

**CWT5016**

GPRS DATA LOGGER

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## 1 PREFACE

Thank you for using the CWT5016 GPRS data logger. You will know well about the functions and operation methods of this product quickly through this User's Manual.

This product is mainly used for remote alarming and control application based on GSM network. Please use it according to the parameters and technical specifications in the User's Manual. Meanwhile, the Notes shall be considered for the usage of radio-control products, especially GSM products. Our Company bears no liability for property loss or bodily injury arising from abnormal or incorrect usage of this product.

### Package list

product	quantity
CWT5016 GPRS data logger	1pcs
RS232 cable	1pcs
12V Adaptor	1pcs
GSM antenna	1pcs
CD	1pcs

## 2 INTRODUCTION

CWT5016 has been designed as a cost effective, low power, self contained data logger. It combines 4 digital inputs, 4 drivable relay outputs, 4 analog inputs and 4 special temperature sensor inputs with embedded GSM/GPRS module to provide an all in one instrument for data logging, remote data acquisition, alarm and control.

It uploads real time data on schedule or alarm or pre-defined condition happens via SMS or GPRS. Alarm levels can also be set for any of the digital inputs, analog inputs and temperature inputs; it support User-defined SMS alarm messages and the outputs can also be controlled via SMS or GPRS.

CWT5016 comes with an easy to use configuration SW for setting up all parameters, including setting alarm levels or states and pre-defined conditions for GPRS transmit etc. The configuration can be done on a PC or from sms command.

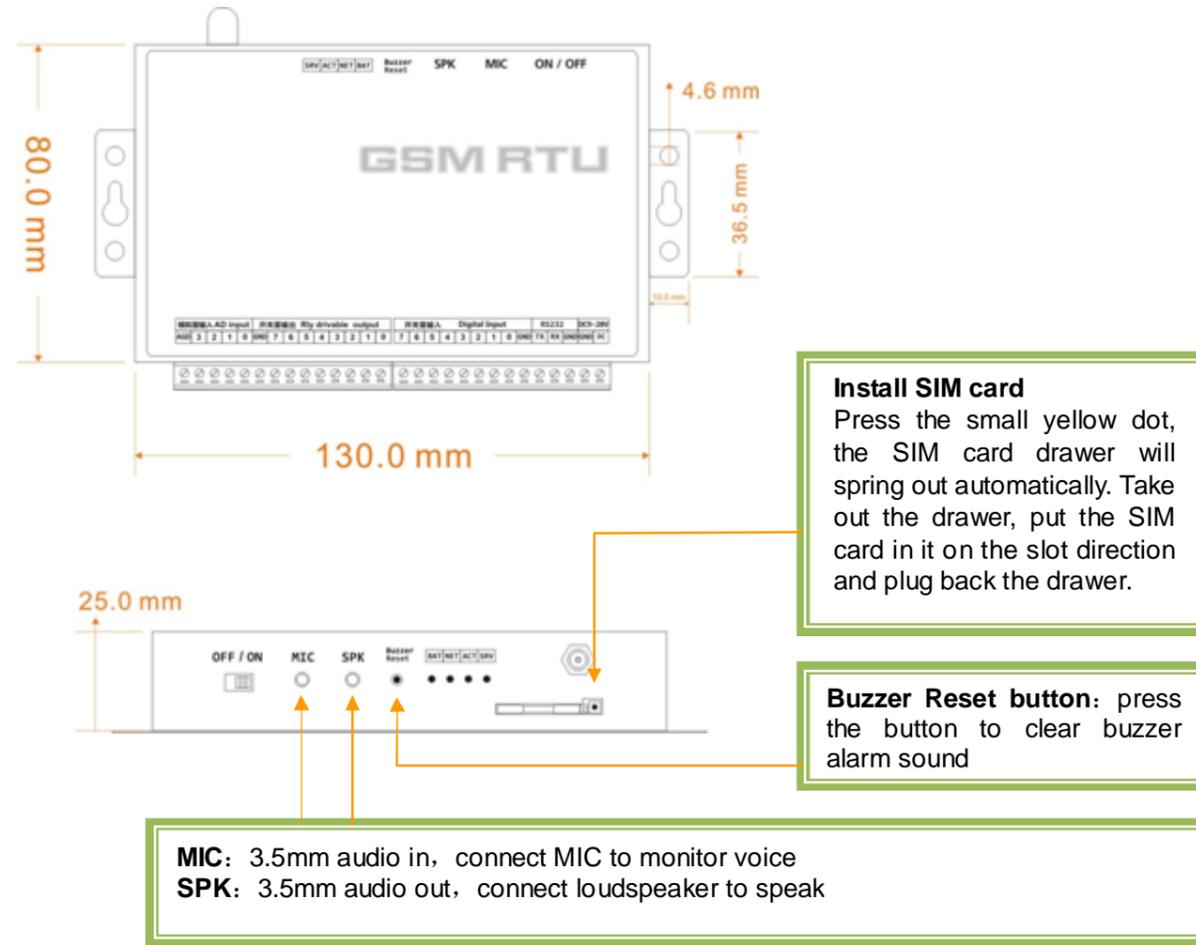
Its internal 256KB memory logs more than 1000 records. Flexible data logging interval starts from 1 minute up to 24 hours.

