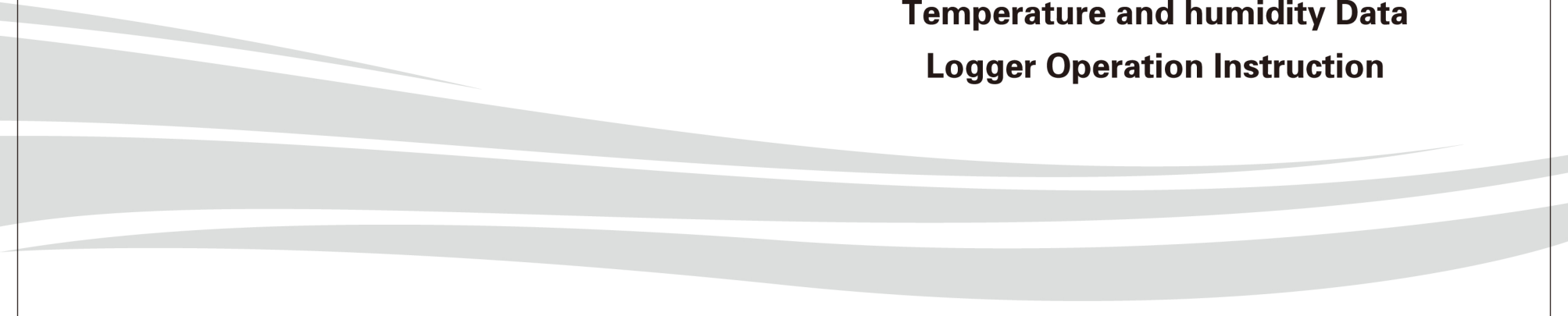


Elitech[®]

RC-40
Temperature and humidity Data
Logger Operation Instruction



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Chapter 1. Product introduction

RC-40 Temperature and humidity Data Logger, Segment LCD display, one channel temperature and one channel humidity as its standard configuration, it could be expanded to four channels(channel 1 and channel 2 temperature and humidity optional), internal rechargeable lithium battery, RS-485 network can be set up, support the U disk copy and USB data transmission. It has the advantages of wide temperature range, high accuracy, big record capacity, etc.The segment LCD could display the system clock, the current work status, record capacity and recorded data; it has the output of buzzer and alarm relay. Its data-processing software has the functions of real-time transmission, historical data uploading, data saving and printing, etc.

The product is widely used in industries of foodstuff, medicine, cold-chain transportation and other industries accordant with HACCP system certification. It could also be used in laboratory where needs temperature and humidity supervision.

1.1. Product Features:

- Monitor and record temperature and humidity data
- Temperature record cycle could be flexibly adjusted
- Large record capacity. If record every 15 minutes, it could record for more than ten months.
- Big LCD screen can simultaneously display system clock, current work status, record capacity and recorded data.
- The upper/lower temperature alarm temperature could be separately set. It will alarm when the temperature exceeds the upper or lower limit.
- It has USB /U disk interface for convenient data copy and save.
- Form a Local Area Network by RS-485 interface to monitor several data loggers' temperature.
- It is matched with our RC-40 data processing software which could real-time monitor, upload, print and manage the data
- It has two alarm output: Buzzer and alarm relay
- with rechargeable standby batteries, when the power is cut off, it could keep running for ninety days after fully charged.(in the condition of GSM module turn-off or no installation of GSM module)
- GSM alarm model is optional, which enables users to know temperature change without the limit of time or space.GSM alarm module could still work 48 hour even if the external power supply is cut off.

1.2. Specification:

Product Size: Length: 133mm Width: 128mm Depth: 34mm

1.3. Technical parameters:

- ◇Power Supply: 12V AC / DC ~ 24V AC / DC, It could connect with 100 ~ 264VAC, 50/60HZ by external power adaptor
- ◇Temperature Measuring Range: -50.0℃~120.0℃
- ◇Temperature accuracy:
 - ± 0.5 ℃for(-30 ℃~+20℃) ;
 - ± 1 ℃for-40℃<temperature<-30℃, or 20℃<temperature<70℃;
 - ± 2 ℃for others; (If sensor wire is longer than 50 M, accuracy deviation 1%) ;
- ◇Humidity measuring range: 0~99%RH

