ONMEAS®

Rev.A1

AT4508~32

Multi Channel Temperature Meter



User's Guide

Scan QR code for operation video

Safety Summary

Warning Dangerour：

The following general safety precautions must be observed during all phases of operation, service, and repair of this instrument. Failure to comply with these precautions or with specific WARNINGS elsewhere in this manual may impair the protection provided by the equipment. In addition it violates safety standards of design, manufacture, and intended use of the instrument.

Disclaimer	The Onmeas Instruments assumes no liability for the customer's failure to comply with these requirements.
Ground The Instrument	To avoid electric shock hazard, the instrument chassis and cabinet must be connected to a safety earth ground by the supplied power cable with earth blade.
DO NOT Operate In An Explosive Atmosphere	Do not operate the instrument in the presence of inflammable gasses or fumes. Operation of any electrical instrument in such an environment constitutes a definite safety hazard.
Keep away from live circuit	Operating personnel must not remove instrument covers. Component replacement and internal adjustments must be made by qualified maintenance personnel. Do not replace components with the power cable connected. Under certain conditions, dangerous voltages may exist even with the power cable removed. To avoid injuries, always disconnect power and discharge circuits before touching them.
Operations not included in the manual are forbidden	The protection measurements will be failure while beyond the scope.
	Warning: TO AVOIDE INSTRUMENT DAMAGED, PLEASE DO NOT PUT DC VOLT OR CURRENT IN THE TESR TERMINAL MAKE SURE THE CAPACITOR IS DISCHARGED BEFORE TESTING

Safety Sign:



Provide double insulation or reinforced insulation protection

Waste Electrical and Electronic Equipment (WEEE) order 2002/96/EC



Do not leave in the trash can

CERTIFIACTION, LIMITED & LIMITATION OF LIABILITY

Onmeas Instruments, Inc. （shortened form **Onmeas**）certifies that this product met its published specifications at the time of shipment from the factory. Onmeas further certifies that its calibration measurements are traceable to the People's Republic of China National Institute of Standards and Technology, to the extent allowed by the Institution's calibration facility or by the calibration facilities of other International Standards Organization members.

This Onmeas instrument product is warranted against defects in material and workmanship for a period corresponding to the individual warranty periods of its component products. **The warranty period is 1 year and begins on the date of shipment.** During the warranty period, Onmeas will, at its option, either repair or replace products that prove to be defective. This warranty extends only to the original buyer or end-user customer of a Onmeas authorized reseller, and does not apply to fuses, disposable batteries or to any product which, in Onmeas's opinion, has been misused, altered, neglected or damaged by accident or abnormal conditions of operation or handling.

For warranty service or repair, this product must be returned to a service facility designated by Onmeas. The buyer shall prepay shipping charges to Onmeas and the Buyer shall pay all shipping charges, duties, and taxes for products returned to Onmeas from another country.

Onmeas warrants that its software and firmware designated by Onmeas for use with an instrument will execute its programming instruction when properly installed on that instrument. Onmeas does not warrant that the operation of the instrument, or software, or firmware, will be uninterrupted or error free.

The foregoing warranty shall not apply to defects resulting from improper or inadequate maintenance by the Buyer, Buyer-supplied software or interfacing, unauthorized modification or misuse, operation outside the environmental specifications for the product, or improper site preparation or maintenance.

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People's Republic of China
Jiangsu Province
Changzhou Onmeas Instruments Inc
.
Oct. 2009
Rev.A1

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1. Unpacking and Inspection

This chapter provides the following information:

- Packing List
- Power Supply
- Operation Environment
- Cleaning
- Instrument Handle

1.1 Packing List

After you receive the instrument, carry out checks during unpacking according to the following procedure.
Check that the packing box or shock-absorbing material used to package the instrument has not been damaged.
Referring to the packing list, check that all packaged items supplied with the meter have been provided as per the specified optioned.
If damaged or accessories shortage, please contact the sales department or our agent.

1.2 Power Supply

AT45xx can only be used in the following power supply conditions:

Voltage：90V-260VAC

Power：30VA MAX

Warning: To prevent risk of electric shock, connect the power supply ground
If the user replace the power cord, make sure the power cord to a reliable connection.

1.3 Operation Environment

Ensure the operation environment meets the following requirements

Temperature Range: 0℃～55℃，
Humidity: 23℃, < 70%RH
Altitude: 0~2000m

1.4 Cleaning

Do not attempt to clean the internal of AT45xx

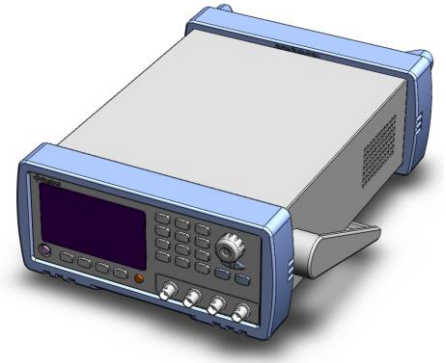
Warning:
Don’t Use Organic Solvents (such as alcohol or gasoline) to clean the Instrument.

Use a dry cloth or a cloth slightly dipped in water to clean the casing.

1.5 Instrument Handle

Instrument handle can be adjusted, both hands gripping the handles on both sides, gently pull toboth sides, and then rotate the handle. The handle can be adjusted to four positions, as shown below:

Figure 1-1 The instrument handle (schematics, panel graphics and is not)

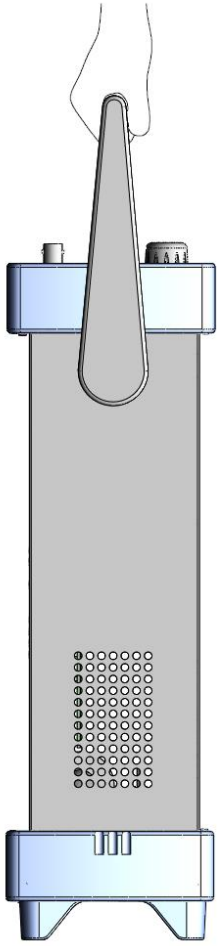


View 1: Position of a both hands holding the handles on both sides , gently pill to the sides until you can rotate freely ,and the switch to the View 2

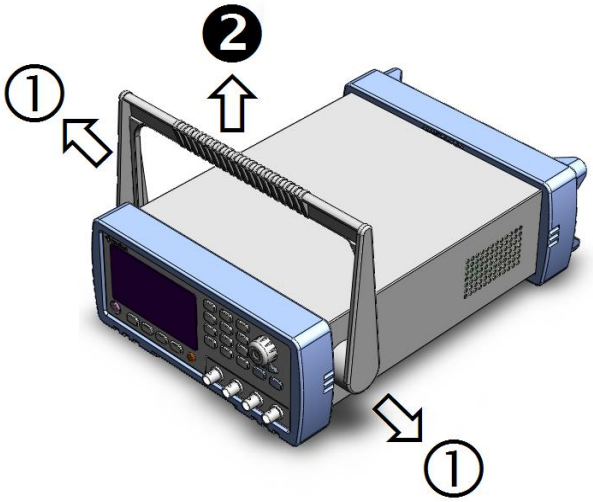
⇩



View 2: Hands holding the handles on both sides at the same time , gently pull to both sides until it can be freely rotated position ,and the switch to the mobile location.

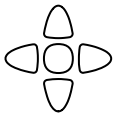


Carrying Position



Remove Handle（*Lift the handle perpendicular to the unit while pulling it in the direction of 1.*）

2. Overview



This chapter provides the following information:

- Overview
- Main Specification
- Main Function

2.1 Introduction

Thank you for purchasing AT45xx Multi-channel Temperature Meter

The Applent AT45xx adopts high-performance ARM microprocessor control, collects multi-channel temperature data simultaneously. The AT45xx can be extended to 128 channels, compatible with a variety of temperature sensors, fast response, data stability while with the burnout detection function. Also you can separately calibrate the data of each channel.