### 2.1 Parameter

Parameter item	Reference scope
DC Power supply	9-28V DC (Standard adapter: DC 12V/1.5A)
Power consumption	12V input Max. 150mA/Average 50mA
Frequency range	Dual-frequency 900/1800/850/1900Mhz
SIM Card	Supporting 3V SIM Card
Antenna	50 Ω SMA Antenna interface
Serial	RS232
Temperature range	-30°C ~ +70 °C
Humidity range	Relative humidity 95%
Digital Input	4 digital inputs(Dry contact)
output	4 drivable relay outputs(open-collector outputs)
Output drive voltage	Equal to input DC voltage
Output drive power	Drive voltage ≤35V, drive current ≤500mA
Analog Input	4 analog inputs(4~20mA or 0~5V)
Temperature input	4 DS18B20 inputs (temperature range -55°C ~ +125 °C )
memory	256K
Audio interface	3.5mm audio in and audio out
Exterior dimension	130×80×25mm
Weight	370 g

### 3 INSTALL

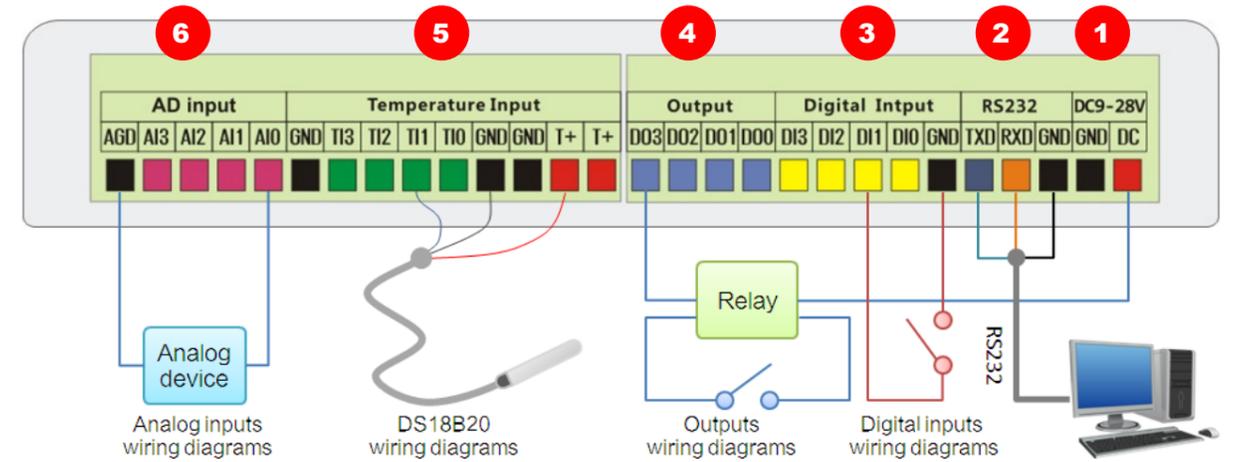
#### 3.1 size



#### 3.2 LED indicator description

Indicator	Status	Indication description
SRV (Orange)	Light on during handling	It will be light on when the system sends short messages and light off when the handling is over
ACT (Yellow)	Flicker	It will flicker periodically when the system is under operation, and the interval time is 6 sec
NET (Red)	Flicker	GSM module signal indicator, which will flicker slowly after the system is registered in GSM network
BAT (Green)	Light on during charge	It is on during interior battery is charging

