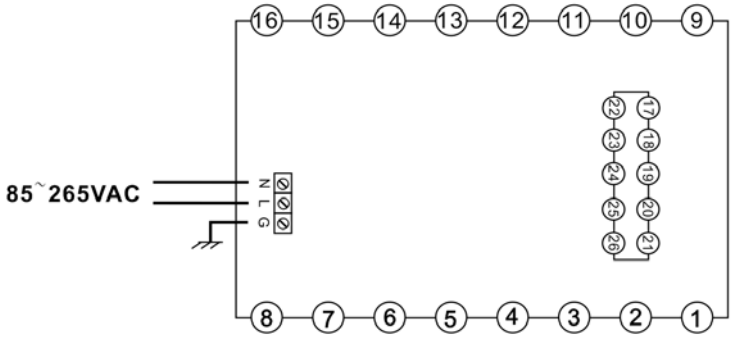


3.4 Diagram Connection



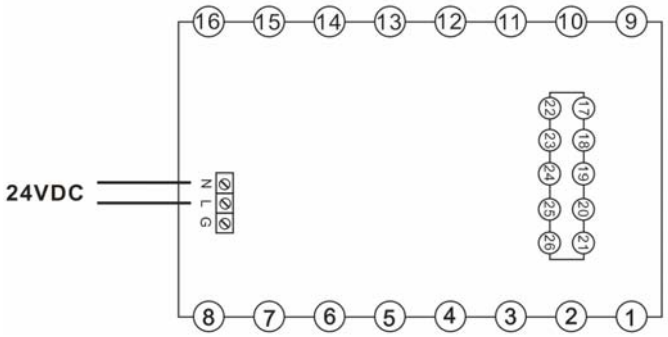
3.4.1. Power connection:

AC Power Connection as follows:



When power supply is 220VAC, please connect terminal “N” and “L”. In order to ensure safe operation of meter, please connect terminal “G” for ground properly as possible as to decrease resistor for ground 24vac power connection:

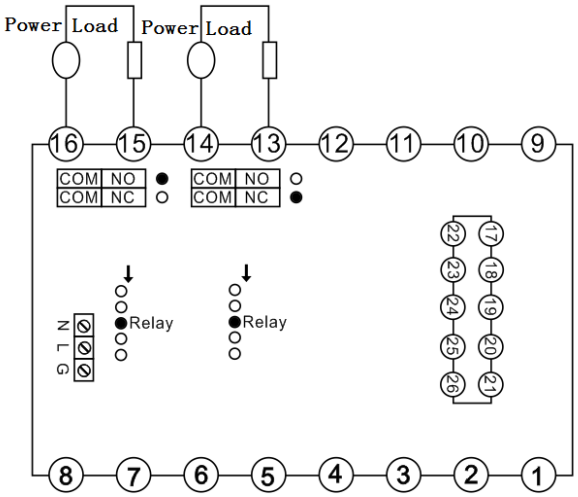
24VDC Power Supply Connection as follows:



Please connect "N" and "L" when 24VDC power supply, no polarity required.

3.4.2 Alarm Output Connection

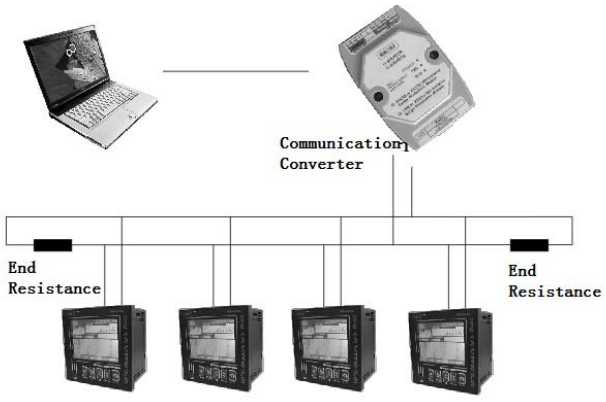
There are up to 2 relay alarm output: NO or NC. NO contact: COM (common) and NO (Normally Open). NC: COM (common) and NC (Normally Close). Alarm capacity: 3A/220VAC. When the load is higher than rated value, the repeater will be needed. Please see connection as follows:



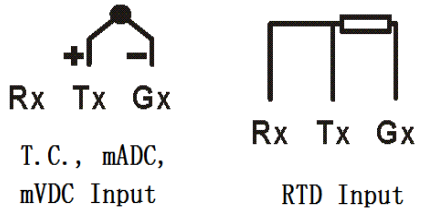
3.4.3 Communication Connection

There is RS485 communication port in meter. Please use Rs485 shielded twisted pair cable when RS485 communication. When the communication distance is more than 1000m, repeater will be used for longer distance communication. When the communication cable is more than 100m for communication, 120ohm end resistance should be matched in order to reduce reflection and echo effect. The end resistor should be connected between RS485 longest terminals.

Please see communication connection as follow:

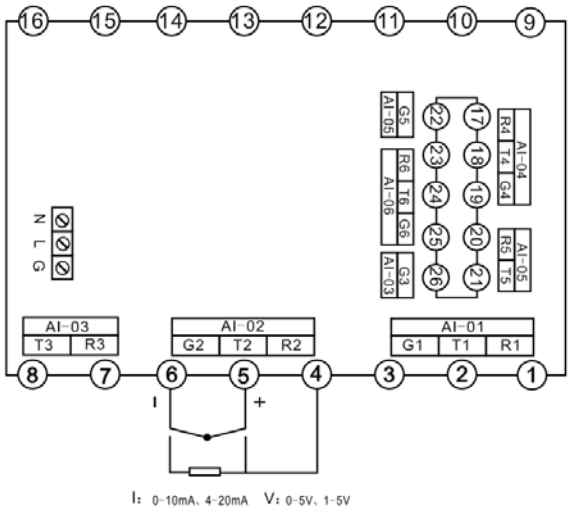


3.4.4 Signal Input Connection



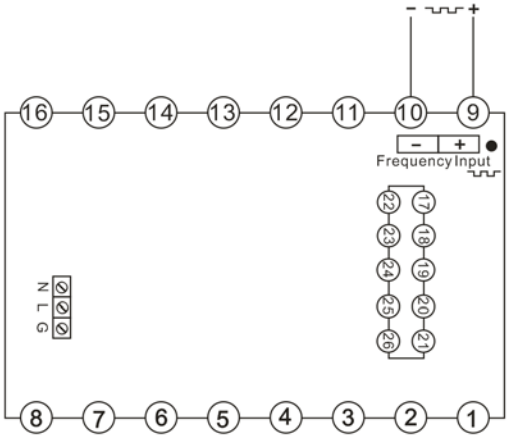
Rx: R1,R2,……R6; Tx: T1,T2,…….T6; Gx: G1,G2…….G6

Please see signal Input Connection as follows:



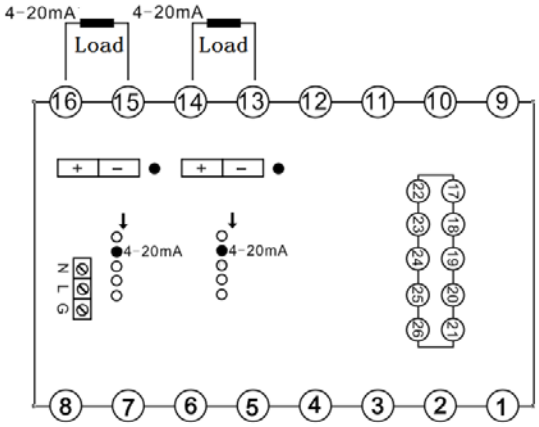
3.4.5 Frequency Input Connection

There is 1 channel frequency input, rated frequency range: 0-5KHZ, max. voltage: 4-32v. Please see the connection as follow:



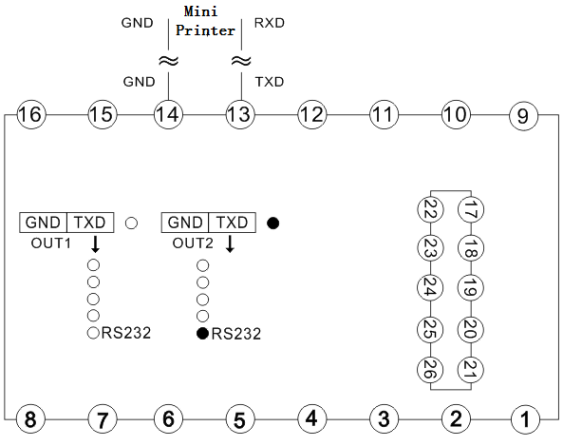
3.4.6. Retransmition Output Connection

There are up to 2 channels 4-20mA output. Please see connection as follows:



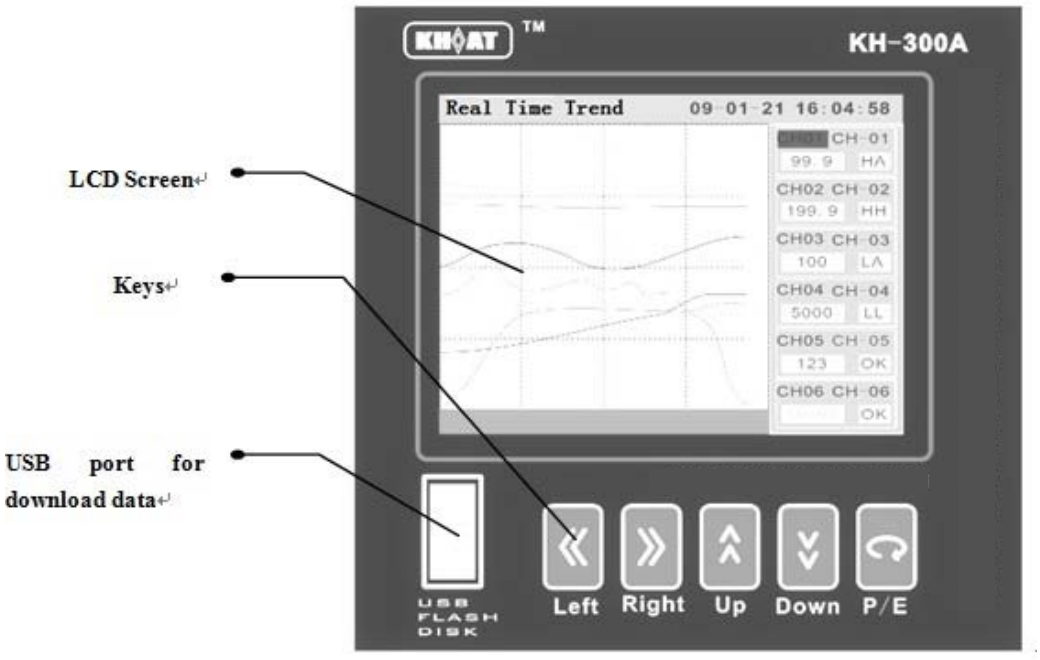
3.4.7 Mini Printer Connection

There is RS232 interface for mini printer, used for the data and curve printing. Please see connection as follow:



4、Operation Guide

4.1、Panel Description



4.2、Keys Operation Description

Please see the key's operation guide as follow:

: Shift display screen or confirm or shift setting parameter setting state.

: Cursor up or left move

: Cursor down or right move

: Up to next parameter in cursor position

: Down to next parameter in cursor position

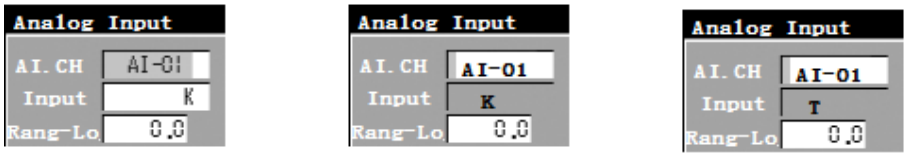
4.3、Parameter Setting

There are four data types for parameters：Character type, password type, integer number type, fix-point number type

Character type is a fix sequence made of one or more character, such as input type, unit etc.
Password type is same as character type, a sequence made of one or more character, but its character has its special meaning, such as password, date, tag no.
Integer number type is value with decimal, as baudrate, record interval, filter etc.
The fixed point number type is value with fixed or settable decimal point, as range high limit, range low limit, offset etc.

4.3.1. Character Type Parameter Setting

The setting method: please press « or » key to shift the cursor to the required parameter position, then press ⇈ or ⇊ to up or down. For example: if analog input type “K” type is changed to “T” type, please see below operation:

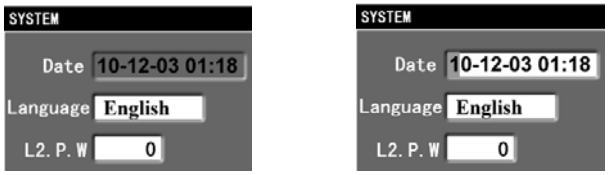


Please press » key to shift the cursor to the “input” and press ⇈ key to set parameter.

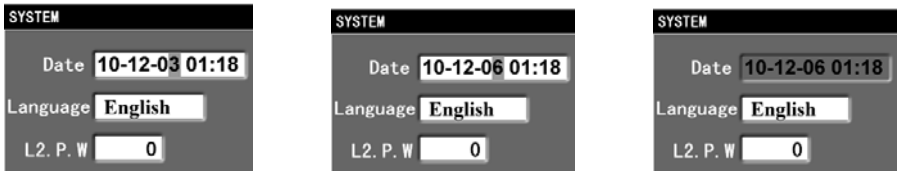
4.3.2、Password Parameter Setting

The setting method is: please press « or » key to move the cursor to the appointed position, then press ↺ key to the setting state , press « or » move the cursor to the modified position, finally press ⇈ or ⇊ to up or down. Please press ↺ key to exit the setting state and confirm the setting parameter after finishing above parameters.

For example: If the parameter “Date” in system parameter is changed from “10-12-03” to “10-12-06”, operation as follows:



After enter ‘SYSTEM’ parameter screen, please press » key to shift cursor to “Date” parameter, then press ↺ key to enter the setting state

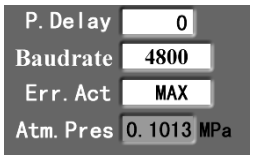


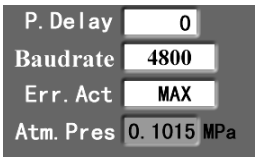
Please press « key to shift cursor in modified position Please press ⇈ or ⇊ key to set Please press ↺ key to confirm

4.3.3 Integer Number Type and Fix-point Number Type

The setting method of the integer number and fix point number type can be same as one of character type if little value change or be same as one of password type if value is changed much.

For example: if the parameter "Atm pres."is changed from "0.1013" to "0.1015", the integer number type setting will be as follow:





Press » key to shift the cursor to "Atm pres." Press ⇈ or ⇊ key to up or down

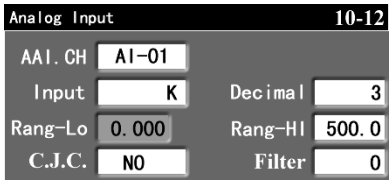
For example: if the parameter "Range-hi" is changed from "1000" to "5000". The fix-point number type setting as follow:

Press » key to shift the cursor to "Range-Hi" Press ↺ key to enter the setting statue.

Press « key to shift the cursor to modified position Press ⇈ or ⇊ key to set value Press ↺ key to confirm setting.

4.3.4 Parameter Decimal Setting of Fix Point Number Type

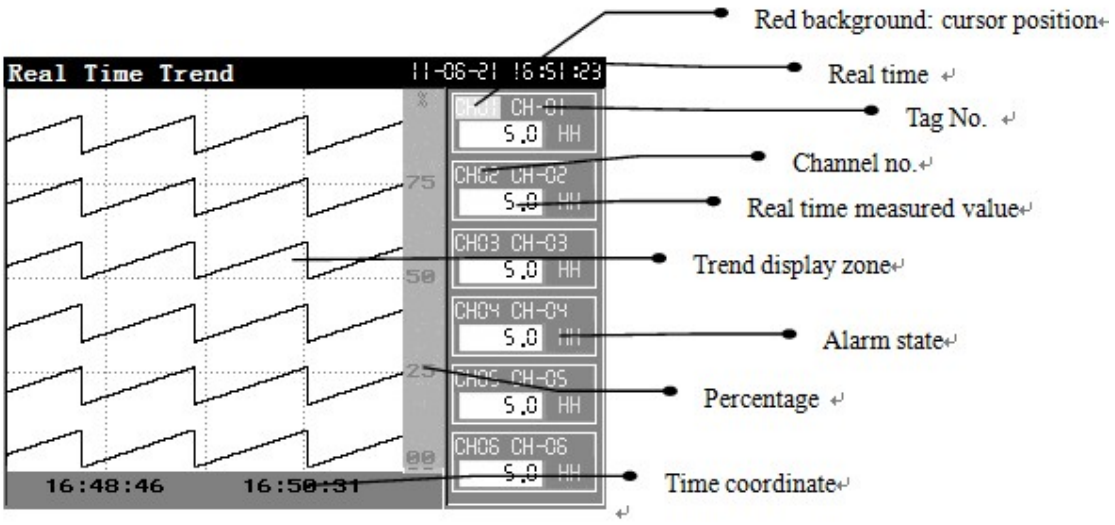
Please shift the cursor to parameter "Decimal" ,then press ⇈ or ⇊ key to up or down. For example: if the decimal of parameter "Range-lo in "ANALOG INPUT" is changed from first bit to third. Please see operation: when enter into "ANALOG INPUT" parameter screen, please shift the cursor to parameter "Decimal' and then press ⇈ or ⇊ key to set decimal as "3". So the decimal "Range-lo" will be displayed as " 0.000"accordingly.