- ◇ Display Resolution: 0.1
- ◇ Humidity accuracy:
 - (@25℃) : +5%RH (typical) ;
 - (@10 ~ 40℃) : 0 ~ 59%RH: + 6%RH (max) 60 ~ 95%RH: + 8%RH (max)
- ◇ Temperature sensor type: NTC Thermistor
- ◇ Humidity sensor type: Honeywell
- ◇ Record Cycle: 1 minute to 24 hours continuously set
- ◇ Record Capacity: Each channel 30,000 points (MAX)
- ◇ Applicable Environment: Temperature -20 ℃ ~ 50 ℃; Humidity 0% ~ 95%
- ◇ Alarming output: Buzzer and alarm relay
- ◇ Communication interface: USB/U-disk interface, RS-485
- ◇ Sensor input interface: Standard configuration is dual channel input, users could customize the mode (temperature or humidity input); the sensor interface could be expanded to four channel temperature sensors, or two channel humidity sensors plus two channel temperature sensors.
- ◇ Standby battery: 3.7V 2200mAh lithium battery

1.4 Sensor installation

1.4.1 Wiring Terminal Diagram, see Figure 1

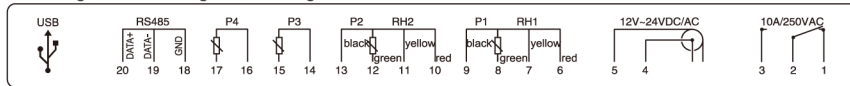


Figure 1 Wiring Terminal Diagram

1.4.2 Wiring Terminal Description:

Relay Output: 1,2 normal close 2,3 normal open 10A/250VAC

Power Input: 4(Positive),5(negative) 12V AC / DC ~ 24V AC / DC

When a switch power adapter is used, it could connect to a round socket.

Humidity Sensor Input 1: 6 (red) , 7 (yellow) , 8 (green) , 9 (black)

Temperature Sensor Input 1: 8,9

Humidity Sensor Input 2: 10 (red) , 11 (yellow) , 12 (green) , 13 (black)

Temperature Sensor Input 2: 12, 13 Temperature Sensor Input 3: 14, 15

Temperature Sensor Input 4: 16, 17

Data transmission interface:

RS485 interface: 18 (GND) 19 (DATA-) 20 (DATA+)

USB interface:(U disk interface)

1.4.3 Sensor connection description

Temperature sensor connection: P1,P2,P3,P4 all could connect temperature sensors, and P2 is defaulted as humidity mode, and P3 and P4 is closed. If want P2 to be temperature and P3/P4 open, please change it through PC software.

Connection position: P1:8,9 P2:12,13 P3:14,15 P4:16,17

Humidity sensor connection: RH1 and RH2 could be connected with humidity sensors, and RH1 is defaulted as temperature mode. If want to change it to humidity, please change it through PC software.

Connection position: RH1: 6(red) , 7 (yellow) , 8 (green) , 9 (black)

RH2: 10 (red) , 11 (yellow) , 12 (green) , 13 (black)

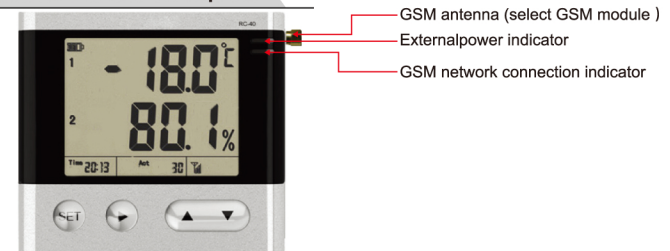
1.5 SIM card installation and use

1. If the data logger has matched with alarm module, it will support GSM function.
2. Make sure to choose GSM network format card. There may be lots of messages sent during usage, please consult your local service provider to handle in SMS promotional business.
3. Make sure there is a certain credit balance in your SIM card..
4. Please install or replace SIM card after disconnect the external power supply and wait until the network signal indicator is off. If the network signal indicator is not off after 50 seconds, please modify the setting of menu item F15 to be 0, then wait the indicator getting off. After finishing SIM card installation, connect the external power supply, GSM module will start automatically. If you want GSM module to continue working after the external power supply is disconnected, please modify the setting of menu item F15 to 1.
5. After your replacement of SIM card, the original set cellphone numbers in the data logger will not disappear, no need to bind them again.
6. When insert SIM card to the card slot, firstly push the card slot to the left flatly, and then lift the card slot, insert the SIM card into the card slot (with SIM card gap upward and the metal-side outward). Then place the card slot flatly and push it to the right to lock it.
7. For the setting method, please refer to the part of "GSM alarm module operation instruction".

