

TZ-TT18

Temperature&humidity Transmitter

User Guide V1.5



1. Product overview

Temperature Transmitter (hereafter referred as TT18) built-in temperature /humidity transmitter and GSM module, need to inset SIM card use.TT18 is with long standby time and only wakes up when it is time to send data, or when the use operates it. Other than this, it is in sleep state so can be used for a longer time to bring you more convenience.

Temperature Transmitter can collect high-precision temperature/humidity quickly, and then transmit to the server through GPRS. It is widely used in cold chain logistics, medicine, transportation and other industries.

2. Specification

Specification	Details
Dimension	80mm*64mm*25mm
Battery	Built-in 3.7V/1800mAh Lithium battery
GSM antenna	Built-in
Flash Memory	Can be save 2880 GPRS data
Temperature precision	±0.3°C
Detect Temperature range	-40°C ~ +125°C
Humidity precision	±3%
Detect humidity range	0~100%
Operating Temperature Range	-20°C~ +60°C
Power Consumption	Active mode(avg.) < 100mA; Sleep mode(avg.) < 2mA
Air pressure	860Kpa --1060Kpa
Humidity	Up to 75% non-condensing
GSM chip	SIMCOM GSM chip, 4 Frequency GSM 850/ 900/1800/1900mHz
Indicators	LED indicators for Temperature

3. Indicators and interface



Hardware	Function
A. LED1	Temperature LED (Green)
A2. LED2	Power LED (Red)
B. USB Port	Configure the machine
C. SIM card	Insert SIM card, send the GPRS data
D.switch	Power on /off the unit

4. Indicator status

Green LED - indicating machine status	
Off	No boot/into sleep/no GPRS data send when work
On	Sending GPRS data and the temperature /humidity sensor connected
On for 20 seconds and off for 20 seconds	Temperature or humidity over threshold
On for 60 seconds and off for 60 seconds	Low voltage

Red LED - Power	
Off	No charge or full charge
On	charging

5. GPRS data format

TT18 GPRS data is in hex format.

The format of hex code:

Format: Start bits(2byte) + Packet length(2byte) + Protocol number(2byte) + Hardware type(2byte) + Firmware version(4byte) + IMEI(8byte) + RTC data time(6byte)+ LBS data length(2byte) + LAC(2byte) + CELLID(2byte) + MCC(2byte) + MNC(2byte) + Extension bits(A) + State data length(2byte) + Alarm type(1byte) + Terminal information(1byte) + GMS signal strength(1byte) +GSM state(1byte) +Battery voltage(2byte) + Temperature(2byte) + humidity(1byte) + Extension bits(B) + Extension bits(C) + packet index(2byte) + CRC(2byte) + Stop bits(2byte)

The data of the device send to the server:

54 5A 00 2F 24 24 04 03 01 07 00 00 08 66 10 40 27 00 34 28 09 01 01 05 03 0D 00 08 25 33 78
37 04 60 00 01 00 09 AA 00 17 37 01 95 09 DA 45 00 0A 57 0A 0D 0A

Below is a table tells more detail information about the protocol.

Data block	Number	Data	Meaning
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	of bytes	Content	
Start bits	2	'T' 'Z'	TZone company identifier, this is the header of every packet
Packet length	2	Variable	The bytes length from the start at protocol number to the end at the CRC.
Protocol number	2	'\$\$'	Normal data
Hardware type	2	0x04 0x03	The hardware is TT18
Firmware version	4	Variable	0xFF 0xFF 0xFF 0xFF = 255.255.255.255
IMEI	8	Variable	BCD format, i.e. 0x08 0x66 0x10 0x40 0x27 0x00 0x34 0x28 = 866104027003428
RCT time date	6	Variable	The time and date when packet the data. The sequence is Year Month Day Hour Minute Second
LBS data length	2	Variable	GSM LBS's data length excludes LBS data length part, if the value is 0, means there is no LBS data.
LAC	2	Variable	GSM's location area code 0x25 0x33 means LAC is 2533
CELL ID	2	Variable	GSM's serving CELL ID 0x78 0x37 means CELL ID is 7837
MCC	2	Variable	Mobile Country Code, ignore the first digital, only 3 digital, 04 60 mean MCC is 460.
MNC	2	Variable	Mobile Network Code, 2 or 3 digital, if the first digital is 8 , means MNC is 3 digital, if the first digital is 0, mean MNC is 2 digital, 87 56 means MNC is 756, 00 56 means 56.
Extension bits	A=0		For future extending the protocol use, currently, has nothing, does not possess any byte
Status data length	2	Variable	The status data length excluding "Status data length" itself, if this part is 0, means no status data.
Alarm type	1	Variable	The value of this part has four possibility, Temperature/humidity included in all the GPRS data. 0xAA Interval GPRS data 0x10 Low battery Alarm 0xA0 Temperature/Humidity over threshold alarm 0xA1 Temperature/Humidity sensor abnormal alarm
Terminal information	1	Variable	Bit 7 to bit 5 are reserved for future use. Bit4: 1 RTC time is abnormal 0 RTCtime is normal Bit3: 1 The temperature/Humidity sensor is abnormal 0 The temperature/Humidity sensor is normal Bit2: 1 The temperature/Humidity is over threshold 0 The temperature/Humidity is normal

