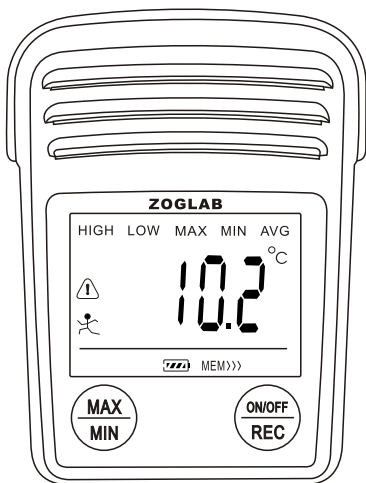


# ZOGLAB

MINI data logger for atmosphere and environment

## User's Manual



CE FC

Your environment is our focus

EN



**Declaration:** This version of User's Manual is specified for operation and installation of MINI temperature and humidity data logger and the assorted data analysis software. The images, dimensions and parameters shown in this document may differ from the actual size depending on the product version in use, please make products as standard only.

This User's Manual shall also applies to both MINI data logger for temperature and MINI data logger for temperature, humidity and carbon dioxide.

#### Symbols definition:



Warn contents are given. Please read carefully to avoid damages to the products or data loss.



Function details are given. Please read carefully before using MINI data logger.

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China Patent No.of Design: 200830090806.X

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**Appendix:**

1 FAQ

2 Application reference

3 Conversion formula

## Chapter 1

### General information

## Safety and Cautions

MINI digital data logger for temperature and humidity is a precision instrument, therefore do not repair or refit it except our professional engineers. ZOGLAB Microsystem Co., Ltd will not undertake any responsibility if any abnormal work, failure or indirect economic loss resulted from any man-made causes.

**Please read this chapter carefully before you start to use MINI data logger.**



### IP class

Ingress protection class of MINI data logger reaches 64. Remove when it's dropped into water. Please send the damaged products back to factory.



### Battery safety

This product uses a 3.6V lithium battery. Battery is recharged via Mini USB cable. The battery can not be placed near to fire/water. Do not short-circuit the battery.



### Accessories

To avoid damages to the products or data loss, please use the original Mini USB cable.



### Product safety

MINI data logger for temperature and humidity passes CE, FCC as well as C-tick, and has been tested and found to meet RoHS. This product uses ABS+PC housing which is flame-retardant and free of toxicity to withstand a 25KV static.



### Working environment

MINI data logger can be used between  $-30^{\circ}\text{C} \sim 70^{\circ}\text{C}$  (DP) or  $-40^{\circ}\text{C} \sim 85^{\circ}\text{C}$  (NP). Please do not use them out of the safety temperature ranges or in corrosive applications.



### WEEE

To comply with WEEE directives for a better living environment, please hand the waste electric and electronic products over to ZOGLAB for collection and recycling.

## Quality Certifications

MINI data logger has been tested and found to comply with the qualifications designed by China Meteorological Administration and China State Bureau of Quality and Technical Supervision. The MINI data logger possesses multiple international patents and obtains the European Union CE certificate, VCCI certificate, FCC certifications and C-tick certificates. In addition, it has been assessed and found to meet the requirements of ISO 9001:2008 standard. The assorted data analysis software possesses independent intellectual property and achieves multiple national software certifications.



MINI data logger is tested and certified by **SGS** lab.

## Chapter 2

### Product description

## MINI Family

# MINI - TH-DP-15

Abstraction  
for MINI data logger

Measuring object

TH Temperature and Humidity  
T Temperature  
THCO<sub>2</sub> Temperature Humidity and  
Carbon Dioxide

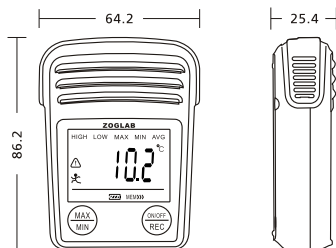
Memory size

15 15,000 units (TH)  
30 30,000 units (TH/T)  
60 60,000 units (T)  
20 20,000 units (THCO<sub>2</sub>)  
10 10,000 units (THCO<sub>2</sub>)

LCD display

DP Display  
NP No display

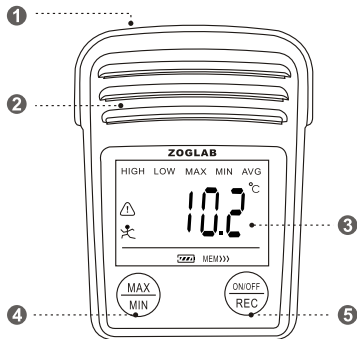
## Dimension (mm)



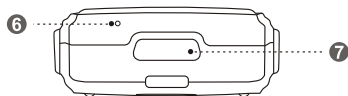
Dimension: 86.2mm × 64.2mm × 25.4mm

## Overview

Take MINI-TH for an example

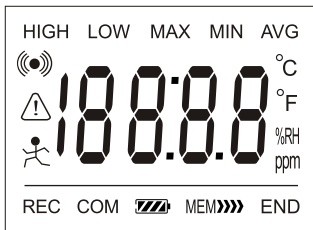


- 1.Vent
- 2.Sensor
- 3.Display area
- 4.Query key
- 5.ON/OFF/REC  
Multifunction  
key



- 6.Reset button
- 7.Mini USB  
interface

## LCD Display



### Main interface

Temperature, humidity or carbon dioxide strength of different models displays alternatively on screen.

### °C °F %RH ppm

These are symbols for temperature, humidity and carbon dioxide strength.

### HIGH symbol

HIGH symbol together with (●) will be flashing if the real-time measuring data exceeds high limit.

### LOW symbol

LOW symbol together with (●) will be flashing if the real-time measuring data exceeds low limit.

### MAX symbol

Display the maximum data of the recorded.

### MIN symbol

Display the minimum data of the recorded.

### AVG symbol

Display the average data of the recorded.



### Alarm symbol

When the high and low limits have been exceeded, the alarm symbol will be flashing quickly per 0.2s; Meanwhile, the data logger has pre-alarm function. If the actual value is nearly 95% of high and low limits, the blinking cycle of this symbol will be 0.5s.

### Alarm mark

Alarm mark shows up when high and low limits are exceeded during logging. It won't fade until the recorded data is cleared.

### Record status symbol

This symbol will be flashing every 1s when data logger is in recording mode.


### REC Record symbol

The record symbol will be flashing based on the logging interval while recording.

### COM Communication symbol

This symbol will be flashing while communicating with PC or other equipment.

### Battery symbol

Each bar stands for 25% of the voltage. The quantity of bars will be shown according to the present voltage. If the system voltage is lower than the normal value, the data may lead to abnormal. Please recharge the battery if the  is flashing. In charging mode, battery symbols shown as below will be in circulative display.



### MEM>>> Symbol

Data capacity of 1%~25%

MEM>

Data capacity of 26%~50%

MEM>>

Data capacity of 51%~75%

MEM>>>

More than 76%

MEM>>>>

Reaches pre-alarmed value

(90% by default)

MEM> Flashing+>>> Not flashing




Capacity of 100%

MEM Flashing+>>>> Flashing

### END Symbol

The END symbol will be flashing when logging ends; exists and shows once data is read; and fades till the recorded data is cleared.

### Calibration status

In calibration mode,  +  +  display simultaneously.

### Turn on or reset

When logger is turned on or reset, the following contents display in order:  
All display → Version → Supply voltage → Year YYYY → Date MM.DD →  
Time HH: MM

### Sensor fault or spalling

Temperature shown as 999.9°C or humidity shown as -99.9%.

### Memory lapse

Full LCD display and flashing.