Please press » key to shift the cursor to parameter "Decimal" ,then press ⇈ or ⇊ to up or down.

5. Screen Description

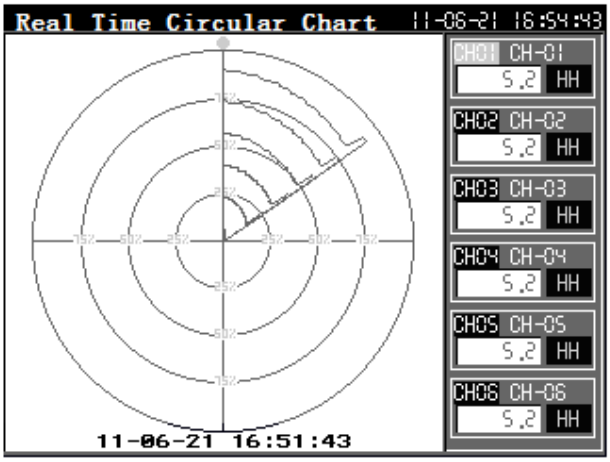
5.1. Real Time Trend Screen



There are 6 channels measured value and trend displayed in a real time screen. Please press « or » key to move the cursor ; please press ↑ or ↓ to change the channel no. When the measured value is “OPEN” , the signal input circle is open or in short circle. Please press ↺ key to shift the next screen. The alarm state parameter as follows：

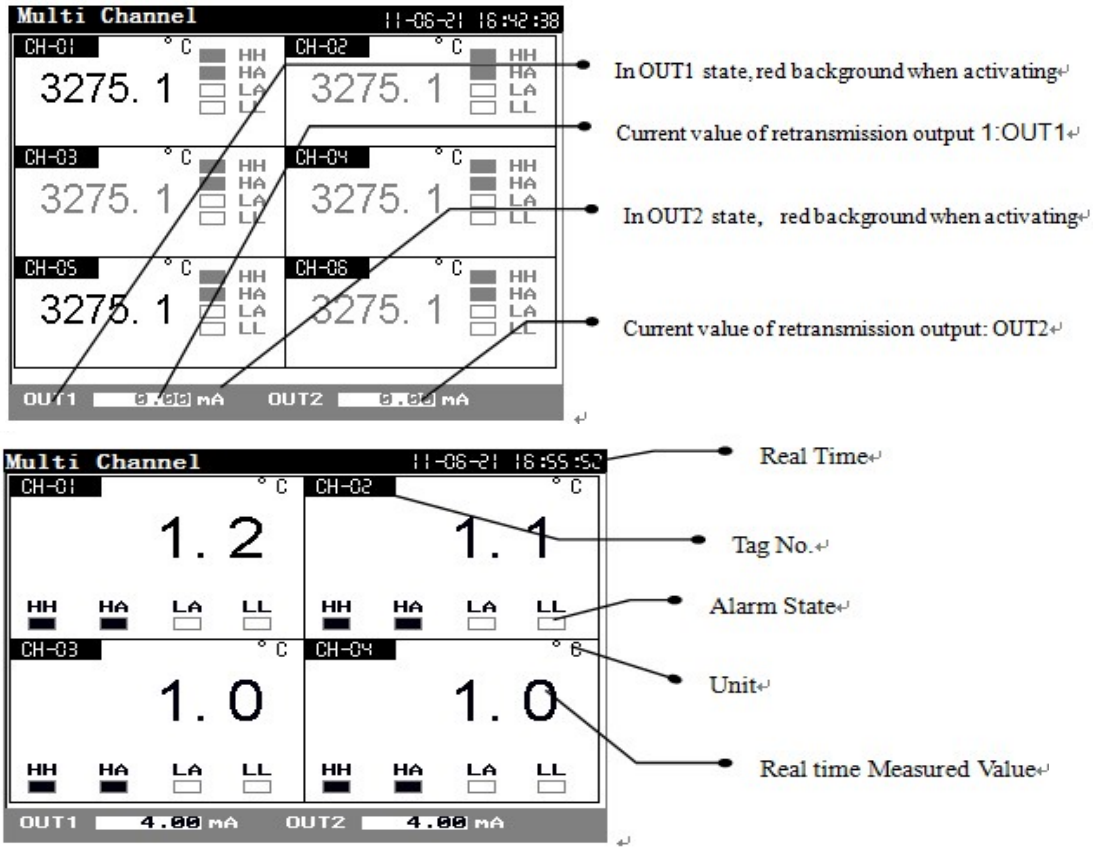
“OK”:no alarm, “LA”：low limit alarm；“HA”：high limit alarm；“LL”：low-low limit alarm, “HH”：High-high limit alarm.

5.2. Real Time Circular Chart Screen



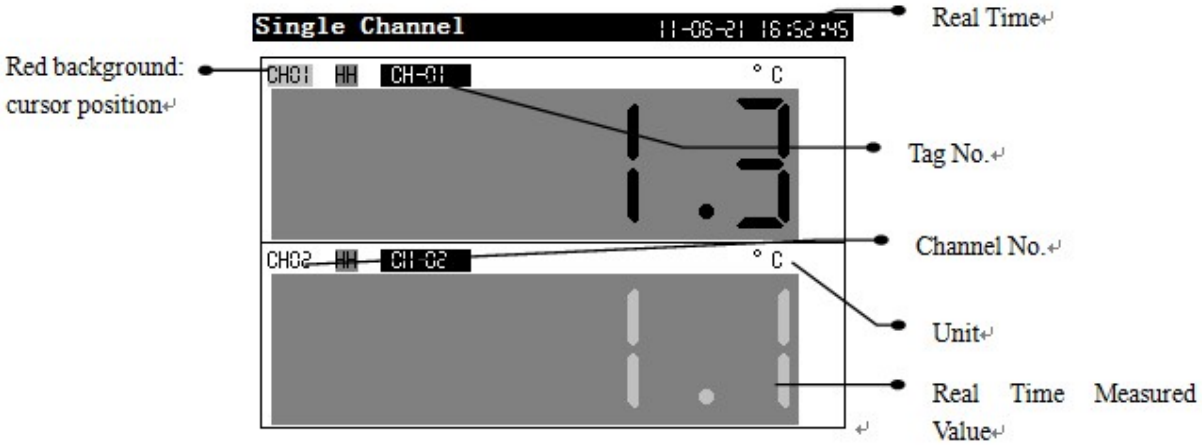
There is circular chart display of multi channel value in real time circular chart screen, similar with paper recorder. Please press « or » key to move the cursor ; please press ↑ or ↓ to change the channel no of circular chart. Please press ↺ key to shift the next screen.

5.3. Multi Channel Screen



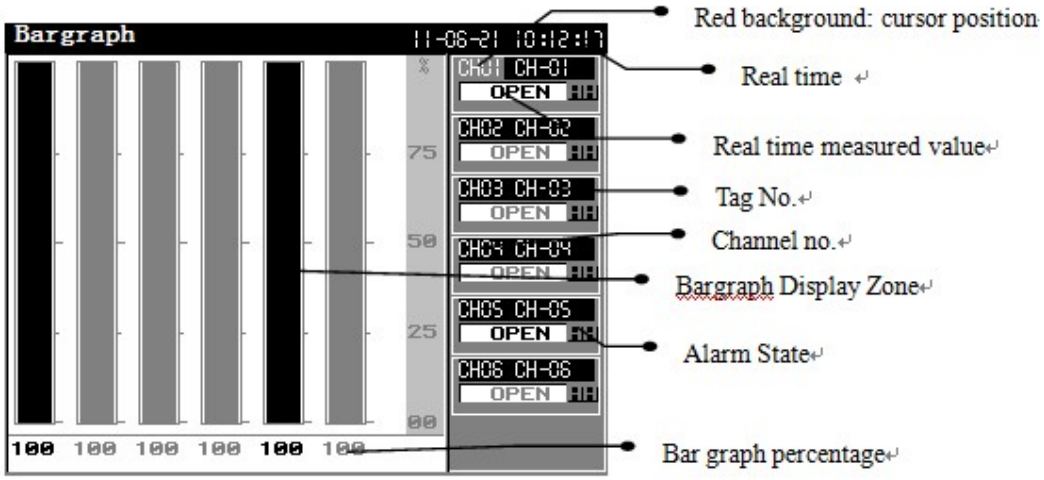
There is multi channel measured value displayed in multi channel screen. Please press key to shift the next screen.