Configuration USB (virtual serial port) interface, through the software to achieve data acquisition, analysis and printing.

AT45xx Supports USB disk storage and save the sampling data real-time.

2.2 Main Specifications

- Graduation: thermocouple J ,K, T, E, S, N, B,R
- Measurement Range: -200.0℃~1800.0℃（change according to different thermocouple type）
- Resolution: 0.1℃
- Channel: 8 channels (can be extended to 128 channels)
- Sample Rate: slow, med, fast

2.3 Main Functions

2.3.1 Functions

1. Comparator Setting
2. Beep Setting
3. Baud Rate Setting
4. Temperature Unit Setting

2.3.2 Sorting Setting

Build-in sorting data, each temperature data can be set both up limit and low limit

2.3.3 Correction Function

Each channel data can been corrected by the user.

2.3.4 FAT Save Function

Users are allowed to create file suffix [.csv], every channel data can be saved in USB memory (do not support removable hard disk)

2.3.5 System Setting

1. Keypad Lock Function
2. Switch both in English and Chinese
3. Date and Time Setting
4. Administrator and user accounts, password is available to the administrator

2.3.6 Remote Control

Support Max 115200bps baud rate, compatible with SCPI protocol, ASCII transfer

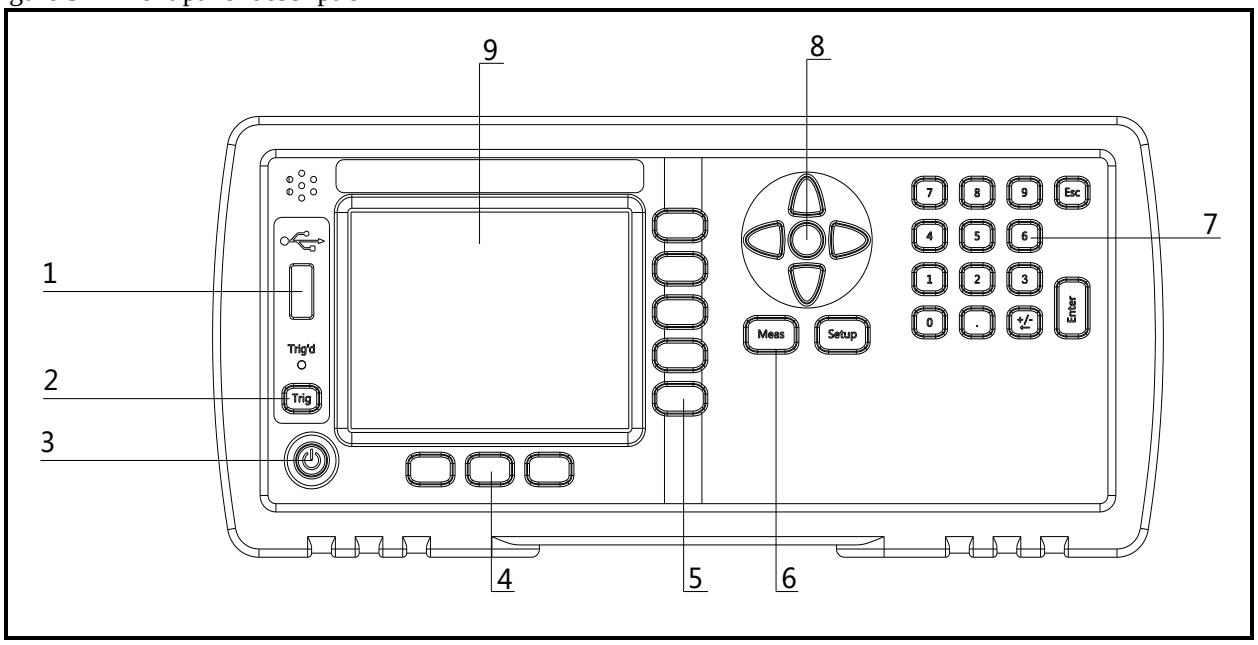
3. Startup

This chapter provides the following information:

- A tour of front and back panel
- Connection of the thermocouple

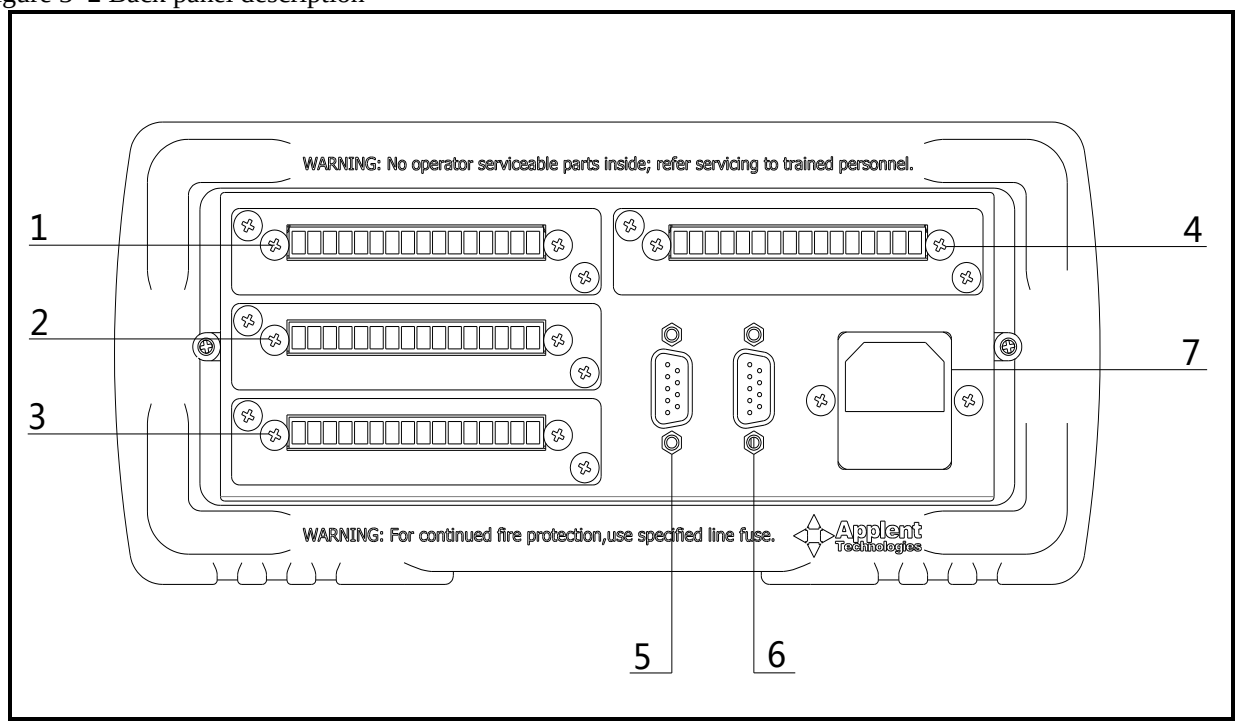
3.1 A tour of front and back panel

Figure 3-1 Front panel description



No	Description
1	USB Disk Port (USB-Host)
2	NG
3	Power Switch
4	System Key (Include File, System and Key Lock)
5	Soft Key
6	Menu key
7	Entry Key
8	Cursor Key
9	LCD Display

Figure 3-2 Back panel description



No	Description
1	1 # connection port
2	2 # connection port
3	3 # connection port
4	4 # connection port
5	RS485 expansion interface
6	RS232 interface
7	Power outlet and fuse box