## Keys and Leds

### Key introduction

#### MAX/MIN (Left): MAX/MIN/AVG value query and °C/°F conversion



When MINI data logger is on, press this key to query in the order of the maximum, minimum and average value of the recorded data. Query mode exits if no operation is done on keys in 30 seconds. When MINI is on, press on MAX/MIN key for 2s to active temperature units (°C/°F) conversion.

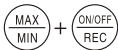
#### ON/OFF/REC(Right): Turn on, turn off and record



When MINI is off, press this key for 2s to turn MINI data logger on. When MINI is on, press to show temperature, humidity and carbon dioxide in order.

When MINI is on, press for 2s to turn off MINI data logger. (Ineffective in logging mode.)

#### Key combination



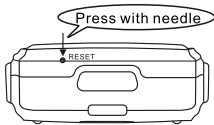
When MINI is on, press and hold on left key, double-press right key to start/stop recording. Press and hold on right key, double-press left key to clear recorded data and alarm marks ⚠.



To assure data security, key operations for clearing data or alarm marks can be set through ANALYSIS 3 to be unworkable. Carefully and cautiously to use this function! (For key setting via software, please refer to Chapter 4 "Software" .)

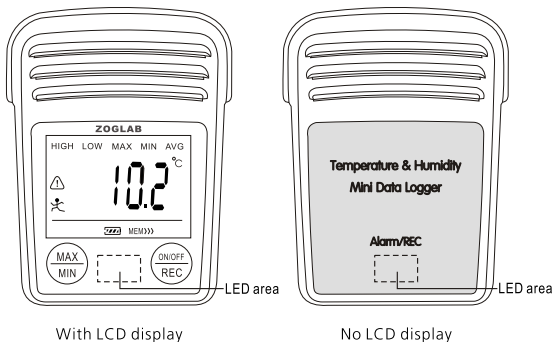
### Reset introduction

When MINI data logger fails, you may press the reset button to reset the data logger.



Attention: The current recorded data will be lost if reset the MINI data logger in logging status; if reset the data logger while it is not logging, the data will not lost. Please use this button after consideration.

## LED indicator



**Green LED:** Recording status

**Red LED:** Alarm status

**Yellow LED:** Charging status

## LED Description

1. In logging mode, the green LED will be shining every 10s.
2. When logging ends, the green LED will keep on shining twice every 10s till data cleared.
3. When data exceeds high/low limits, the red LED will be shining every 10s.
4. In low-battery mode, the red LED will keep on shining twice every 10s.
5. When in low-battery mode, together with data exceeds high/low limits, the red LED will keep on shining twice every 10s.
6. In battery charging mode, the yellow LED keeps on till battery fully charged.

## Components



1. MINI data logger
2. Mini USB cable
3. Software

4. User's Manual
5. Warranty card
6. Calibration certificates

7. Qualification
8. WEEE tips
9. VIP application

## Technical Data


### MINI-TH Data logger for temperature and humidity

Sensor type	High accuracy NTC, capacitive polymer humidity sensor
T Measuring range	-30 °C~ 70 °C(DP), -40 °C~ 85 °C(NP)
T Accuracy	±0.5 °C, ±0.3 °C(High-precision version)
T Resolution	0.1 °C / °F
H Measuring range	0%~100%RH
H Accuracy	±3%RH(10%~85%) ±5%(other range)
	(Testing Environment 23 °C±2 °C)
	±2%RH (High-precision version)
H Resolution	0.1 %RH
Memory size	15,000/30,000 units
Alarm	High and low limits
	Display+backlight, support *alarm mark
Logging interval	2seconds~24hours
Start with delay time	1~120seconds
Start mode	Key operation
	Start immediately/delay start/timing start
End mode	Key operation
	Full/FIFO/presetting units
Interface	Mini USB
Battery	3.6V lithium battery × 1
Battery lifetime	1 year(with a sample rate of 60s)
IP class	IP64
Storage temperature	-50 °C~ 90 °C
Software	ANALYSIS 3
Weight	85g

\*Alarm mark : The symbol shows up on the screen when one or more alarms happen during logging.

### MINI-T Data logger for temperature

Sensor type	High accuracy NTC
T Measuring range	-30 °C ~ 70 °C(DP), -40 °C ~ 85 °C(NP)
T Accuracy	±0.5 °C, ±0.3 °C(High-precision version)
T Resolution	0.1 °C/°F
Memory size	30,000/60,000 units
Alarm	High and low limits Display+backlight, support *alarm mark
Logging interval	2seconds~24hours
Start with delay time	1~120seconds
Start mode	Key operation Start immediately/delay start/timing start
End mode	Key operation Full/FIFO/presetting units
Interface	Mini USB
Battery	3.6V lithium battery × 1
Battery lifetime	1 year(with a sample rate of 60s)
IP class	IP64
Storage temperature	-50 °C ~ 90 °C
Software	ANALYSIS 3
Weight	85g

\*Alarm mark  : The symbol shows up on the screen when one or more alarms happen during logging.

## MINI-THCO<sub>2</sub> Data logger for temperature, humidity and carbon dioxide

Sensor type	High accuracy NTC, capacitive polymer humidity sensor and infrared gas sensor
T Measuring range	-30 °C ~ 70 °C(DP), -40 °C ~ 85 °C(NP)
T Accuracy	± 0.5 °C, ± 0.3 °C (High-precision version)
T Resolution	0.1 °C / °F
H Measuring range	0% ~ 100%RH
H Accuracy	±3%RH(10%~85%) ±5%(other rang) (Testing Environment 23 °C ± 2 °C) ±2%RH (High-precision version)
H Resolution	0.1%RH
CO <sub>2</sub> Measuring range	0 ~ 9999.9ppm(Customized measuring range)
CO <sub>2</sub> Accuracy	± 1.5%FS+2.0%Reading
CO <sub>2</sub> Resolution	0.1ppm
Memory size	10,000/20,000 units
Alarm	High and low limits Display+backlight, support *alarm mark
Logging interval	2seconds~24hours
Start with delay time	1~120seconds
Start mode	Key operation Start immediately/delay start/timing start
End mode	Key operation Full/FIFO/presetting units
Interface	Mini USB
Battery	3.6V lithium battery × 1
Battery lifetime	1 year(with a sample rate of 60s)
IP class	IP64
Storage temperature	-50 °C ~ 90 °C
Software	ANALYSIS 3
Weight	100g

\*Alarm mark  : The symbol shows up on the screen when one or more alarms happen during logging.

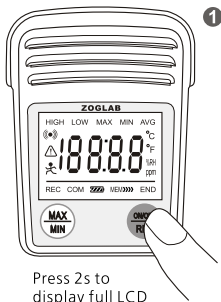


## **Chapter 3**

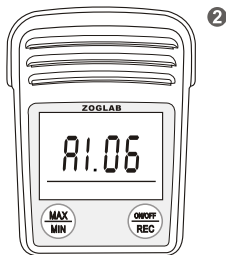
### **Operation and use**

## Operation Description

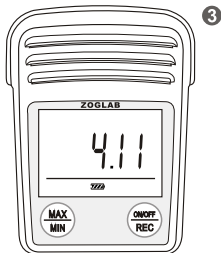
### Startup



Press 2s to display full LCD



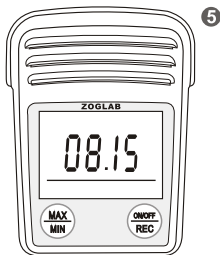
Display firmware version



Display battery voltage



Display year



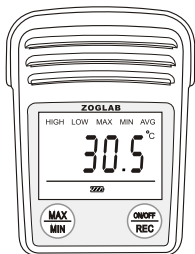
Display date



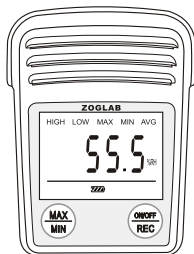
Display time

Backlight turns off in 10s when no operation is done. Press and hold on ON/OFF/REC key for 2s to shut off.