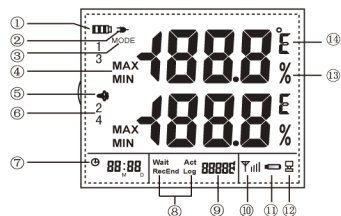
1.6 Quick Start Guide

1. The data logger will continue display until the battery is very low, then it will automatically shut down and turn off the screen.
2. For the initial use or it is turned off before use, please set the time through PC software.
3. Install the supplied PC software according to the prompts, and connect it to PC by USB cable. The specific steps are: open the software→ data logger→ parameter setting→ USB → OK. After Successful connection, it will appear in the left column "station x", click "station x" and set the parameters through PC software.
4. If you have two or more data loggers networking, firstly change the device address(1、2、3、4.....80) by USB, or else, they could not be recognized after networking.
5. If you need to record data, start the record function by data logger menu and you can stop recording in any time. The record interval could be modified by PC software. Before starting recording, please confirm whether the historical record needs to be saved, if not, please clear the record through PC software.
6. If the data logger has matched with GSM module, please bind the cellphone numbers in the condition of a good network signal. The max. bound numbers will be five. The first bound number will be administrator's number, who has the right of modification, and other numbers will be the common numbers. For details, please see the part of "2.3 GSM alarm function operation instruction"

1.7 Production interface description



1.8 LCD display symbol description



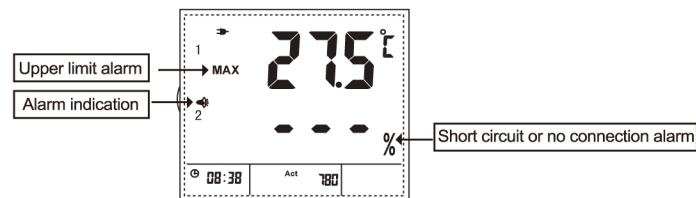
- (1) Battery level display
- (2) External power connection indication
- (3) Menu setting mode display
- (4) Over limit alarm indication
- (5) Alarm indication
- (6) Sensor indication
- (7) Date and time display
- (8) Record state indication: Wait-waiting for record ACT-be recording End-stop recording Log-data playback
- (9) Record numbers or playback numbers
- (10) GSM network signal strength
- (11) U disk copy indication
- (12) Communication indication with PC
- (13) Unit indication in humidity mode
- (14) Unit indication in temperature mode

1.9 Data logger parameter list

Parameter	Function	Set range	Default
MODE F01	Start record symbol	1–start record 0–stop record	0
MODE F02	Record auto-stop method	1–full record stop 0–loop record	1
MODE F03	Sensor 1 alarm delay setting	0–60 Min	5 Min
MODE F04	Sensor 2 alarm delay setting	0–60 Min	5 Min
MODE F05	Sensor 3 alarm delay setting	0–60 Min	OFF
MODE F06	Sensor 4 alarm delay setting	0–60 Min	OFF
MODE F07	Buzzer alarm setting	0–not beeping 1–beeping	1
MODE F08	Software version number(irreversible)	Ex.x	E 1.0
MODE F09	Cellphone password(irreversible)	Display range (000–999)	000
MODE F10	Sensor 1 SMS alarm delay setting	0–60 Min	5 Min
MODE F11	Sensor 2 SMS alarm delay setting	0–60 Min	5 Min
MODE F12	Sensor 3 SMS alarm delay setting	0–60 Min	OFF
MODE F13	Sensor 4 SMS alarm delay setting	0–60 Min	OFF
MODE F14	Dial the bound cellphone after send message twice	0–Forbidden 1–Permitted	1
MODE F15	GSM alarm model turnoff method	0–turn off when external power disconnection 1–not turn off when external power disconnection	0

Note: 1. SMS alarm actual delay time = alarm delay setting value + SMS alarm delay setting value.
 2. If the sensor measured value is higher than the set upper limit 30 ° C or 30%, or there is a short circuit or open circuit, it will alarm immediately.SMS alarm actual delay time = 0 + SMS alarm delay setting value.