3.2 Connection of the thermocouple



Figure 3-3 Thermocouple Terminals

PIN 1	Channel 1, positive pole of the thermocouple
PIN 2	Channel 1, negative pole of the thermocouple
PIN 3	Channel 2, positive pole of the thermocouple
PIN 4	Channel 2, negative pole of the thermocouple
PIN 5	Channel 3, positive pole of the thermocouple
PIN 6	Channel 3, negative pole of the thermocouple
PIN 7	Channel 4, positive pole of the thermocouple
PIN 8	Channel 4, negative pole of the thermocouple
PIN 9	Channel 5, positive pole of the thermocouple
PIN 10	Channel 5, negative pole of the thermocouple
PIN 11	Channel 6, positive pole of the thermocouple
PIN 12	Channel 6, negative pole of the thermocouple

PIN 13	Channel 7, positive pole of the thermocouple
PIN 14	Channel 7, negative pole of the thermocouple
PIN 15	Channel 8, positive pole of the thermocouple
PIN 16	Channel 8, negative pole of the thermocouple



Channel segregation between voltage of 350 v dc, ac 230 v

4. [Meas] Page

This chapter provides the following information:

- <Measure Display> Page
- <GRAPH> Page
- <CHAN SETUP> Page

4.1 <MEASURE DISPLAY> Page

When press the [Meas] key, the <MEAS DISPLAY> page appears.
<MEASURE DISPLAY> page mainly highlights the measurement results, and current sorting results will be displayed in different font and color.
The following measurement controls can be set:

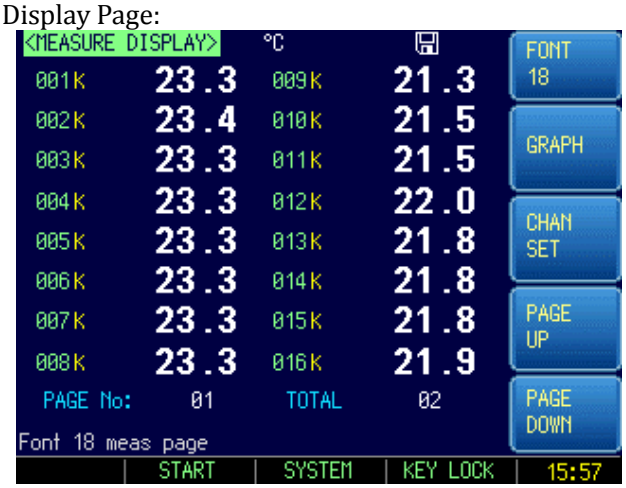
- 001 thru 008 - Channel Setting

Figure 4-1 <Measure Display> Page

- Font 24 Display Page:



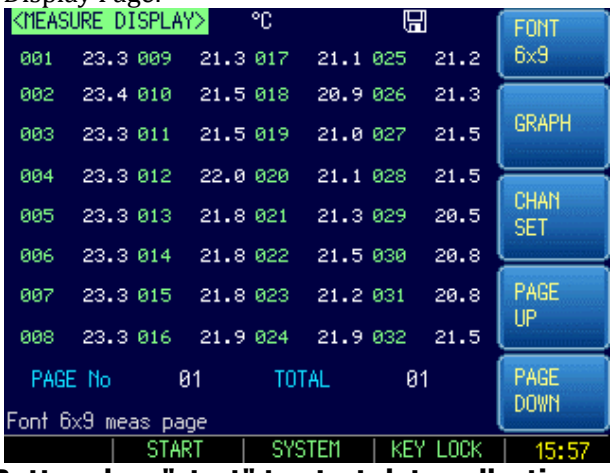
- Font 18 Display Page:



- Font 16 Display Page



- Font 6x9 Display Page:



According Buttom key "start" to start data collection, according "stop" termination of data collection.

4.1.1 Channel[001]

- Steps to close or open the channel

Step 1	Press shortcut [Meas] to enter < MEASURE DISPLAY > page	
Step 2	Use the cursor keys to select [001] field	
Step 3	Use function key to select	
	Soft Keys	Function
	OFF	Close the current channel
	ON	Open the current channel

*The same steps to close or open other channels

- Steps to modify the channels of display

Step 1	Press [Meas] key to enter < MEASURE DISPLAY > page
Step 2	Use the cursor keys to select [001] field
Step 3	Input the channel number you wanted to display in current position by pressing numeric keys, press [Enter] to end.

*The same steps to set other channels

- Steps to change the font display

Step 1	Press [Meas] key to enter < MEASURE DISPLAY > page
Step 2	Use the function key [PAGE UP] or [PAGE DOWN]

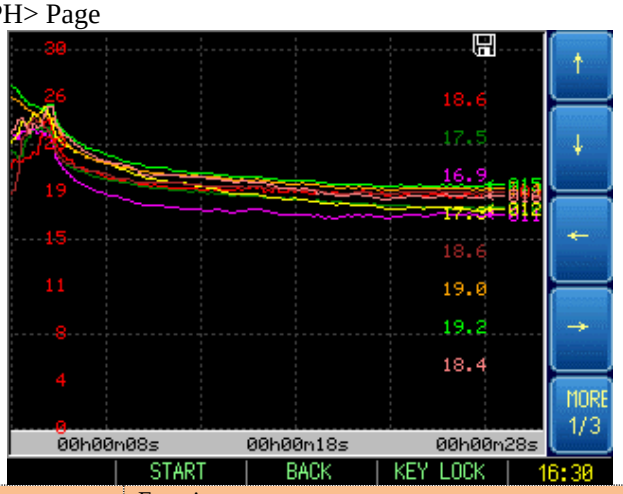
Table 4-1 Icon Function

Icon	Function
	USB-Disk attached
	Unit of current temperature
	Comparator Enabled

4.2 <GRAPH> Page

Press[Meas] key and then side soft key [GRAPH] to enter <GRAPH> page
<GRAPH> page mainly highlights the graph of the measurement results.

Figure 4-2 <GRAPH> Page



Soft Keys	Function
↑	Graph move up
↓	Graph move down
←	Graph move left
→	Graph move right
Z++	Y-axis unit spacing enlarge
Z--	Y-axis unit spacing narrow
TRACK	Graph Tracing
P+	Reset
P-	Page down

4.3 <CHAN SETUP> Page

Press[Meas] key and then side soft key [CHAN SET] to enter <CHAN SETUP> page
Note: Measurement data and sorting results only validity in the page of <Measurement Display>

Figure 4-3 <CHAN SETUP> Page



4.3.1 [MODEL] Setting

■Steps to set MODEL:

Step 1	Press [Meas] key to enter <MEASURE DISPLAY> page	
Step 2	Press [CHAN SET] soft key to enter <CHAN SETUP> page	
Step 3	Use the cursor keys to select [TC-K] field	
Step 4	Use soft key to select	
	Soft Key	Function

	TC-K	Setting the thermocouple K type
	TC-T	Setting the thermocouple T type
	TC-J	Setting the thermocouple J type
	TC-N	Setting the thermocouple N type
	TC-E	Setting the thermocouple E type
	TC-S	Setting the thermocouple S type
	TC-R	Setting the thermocouple R type
	TC-B	Setting the thermocouple B type
	ONEKEY SET	Set other channels sensor model for the current sensor model

4.3.2 [LOW] Setting

■Steps to set Low:

Step 1	Press [Meas] key to enter <MEASURE DISPLAY> page	
Step 2	Press [CHAN SET] soft key to enter <CHAN SETUP> page	
Step 3	Use soft keys to select [-200.0] field	
Step 4	Use numeric key to input low value, then press [Enter] to end	
	Soft Key	Function
	RESET	Under the current channel limit restore factory Settings
	ONEKEY SET	Set other channels of low limit for the low limit of the current channels

4.3.3 [HIGH] Setting

■Steps to set High:

Step 1	Press [Meas] key to enter <MEASURE DISPLAY> page	
Step 2	Press [CHAN SET] soft key to enter <CHAN SETUP> page	
Step 3	Use soft keys to select [1800.0] field	
Step 4	Use numeric key to input low value, then press [Enter] to end	
	Soft Key	Function
	RESET	Under the current channel limit restore factory Settings
	ONEKEY SET	Set other channels of high limit for the high limit of the current channels

*The same steps to set other channels

5. [Setup] Page

This chapter provides the following information：

- <SETUP> Page
- <CHAN SET> (refer to < MEASURE DISPLAY>)
- <GUEST CAL> Page

5.1 <Setup> Page

At any time, press [Setup] key to enter <**Setup**> page
<**Setup**> page can complete all settings concerned with the measurement, measurement and sorting results will not displayed and the instrument is in waiting state. Following parameters are included:

- COMP – The Comparator function Settings
- RATE – The Rate function Settings
- BEEP – The Beep function Setting
- UNIT – The Unit function Setting
- CYCLE – The Cycle function Setting
- LOW – The Low Limit Setting
- HIGH – The High Limit Setting
- SCALE – The Scale Setting
- PREFIX – The File Prefix Setting
- SPLIT – The File Split Setting

Figure 5-1 <Setup> Page



5.1.1 [COMP] Setting

Comparator setting includes: ON and OFF

■To set up the comparator ON/OFF

Step 1	Press [Setup] key to enter <SETUP> page	
Step 2	Use the cursor keys to select [COMP] field	
Step 3	Use soft key to select	
	Soft Key	Function
	OFF	Turn off the comparator function and comp icon disappeared
	ON	Turn on the comparator function to ON and comp appeared

5.1.2 [RATE] Setting

There are three kinds rate: Slow, Med and Fast

■Steps to set the speed

Step 1	Press [Setup] key to enter < SETUP > page	
Step 2	Use cursor keys to select [RATE] field	
Step 3	Use function key to select	
	Soft Key	Function

	SLOW	Set the sampling rate 1s
	MED	Set the sampling rate 0.5s
	FAST	Set the sampling rate 0.1s, Increase the length of each 8 cycle by 0.1s to 0.5s

5.1.3 [BEEP] Setting

Beep Feature includes: OFF and ON

■Steps to set beep feature

Step 1	Press [Setup] key to enter < SETUP > page	
Step 2	Use cursor keys to select [BEEP] field	
Step 3	Use soft keys to select	
	Soft Key	Function
	OFF	Turn off the Beep feature
	ON	Turn on the Beep feature

5.1.4 [UNIT] Setting

Units Includes: ℃, K,℉.

■Steps to Set the Unit:

Step 1	Press [Setup] key to enter < SETUP > page	
Step 2	Use cursor keys to select [UNIT] field	
Step 3	Use function keys to select	
	Soft Key	Function
	℃	Degree Celsius
	K	Degree Kelvin
	℉	Degree Fahrenheit

5.1.5 [LOW] Setting

Graph low setting:

■Steps to set low

Step 1	Press Shortcut[Setup] to enter <SETUP> page
Step 2	Use the cursor keys to select[-200.0]field
Step 3	Use numeric key to input low limit value, then press [Enter] to end

5.1.6 [HIGH] Setting

Graph high setting:

■Steps to set high

Step 1	Press Shortcut[Setup] to enter <SETUP> page
Step 2	Use the cursor keys to select[1800.0]field
Step 3	Use numeric key to input high limit value, then press [Enter] to end

5.1.7 [SCALE] Setting

Scale setting includes:

■Steps to set the scale

Step 1	Press Shortcut[Setup] to enter <SETUP> page			
Step 2	Use the cursor keys to select[SCALE]field			
Step 3	Use function key to select			
	Function Keys			Function
	SLOW	MED	FAST	
	1s	500ms	100ms	Graph the timeline Setting
	2s	1s	200ms	Graph the timeline Setting
	5s	2s	500ms	Graph the timeline Setting
	10s	5s	1s	Graph the timeline Setting
	20s	10s	2s	Graph the timeline Setting
	30s	20s	5s	Graph the timeline Setting
	1m	30s	10s	Graph the timeline Setting
	2m	1m	20s	Graph the timeline Setting
	5m	2m	30s	Graph the timeline Setting
	10m	5m	1m	Graph the timeline Setting
	15m	10m	2m	Graph the timeline Setting
	20m	15m	5m	Graph the timeline Setting
	30m	20m	10m	Graph the timeline Setting
	1h	30m	15m	Graph the timeline Setting

5.1.8 [PREFIX] Setting

Prefix setting includes:

■Steps to set the prefix

Step 1	Press Shortcut[Setup] to enter <SETUP> page
Step 2	Use the cursor keys to select[AUTO]field
Step 3	Create a new file prefix. Example: the input file named "Applent", the actual file called "Applent0001. csv

5.1.9 [SPLIT] Setting

Split setting includes: CLOSE ,10m,20m,30m and 1h

■Steps to set the split

Step 1	Press Shortcut[Setup] to enter <SETUP> page	
Step 2	Use the cursor keys to select[SPLIT]field	
Step 3	Use function key to select	
	Soft Keys	Function
	CLOSE	Shut down automatically split function
	10m	save the new file in about 10 minutes
	20m	save the new file in about 20 minutes
	30m	save the new file in about 30 minutes
	1h	save the new file in about 1 hours

5.1.10 [DELAY] Setting

Disk recording interval Settings

■Steps to set the delay

Step 1	Press Shortcut[Setup] to enter <SETUP> page
Step 2	Use the cursor keys to select[SPLIT]field, select function [CLOSE]
Step 3	Use the cursor keys to select[DELAY]field
Step 4	Use numeric key to input delay time, then press [Enter] to end.

Tip：

USB data logging is only available in 【MEAS】 or 【GRAPH】 page. Data logging time Is instrument internal as the criterion. When instrument internal clocking stops working, data logging will stop working too. When internal clocking does not work, users need to change internal battery.

Data includes two parts, logging time and corresponding channel temperature.

Example：

File path：AT4808/2016-12-12/AUTO0001.csv

Data format is float, reserve the last digit of decimal point, use “,” as division of channel.

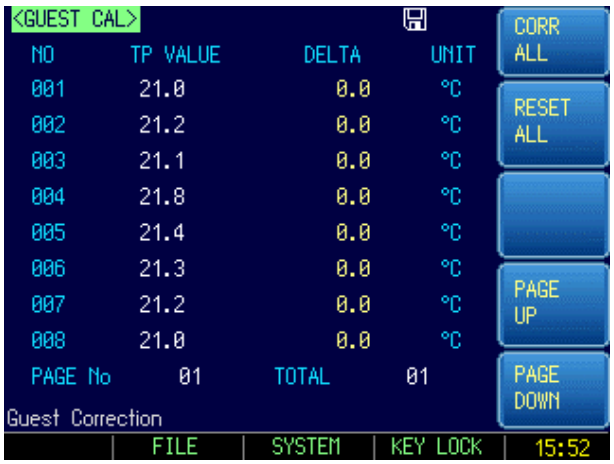
File Name			AUTO001.csv					
Trigger Time			2016/12/10 10:16:48					
Channel	1	2	3	4	5	6	7	8
Type	TC-K	TC-K	TC-K	TC-K	TC-K	TC-K	TC-K	TC-K
Time(s)	℃	℃	℃	℃	℃	℃	℃	℃
0	28.0	28.1	1005	19.2	32.4	54.3	21.6	41.9
1	28.1	28.0	100.4	19.2	32.4	54.2	21.5	42.0
2	28.0	28.1	100.5	19.1	32.3	54.2	21.5	42.0
3	28.0	28.1	100.5	19.2	32.4	54.2	21.5	42.0
4	28.1	28.1	100.5	19.1	32.4	54.2	21.6	41.9