## Work



Temperature

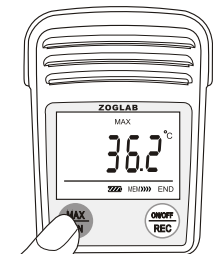


Humidity

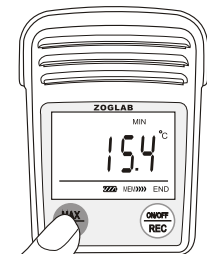
Under normal display mode (Take MINI-TH data logger for example), real-time temperature and humidity alternatively display with the interval of 3s, together with battery status shows.

## Query

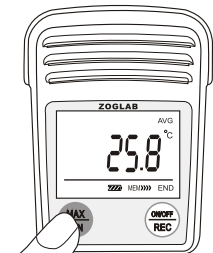
When MINI is on, press MAX/MIN key to query the maximum, minimum and average values of the recorded data.



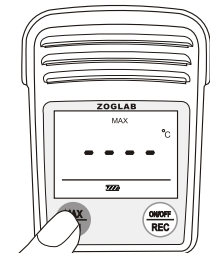
Press to query maximum value



Press to query minimum value



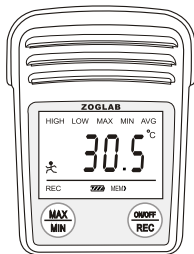
Press to query average value




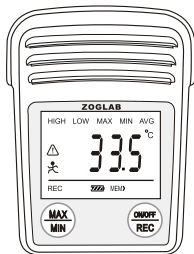
No query value when no data recorded


## Record

In recording mode,  will be shining every 1s, together with REC symbol shining at the time of data being recorded.

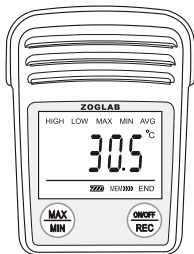


Both  and REC flash

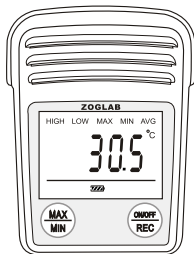


 Alarm mark keeps on

END symbol will be flashing when logging stops, and keeps on when data is read. Both MEM and END symbol fade when data is cleared.



END flashes

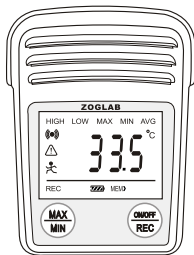


MEM and END fade

## Alarms

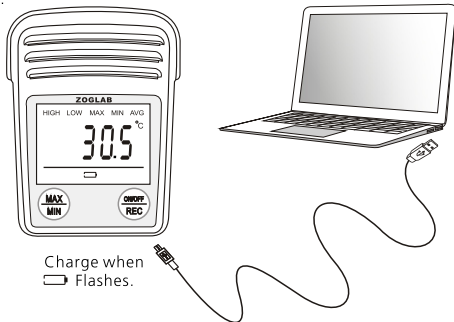
In standby or recording mode, [HIGH] or [LOW] symbol together with (●) will be flashing when measured data exceeds the preset value.

In logging mode, (⚠) symbol appears once there are any alarms, and disappears only when data is cleared.



## Battery Charging

MINI data logger needs to be charged when battery symbol shines. Please connect MINI data logger to PC via Mini USB cable. Charging works in off mode.



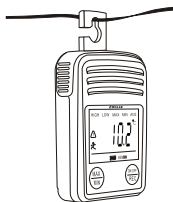
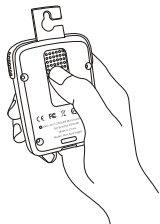
A fully charged battery can be continuously used for about 100 days with a sampling interval of 2 seconds, and 250 days with a sampling interval of 10 seconds.



Heats will be generated during charging, so do not read or record temperature and humidity data then.

## Portable use and Mounting

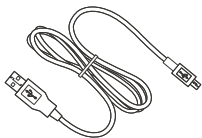
In accordance with environmental requirements, MINI data logger can be placed into pocket for portable using; or be hung up with a rope through the hole at the bottom, or be hung up on ropes or nails with the pothook.



## Connect to PC



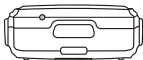
Use Mini USB cable to connect MINI data logger and PC, run ANALYSIS 3, make connection and set parameters.



Mini USB cable

## Establish communication with PC

Mini USB interface



Connect to PC USB interface



Note: Charging works when MINI data logger connects to PC with Mini USB cable.



## Chapter 4

### Software

## Software Installation

Software is in compliance with GMP, GLP, GSP, FDA, ISO22000 standards.

### Operating requirement

IBM or compatible computer  
Intel or compatible X86 CPU  
1 GB system RAM or above  
24X CD-ROM or above  
20G HDD or above  
Microsoft.NET framework

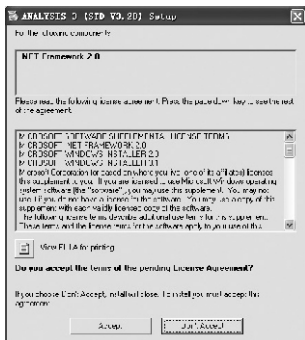


This software compatible with windows SVR 2000/2003/2008/2000/XP/  
VISTA/7, data can be exported in Office XP/2003/2007 format

### Software installation

(Take Windows XP system and standard V3.20 for example)

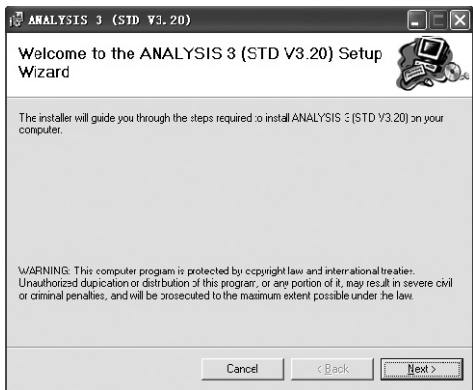
Put the MINI analysis 3 software disk into the CD/DVD-ROM to spring the installation interface.



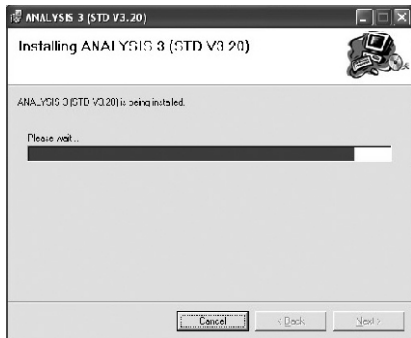
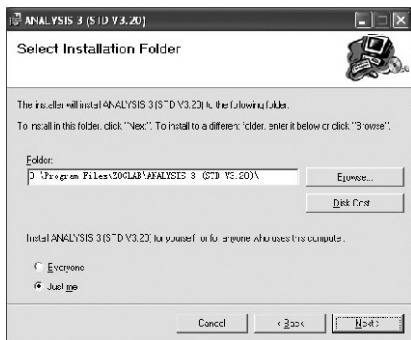
If your computer has never installed Microsoft.NET operating environment and its related language pack, the installation will proceed automatically. The entire installation process may take 1~2 minutes (depending on the system speed).