1.10 Alarm interface description



Chapter2 Operation instruction

2.1PC software instruction

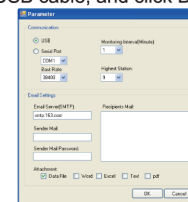
2.1.1 Software installation



Insert the matched CD, and open it, will appear the above icon, click it to install the software.

2.1.2 Port setting and data logger connection

Firstly connect data logger by USB cable, and click Data logger→Parameter setting → select USB

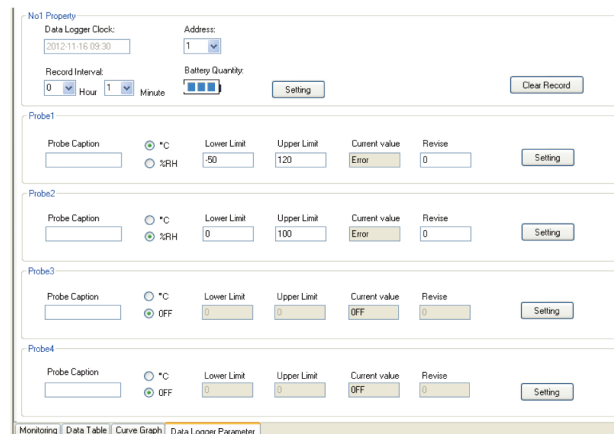


In the figure, real time monitor interval is the interval that PC real-time collects the data of data logger

Highest station address is the maximum sets of data loggers which are connected with PC. If you have only one data logger, it is suggested to set Highest Station as 1.

2.1.3 Data logger parameter setting

When click "OK", PC will start to connect with data logger. if success,will appear the screen as below:



Through this screen, you could set clock, station, record interval, the upper and lower limits of the datalogger, and it could also change the data acquisition channels.

Note: Before modifying parameters, be sure to connect the USB cable first, and then click connection. PC will read the original set parameters, and you could modify settings accordingly.

2.2 Data logger operation instruction

2.2.1 System menu setting

Under the normal display screen:

Press \rightarrow to enter the parameter setting state MODE, then press \blacktriangle or \blacktriangledown to select the parameter menu, the menu is F01、F02.....F15.After a menu is selected, press \rightarrow to select the corresponding value, and this value will flash. Press \blacktriangle or \blacktriangledown to modify this parameter, press \rightarrow the cursor will shift in circulation, press SET to save the parameter. Parameters setting please refer to "parameter list".

2.2.2 U-disk copy

Under the normal display screen and the external power is connected, and insert U disk, hold and press SET key and \rightarrow key for about five to fifteen seconds to copy data, and do not release the keys until the symbol of U-disk flashes. After finishing copy, the icon of U-disk stops flashing, then U-disk could be exited. If GSM module is selected, it could only copy after connect the external power supply for 60 seconds. After connect external power supply, and if there is read-write lock in U disk, please open the read-write lock. If there is no U disk icon flashing over 15 seconds, please check whether file format of U disk is FAT32 or FAT by computer, and check whether U disk could normally read or write documents, and the U disk capacity should be below 8GB(include 8GB). See Figure 3

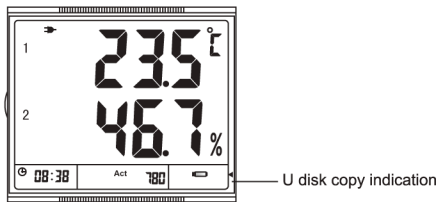


Figure3

The file copied by U-disk will have the name of RC-40.TXT, it could be opened by the notepad,

WordPad or Office Word in Windows, please see Figure 4

NO.	DATE	TIME	P1	RH2	P3	P3	POWER
1:	11-06-27	08:32	77.4°C	53.5%	OFF	OFF	EXT-PWR
2:	11-06-27	08:32	77.4°C	53.5%	OFF	OFF	EXT-PWR
3:	11-06-27	08:32	--.-°C	53.4%	OFF	OFF	EXT-PWR
4:	11-06-27	08:32	77.4°C	53.5%	OFF	OFF	EXT-PWR
5:	11-06-27	08:32	77.4°C	53.5%	OFF	OFF	EXT-PWR
6:	11-06-27	08:32	77.4°C	53.5%	OFF	OFF	BAT

Figure4 Example of U disk copy file

The representation of symbols shown above is as below:

- 1."NO."represents save sequence number 2."DATE" represents save date
 3."TIME"represents save time 4."P1" represents the channel is for temperature sensor.