5.2 <GUEST CAL> Page

Press[Setup] key and then side soft key [COMP SET] to enter <COMP SETUP> page

In this page, you can set the HIGH and LOW limits for each channel

Figure 5-2 <COMP SETUP> Page



5.2.1 [001]

■Steps to correct channel 001

Step 1	Press [Setup] key to enter <SETUP> page	
Step 2	Press [GUEST CAL] soft key to enter <GUEST CAL> page	
Step 3	Use cursor keys to select [0.0] field	
Step 4	Use soft key to select	
Step 5	Soft Key	Function
	INPUT	Input correction temperature value in selected channel, using numeric key to input data, press [Enter] to end
	DELETE	Delete the select channel correction temperature values

*The same steps to correct other channel values

■Steps to One-key Correction

Step1	Press [Setup] key to enter <SETUP> page	
Step2	Press [GUEST CAL] soft key to enter <GUEST CAL> page	
Step3	Press function key [CORR ALL]	
Step4	Use numerical key to input Up Values, press [Enter] to end	

■Steps to One-key Zeroing

Step1	Press [Setup] key to enter < SETUP > page	
Step2	Press [GUEST CAL] soft key to enter <GUEST CAL> page	
Step3	Press soft key [RESET ALL]	
Step4	Function Key	Function
	YES	Delete the current page correction value
	NO	Cancel “RESET ALL”, exit
	CANCEL	Cancel “RESET ALL”, exit

■Steps to Switch Channel Page

Step1	Press [Setup] key to enter < SETUP > page
Step2	Press [GUEST CAL] soft key to enter <GUEST CAL> page
Step3	Press soft key [PAGE UP]or [PAGE DOWN]to switch next page

6. System Configuration

This chapter provides the following information:

- <SYSTEM CONFIG> Page
- <SYSTEM INFORMATION> Page
- <SERVICE> Page

6.1 <SYSTEM CONFIG> Page

In any place, just press shortcut [Setup] and select taskbar key [SYSTEM] to enter <SYSTEM CONFIG> page

<**System Configuration**> Page Includes the following settings:

- Language Setting
- Date/Time Setting
- Account/Password Setting
- Baud Setting

Figure 6‑1 System Configuration Page



6.1.1 [Language]

AT45xx supports both English and Chinese

■Steps to setup language

Step 1	Press [Setup] key	
Step 2	Press bottom soft key [SYSTEM] in taskbar to enter <SYSTEM CONFIG> page	
Step 3	Use cursor key to select [LANGUAGE] field	
Step 4	Use side soft key to select language	
	Soft Key	Function
	ENGLISH	English
	CHINESE	Chinese

6.1.2 Setting the system [Date], [Time]

AT45xx features a built-in 24-hour clock.

■Steps to setup date

Step 1	Press [Setup] key	
Step 2	Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> page	
Step 3	Use cursor key to select [DATE] field	
Step 4	Use soft key to set date	
	Soft Key	Function
	YEAR INCR+	+1 year
	YEAR DECR-	-1 year
	MONTH INCR+	+1 month
	MONTH DECR-	-1 month
	DAY INCR+	+1 day
	DAY DECR-	-1 day

■Steps to setup time

Step 1	Press [Setup] key	
Step 2	Select bottom soft key [SYSTEM], enter <SYSTEM CONFIG> page	
Step 3	Use cursor key to select [TIME] field	
Step 4	Use soft key to set time	
	Soft Key	Function
	HOUR INCR+	+1 Hour
	HOUR DECR-	-1 Hour
	MINUTE INCR+	+1 Minute
	MINUTE DECR-	-1Minute
	SECOND INCR+	+1Second
	SECOND DECR-	-1 Second

6.1.3 [ACCOUNT] Setting

The AT45xx has two accounts, administrator and user.
Administrator: All functions can be configured by administrator except <SYSTEM SERVICE> page.
User: All functions can be configured by user except < SYSTEM SERVICE> page and <FILE> page.

■Steps to set Account

Step 1	Press shortcuts [Setup]	
Step 2	Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> page	
Step 3	Use cursor key to select [ACCOUNT] field	
Step 4	Use side soft key to change account	
	Function Key	Function
	ADMIN	Except page < SYSTEM SERVER > , all the functions are available to the administrator
	USER	Except page [SYSTEM SERVER] and [CATALOG], all the functions can be operated by the user.

■Steps to input password for administrator:

Step 1	Press [Setup] key	
Step 2	Press bottom soft key [SYSTEM] to enter <SYSTEM CONFIG> page	
Step 3	Use cursor key to select [PASSWORD] field	
Step 4	Use side soft key to input password	
	Soft Key	Function
	CHANGE PASSWORD	Input 9 digits numeric password. If you forget the password, please contact our sales department.
	DELETE PASSWORD	

6.1.4 [Baud] Setting

In order to correct communication, please make sure the baud rate set up correctly, PC with different baud rate will not be able to correct the communication instrument. 232 interface using SCPI language for programming.

RS-232 configuration is as follows:
Data bits: 8-bit
Stop bits:1-bit
Parity: none

■Steps to set up the baud rate

Step 1	Press [Setup] key to enter < SETUP > page	
Step 2	Use cursor keys to select [BAUD] field	
Step 3	Use side soft keys to select baud rate	
	Soft Key	Function
	9600	Chose the baud rate if you use the opto-isolated communication converter
	19200	
	38400	
	57600	
	115200	Chose this high-speed baud rate while communication with the PC

6.2 <SYSTEM INFORMATION> Page

When press the [Setup] key followed by [SYSTEM] bottom soft key, and then press [SYSTEM INFO] soft key, the <SYSTEM INFO> page appears.
There are no configurable options in the <SYSTEM INFO> page.

Figure 6-2 System Information Page



6.3 <SYSTEM SERVICE> Page



This page is used to calibrate data while input market. Non-professional person is forbidden.

7. Catalog Operation

This chapter provides the following information

- <Catalog> Page

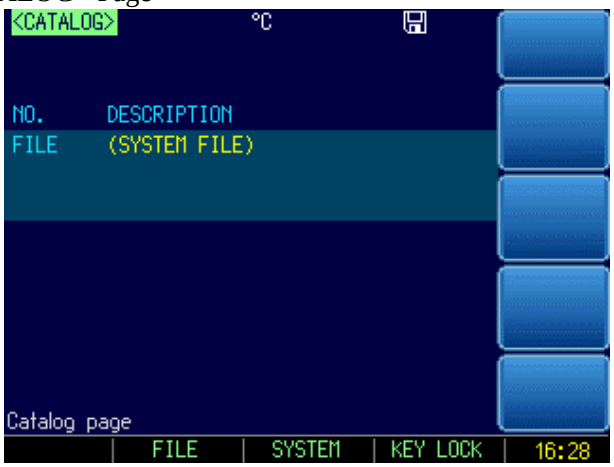
7.1 < CATALOG > Page

When press the [Setup] key followed by [CATALOG] bottom soft key, the <CATALOG> page appears. Some system settings will be saved into this file. The file will be loaded at power up.

<**CATALOG**> page includes the following settings

- FILE

Figure 7-1 <CATALOG> Page



■ Steps to Save Settings

Step 1	Press [Setup] key	
Step 2	Press [CATALOG] bottom soft key to enter <CATALOG> page	
Step 3	Use cursor key to select [FILE] field	
Step 4	Use soft key to setup file.	
	Function Key	Function
	SAVE	Save the current settings
	RECALL	Load the saved settings
	ERASE	Delete the saved settings and the settings will be reset to system default.