5.4. Single Channel Screen



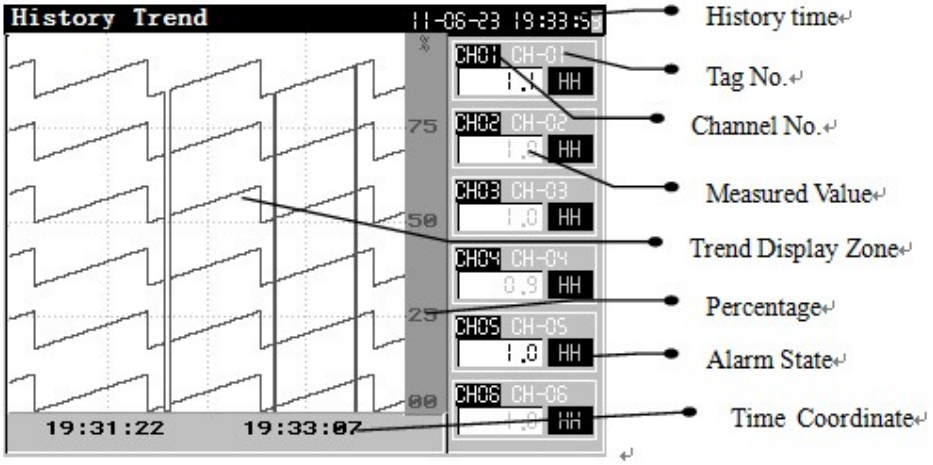
In single channel screen, the measured value and alarm state is display larger for user to be easy to see in a little long distance. When alarm is activated, the background of the measured value will be changed in red. Please press or key to move the cursor ; please press or to change each channel no

5.5.Bar graph Screen



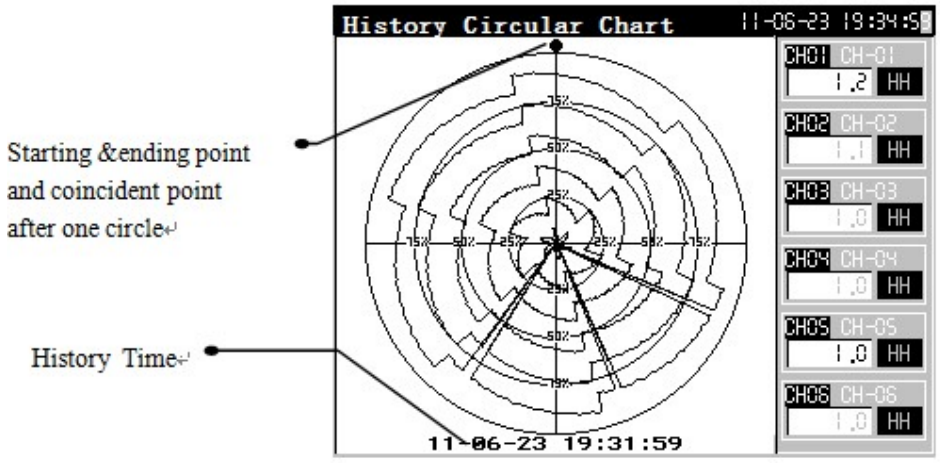
There is bargraph percentage of multi channel display in bragraph screen for user being convenient to compare. Please press « or » key to move the cursor ; please press ↑ or ↓ to change each channel no

5.6.History Trend Screen



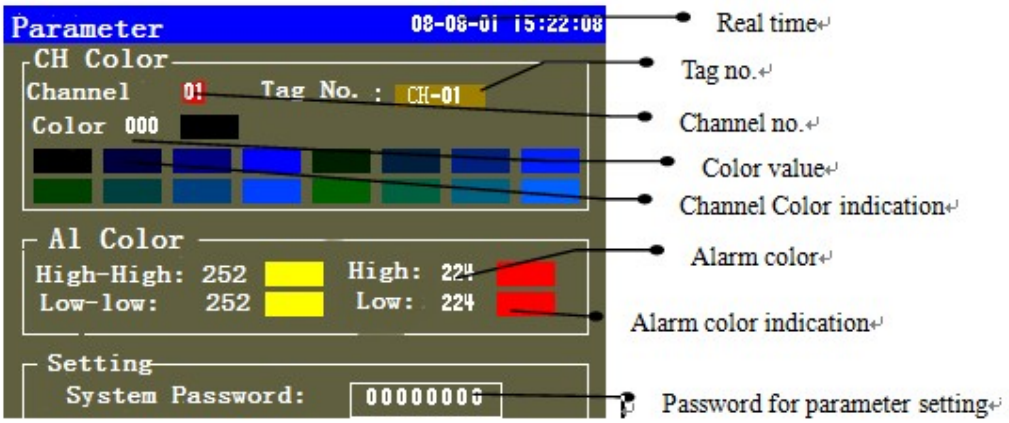
The history curve screen is mainly used to check the history curve and data. Please press « or » key to move cursor; press ↑ or ↓ key to change the channel number and history time, which can check the measured value and curve of required channel in required time and. Please press ↺ to shift the next screen.

5.7. History Circular Screen



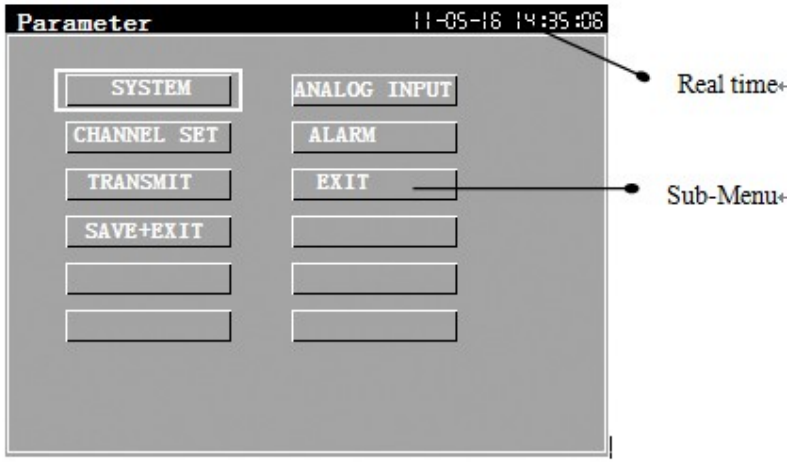
There is history value of multi channel displayed in circular chart in history circular chart screen. Please press « or » key to move cursor; press ↑ or ↓ key to change the channel no. and specified time. Please press ↵ to shift the next screen.

5.8. System Color Setting and Password Screen

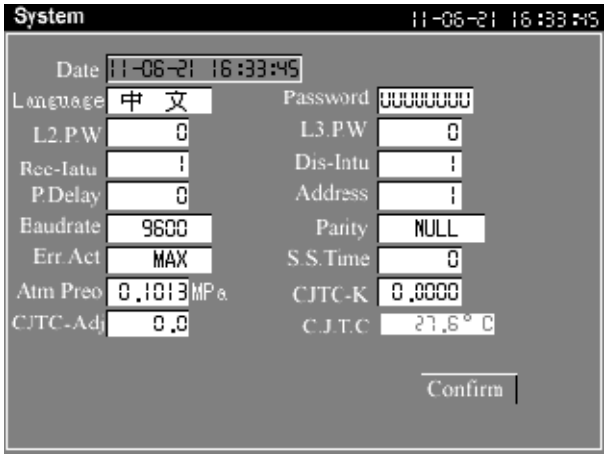


The system configuration screen is mainly used to set channel color and alarm color and enter into system parameter setting. Please press « or » key to move the cursor; please press ↑ or ↓ key to change the channel no., channel color value, alarm color value and enter into system password. Please shift the cursor in password parameter and then input correct password, then press ↵ key to enter the system parameter setting. If the cursor is not in password parameter position, press ↵ key to shift the next screen.