### 3.3 Terminal Description



#### ①. DC9-28V (power in)

DC	positive terminal of the DC power supply (+)
GND	Negative terminal of the DC power supply (-)
Warning : must be careful that the polarity is not reversed, otherwise, the output will be damage	

#### ②. RS232

RXD	Receive Data	Connect RS232 cable orange wire
TXD	Transmit Data	Connect RS232 cable blue wire
GND	Ground	Connect RS232 cable black wire

#### ③. 4 digital inputs (NO or NC)

DI0 ~ DI3	Connect NO or NC
GND	Connect COM

#### ④. 4 drivable relay outputs

DO0 ~ DO3	negative pole of relay coil
DC	Positive pole of relay coil

#### ⑤. 4 temperature inputs

T+	DS18B20 V <sub>DD</sub>
GND	DS18B20 GND
TI0~TI3	DS18B20 DQ

#### ⑥. 4 analog inputs

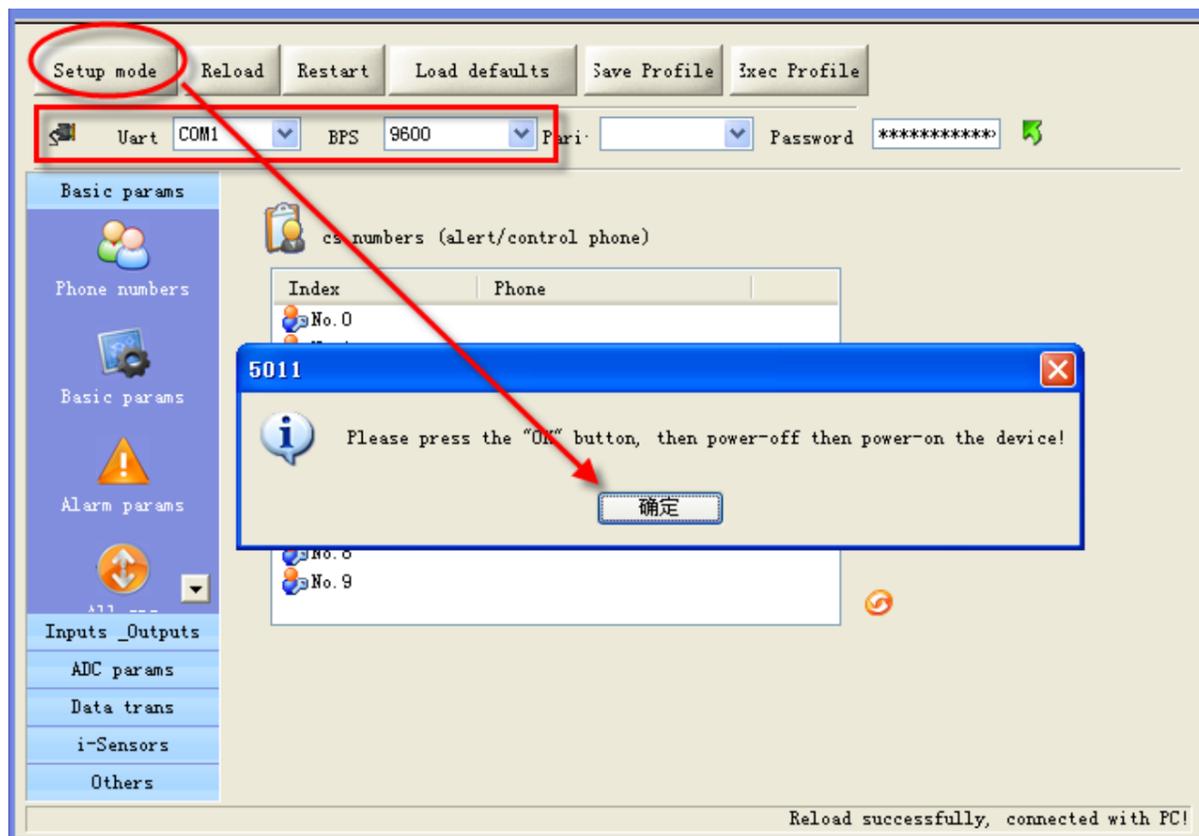
AIN0 ~ AIN3	Connect analog device output
AGD	GND