8. Remote Control

This chapter provides the following information to remotely control the AT45xx via the RS-232C or USB interface.This chapter provides the following information

- About RS-232C
- About USB Interface
- Select Baud Rate.
- About SCPI

8.1 About RS-232C

You can connect a controller (i.e. PC and PLC) to the RS-232 interface using Applent RS-232 DB-9 cable.The serial port uses the transmit (TXD), receiv (RXD) And signal ground (GND) lines of the RS-232 standard. It does notuse the hardware handshaking lines CTS and RTS.

NOTE:
JUST ONLY Use an Applent (not null modem) DB-9 cable.
Cable length should not exceed 2m.

Figure 8-1 The RS-232 connector in the real panel

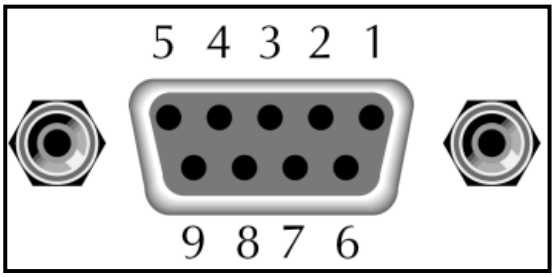


Table 8-1 RS-232 connector pinout

NAME	DB-25	DB-9	NOTE
DCD	8	1	Not Connection
RXD	3	2	Transmit data
TXD	2	3	Receive date
DTR	20	4	Not Connection
GND	7	5	Ground
DSR	6	6	Not Connection
RTS	4	7	Not Connection
CTS	5	8	Not Connection

- Make sure the controller you connect to AT45xx also uses these settings.
  The RS-232 interface transfers data using:
  8 data bits,
  1 stop bit,
  And no parity.

8.2 About USB-Serial Interface(Option)

The USB-Serial Interface allows you to connect AT45xx to a USB port on your PC.

NOTE:
Please install the USB-Serial driver before using USB-Serial Interface.
The Applent USB-Serial interface model is ATN2.

Figure 8-2 USB-Serial Interface ATN2



8.3 To Select Baud Rate

Before you can control the AT45xx by issuing RS-232 commands from built-in RS-232 controller connected via its DB-9 connector, you have to configure the RS-232 baud rate.
The AT45xx's built-in RS-232 interface uses the SCPI language.
The configuration of RS-232
RS-232 configuration is as follows:
Data bits: 8-bit
Stop bits: 1-bit
Parity: none

To set up the baud rate

Step 1. Press the [Setup] key
Step 2. Use the cursor key to select [BAUD] field
Step 3. Use the soft keys to select baud rate.

Soft key	Function
9600	
19200	
38400	
57600	
115200	Recommend

8.4 SCPI Language

Standard Commands for Programmable Instruments (SCPI) is fully supported by the



NOTE:
AT45xx ONLY supports the SCPI Language.

9. Command Reference

This chapter contains reference information on programming AT45xx with the SCPI commands.

- Terminator
- Notation Conventions and Definitions
- Header and Parameters
- Command Reference

This chapter provides descriptions of all the AT45xx's available RS-232 commands which correspond to Standard Commands for Programmable Instruments (SCPI) command sets, listed in functional subsystem order.

9.1 Terminator

<NL> : The EOI line is asserted by New Line or ASCII Line Feed character (decimal 10, Hex 0x0A，or ASCII '\n')

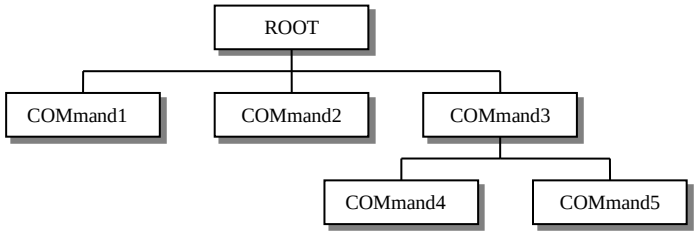
9.2 Notation Conventions and Definitions

The following conventions and definitions are used in this chapter to describe RS-232 operation.
< > Angular brackets enclose words or characters that are used to symbolize a program code parameter or an RS-232 command.
[ ] A square bracket indicates that the enclosed items are optional.
\n Command Terminator

9.3 Command Structure

The AT45xx commands are divided into two types: Common commands and SCPI commands.
The common commands are defined in IEEE std. 488.2-1987, and these commands are common for all devices. The SCPI commands are used to control all of the AT45xx's functions.
The SCPI commands are tree structured three levels deep. The highest level commands are called the subsystem commands in this manual. So the lower level commands are legal only when the subsystem commands have been selected.
A colon (:) is used to separate the higher level commands and the lower level commands.
Semicolon (;) A semicolon does not change the current path but separates two commands in the same message.

Figure 9-1 Command Tree Example



Example:

```
ROOT:COMmand3:COMmand5 ppp
ROOT    Subsystem Command
    COMmand3        Level 2
        COMmand5        Level 3
            ppp             Parameter
```

- The basic rules of the command tree are as follows.

- Letter case (upper and lower) is ignored.
  For example,
  ROOT:COMMAND3 = root:command3
- Spaces (_ used to indicate a space) must not be placed before and/or after the colon (:).
  For example,
  ☒ root_:_command3 → ☑ root:command3
- The command can be completely spelled out or in abbreviated.(The rules for command abbreviation are described later in this section)
  For example,
  root:command3 = root:com3
- The command header should be followed by a question mark (?) to generate a query for that command.
  For example,
  root:com3?
- The semicolon (;) can be used as a separator to execute multiple commands on a single line. The multiple command rules are as follows.
  Commands at the same level and in the same subsystem command group can be separated by a semicolon (;) on a multiple command line.
  For example,
  root:com3:com5 ppp ; com4 ppp
  To restart commands from the highest level, a semicolon (;) must be used as the separator, and then a leading colon (:), which shows that the restarted command is a command at the top of the command tree, must follow.
  For example,
  root:com3:com5 ppp; **:** **root:com1 ppp**



The AT45xx accepts the three forms of the same SCPI commands: all upper case, all lower case, and mixed upper and lower case.

9.4 Header and Parameters

The commands consist of a command header and parameters. (See the following.)
Example: comp:nom 100.0e3
Header Parameter

- Headers can be of the long form or the short form. The long form allows easier understanding of the program code and the short form allows more efficient use of the computer.
- Parameters may be of two types as follows.
  (A) Character Data and String Data Character data consists of ASCII characters. The abbreviation rules are the same as the rules for command headers.
  (B) Numeric Data
    (a) <integer>: For example, 1,+123,-123
    (b) <float>: For example, 1.23e3, 5.67e-3, 123k, 1.23M, 2.34G, 1.234
    (c) <scifloat>: For example, +1.23456e+03

The available range for numeric data is 9.9E37. When numeric data is used as a parameter, the suffix multiplier mnemonics and suffix units (The suffix multiplier must be used with the suffix unit) can be used for some commands as follows.
Table 9-1 Multiplier Mnemonics

Definition	Mnemonic
1E18 (EXA)	EX
1E15 (PETA)	PE
1E12 (TERA)	T
1E9 (GIGA)	G
1E6 (MEGA)	MA
1E3 (KILO)	K
1E-3 (MILLI)	M
1E-6 (MICRO)	U

1E-9 (NANO)	N
1E-12 (PICO)	P
1E-15 (PEMTO)	F
1E-18 (ATTO)	A

9.5 Command Reference

All commands in this reference are fully explained and listed in the following functional command order.

- MEAS Subsystem
- SYST Subsystem
- FETCH Subsystem
- ERROR Subsystem
- IDN?

9.5.1 MEAS SUBSYSTEM

The MEAS Subsystem command group sets the meas page.