			<p>Bit1: 1 The battery low voltage 0 The battery is normal</p> <p>Bit0: 1 The machine is charging 0 The machine is not charging</p>
GMS signal strength	1	Variable	CSQ value , Hex code
GSM status	1	Variable	<p>Bit 7 to bit 6 are reserved for future use.</p> <p>Bit 5: 1 Internet connection is established 0 Internet connection is not established</p> <p>Bit4: 1 GPRS is registered successfully 0 GPRS is not registered</p> <p>Bit3: 1 The GSM is in roaming mode 0 The GSM is in home network mode</p> <p>Bit2: 1 GSM is registered successfully 0 GSM is not registered yet</p> <p>Bit1: 1 Detected SIM card 0 Not detected SIM card</p> <p>Bit0: 1 The GSM module is started 0 The GSM module is not started yet</p>
Battery voltage	2	0	Unit:10mv, for example: 0195H=405(DEC), 405*10mV=4.05V.
Temperature	2	0	<p>Unit:0.01℃, convert to binary first, mark in the highest bit , 1-disconnect 0-connect , negative/positive mark 1-mean the temperature is negative 0-mean the temperature is positive. Remaining is the temperature value, convert to HEX first , and multiply 0.01℃. for example:09 DA=25.22℃ , 49 DA= - 25.22℃ 80 00= not connect temperature/humidity sensor</p>
humidity	1	0	Unit:100%, Hex code, for example: 45=69%, FF = not connect temperature /humidity sensor
Extension bits	B=0		For future use, currently, this part has nothing, does not have any byte
Extension bits	C=0		For future use, currently, this part has nothing, does not have any byte
Packet index	2	Variable	The value range of this part is between 1 and 9999
CRC	2	Variable	The checked content is from the “protocol number” to the end at “CRC”, including “protocol number”, excluding “CRC”.
Stop bits	2	0x0D 0x0A	Indicate this packet is finished

6. Use the GPRS function

Notes:

You can set it via SMS or use the same command via serial port tool.

Step1: Set the APN (Access Point Name)

Different network of provider have the different APN at every country, if you don't know, please refer to the attachment.

Format: *\$\$\$\$\$,011,APN,Username,Password#

Notes: The username and password could to be null.

For example: *000000,011,cmnet,,#

Explication: The China Mobile's APN is "cmnet", and the username and password are empty.

After you send the command of SMS to device, it will reply to your mobile phone:

Receive: '011'OK

*000000,011,cmnet,,#

If you send the command of USB to device, the serial port tool will shows:

CMD bytes: 14

*000000,011,cmnet,,#

ComdType:011(SETAPN)

APNnumber:cmnet

Username:

Password:

Step2: Set the server's IP & PORT

Format: *\$\$\$\$\$,015,1,IP,PORT#

For example: *000000,015,1,gateway.gotracking.net,54929#

gateway.gotracking.net is our server's domain name,54929 is the port.

If client have the server by himself, please make sure the IP and port is correct.

After you send the command of SMS to device, it will reply to your mobile phone

Receive: '015'OK

000000,015,1,gateway.gotracking.net,54929#

If you send the command by USB to device, the serial port tool will shows:

CMD bytes: 2B

***000000,015,1,gateway.gotracking.net,54929#**

ComdType:015(SETIPANDPORT)

Mode:01

IP/Domain Name:gateway.gotracking.net

Port:54929

Step3: Set GPRS time interval

Format: *\$\$\$\$\$,018,X#

X: the time interval (unit is min),

For example: *000000,018,1#

The device will send GPRS every1 minute and no times limit.

After you send the command of SMS to device, it will reply to your mobile phone:

Receive: '018'OK

***000000,018,1#**

If you send the command of USB to device, the serial port tool will shows:

CMD bytes: 0E

***000000,018,1#**

ComdType:018(SetGpreInternal)

Interval:1

7. Command list

If you want to know more about the TT18, and configure it, you can refer to the command list.