5. "RH2" represents the channel is for humidity sensor
 6."OFF" represents the channel has been closed.
 7."--.-" represents sensor in short-circuit or not connected
 8."POWER"represents the method of power supply
 9."EXT-PWR"represents the external power supply
 10."BAT"represents the disconnection of external power and it is powered by internal battery.

Note: When you copy the data by U disk, the original RC-40.TXT file will be overwritten, please save or rename the existed file before U disk copy.

2.2.3 Historical record query

Under the normal display screen:

Press \blacktriangledown to enter the state of historical record query"Log", press \blacktriangledown to query data forward, press \blacktriangle to query date backward, long press \blacktriangle or \blacktriangledown to quicken the query. During query, press \rightarrow to check the record time. If channel 3 and channel 4 are also enabled, the record data in Channel 3 and Channel 4 could also be checked. In the query mode, if no key operation within four seconds, the interface will auto switch, and separately display date and time. If Channel 3 and Channel 4 are enabled, display the data from Sensor 3 and Sensor 4. If no key operation within 15 seconds, it will return to normal work state automatically, or press SET to return to normal work state.

2.2.4 Data storage start and stop

Under the normal display screen:Press \rightarrow to enter the parameter setting items, then Press \blacktriangle or \blacktriangledown to select F01. Press \rightarrow to enter the setting, press \blacktriangle or \blacktriangledown key to change "0" to "1". "0" represents the recording stops. After save and exit the interface, it will display "Wait" in the position of record status. "1" represents recording start, and it will display "Act".

2.2.5 Alarm Open and close

The data logger alarm is activated automatically. When the collected data beyond the set value and beyond the alarm delay time, alarm will occur. The alarm has two modes: buzzer alarm and display flashing alarm. During the alarm, if it exceeds SMS alarm delay time, it will send alarm short message. Press any key to cancel buzzer alarm. If buzzer alarm is not allowed, please change the setting of menu F07 to 0. After you receive the first alarm short message, you could dial the data logger, and if you hear it is hung up, the shortmessage alarm could be temporarily canceled.

Note: To avoid the frequent false alarms caused by defrost, it adds automatic learning function in the data logger. If there is abnormal alarm caused by defrost or the door open which lead to the rapid temperature rise, it won't have alarm short message sending. However, the data logger will detect the defrost, and if exceed the preset defrost delay time, it will be SMS reminder. For details, see 2.3.2 "defrost" command in SMS command list.

2.3 SMS alarm function operation instruction

2.3.1 Quick start guide

For the initial use, please refer to the steps as below:

(1) Please bind the cellphone numbers which need to receive SMS alarm information from the data logger Operation method: When GSM network signal indicator lights, please send "Set xxx" to data logger number. If you receive the successful binding information, it means that your cellphone number is successfully bound.

If you are the first bound number, you will be the administrator and have administrator's right. "xxx" is the administration password, the default is "000". For the following, it is the same. For other commands, please check <GSM alarm administrator part (Table 2)>.

(2) If you want to bind other cellphone number with the data recorder, please operate as below:

Operation method:

A: You could inform the cellphone number to be bound to send "Set xxx" to data logger number. If they receive the successful binding information, it means that the cellphone number is successfully bound. "xxx" is the administration password

B: You could also send " add 0086xxxxxx" to the data logger by your cellphone, it finishes binding once receive successful binding information. "0086xxxxxx" is the cellphone number to be bound. Please check the correction of the cellphone number before binding, to avoid the trouble for other person.

(3) If you want to change the sensor name when receiving the message, please operate as below:

Operation method: Please use your administrator's cellphone to send "sensor x_xxxxxx" to data logger, it finishes when receives the successful modification message. x is the sensor number to be modified. "xxxxxx" is the modified name, which user could customize. The length of the name is Max. 6 characters (include the number). "_" is for space.