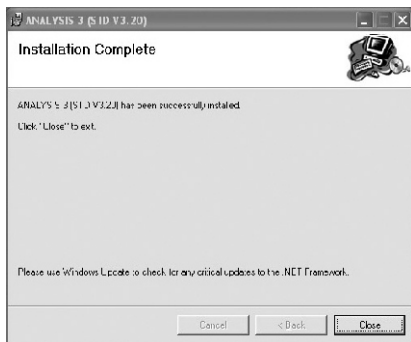
The formal installation begins after Microsoft.NET operating environment installation has finished.



Select permissions and we recommend you to select installation folder under non-system disk.



After installation , it will prompt that the installation has been finished and the corresponding shortcuts have been added both on the desktop and the programbar.



You can find this icon on the desktop after installation.



Double click to startup the software

## USB driver installation

USB driver installation is a must for establishing communications between MINI temperature and humidity data logger with PC. It is always installed automatically during the process of software installation.

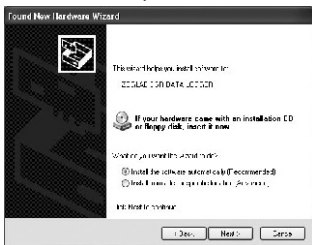
If not, after software installation, connect the MINI temperature and humidity data logger to PC by using a Mini USB communication cable, then the following dialog box will pop-up on the PC screen :

Choose "Yes, this time only" and click "Next" .



Wizard installation can be divided into two types: 1. Install the software automatically 2. Install from a list or specified location

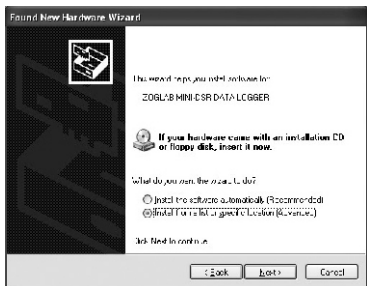
1. Install the software automatically



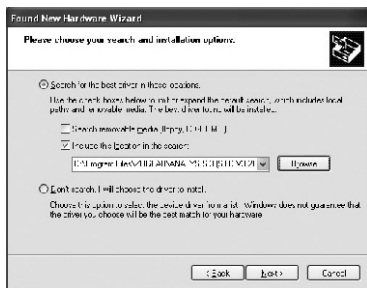
The system will search the installation package and install it automatically, please wait a few minutes for the installation to finish.



## 2. Install from a list or specified location



Choose "Install from a list or specified location", then the following dialog box will pop-up:





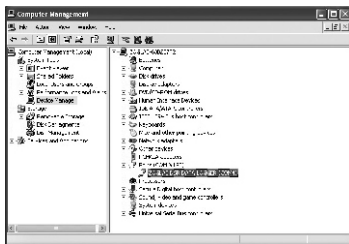
Click "browse" to find out and choose the installation package "Driver", the installation will begin after press "OK".



Please wait for the installation to finish.



The mapped corresponding COM port can be found in the device manager of the computer after the driver installation has finished. Just like the following: "ZOGLAB DSR DATA LOGGER"



On some computers, the driver may need to be reloaded twice to complete.



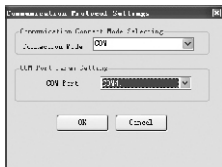
USB driver installation is not needed for MINI data loggers with HID function.

## Quick Settings



1. MINI data logger is in OFF mode when first used. Press and hold ON/OFF/REC key for 2s to startup it before connected to PC.

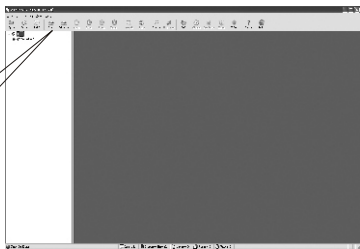
2. "Communication protocol settings "are used to set the communication protocol, communication rates between MINI software and different MINI devices. Do not change the baud rate so as to avoid communication failure except advanced users. If your PC does not have COM port or the COM port is occupied , you can re-select port through this option.



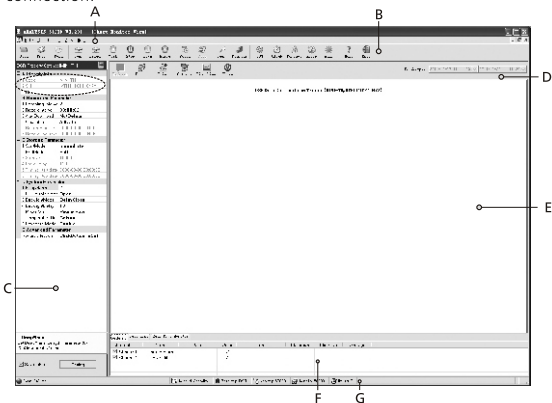
Communication protocol setting is not needed for MINI data loggers with HID function.



3. Click "conn" to establish communications with PC.



The serial number of data logger is in the circle (each data logger has a unique serial number).The following chart is the interface shown after connection.



- A. Main Menu      B. Shortcut menu      C. Property bar      D. Submenu  
 E. Main display area      F. Numerical table      G. Status bar

When the connection is completed, the above form will appear . If not , the software will alert you to access the MINI data logger .You will not be able to run normal operations of the software without the data logger.

## Property

### Sampling and logging interval

Ex-factory default interval is 10s per refreshing and 60s per logging .The fastest refreshing interval is 2s (refreshing interval is the sensor sampling interval). Please select a suitable sampling interval between 2s/5s/10s/30s /60s/255s and logging interval from 2s to 24h(Logging interval shall not be shorter than sampling interval.).



We recommend that you use the "Power save" mode (60s per refreshing, 10mins per logging) as the standard setting .

B Recording Parameter	
1.Sampling Interval	60
2.Record interval	?
3.After Download	h
4.View objects	10
5.RecordStartTime	30
6.RecordEndTime	80

C Storage Parameter	
1.StartMode	255

B Recording Parameter	
1.Sampling Interval	<b>60</b>
2.RecordInterval	<b>00:01:00</b>
3.AfterDownload	<b>NotDelete</b>
4.View objects	<b>AllData</b>
5.RecordStartTime	2011-12-22 11:27:13
6.RecordEndTime	2011-12-22 11:27:38

Set sampling interval

Sampling interval is the display update interval, please set it depending on your actual needs.

Set logging interval

Logging interval is the interval between two loggings. The software setting format is HH: MM: SS .The logging interval is from 2s to 24 hrs.

Start mode and end mode

Start mode :

C Storage Parameter	
1.StartMode	<b>Immediate</b>
2.EndMode	Immediate
3.StoreUnits	Delay
4.StoreDelay	Timing

Immediate start

MINI data logger will start recording as soon as you click the button "work" .

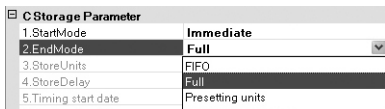
Delay start

MINI data logger will start recording after the delay time when you click the button "work" .

Timing start

MINI data logger will be logging from pre-set start time to end time.

End mode :



**FIFO** First in first out :if the memory is full ,the latest data will take the place of earlier data.

**Full** Data logger will stop recording when the memory is full.

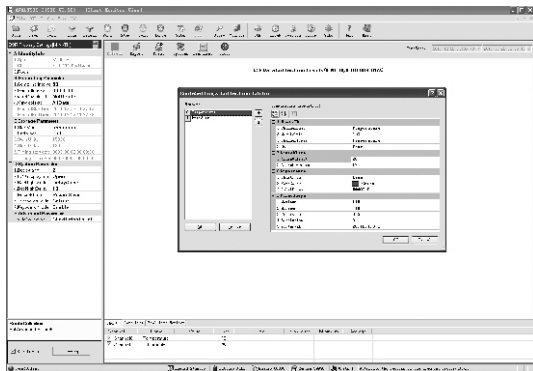
**Presetting units** Data logger will stop recording in accordance with the threshold parameters set in "store units" .