## 4 SETUP PARAMETERS FOR RTU

### 4.1 Access setup mode

Connect RTU and computer with RS232 cable, and open the configuration software, make RTU access setup mode according to the following figure.

⚠ Note: Please choose the serial port No. and rate correctly, the default communication rate is 9600; default password is "000000"



#### Definition: Working mode and setup mode

In setup mode, all functions are disabled, only to setup parameters. And RTU must be restart to enter working mode, all functions is enabled, the RTU can alarm and be control.

#### ⚠ NOTE

Access setup mode, the simcard and antenna is no need, but access wording mode, the simcard and antenna is necessary.

#### ⚠ How to know current mode:

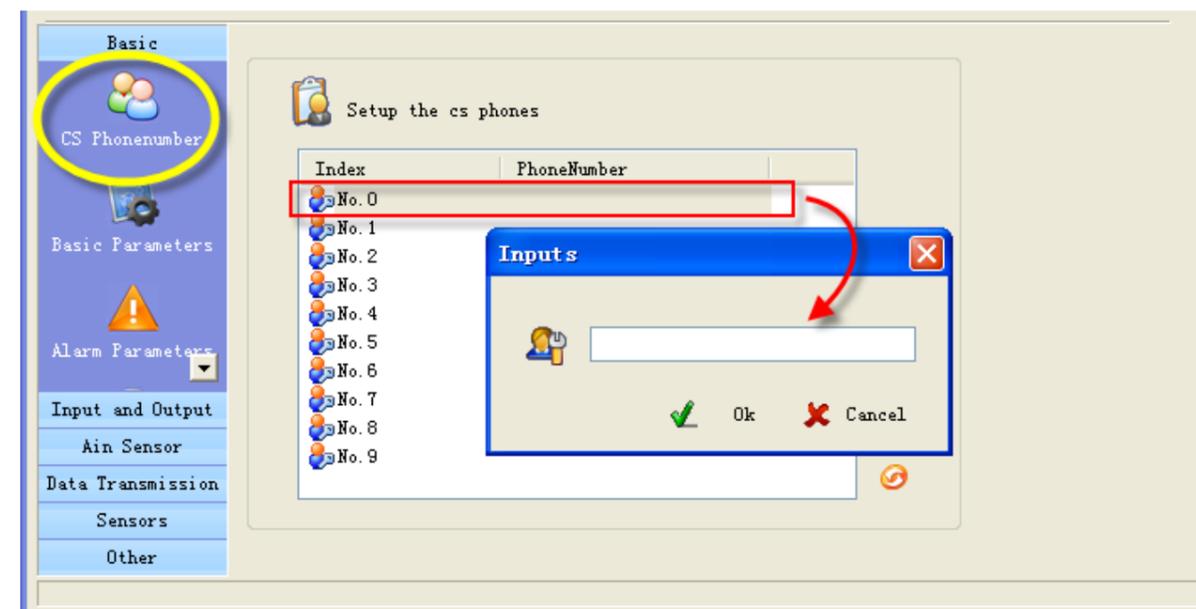
Method 1: Check the ACT light, if the ACT light flickers twice per second, that means it is under the setup mode; the flicker period of the ACT light can be up to 6 sec under the working mode.

Method 2: Check the information from the serial port, if the character string of "dtu come in setup mode" occurs, it means that RTU is under the setup mode.