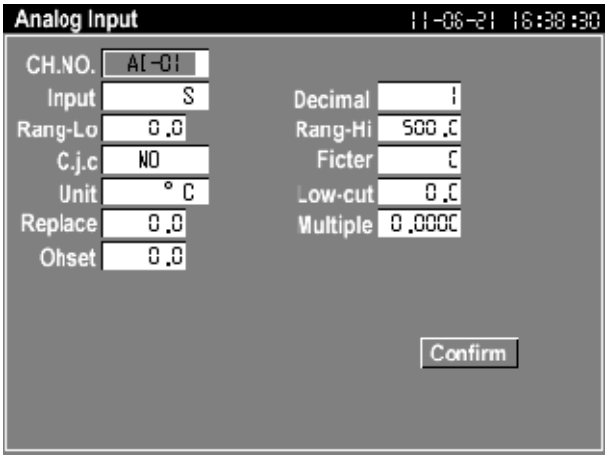
5.9 System Parameters Configuration Screen



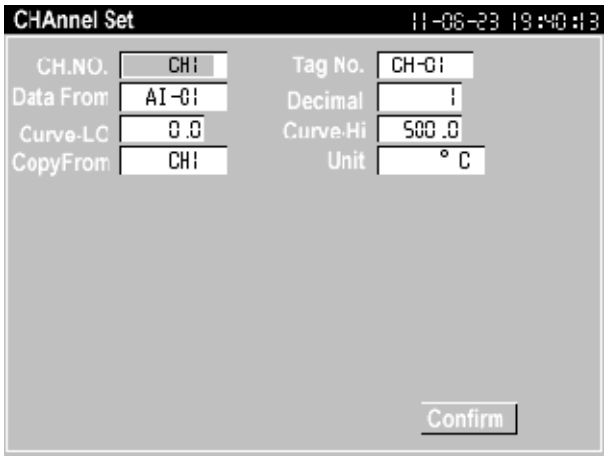
The System parameters configuration screen “Parameter” is used for system parameters configuration and save. There are system parameter, channel parameter, alarm parameter etc in system configuration screen. Please press « or » to move cursor; press ↵ key to enter into each parameter setting screen and operation. After finishing required parameter setting ,please shift the cursor to parameter “Save+Exit” and press ↵ key to save modified parameter setting and exit . If do not save the modified parameter setting, please shift the cursor to parameter “ EXIT” and press ↵ key to exit parameter but not save modified parameters. Please see operation as follows:



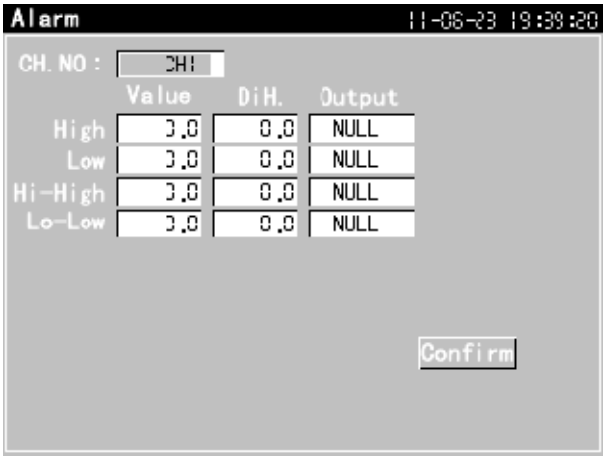
The system parameter setting screen “SYSTEM” is used for setting the system common parameters, such as date, password, record interval etc. After finishing the setting, please shift the cursor to parameter “Confirm” and press ↵ key to exit setting screen and return back to general system parameters configuration screen.



"ANALOG INPTU" Screen is used for setting analog input parameters, such as input signal type, range high and low limit etc. After finishing setting, please shift the cursor to parameter "Confirm" and press key to exit setting screen and return back to general system parameters configuration screen.



"Channel Set" screen is used to set the required channels parameters with display, record and alarm functions, such as singal source-"Data from", curve low limit-"Curve-Lo", unit etc. After finishing the setting, please shift the cursor to parameter "Confirm" and press key to exit setting screen and return back to general system parameters configuration screen.



"Alarm" screen is used to set alarm parameter of each channel, such as alarm value-"Value", alarm output position-"Output", hysteresis-"Hy." etc. After finishing the setting, please move the cursor to 'Enter' menu, and then press to exit the setting display and return to the system configuration display.

6. System Configuration Parameters

System Parameter

Parameter	Range	Parameter Type	Function &Description
Date	Valid date value	Password	System real time date
Language	Chinese, English	Character	Chinese and English shift able
Password	character	Character	System password for preventing system parameter modified viciously. 000000 as default.
L2 P.W.	-30000-30000	Integer Number	Level 2 password for clearing flow totalizer value
L2.P.W.	-30000-30000	Integer Number	Level 3 password for clearng quantitative totalizer flow value
Rec-intv	1 – 3600s	Integer Number	Record interval time. The higher the record interval time is set, the longer the total data record time is. Otherwise, lower record interval time against shorter data record time. When the measured object value changes slowly, “Rec-intv” can be set higher. Please set “Rec-intv” lower if changing fast. Usually ‘Rec-intv” can be set as half or lower than the measured changing time.
Dis-intv	1-3600s	Integer number	Interval time of real time trend refreshing. The higher “Dis-intv” value is set, the slower the trend refreshes, the longer the current curve time is in current display zone. Otherwise, will be adverse.
P.Delay	1 – 30000s	Integer Number	Print Delay Time for adjust printing speed, in order to avoid that the data received by mini printer is exceed its capacity.
Address	0 – 253	Integer Number	Communication address. When there is multi-meter communication, please set “Address” different. 255: address, 254: universal address.
Baud rate	1200, 2400, 4800, 9600, 19200	Character	Communication rate. Please set “Baudrate” same with master-PC when multi-meter communication.
Parity	Null, EvEn, Odd	Character	Null: communication without even-odd check EvEn: communication with even check Odd: communication with odd check
Err. Act	MAX, MIN, HOLD	Character	Error action handing. If when thermocouple input, RTD input 1-5VDC input, 4-20mA input is in short-circuit or open-circuit or over-range; the measured value display “OPEN”, according to “Err.act” Parameter, please see below operations as follows: MAX: the measured value in maximum (32751) MIN: the measured value in minimum (-20000) HOLD: the measured value hold same
S.S.Time	0-30000s	Integer Number	Screensaver time for LCD background light auto off when there is no any operation in meter. in order to decrease the power consumption. When “S.S.Time” is set as “0”, LCD background light will be always on. If set as “ 30”, LCD background light will be auto off if there is no any operation in meter. Meanwhile, if the meter is in “System Parameter Configuration” screen, it will exit this screen automatically
Atm pres.	0.0000 -3.0000Mpa	Fix point number	Atm pressure value for mounted location of flow meter if temperature and pressure compensation is needed when flows accumulation.

CJCT-K	0.0000 -2.0000	Fix point number	Used for adjusting temperature coefficient of thermocouple cold junction temperature(Temperature compensation value= Temperature compensation coefficient x Temperature compensation value + Temperature offset), parameter as follow:C.J.T.C=CJCT-K x C.J.T.C+ CJTC-Adj)
CJTC-Adj	-20.0 -50.0	Fix point number	Used for adjusting " CJCT-K" constant (C.J.T.C.=CJCT-K x C.J.T.C. +CJTC-adj)
C.J.T.C	Temperature value	Fix point number	Display connection terminal temperature of meter

Analog Input Parameter

Parameter	Range	Parameter Type	Function & Description
AI.CH	AI-01 ~ AI-06	Character	Analog Channel No., also called variable name for analog input.
Input	K, S, B, T, E, J, N, WRe325,WRe526, R,Pt100,Cu50, Cu100, 0-5V, 1-5V, 4-20mA, 0-10mA, 0~20Mv, 0~60mV, 0~100mV, 0~500mV	Character	Analog input signal l type
Decimal	0 ~ 4	Integer Number	Decimal point number. "0": no decimal. The measured value is displayed with just one decimal point when T.C. and RTD input.
Range-Hi	-20000 ~ 20000	Fix Point Number	Range high limit just for linear signal input, unvalid for T.C. and RTD input
Range-Lo	-20000 ~ 20000	Fix Point Number	Range Low limit just for linear signal input, unvalid for T.C. and RTD input
C.j.c	NO, YES	Integer Number	Cold junction compensation only used for thermocouple signal input according to thermocouple working principle. "NO": no compensation "YES": compensation. Please set "C.j.c" as "NO" for calibration.
Filter	0 ~ 99	Integer Number	Used for smooth measurement result. "Filter" set as "1"default. Please set "Filter" higher gradually if no idea resul. But the higher "Filter" is set, the slower the measuring rate.
Unit	□、□,Mpa, Psi, ppm etc	Character	Engineer Unit. Please be noted that when unit is "℉" and input signal from temperature sensor, the measured value will be changed from "C" to "℉" (Table 1 as reference)
Low Cut	-20000 ~ 20000	Fix Point Number	Used for low cut invalid small signal during measurement. When the measured value is lower than "Low Cut" set value, the measured value will use "Replace" Value. When "Low Cut" is set "0", no low cut function. There should be kept one decimal when T.C.,RTD input
Replace	-20000 ~ 20000	Fix Point Number	Replace value of parameter "Low Cut" , working with parameter "Low Cut"
Multiple	-2.0000 ~ 2.0000	Fix Point Number	Used for revising measured value gradient. When "Multiple" is not set as "0", the measured value= unrevised measured value * "Multiple" value + "Offset "value。Working with parameter