(4) The data logger has timing push by default. The factory default is 19:00 daily. If your number is bound, you will receive the timing push information. If you want to change the time of timing push, please operate as below. Operation method: Please use your administrator's cellphone to send "push 08_24" to data logger, it finishes when receives the successful modification message. 08 represents the push time starting from 08:00, and you could customize. 24 represents interval is 24 hours, and you could customize. It is reminded that if you set between 20:00~08:00, it will not push! If you want to close push function, send "push 08-00" to data logger. "_" is for space.

(5) If you don't want to be dialed cellphone without checking your short message, you could change the setting of menu F14 to 0.

(6) If you want to delete the bound cellphone number, please operate as below.

Operation method: If you are administrator, you could delete other cellphones, send "Delete X". X is the cellphone serial number. If you do not know the serial number, please send "query cellphone" to data logger, then you will receive cellphone serial number message. If you want to delete your own cellphone number, please send "delete", it finishes when receive the deletion success reply. For common users, if you want to delete your own cellphone number, please send "delete", it finishes when receive the deletion success reply.

(7) If you want GSM module to continue working even if external power supply is disconnected, change the setting of F15 to 1.

2.3.2 SMS command list

In the table below, content in [xxxxxxx] represent cellphone sending message. For (xxxxxxx), represent SMS that data logger replies to the cellphone.

GSM alarm administrator operation part

Operation aim	SMS sent to data logger	Feedback information from Data logger	Command description
Set the own number to receive alarm information	[ST000]	(Te cellphone number is bound successfully! For details, please see the part of administrator or of SMS alarm in the manual.)	It could only be set Max. five cellphone numbers. "XXX" is the password for GSM function. The first number received will be administrator's number, with the right of administrator.
		(Set repeated, the cellphone number you set has been successfully bound!)	
		(Sorry, the password you enter is incorrect, please check parameter F09 in the host menu to display the password, or contact your administrator, and then try again!)	
Add other number to receive alarm information	[ZJXXXXXXX#]	(Hello, your set cellphone number 86xxxx xxxx is bound successfully! In order to ensure a correct cellphone number, please re-confirm the bound cellphone number.)	here "xxxxxxxxxx" is the cellphone number, which consist of "country code+ cellphone number+end mark#"
		Set repeated, the cellphone number you set has been bound!	
		Binding failed, five numbers have been bound, please cancel one of them and try again!	
Push the real-time data of data logger	[DSxx_yy]	Push setting successful, push start time is xx:00, the interval is xx hours. Push start time will be delayed to 8:00 if push time is set within 20:00~8:00)	"xx" is push start time, in the format of whole point, range from 08:00 to 20:00, the default is 19:00. "yy" is push interval, setting range from 01 to 24, unit-hour, default is in 24 hours. For example: Set push 09-24, which means that it starts push from 09:00, after interval of 24 hours, it pushes again. If interval is 00, no push. "_" for space.
		Command could not be recognized, please check the format correct or not!	
		Operation failed, only available for administrator!	
Query the current collected data of sensors	[CX]	(Qs>> T1:-33.1°C; RH2 :70.1%RH ; T3:-33.1°C; T4: Missed!) Command could not be recognized, please check the format correct or not!	The data of channel 3 and channel 4 could only be sent when these channels have been enabled.
Cancel other numbers	[QX]	The cancel of cellphone binding successful! Command could not be recognized, please check the format correct or not!	

Operation aim	SMS sent to data logger	Feedback information from Data logger	Command description
Cancel other numbers	[LCx]	The cancel of cellphone binding successful! Cancel failed, the number does not exist!	"X" represents the serial number that the cellphone numbers are saved. The serial number could be aquired by the function of "query cellphone":
		Operation failed,only available for administrator!	
		Command could not be recognized,please check the format correct or not!	
Query the saved cellphone numbers	[CXPX]	1.-----; 2.-----; 3.-----; 4.-----; 5.-----; Command could not be recognized, please check the format correct or not!	The first number is the administrator's number by default, and has the right of administrator. And 1. 2. 3. 4. 5. represents the serial number that each cellphone number is saved.
Modify administration password	[XGxxx]	(Modification of sending password success,new password is xxx.)	XXX is the new password, and it is the administration password during cellphone setting.And you could also check it by data logger menu item F09.
		(Sorry,you have no right to use this function, please contact the administrator to set it.)	
		(Hello,the format of the password you modified is incorrect, please carefully read the manual and try again!)	
		Command could not be recognized,please check the format correct or not!	
SMS alarm suspend	After receiving SMS alarm, ring the data logger, it will be OK after hearing the ring 2-10 sec and it hung up by the data logger.		SMS alarm could be sutomatically recovered after the data returns to be normal.