\$\$\$\$\$\$ is user`s password, and initial password is 000000

	SMS Instruction	Format	Note
1	Request one current machine information	*\$\$\$\$\$,000#	The machine will reply in the form of SMS
2	Modify user password	*\$\$\$\$\$,001,@@@@#@#	\$\$\$\$\$ is old password @@@@@ is new Password
3	Set the high/low temperature and humidity alarm function When the TT11 high/low temperature and humidity, TT11 will always send high/low temperature and humidity alarm GPRS data to the Preset Server. the machine can send data according to the time interval you have set(003 has priority to 004)	*\$\$\$\$\$,003,A,B,C,D,X#	A=[-40~125],high-temperature threshold(unit:°C,default:100) B=[-40~125],low-temperature threshold(unit:°C,default:-20) A must be bigger than B if Temperatures exceed [A, B],it will send alarm data C=[0~100],high-humidity threshold(unit:%,default:80) D=[0~100],low-humidity threshold(unit:%,default:20) C must be bigger than D if Humidity exceed [A, B],it will send alarm data X=[1,60],TT18 more than threshold change into Xmin send a GPRS data(unit:min,default:1)
4	Set low power alarm When the TT18 voltage is lower than the preset value, TT18 will send one lower power alarm GPRS data to the Preset Server. the machine can send data according to the time interval you have set	*\$\$\$\$\$,004,X,Y#	X is the low power alarm voltage, eg: 3.8v,X=380(default:350) Y=[1~60] Y is the Low power to send data interval time(unit:min, default:60, 0 is don't send data) For example: \$\$\$\$\$,004,380,10# When the battery voltage is lower than 3.8 V, 10 minutes to send a GPRS data
5	Set RTC time	*\$\$\$\$\$,006,year,mounth,day,hour,minute,second#	Set the device RTC time . For example: *000000,006,16,01,11,10,46,30# Year:16 Mounth:1 Day:11 Hour:10 Minute:46 Second:30
6	Extend setting	*\$\$\$\$\$,008,ABCDEFG#	A=0, Disable machine information report function which get machine

			<p>information SMS by Calling A=1, Enable machine information report function which get machine information SMS by Calling (default) B/C/D/E/FG=0 B=0,disable GPRS ACK function(default); B=1,enable GPRS ACK function; Note: the machine once every send GPRS data to the server, the server must respond @ACK,serial number(Packet index)# to the machine, then the machine will continue to send next GPRS data to the server. C/D/E/FG=0</p>
7	Set APN,Username,Password	*\$\$\$\$\$,011,APN,Username,Password#	<p>APN : APN string (must < 28 chars) User name: Your username (must < 28 chars) Password: Your password (must < 28 chars) * If haven't username or password, then left it blank. For example: *000000,011,CMNET,,# (It haven't username and password)</p>
8	Set IP Address & port number	*\$\$\$\$\$,015,X,IP,PORT#	<p>X=0 use IP connect the server X=1 use DN connect the server IP : xxx.xxx.xxx.xxx DN:(domain name) www.xxx.com PORT : [1,65535]</p>
9	Set the time intervals of GPRS Data	*\$\$\$\$\$,018,X#	<p>X (3 Digital) [1,60] Time interval (Unit: min,default:5)</p>
10	Set the GPRS mode	*\$\$\$\$\$,019,X#	<p>X=0, Use the UDP mode X=1, Use the TCP mode(default)</p>
11	Set the temperature&humidity SMS alarm function	*\$\$\$\$\$,020,X,Y#	<p>X=0, disable this function(default) X=1,enable this function Y, SMS number Note:only send a sms alarm when</p>

			over or below the threshold, so please the first set 020 command, then set 003 command.
12	When bad condition only save data	*\$\$\$\$\$\$,021,A,B,C,D,E#	A=[-40~125],high-temperature threshold(unit:min,default:100) B=[-40~125],low-temperature threshold(unit:min,default:-40) A must be bigger than B if Temperatures exceed [A, B],it will save data C=[0~100],high-humidity threshold(unit:%,default:100) D=[0~100],low-humidity threshold(unit:%,default:0) C must be bigger than D if Humidity exceed [A, B],it will save data E=[350,400], low power threshold (unit: 10mv,default:350)
13	Clear data flash	*\$\$\$\$\$\$,500#	Clear history in the flash memory
14	Initialization	*\$\$\$\$\$\$,990,099#	It will set all parameter to factory default value (Excluding the Password).
15	Reboot by SMS command	*\$\$\$\$\$\$,991#	It will reboot the TT18 by this SMS command.
16	Read the machine records of Flash	*\$\$\$\$\$\$,999#	Through the USB configure cable, read the machine records in the Flash to the computer

8. Instruction

With the battery in TT18 , turn on the switch , machine running,when TT18 completes initialization and sends the first data, it will sleep, Most of the time TT18 is in sleep mode, with only interval time data, only when connected with serial port tool for configuration,or it is called / receives SMS command, will it wake up. After this, it goes into sleep mode again, thus it can work for longer time.

Note:

Please set the RTC time when turn on the device, otherwise the machine for the initial time.(if send data to ours server, when ours server get yours device data, the RTC time will auto update).