			"Offset" to finish math "y = ax + b".
Offset	-10000 ~ 10000	Fix Point Number	Used for revising static error of measurement, set "0" as default. Just when there is a static error, this parameter will be set. Working with parameter "Offset" to finish math "y = ax + b".

Channel Set Parameter

Parameter	Range	Parameter Type	Function & Description
CH. No.	CH1-CH6	Character	Channel No.
Tag No.	ASCII code	password	Tag No., ASCII code
Data From	AI-01-AI-08 FI-01-FI-04 OP-01-OP-08 LINE-01-LINE08 FLOW-01-FLOW-08	Character	Signal Source. Data is needed displaying, alarm, and recording. "AI-01-AI-08": analog input data, such as T.C., RTD, linear input "FI-01-FI-04" :frequency input data; OP-01-OP-08: Math data; LINE-01-LINE08: Line Math data FLOW-01-FLOW-08: Flow math data.
Decimal	0-4	Integer	Decimal points numbers, usually be same as one of parameter "Data From". "0": no decimal
Curve-Lo	-20000 to 20000	Fix point number	Working with parameter " Curve-Hi", used for limit curve range of real time trend, history trend, bargraph display
Curve-Hi	-20000 to 20000	Fix point number	Working with parameter " Curve-Lo", used for limit curve range of real time trend, history trend, bargraph display
Unit	□、□, Mpa, Psi, ppm etc	Character	Engineer unit, same with one of parameter " Data From"
Copy From	CH1-CH6	Character	Copy parameter setting information from parameter "CH. No." to current channel.

Alarm Parameter

Parameter	Range	Parameter Type	Function & Description
CH No.	-20000-20000	character	Channel No.
High Value	-20000-20000	Fix point number	High limit alarm when the measured value is higher than set value of parameter "High value"
Low Value	-20000-20000	Fix point number	Low limit alarm when the measured value is lower than set value of parameter "Low value"
Hi-High Value	-20000-20000	Fix point number	High-High limit alarm when the measured value is higher than set value of parameter "Hi-High value"
Lo-Low Value	-20000-20000	Fix point number	Low-Low limit alarm when the measured value is higher than set value of parameter "Lo-Low value"
High Diff.	-20000-20000	Fix point num ber	Hysteresis value or buffering value or difference value when alarm output. It is used to avoid alarm happen or released frequently caused by the measured value changes or fall and rise. The measured value will be with one fixed decimal point when temperature input. Please see ref.7.2 on alarm output in details.
Low Diff.	-20000-20000	Fix point number	Same as "High Diff."
Hi-High Diff.	-20000-20000	Fix point number	Same as" High Diff."
Lo-Low Diff.	-20000-20000	Fix point number	Same as "High Diff."

High Output	NULL,OUT1,OUT 2	Character	High limit alarm output position for relative channel. “ NULL”: no output
Low Output	NULL,OUT1,OUT 2	Character	Low limit alarm output position for relative channel. “ NULL”: no output
Hi-High Output	NULL,OUT1,OUT 2	Character	High-High limit alarm output position for relative channel. “ NULL”: no output
Lo-Low Output	NULL,OUT1,OUT 2	Character	Low-Low limit alarm output position for relative channel. “ NULL”: no output

Transmit Parameter

Parameter	Range	Parameter Type	Function & Description
Trans.CH	Tout-01 ~ Tout-02	Character	Channel No. of retransmission
Data From	NULL,AI-01~AI-08, FI-01 ~FI-04, OP-01~ OP-08, LINE-01~LINE-08, FLOW-01~FLOW-08	Character	Signal Source. Data is needed displaying, alarm, and recording. “AI-01-AI-08”: analog input data, such as T.C., RTD, linear input “FI-01-FI-04” :frequency input data; OP-01-OP-08: Math data; LINE-01-LINE08: Line Math data FLOW-01-FLOW-08: Flow math data.
Decimal	0 ~ 4	Integer Number	Decimal points numbers, usually be same as one of parameter “Data From”. “0”: no decimal
Trans-Lo	-20000 ~ 20000	Fix Point Number	Low limit value of retransmission output range
Trans-Hi	-20000 ~ 20000	Fix Point Number	High limit value of retransmission output range

7、Function Description

7.1、Digital Filter

When there is digital change and jump caused by input signal with interference, it can adopt digital filter to make it smooth. The range of “Filter” is 0-99. “ 0” is no any filter. When “Filter “ value is is higher, the measured value is more stable but ther responding rate will be slower. When there is strong interference on the measured value, the value “Filter” can be increased higher gradually to make the measured value changes instantaneously during less than 2-5 digits. Please set “Filter” as 0 to increase the respond speed when calibration in lab.

7.2. Alarm Output

Low and lower limit alarm diagraph

alarm off Low alarm

lower limit alarm

LA : Low alarm limit

LLA : lower limit alarm

Hy : alarm hysteresis

high and higher limit alarm diagraph

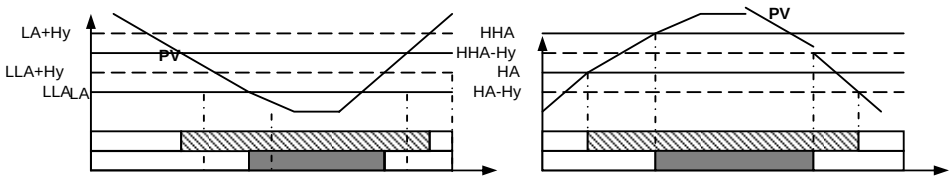
Alarm –off high limit alarm

High limit alarm

HA : high limit alarm

HHA : higher limit alarm

Hy : alarm hysteresis



7.3 transmitter output

The transmission function is current signal output according to measured value (PV) and retransmission range. Please see below calculation format of retransmission current output:

$$\text{Transmission current Value} = \frac{(PV - \text{“Trans.Lo”}) \times 16mA}{\text{“Trans.Hi”} - \text{“Trans.Lo”}} + 4mA$$

It is assumed that the retransmission parameter setting as follows:
‘Tran.CH’=”Tout-01”, ‘DataFrom’= “AI-01”, ‘Trans-Lo’=0, ‘Trans-Hi’=1300

So：When PV(measured value)≤0, retransmission output is4 m A.

When PV (measured value)≥1300, retransmission output is 20m A.
When PV (measured value) =650, re transmission output is12 m A.