Figure 9-2 MEAS Command Tree

Meas	:MODEL	{tc-t,tc-k,tc-j,tc-n,tc-e,tc-s,tc-r,tc-b}
	:RATE	{fast,med,slow}
	:KEYLOCK	{on,off}
	:START	{on,off}
	:CMODEL	<para>,<level>
	:CHANON	<para>,<on,off>
	:LOW	<level>
	:CLOW	<para>,<level>
	:HIGH	<level>
	:CHIGH	<para>,<level>
	:SENSOR	{tc-t,tc-k,tc-j,tc-n,tc-e,tc-s,tc-r,tc-b}
	:FONT	{fong24,font18,font16,font6x9}

9.5.1.1 MEAS:MODEL

The :MODEL command sets the Model.

Command Syntax	MEAS:MODEL <tc-t,tc-k,tc-j,tc-n,tc-e,tc-s,tc-r,tc-b>
Example	SEND> MEAS:MODEL TC-T<NL> //Set MODEL to T-type thermocouple
Query Syntax	MEAS:MODEL?
Query Response	< tc-t,tc-k,tc-j,tc-n,tc-e,tc-s,tc-r,tc-b ><NL>
Example	SEND> MEAS:MODEL?<NL> RET> tc-t<NL>

9.5.1.2 MEAS:RATE

The :RATE command sets the Speed.

Command Syntax	MEAS:RATE <fast,med,slow>
Example	SEND> MEAS:RATE fast<NL> //Set to fast speed
Query Syntax	MEAS:RATE?
Query Response	<fast,med,slow><NL>
Example	SEND> MEAS:RATE?<NL> RET> fast<NL>

9.5.1.3 MEAS:KEYLOCK

The :KEYLOCK command sets the KEYPAD.

Command Syntax	MEAS:KEYLOCK <on,off>
Example	SEND> MEAS:KEYLOCK off<NL> //Set to close Keypad
Query Syntax	MEAS:KEYLOCK?

Query Response	**<on,off><NL>**
Example	**SEND> MEAS:KEYLOCK?<NL>** **RET> on<NL>**

9.5.1.4 MEAS:START

The :START command sets the sample.

Command Syntax	**MEAS:START <on,off>**
Example	**SEND> MEAS:START off<NL> //Set to start sample**
Query Syntax	**MEAS:START?**
Query Response	**<on,off><NL>**
Example	**SEND> MEAS:START?<NL>** **RET> on<NL>**

9.5.1.5 MEAS:CMODEL

The :CMODEL command sets the MODEL of each channel.

Command Syntax	**MEAS:CMODEL <para>,< tc-t,tc-k,tc-j,tc-n,tc-e,tc-s,tc-r,tc-b >**
Example	**SEND> MEAS:CMODEL <001>,<tc-t>** **//Set the channel 001model for T-type thermocouple**
Query Syntax	**MEAS:CMODEL?**
Query Response	**< tc-t,tc-k,tc-j,tc-n,tc-e,tc-s,tc-r,tc-b >**
Example	**SEND> MEAS:CMODEL?<NL>** **RET> < tc-t,tc-t >**

9.5.1.6 MEAS:CHANON

The :CHANON command sets the status of each channel.

Command Syntax	**MEAS:CMODEL <para>,<on,off>**
Example	**SEND> MEAS:CMODEL <001>,<on>** **//Set the channel 001 open**
Query Syntax	**MEAS:CHANON?**
Query Response	**< on,off>**
Example	**SEND> MEAS:CHANON?<NL>** **RET> < ON,ON,ON,ON,ON,ON >**

9.5.1.7 MEAS:LOW

The :LOW command sets the low value of all channel.

Command Syntax	**MEAS:LOW <float>**
Example	**SEND> MEAS:LOW <-200.0>** **//Set the all channel low limit -200.0**
Query Syntax	**MEAS:LOW?**
Query Response	**< float,float >**
Example	**SEND> MEAS:LOW?<NL>** **RET> < -2.00000e+02, -2.00000e+02 >**

9.5.1.8 MEAS:CLOW

The :CLOW command sets the low value of each channel.

Command Syntax	**MEAS:CLOW <para>,<float>**
Example	**SEND> MEAS:CLOW <001>,<-200.0>** **//Set the channel 001 low limit -200.0**

9.5.1.9 MEAS:HIGH

The :HIGH command sets the high value of all channel.

Command Syntax	**MEAS:HIGH <float>**
Example	**SEND> MEAS:HIGH <1800.0>** **//Set the all channel high limit 1800.0**
Query Syntax	**MEAS:HIGH?**
Query Response	**< float,float >**
Example	**SEND> MEAS:HIGH?<NL>** **RET> < 1.80000e+02, 1.80000e+02 >**

9.5.1.10 MEAS:CHIGH

The :CHIGH command sets the high value of each channel.

Command Syntax	**MEAS:CHIGH <para>,<float>**
Example	**SEND> MEAS:CHIGH <001>,<1800.0>** **//Set the channel 001highw limit 1800.0**

9.5.1.11 MEAS:SENSOR

The :SENSOR command acquiring the sensor of each channel.

Command Syntax	**MEAS:SENSOR**
Example	**SEND> MEAS:SENSOR <NL>** **RET> < tc-t,tc-k,tc-j,tc-n,tc-e,tc-s,tc-r,tc-b ><NL>**

9.5.1.12 MEAS:FONT

The :FONT command set the font of measure display.

Command Syntax	**MEAS:FONT < font24,font18,font16,font6x9>**
Example	**SEND> MEAS:FONT font24<NL>** **//Set the measure display of FONT24**

9.5.2 SYST SUBSYSTEM

The SYST Subsystem command group sets the setup page.

Figure 9-3 SYST Command Tree

Meas	**:COMP**	**{on,off}**
	:BEEP	**{on,off}**
	:UNIT	**{cel,kel,fah}**

9.5.2.1 SYST:COMP

The :COMP command sets the comp feature.

Command Syntax	**MEAS:COMP <on,off>**
Example	**SEND> SYST:comp on<NL> //Set to open comparator**
Query Syntax	**MEAS:comp?**
Query Response	**<on,off><NL>**
Example	**SEND> SYST:comp?<NL>** **RET> on<NL>**

9.5.2.2 SYST:BEEP

The :BEEP command sets the beep feature.

Command Syntax	**MEAS:BEEP <on,off>**

Example	**SEND> SYST:beep on <NL> //Set to open beep**
Query Syntax	**MEAS:beep?**
Query Response	**<on,off><NL>**
Example	**SEND> SYST:beep?<NL>** **RET> on<NL>**

9.5.2.3 SYST:UNIT

The :UNIT command sets the unit feature.

Command Syntax	**MEAS:UNIt <cel,kel,fah>**
Parameter	<cel,kel,fah> **cel: Degrees Celsius** **kel: Degrees Kelvin** **fah: Fahrenheit**
Example	**SEND> SYST:unit cel<NL> //Set to Degrees Celsius**
Query Syntax	**MEAS:unit?**
Query Response	**<℃,K,F><NL>**
Example	**SEND> SYST:unit?<NL>** **RET> ℃<NL>**

9.5.3 FETCH SUBSYSTEM

The FETCh subsystem command group is a sensor-only command which retrieves the measurement data taken by measurement(s) initiated by a trigger, and places the data into the output buffer

Figure 9-4 FETCH Command Tree

fetch?	

9.5.3.1 FETCH?

The FETCh? retrieves the latest measurement data and comparator result.

Query Syntax	**Fetch?**
Query Response	**<float, float, float><NL>** **//Returns the number related to the number of channels**
Example	**SEND> fetch?<NL>** **RET> +1.00000e-05, +1.00000e-05, +1.00000e-05<NL>**

9.5.4 ERROR SUBSYSTEM

The ERRor subsystem retrieves last error information.