## High and low limits

E advanced parameter---->route collection :used to configure the high and low temperature and humidity limits. Also the user can customize the colour, resolution, precision, scale parameters of the curve graph.



**!** Caution: Do not change the resolution, accuracy, calibration specifications and the high and low limits parameters except the advanced users.



## Start logging



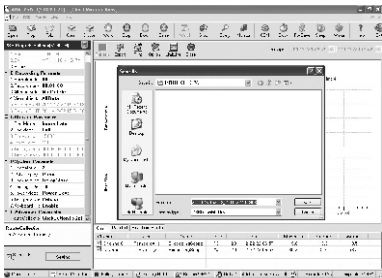
If there is no problem of settings, click "setting" in the lower-left corner of property bar to download the new parameters to the device and click "work" to start logging.



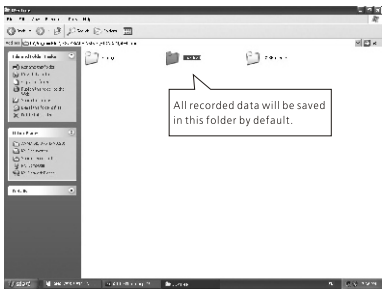
## Data processing

- A Read / download the data after the data logger has automatically or man-made stopped.

Stop logging by clicking "stop", then click "down" and you will see a save path dialogue:

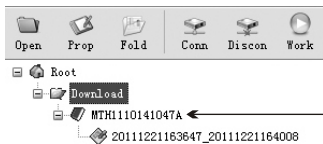


- B The default storage path is "DSRTree\Download":





Folder is named by serial number



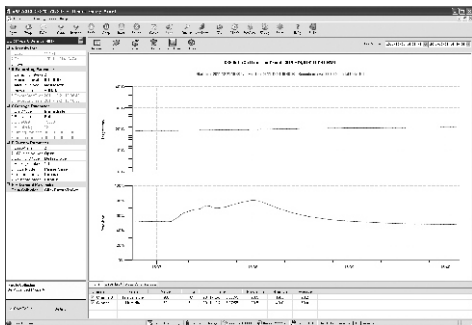
Record data file is named by its start time and end time

20111221163647\_20111221164008  
Start time                      End time

(Time format is YYYY-MM-DD-HH-MM-SS)

Each download file will be stored in its MINI serial number named folder in the "Download", and the download files are named with its start time and end time in the file type \*.dsrf. These files can be read in the "Folder" of analysis software.

After the download has been completed, a curve graph will pop up to show the trend of temperature and humidity in the scope (time or units) of records. By moving the mouse you will see a red vertical measurement line showing the real-time numerical points.



The inquiries can be customized according to the time frame while reading the graph. Click "Refresh" on the sub-menu to update display after changes.

TimeScope: 2011-12-22 15:39:46 2011-12-22 15:51:07

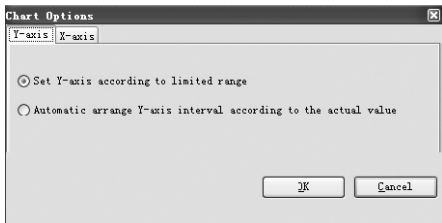
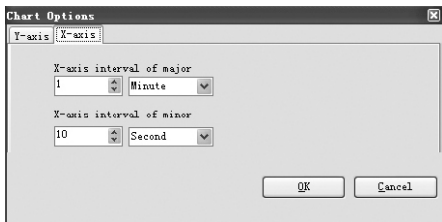
< December, 2011 >

Sun	Mon	Tue	Wed	Thu	Fri	Sat
27	28	29	30	1	2	3
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31
1	2	3	4	5	6	7

Today: 12/22/2011

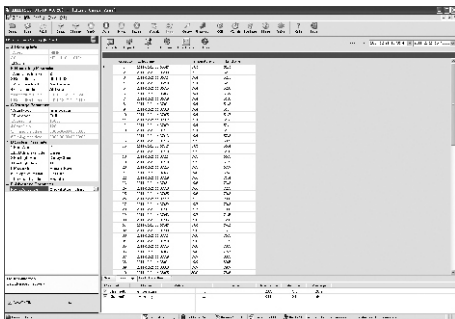


Click "Options" on the sub-menu to set X and Y coordinates. You have to click "Refresh" on the sub-menu to update display after settings.

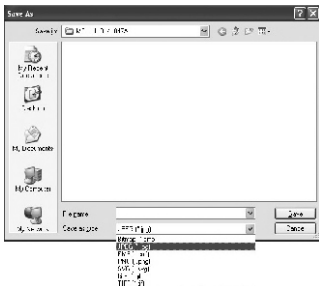


Do not change the default coordinates settings except the professional users.

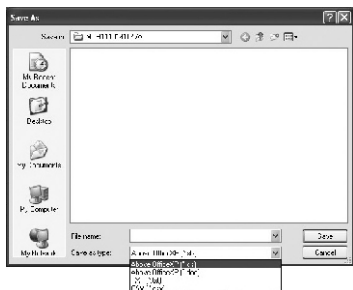
Click "Chart" and "Datalist" in main display to switch between curve graph and data list in the main display area. Specific data format listed as follows:



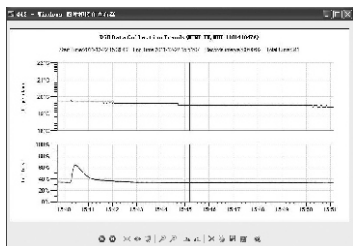
In the curve graph state, click "export" to export JPG or other image format files. This feature is convenient for users who need to analyse the process and to print chart. In this way the paper data in the ordinary paper driving recorder can be replaced.



In data list state, click "Export" to export XLS, CSV, TXT or DOC format files.

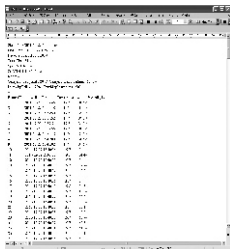


1



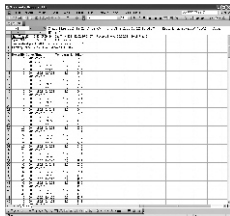
1.JPG

2



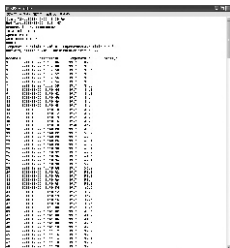
2.WORD

3



3.EXCEL

4



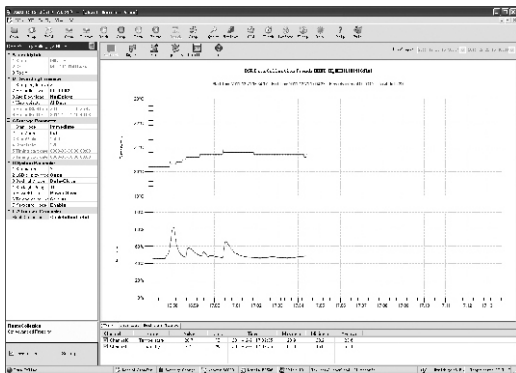
4.TXT

## Real-time trace

Real-time data acquisition and data display updating (curve and data list) is the unique feature of the internationally popular digital loggers. MINI temperature and humidity data logger can not only support this feature, but also make your computer's hard disk like a super-memorizer used to preserve real-time traced data.