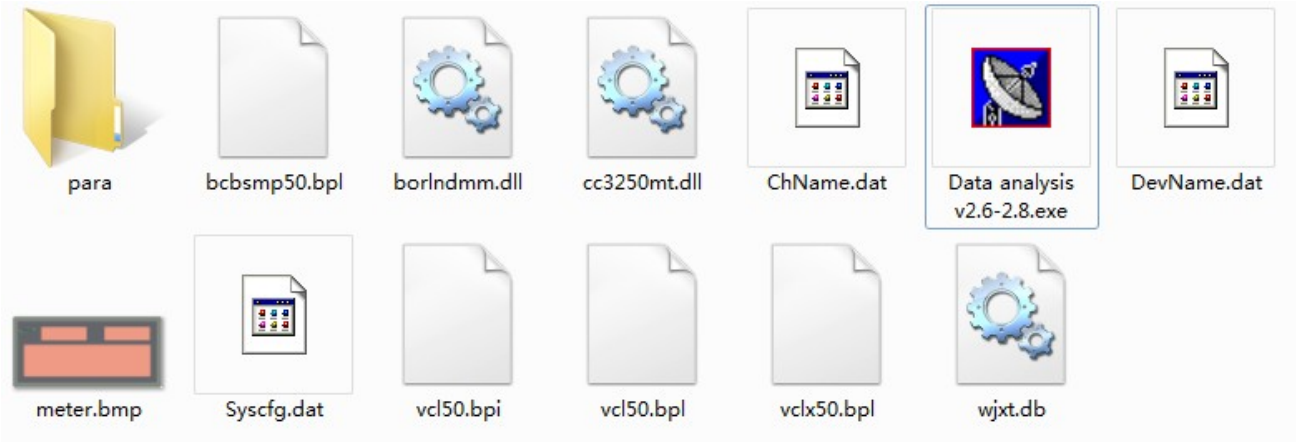
8. Data Analysis Software

8.1、Download Data from Recorder

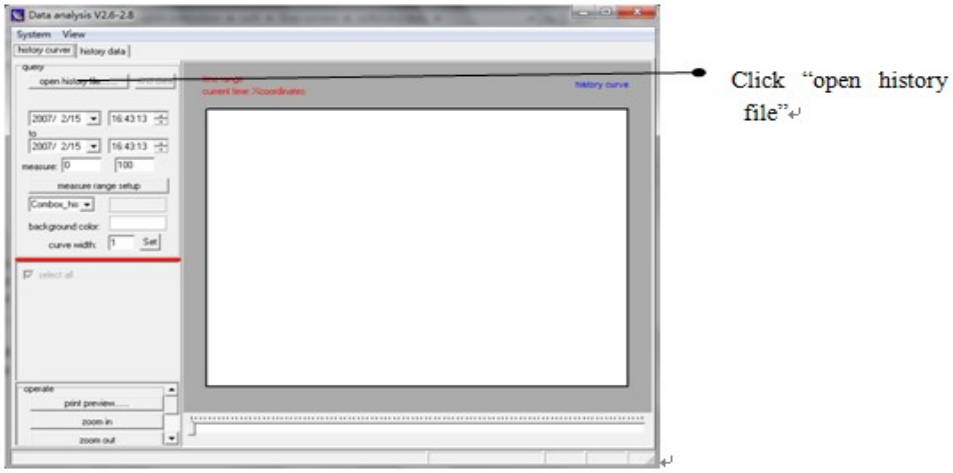
1. Please be advised that USB flash drive file format is ‘FAT16’ default. If not, please format it to ‘FAT16’.
2. Please ensure USB flash drive with enough space for memory, which should be more than recorder itself storage capacity (8MB default).
3. Please insert USB flash drive into USB interface at the front panel of recorder. So the “DAT” format file will be made automatically in USB flash drive, also named automatically in current year, month and data format, such as 050811.dat. (05: year in 2005, 08: month in August, 27: day in 11th) . During download data, the recorder will display “Save data…” in the top of the screen with USB red light flashing. Please do not take out the USB flash drive during downloading data from recorder so that it affects normal working of the recorder.
4. If there is something wrong during download data from recorder, please take out USB flash drive and confirm above point 1 and point 2 again. If the screen displays error, please press “ ” key to shift the screen, will be ok.
5. when the screen display” Save data….OK” and red light not flashing in USB flash drive, please take out USB flash drive for further analysis to PC. Finish Download.

8.2、Data Analysis Software

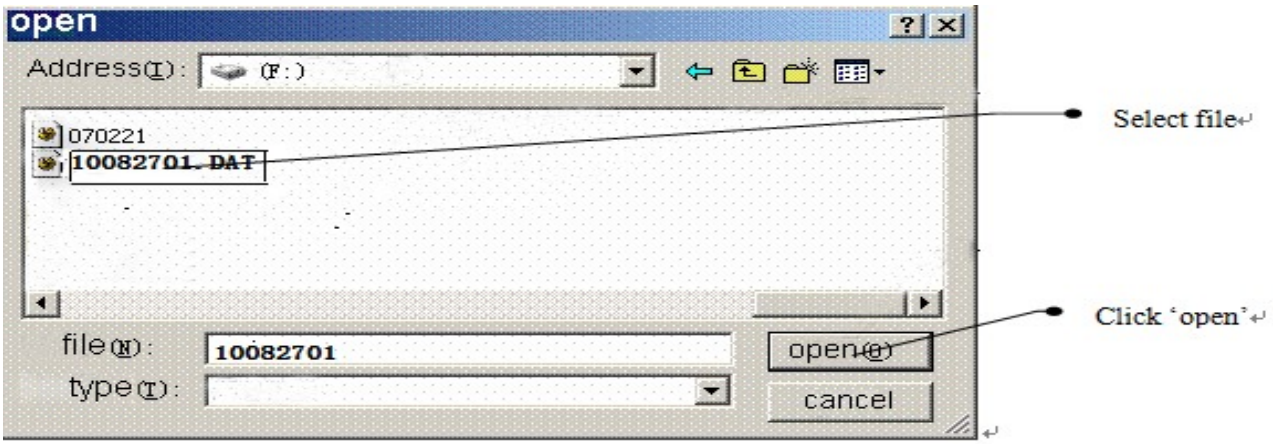
1. Please insert the USB flash drive into computer USB port after finishing download data from recorder. Pleases copy and save in hard disk in computer for long time memory.
2. Please save the data analysis software from USB flash drive and CD to PC. Please open the data analysis software and click “Data analysis v2.6-v2.8.exe” as follows:



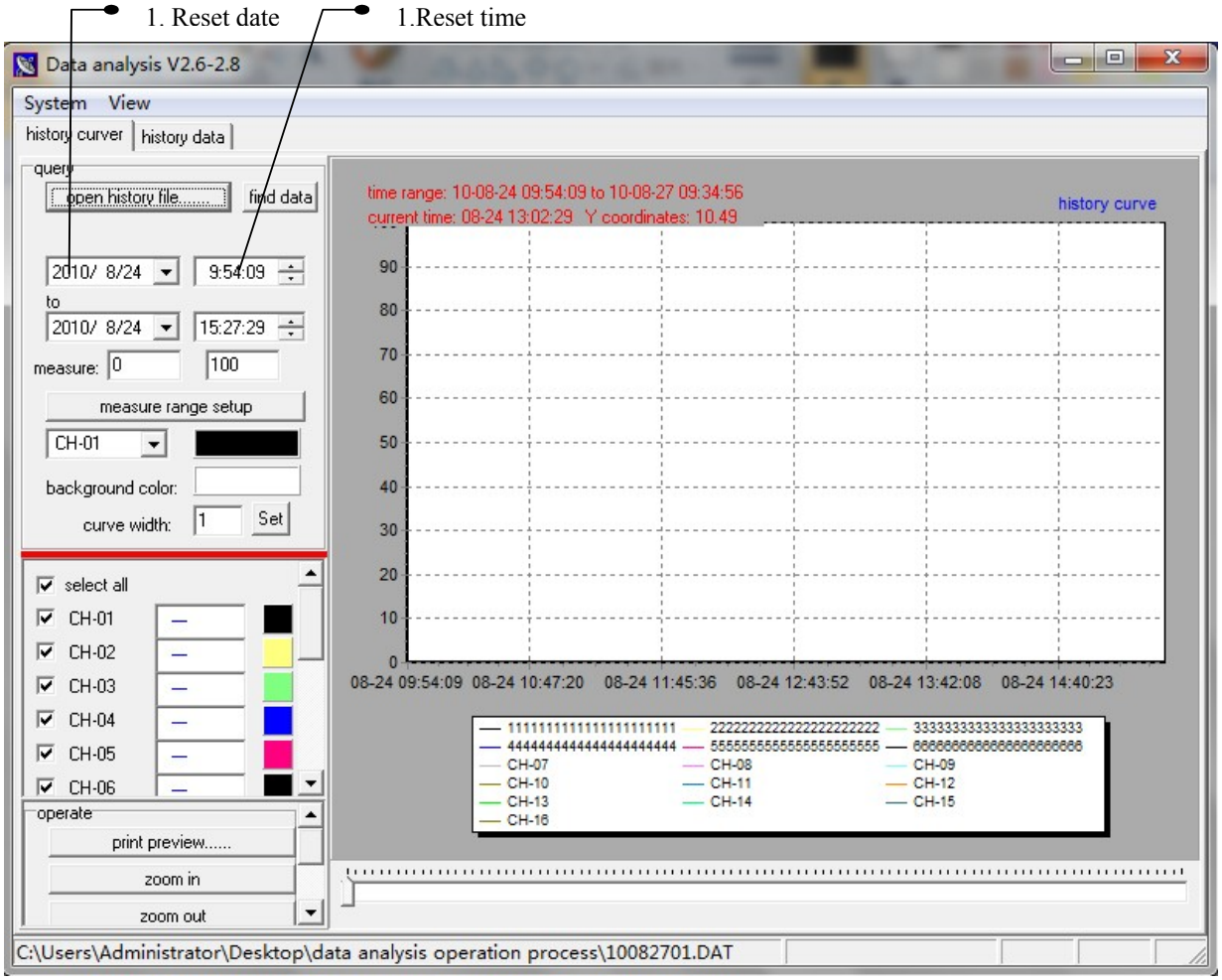
3. Please click “open history file” after click “Data analysis v2.6-v2.8.exe” as follows