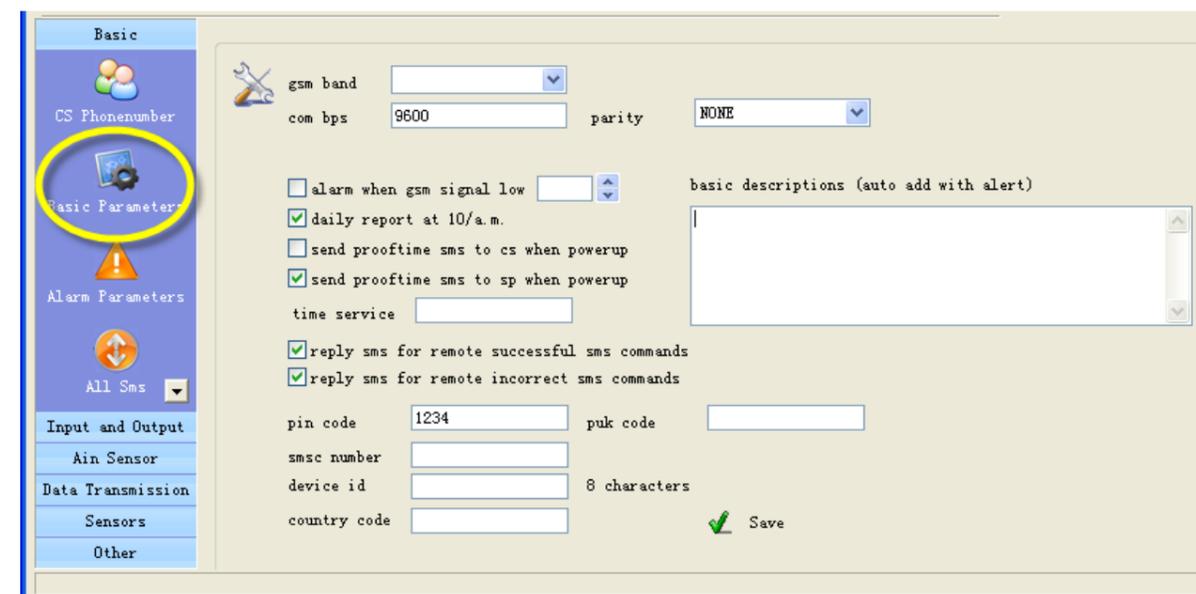
## 4.2 Setup basic parameters

### 4.2.1 Setup "CS number"

RTU under working mode, the "CS number" can send sms commands to control RTU and receive sms (include alarm sms, report sms etc). User can set 10 CS numbers, CS0-CS9



### 4.2.2 Setup basic parameters



⚠ Attention: gsm band, com bps, uart, pin code, country code please using the default parameter

#### ☐ Alarm for GSM signal low

GSM signal normal range is 18-32, RTU sends alarm sms to CS number when RTU's GSM signal value

below the preset threshold, the default is 11.

#### Daily report

enable the option, RTU will send a report sms to CS number at 10:00 every morning for reporting current states, through which the user can make sure the normal operation of RTU.

#### Proof time

Proof time is keeping the RTU's os (operation system) has correct time. RTU can execute daily report, timing arm or disarm, timing output at correct time.

#### Send proof time sms to cs when power up

When RTU power up, it send a sms to CS0 to request proof time, CS0 can reply sms"999" to RTU to complete proof time.

#### Send proof time sms to sp when power up

SP phone number is a phone that cans automatic reply a SMS to any incoming SMS, RTU use it to update interior Clocker by the timestamp in SMS, the SMS contents is not important.