### Real-time trace / stop

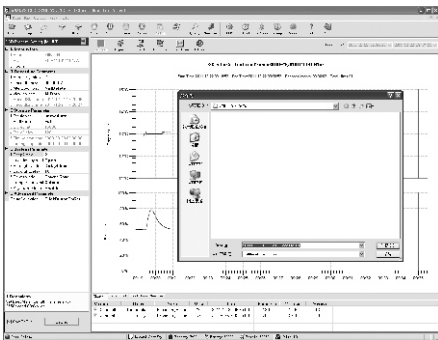
Click "monitor" to open a blank page before starting real-time trace. Then click "watch" to enable the real-time trace. In the process of acquisition, click "stop" (the one near "watch") to shut down.



Real-time trace may consume much system memory, we recommend customers to use PC that contains at least 512MB or above.

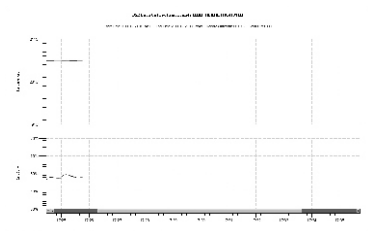
## Data preservation

For each real-time trace, click "stop" and you will see a dialog box asking whether you need to save the collected data. If you click "yes" the data will be adopted as a standard \*.dsrf file which format is the same with the download file and if "no" the system will immediately withdraw from the real-time trace function.



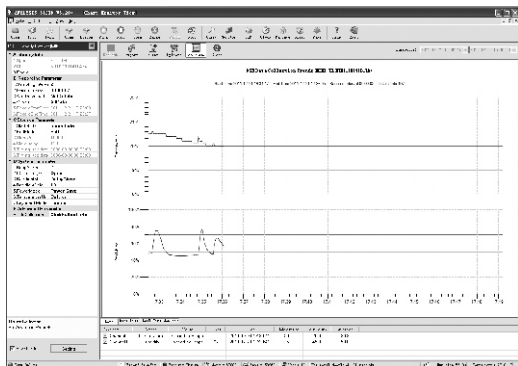
Drag the mouse to magnify and observe the collected data, click ⊖ in the left bottom corner to restore.

## Data observation





## Alarm line

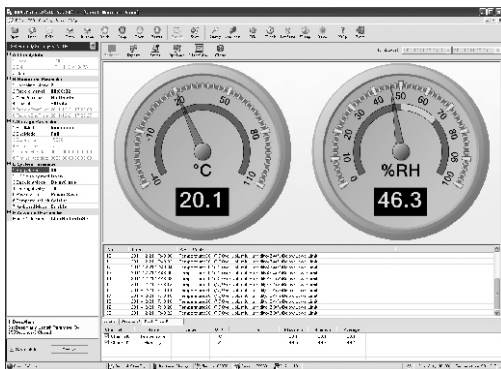


ANALYSIS 3(STD V3.20) provides high and low limits alarming under the chart mode. The curve display shows whether there is an overrun event in an intuitive way.



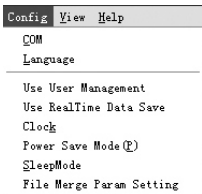
This feature is turned off by default, click "LimitLine" in the sub-menu to enable.

## Meter graphic interface



ANALYSIS 3 (STD V3.20) provides real-time data simulation display. As shown above, the interface combines analog meter with digital display and also provides different colours of high and low limits, so that the user is able to realize the environmental parameters changes and alarm limits at a glance.

## User management



ANALYSIS 3 (STD V3.20) provides management feature for the user. It is disabled by default, the user can enable it in accordance with their needs.

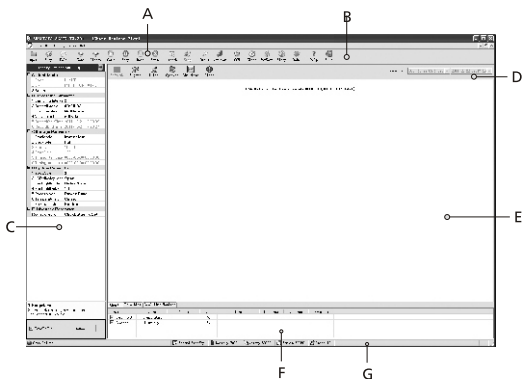


The default login name is Admin and the default password is 123456. It is recommended that you'd better change the initial password for better security after logging in.



Non-Admin users will be restricted on the use of high-level operations, such as settings and deleting.

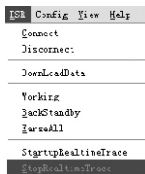
## Menu Description



### A Main menu



1. Click "File" to open or merge \*.dsrf documents, manage users, logoff or exit the system.



2. "DSR" can be implemented to connect and disconnect the data logger, download recorded data, begin logging, return to the standby mode (as the end command while logging), delete all records, start / stop real-time trace.



3. "Config" can carry out the communications settings, language settings, clock settings, file merge parameter settings, power save mode, sleep mode, real-time data save and user management.



4. "View" is used for querying, monitoring, remote net monitoring, switching to the property bar / folder column, start / stop status refreshing, manually refresh status opening.



When the status refreshing enabled, either automatically or manually, ANALYSIS 3(STD 3.20) software will obtain the current parameters of the sensor through the communication protocol within the sampling interval. This will take up some computer resources and may affect the speed. The function is turned on by default, you can also manually set it to stop.



5. "Help" can be used to query the software version information, open the electronic user's manual and access to the MINI exclusive website for online help and upgrade services.



## B Shortcut menu

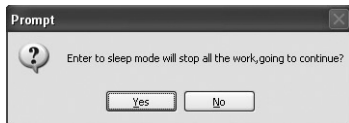


In order to facilitate the operation, the software use the popular XP shortcut menu operating style.

From left to right:

Open / Prop/ Fold / Conn / Discon/ Work / Stop / Down / Erase / Watch / Stop / Query / Monitor / COM / Clock / PwrSave / Sleep / Wake/ Help / Exit.

- MINI sleep mode operation can not be back-kicked. If you choose to enable this feature, the software will remind you to reconfirm. Once the implementation has been carried out, the data logger will stop all the operations and enter super-low-power sleep mode. This operation requires manual operation to startup MINI data logger in order to return to normal working condition.



## C Property bar

DSR Property Settings[MINI-TH]	
<b>A Identity Info</b>	
1.Spec	MINI-TH
2.SN	MTH1110141047A
3.Room	
<b>B Recording Parameter</b>	
1.Sampling Interval	2
2.RecordInterval	00:00:02
3.AfterDownload	NotDelete
4.View objects	AllData
5.RecordStartTime	2011-12-22 10:28:04
6.RecordEndTime	0000-00-00 00:00:00
<b>C Storage Parameter</b>	
1.StartMode	Immediate <input type="button" value="v"/>
2.EndMode	Full
3.StoreUnits	15000
4.StoreDelay	120
5.Timing start date	0000-00-00 00:00:00
6.Timing stop date	0000-00-00 00:00:00
<b>D System Parameter</b>	
1.BeepAlarm	30
2.LCD display mod	Open
3.BacklightMode	DelayClose
4.BacklightDelay	10
5.PowerMode	Power Save
6.TemperatureUnit	Celsius
7.Keyboard Mode	Enable
<b>E Advanced Parameter</b>	
RouteCollection	ClickButtonToSet
<b>1.StartMode</b> Set Start Mode Parameter	
<input checked="" type="checkbox"/> SaveToFile	<input type="button" value="Setting"/>

\* It is used to set the various operating parameters in MINI temperature and humidity logging.



## D Submenu



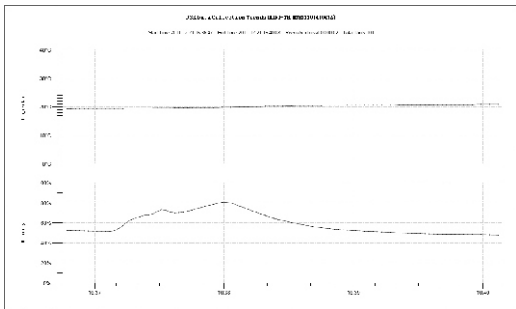
The software also provides a flexible sub-menu for the regulation of the curve graphs and data list.