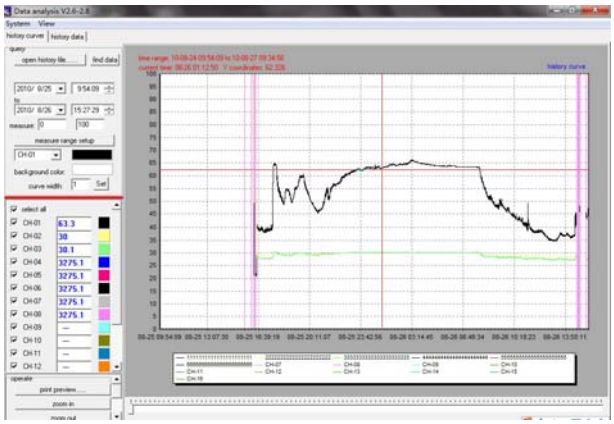
3.Plase select data file in “ .DAT “ format：



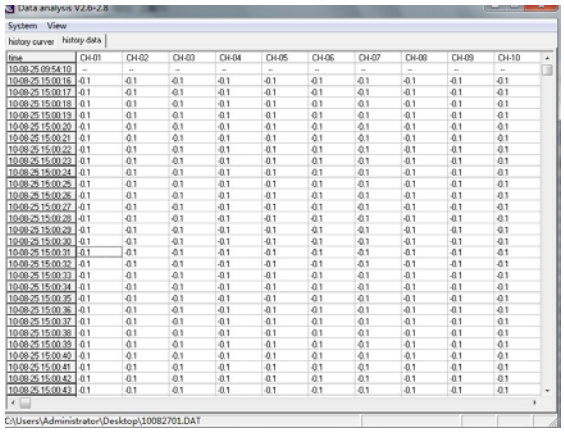
4. After clicking “open”, Please reset the date and time for recorded data. Then click “find data” to get the data in curve and digital display.



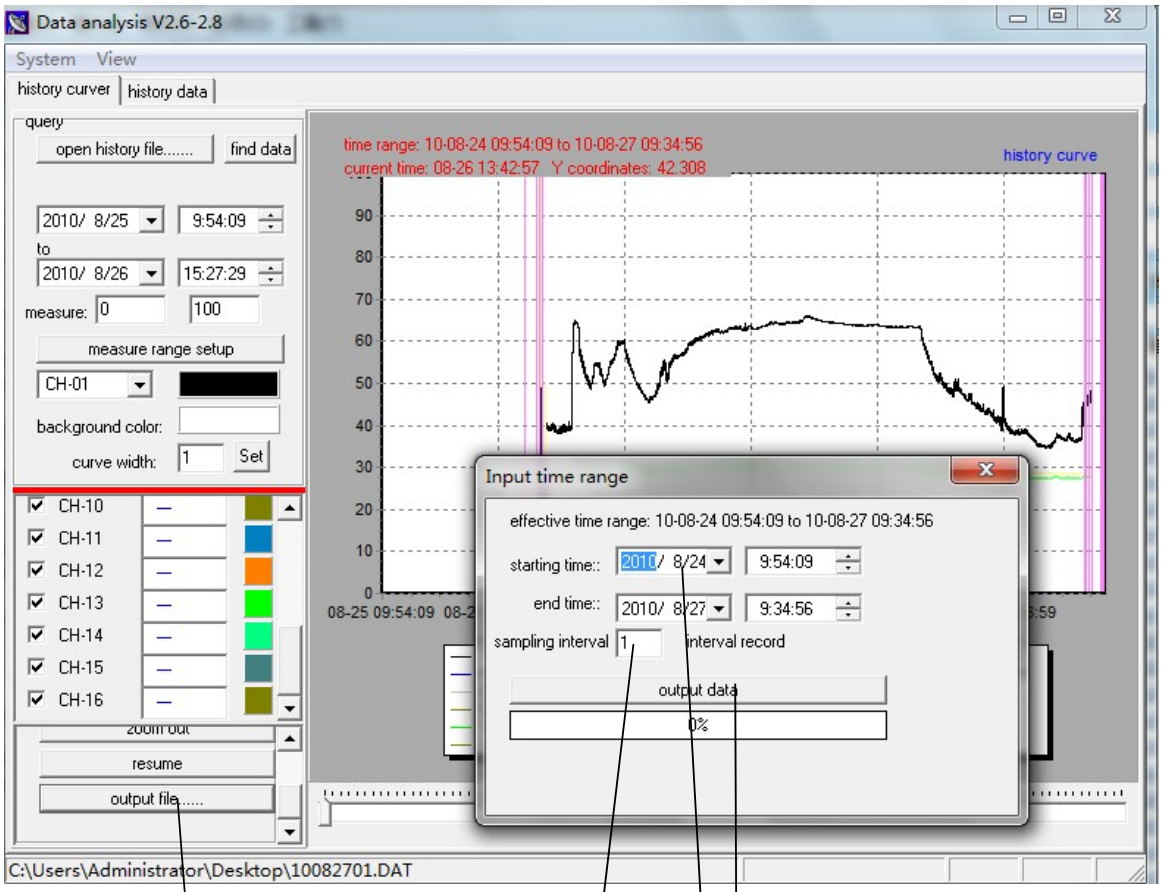
. Curve Display and digital value display per with the cursor moving



Please click “history data” to see total digital display in the time range of all channels.



3. Data output to excel format: Please click “data output” then set the starting and ending time, sampling interval in below dialogue. Then please click “output data” to save and name the excel file in PC.



1. Output Excel file

3. Set the interval time of data output: get a data every some records

2. Set starting and end time of the data for output data.

4. Click “output data”, save and name the file in save dialogue to get excel format data

9. Communication

9.1、MODBUS-RTU Communication

KH300A series meters have serial communication function, can be communicated with computer via RS232 or RS485 interface (RS485/RS232 converter should be needed in PC port) and receive read and write operation on meter to achieve DCS control. The Standard MODBUS communication protocol is available, strong universality, good compatibility and high communication stability etc. There can be up to 255 pcs of meters in a communication fieldbus by the working with repeater. The PC software can be programmed by user based on our free MODBUS-RTU protocol or can be purchased from KEHAO.

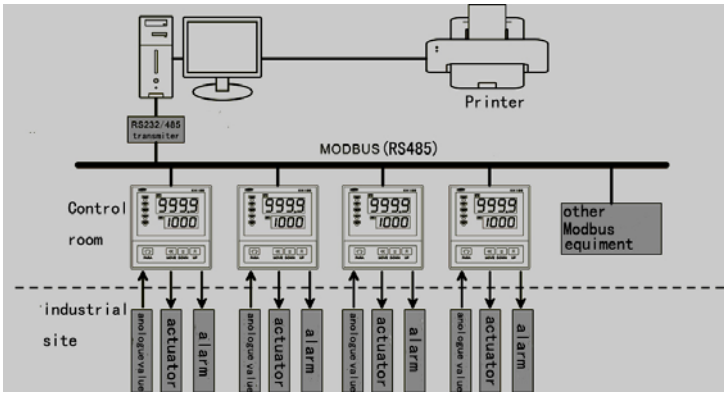


Table 1:Unit

°C	°F	Kg/h	Kg/min	Kg/s	t/h	t/min	t/s
L/h	L/min	L/s	m3/h	m3/min	m3/s	Km3/h	Km3/min
Km3/s	Nm3/h	Nm3/min	Nm3/s	t	kg	g	m3
Km3	Nm3	%RH	Pa	KPa	MPa	mmHg	cmHg
mHg	bar	mbar	%	‰	A	mA	KV
V	mV	~A	~mA	~KV	~V	~mV	M
mm	Wm	cm	Km	Hz	KHz	MHz	r/min
r/s							

Caution on Safety

Read instruction manual before using the product

Information in the catalog is subject to change without notice.