Common user operation part

Operation aim	SMS sent to data logger	Possible received feedback information	Command description
Set the own number to receive alarm information	[ST000]	The number binds successfully! SMS alarm andpush information will be informed,and you could reply "[CX]"to real-time query data logger collected data. (Set repeated,the number you has been bound)	It could only be set Max. five cellphone numbers. "XXX" is the password for GSM function. It could also be queries by data logger menu item F09.
		(Qs>> T1:-33.1°C; RH2 :70.1%RH; T3:-33.1°C; T4: Missed!)	
Query current sensor collected data	[CX]	(Qs>> T1:-33.1°C; RH2 :70.1%RH; T3:-33.1°C; T4: Missed!)	The data of channel 3 and channle 4 could only be sent when these channels have been enabled.
Cancel own number	[QX]	(The cancel of cellphone binding successful)	
GSM alarm suspend	After receiving SMS alarm, ring the data logger, it will be OK after hearing the ring 2-10 sec and it hung up by the data logger.		SMS alarm could be recovered after the alarm is lifted.

2.4. Communication Means Selection:

Selection mode of data transmission:

2.4.1. For single RC-40, its data could be transmitted to PC by U disk or by USB interface, and then connect U disk to the computer for data analysis. Please see Figure 9.1 and 9.2.

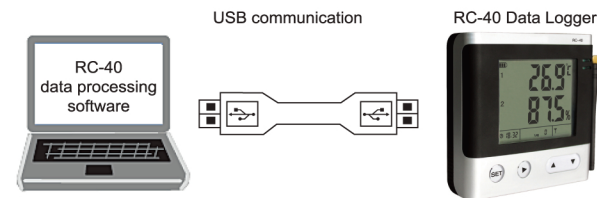


Figure 9.1 Scheme of data transmission by USB

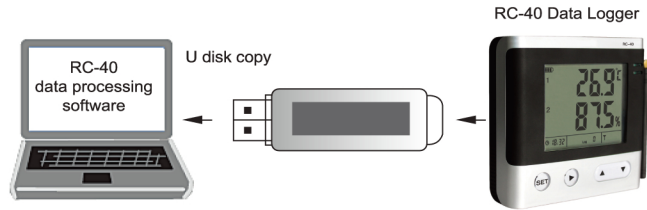


Figure 9.2 Scheme of data transmission by U disk

Multiple RC-40 devices can form a LAN by connecting to the RS-232/RS-485 converter at the computer terminal via RS-485 bus. It could assign different addresses for each RC-40 in the LAN through PC, and the address range is from 1 to 80. See Figure 9.3 All data of the device in LAN could be monitored, uploaded by the computer software and could be saved and printed in graphic or data report forms.

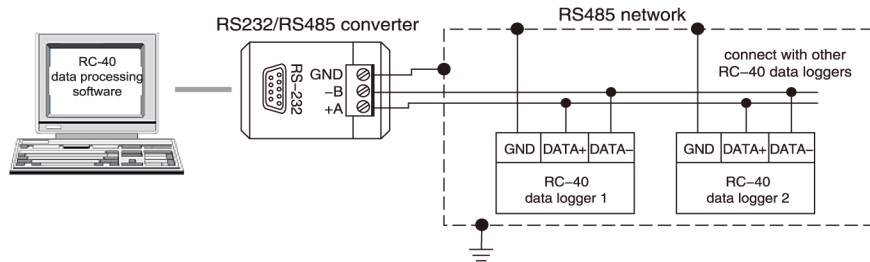


Figure 9.3 Multiple devices RC-40 form LAN by RS-485 interface

Note: Baud rate could be automatically set by the computer software (Default baud rate is 4800)

3.1 Standard accessories

- RC-40 Temperature and Humidity Data Logger
- One Temperature Sensor (length: 5M)
- One Humidity Sensor (length: 5M)
- One Computer Installation Software CD
- One Operation Instruction
- One Power Adaptor

3.2 Optional Accessories

- ▽ RS232/RS485 Converter
- ▽ Humidity Sensor
- ▽ Temperature Sensor
- ▽ GSM alarm module