**!** Caution: Once select the initial and ending time of "TimeScope", click "Refresh" to obtain updated curve graph or data list.

## E Main display area

The main display shows the curves display or data list of temperature and humidity. Meanwhile the software will update the necessary parameters on the top of the curve: the data logger type, serial number, operator, start time, end time, logging interval, the total units. These parameters can also be exported together with curves as JPG and other graphic forms.

### Curve graph





There is a unique feature "dynamic equilibrium value" when the main display shows the curve graph. It is to build suitable observing coordinate graph in accordance with the average value of collected data. This special feature of each curve makes it able to display its extreme high and low number clearly.

## Data list

Item No.	Value	Time	Unit
2	22.0	16:31:22.00	0.9
3	22.0	16:31:22.00	1.1
4	22.0	16:31:22.00	1.3
5	22.0	16:31:22.00	1.5
6	22.0	16:31:22.00	1.7
7	22.0	16:31:22.00	1.9
8	22.0	16:31:22.00	2.1
9	22.0	16:31:22.00	2.3
10	22.0	16:31:22.00	2.5
11	22.0	16:31:22.00	2.7
12	22.0	16:31:22.00	2.9
13	22.0	16:31:22.00	3.1
14	22.0	16:31:22.00	3.3
15	22.0	16:31:22.00	3.5
16	22.0	16:31:22.00	3.7
17	22.0	16:31:22.00	3.9
18	22.0	16:31:22.00	4.1
19	22.0	16:31:22.00	4.3
20	22.0	16:31:22.00	4.5
21	22.0	16:31:22.00	4.7
22	22.0	16:31:22.00	4.9
23	22.0	16:31:22.00	5.1
24	22.0	16:31:22.00	5.3

Data list interface provides the serial number, logging time and parameter values, which well displays the true changes in circumstances.

## F Numerical table

Channel	Unit	Value	Unit	Time	Max. value	Min. value	Average
<input checked="" type="checkbox"/> Channel1	Temperature	27.0	°C	2011-10-21 16:38:51	28.8	5.7	21.5
<input checked="" type="checkbox"/> Channel2	Pressure	49	%	2011-10-21 16:38:51	88.5	49.0	73.7

The numerical table provides the channel information, minimum/maximum/average/selected value information (the selected value is generated by the system selected red measurement line)

## G Status bar



The status bar provides message of Comm, Record, Battery, Memory, Remain and Units, current command status return.

## Settings Description

### System clock

The data logger comes with a real-time clock which can still work after power-off. Time can be set by clicking "clock". Each time connected to the computer, data analysis software will automatically calibrate the time.

### Room name

Binding with the serial number, it will be shown in the curve display and data list. Please fill in the name of operation staff, departments, and the warehouse name.

### Sampling interval

Sampling interval controls the sensor sampling rate and it can be set up from 2, 5, 10, 30, 60 to 255s or any value between 2s to 255s. Faster sampling rate means more power consumption. Please set up the sampling interval according to actual needs.



While sending the MINI data logger to the relevant department for calibration, we recommend you to set the sampling interval to 2s in order to improve the device sensitivity and get the best measurement result.

### Logging interval

Logging interval is the interval between two loggings. The software settings format is HH: MM: SS from 2s to 24hrs. Please set up according to actual situation.

## After download

Two modes for your choice: 1. Delete the record after downloads. 2. Keep the record after downloads. Set it according to your needs. Once deleted, the data will not be able to resume, please use this function carefully.

## View objects

Since the data logger supports monitoring mode, you can also use it as a digital meter of temperature and humidity. Please set the necessary parameter types to monitor depending on your need, we recommend you to enable all the parameter types.

## Start mode

The data logger supports three types of startup mode: immediate start / delay start / timing start.

**Immediate start** Click "work" to start data recording immediately after the parameter has been set.

**Delay start** Click "work" to start data recording after pre-set delay time.

**Timing start** In this mode you can start the data logger from the pre-set starting date to the ending date.



**Caution:** While using the delay or timing start, you should still click "work" after settings.

## End mode

The end mode can be set up to three types: FIFO / Full / presetting units. In addition, there is a timing end mode. Timing end mode is a special mode that once selected the data logger is no more constrained by the above three modes.

**FIFO** This mode is used to prevent data lost caused by over memory deposit. When the memory is full, the new data will overwrite the earliest data. Data stored will maintain to the latest period recorded data.

**Full** This is the most commonly used mode (also the default end mode of this logger). Once the recorded data reaches the rated capacity of memory, logging will be stopped. And you can see the prompt on the LCD display (refer to "Introduction" for information of **MEM>>>>** status).

**Presetting units** It is an end mode based on user units settings . Store units must be set up after presetting units mode is selected.

### Store units

Store units settings should adapt to the end mode settings for effectiveness. The store units setting range is from 1 to 65,535 units or decided by the recorder upper limits.

### Delay start parameter

Delay start parameter works only when the working mode is set to delay start. This parameter range is from 1s to 120s.

### Alarm time

Backlight and beep alarm time can be set from 1s to 255s.

### LCD display mode

LCD display mode settings can set up the LCD display: normally open or closed.

### Beep alarm

Beep alarm settings can make beep alarm available or not. In available mode, beep alarms as the preset alarm time.



Caution: Beep alarm settings only work for MINI data logger with beep alarm function.

### Backlight delay

Backlight delay settings is used to adjust the LCD backlight delay closing time and it works only when the backlight is set to delay closing mode.

## Power mode

Power mode setting is used to configure the signal acquisition, display refreshing mode and the user can decide to set up the data logger in a high-speed or power-saving state through this option .If you want to use this data logger as a visual digital table, you can choose the always power mode on.

## Temperature units

Temperature units is used to set up the temperature display unit on the LCD. By modifying the parameters, you can switch between Celsius and Fahrenheit temperature values on the data logger LCD display.

## Key operation for startup and stop recording

Four modes can be set for startup or stop recording by keys.

- |                  |  |
|------------------|--|
| Enable mode:     | key operation is workable for both startup and stop recording              |
| Disable mode:    | key operation is unworkable for neither startup nor stop recording         |
| Once mode:       | key operation works only once for startup and stop recording               |
| Start only mode: | key operation only works for startup, while PC software for stop recording |

## High-low limits

Click "route collection" you will see a pop-up form for a detailed high and low limits settings of temperature and humidity.

## Chapter 5

# Applications

## Applications

With the continuous improvement and ISO standards, GMP, FDA, HACCP implementation of modern enterprise in the manufacturing, warehouse management, process control, temperature and humidity display, recording, management and control is becoming more and more important. MINI temperature and humidity data logger is a new generation of recording devices used in more and more widely industry fields with its unique advantages.

### Vaccine



The medicine storage, preservation of blood serum and chemical reagents need a constant temperature and humidity environment. And the temperature and humidity data in the process of storage has also become essential factual basis in its ultimate use as well as in malpractice appraisal. Traditional temperature and humidity devices can only be read manually and the accuracy is too low. For the use of ordinary paper

Paper driving logger, it will consume a large amount of paper and it is too troublesome to read the history record. Our MINI temperature and humidity data logger does not need paper or other supplies. Once the operating parameters have been set, it can work automatically. What's more, it is very convenient for software to export data as Excel documents, text documents for archiving. Its long record-time and powerful application makes it the ideal candidate for use.