Query Syntax	**ERROR?**
Query Response	**Error string**
Example	**SEND> ERR?<NL>** **RET> no error<NL>**

9.5.5 IDN SUBSYSTEM

The *IDN? query returns the instrument ID.

Query Syntax	**IDN? Or *IDN?**
Query Response	**<MODEL>,<Revision>,<SN>,< Manufacturer>**

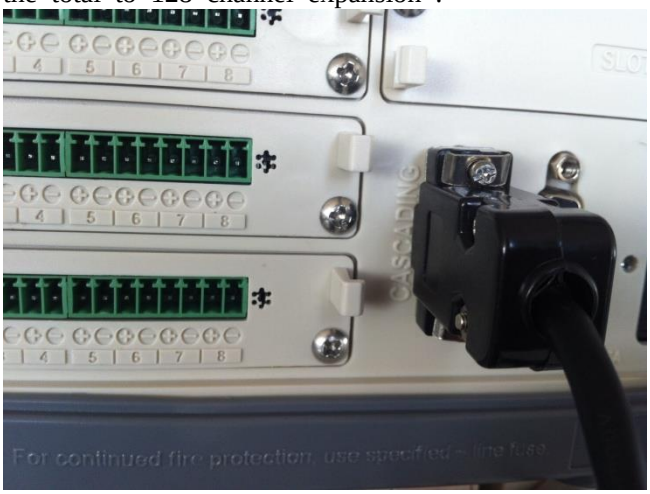
10.RS485 Connect

This chapter contains reference information on programming AT45xx with the RS485 connect.

- RS485 connect

10.1 RS485 Connect

You can use a dedicated communication cable to connect an external ATL104 acquisition board , bringing the total to 128 channel expansion .



To either end of ATL104 communication cable connector into CASCADING Interface

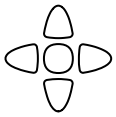


Insert ATL104 communication cable into BUS<1> or BUS<2>, plug 9V power source to the temperature module.

BUS<1> and BUS<2> is collateral and the interface is all-purpose.

Use ATL104 communication cable to connect other temperature modules, add a 9V power source for every 4 temperature modules.

11. Accuracy



This chapter provides the following information:

- Accuracy

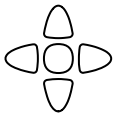
11.1 Accuracy

Instrument Accuracy does not include the standard contact compenstation Precision.

Model	Range（℃）	Accuracy（℃）
T	-150℃ to 0℃ 0℃ to 400℃	±1.0℃ ±0.8℃
K	-100℃ to 0℃ 0℃ to 1350℃	±1.2℃ ±0.8℃
J	-100℃ to 0℃ 0℃ to1200℃	±1.0℃ ±0.7℃
N	-100℃ to 0℃ 0℃ to 1300℃	±1.5℃ ±0.9℃
E	-100℃ to 0℃ 0℃ to 850℃	±0.9℃ ±0.7℃
S	0℃ to 100℃ 100℃ to 300℃ 300℃ to 1750℃	±4.5℃ ±3.0℃ ±2.2℃
R	0℃ to 100℃ 100℃ to 300℃ 300℃ to 1750℃	±4.5℃ ±3.0℃ ±2.2℃
B	600℃ to 800℃ 800℃ to 1000℃ 1000℃ to 1800℃	±5.5℃ ±3.8℃ ±2.5℃

Standard connection compensation need to add ±0.5℃ based on thermocouple measuring accuracy.
The measuring accuracy of thermocouple sensor gives priority to sensor supplier's standard.

12. Specification



This chapter provides the following information:

- General Specification
- Specifications
- Dimension

12.1 General Specification

The Data is Achieved under the Following Conditions:

- Temperature: 23℃±5℃
- Humidity: ≤65% R.H.
- Warm-up Time: > 60 minutes
- Calibration Time：12 months

Test Environment:

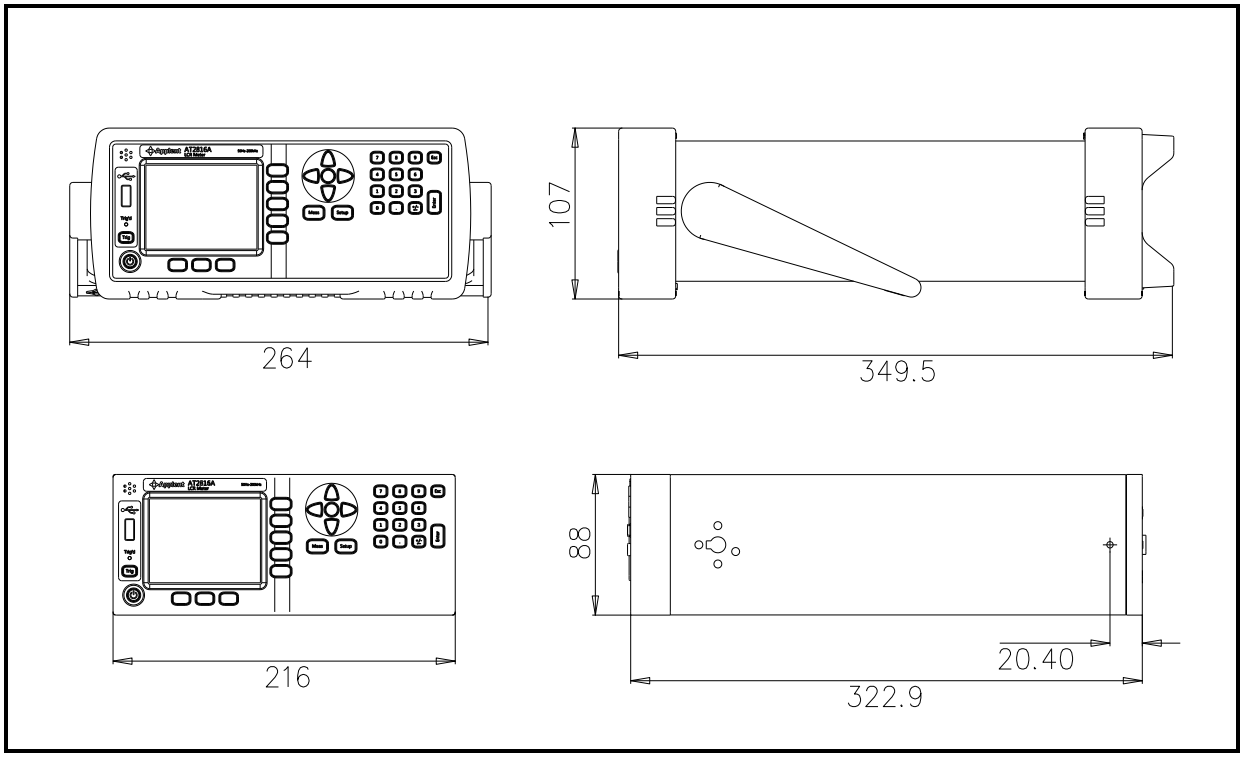
- Temperature and humidity range: 15℃~35℃, 80% RH or less
- Storage temperature and humidity range: 10℃~40℃,10~90% RH

Thermocouple Type:	T,K,J,N,E,S,R,B
Display:	5 digits
Test Speed:	Fast, Medium, Slow
Max Reading:	1800.0℃
Min Reading:	-200.0℃
Data Logger:	USB Disk
Beep:	ON/OFF
Interface:	RS232 to USB Interface
Program Language:	SCPI
Auxiliary Function:	Keypad Lock

12.2Specifications

- 3.5 inches, true color 16M, TFT-LCD display
- Comparator (Sorting) Function.
- Keypad Lock Function
- Language: English and Chinese
- Build-in RS485 expansion interface
- Build-in RS232 interface
- Compatible SCPI Instruction Set

12.3Dimension



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