### Reagent

Biochemical laboratories are another user groups who are sensitive to temperature and humidity. There are tens of thousands of chemical and biological laboratories around the world, and the controlling, recording and analysing of temperature and humidity is very important for a standard biochemical laboratory .



### Fresh



Agricultural research is an area that much attention should be paid to the temperature and humidity, because the conditions of temperature and humidity directly determine the growth of plants and animals. As a cost-effective temperature and





humidity data logger, our MINI data logger will provide you a visual observation and analysis platform. It is a great contribute to people's precise control of temperature/humidity and crop's growth environmental record.

### Drinks/Wine



Workshops and warehouses in food industry also need temperature and humidity recording. Many companies need a digital recorder which can not only display the temperature and humidity values, but also can store the data in order to keep its products strictly controlled in a reasonable temperature



and humidity conditions from production to ex-factory.

### Seafoods/Frozen foods

The temperature and humidity logging through transportation is an ancient and futuristic area. In the initial invention of paper driving logger, it is used for logging during cargo and even containers' transport. Nowadays, at the major trend of promoting environmental protection and sustainable use of resources, the depletion of using these paper driving recorders is increasingly clear. On the contrary, you do not need to use traditional paper while using MINI temperature and humidity data logger and the



memorizer can be used repeatedly for more than 40 years with data retention for more than 100 years .Meanwhile, the capacity of MINI data logger is several times or even several thousands times of the paper driving logger and the system maintenance and possibility of trouble is much less than traditional paper driving recorders. Therefore, applications of MINI temperature and humidity data logger in these industries are a general trend.



### Others

Precious literatures and historical relics in museums and archives should be preserved in a certain temperature and humidity conditions so as to avoid mildew, moth-eaten, etc. The MINI temperature and humidity data logger also applies to this area.

Cleanroom is widely used in the electronic industry. And the requirements of temperature/humidity are pretty high in the SMD manufacturers and production of integrated circuit, because the changes in these parameters will seriously affect the quality of their products. Therefore, to ensure the environmental parameters of temperature and humidity and access to historical data is particularly important. Our MINI temperature and humidity data logger is just to the needs of the electronic industry.

Of course, the use range of MINI temperature and humidity data logger is far more wider than fields placed above .As long as you need to monitor, store, analysis temperature and humidity data, the MINI data logger and its assorted software is your best option. In addition, MINI data logger has plenty of derived models to meet your needs on the wireless transmission, network monitoring and demands for secondary development. For more information, please contact us or refer to our professional MINI website for up-to-date product information.

## Appendix I

FAQ	Troubleshooting
Connection failure	Please check communication settings are correctly made.
No LCD display	Data logger may be in off mode, please press the right key for 2s to turn it on. If the data still can not be displayed, the device may run out of battery or other reasons, please contact the supplier for maintenance.
Dim LCD display	Lack of battery power may cause the dim display. Therefore charge or replace the battery in time if a low battery symbol appears. In addition, direct sunlight or using the machine in excess of normal operating temperature range can cause uneven display.
Display data various from other instruments	You have to compare the accuracy of values in the convection environment. Meanwhile, set sampling interval to 2s as to achieve maximum sensitivity.
Water penetration	Please take data logger out of water as quickly as possible. If it fails to work, please contact supplier for maintenance or change.
Temperature display 999.9 °C	Temperature sensor is damaged or falling off, please contact the supplier for maintenance or replacement.
Humidity display -99.0%	Humidity sensor is damaged or falling off, please contacts the supplier for maintenance/ replacement.

## Appendix II

### Application reference

Industry	Application	Environment Requirement		
		Temperature (°C)	Relative Humidity (%RH)	
Cargo	Drugs	0~4	85~90	
	Fruits & vegetables	0~14	85~95	
	Milk	0~4	80~85	
Food	Cheese	10~21	35~40	
	Chocolate conveyor	21	40~50	
	Hard candy packing	24~27	30~40	
	Candy storage	10~13	50	
	Seed storage	1~27	10~25	
	Raw powder storage	21~27	30~35	
Pharmaceutical	Tablet coating	27	35	
	Injections	24~27	30	
	Processed powder storage	24~27	15~35	
	Vaccine	Cold storage	2~10	45~75
		Cool storage	<20	
		Normal storage	10~30	
	Drug store	18~26	45~75	
Tobaccos & Wines	Cigar/cigarette production	20~22	55~65	
	Yeast storage	0~2	75	
	Red wine storage	13	70~80	
Architecture	Air-conditioned room	19~24	45~65	
	Painting environment	5~38	<85	
Agriculture	Grapes in sunlight greenhouse	Daytime 30 Nighttime $\geq$ 10~15	55~65	
	Silkworm nursery	Prophase 24 Anaphase 26~28	85~90	

\*Different application has its own requirements on temperature and humidity. The above is only for your reference.

## Application reference

Industry	Application	Environment Requirement	
		Temperature (°C)	Relative Humidity (%RH)
Collection	Natural history museum	20	50
	Archives	14~24	45~60
Fur	Fur storage	5~10	55~65
	Leather storage	10~16	40~60
Textile	Opening picking	20~22 <sub>Win.</sub>	50~60 <sub>Win.</sub>
		28~30 <sub>Sum.</sub>	55~60 <sub>Sum.</sub>
	Combing	22~24 <sub>Win.</sub> 28~30 <sub>Sum.</sub>	60~65 <sub>Win. Sum.</sub>
	Spinning	24~27 <sub>Win.</sub> 28~30 <sub>Sum.</sub>	50~55 <sub>Win.</sub> 55~60 <sub>Sum.</sub>
Electronics	Computer room	18~25	40~60
	Electronics production and storage	24~28	40
Photographic equipment	Films/cameras storage	14~24	40
Precious material	Semiconductor/circuit board/battery Precision instrument	18~24	35~45
Medical care spaces	Operating theatre	22~25	45~60
	Public hygiene site	>26	40~80
Printing	Color printing shop	24~27	46~48
	Base paper storage	23~27	49~51
	Carton workshop	10~30	40~70
Laboratory	Cleanroom	18~26	45~65
	Balance room	20~25	55~75
	Instrument room	18~28	45~65
	Sterile room	18~26	45~65
Musical instruments	Paint shop	22~26	50~60

\* Different application has its own requirements on temperature and humidity. The above is only for your reference.

## Appendix III

### Conversion formula

#### Temperature

International units: Celsius " °C ", Fahrenheit " °F ", Kelvin " K " .

#### Conversion formula

$$0\text{ }^{\circ}\text{C}=273.15\text{K}$$

$$\text{K}=5/9(\text{ }^{\circ}\text{F}+459.67 )=\text{ }^{\circ}\text{C}+273.15$$

$$n\text{ }^{\circ}\text{C}=(9/5\times n+32)\text{ }^{\circ}\text{F}$$

$$n\text{ }^{\circ}\text{F}=[(n-32)\times 5/9]\text{ }^{\circ}\text{C}$$

#### Humidity

Humidity can be divided into absolute humidity ( $\text{g}/\text{m}^3$ ) and relative humidity(%RH).

Relative humidity= Absolute humidity/Saturated humidity $\times 100\%$

#### Dew point temperature

$$T_d = \frac{b\gamma(T,RH)}{a - \gamma(T,RH)}$$

$$\text{In which, } \gamma(T,RH) = \frac{aT}{b+T} + \ln(RH/100)$$

In stands for natural logarithm

$$a = 17.27$$

$$b = 237.7\text{ }^{\circ}\text{C}$$

#### Gas Strength

International units: ppm

#### Conversion formula

$$1\text{ ppm}=1\text{ mg/L}=1000\text{ug/L}=\text{cm}^3/\text{m}^3$$





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