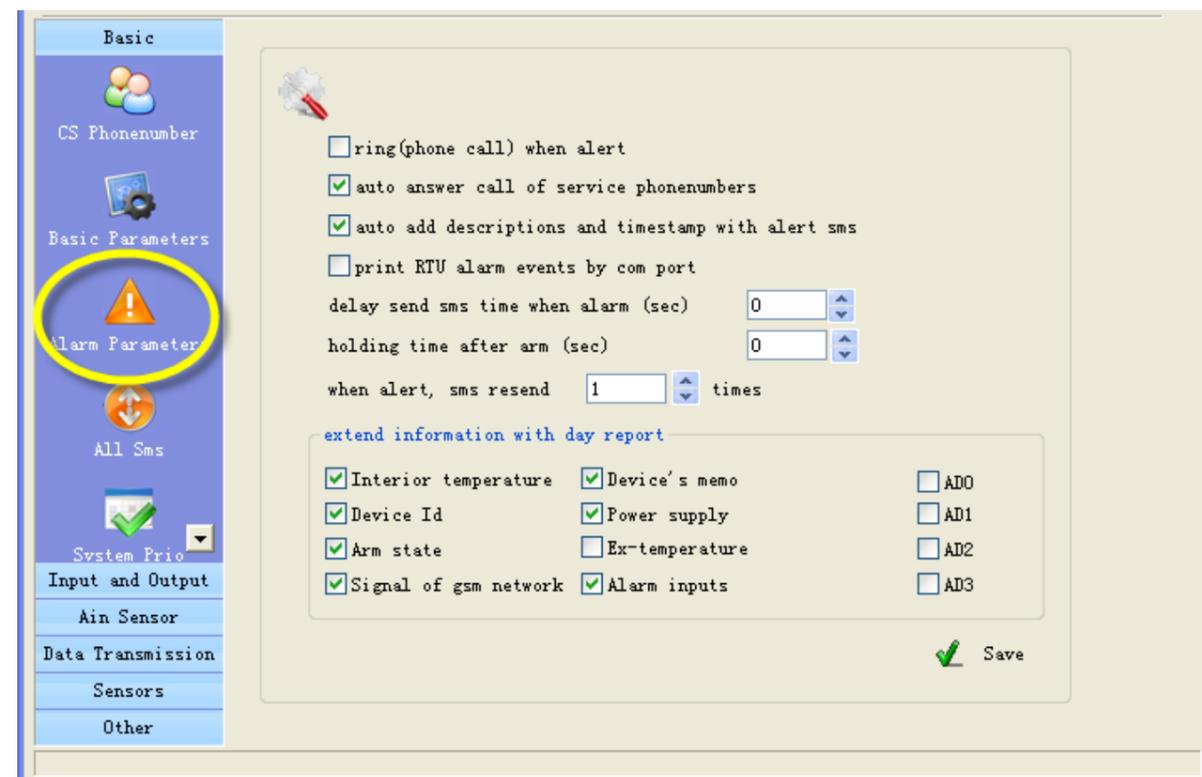
#### Device description

You can add description with RTU (such as install position, user information), the description is show in RTU alarm sms.

#### Device ID

The device ID is an 8-byte ASCII characters which is show in RTU state sms.

### 4.2.3 Alarm parameters



#### ring when alert

Enable this option, RTU will give CS number a phone call then send sms when alarm

#### auto answer call of service phone numbers

⚠ Attention: This option is valid for the RTU models that have audio interface.

If MIC and speaker are connected; RTU auto answer when CS numbers call it, so user can remote monitor voice and speaking.

#### Auto add basic description with alert sms

Enable this option, the description (such as install position, user information) that have been defined by user will show in alarm sms and daily report sms.

#### print RTU alarm events by com port

Enable this option, when RTU alarm, it sends the alarm data to com port with CWT\_IO data format.

#### delay send sms time when alarm(disarm delay)

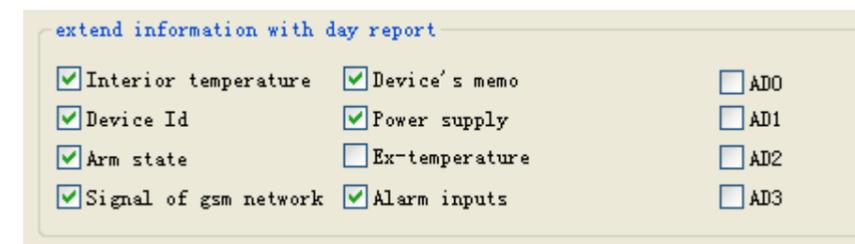
Define the time; you have an enough time to disarm RTU when you go into the monitor area.

#### Holding time after arm(arm delay time)

Define the time; you have an enough time to arm RTU when you leave the monitor area.

#### Extend information with report

RTU can send report sms to cs phones by timer or user's inquiry by sms command, this function is designed to let user know the RTU is stilling working and its status, enable or disable follow information to show in report.



- **Interior temperature:** The internal temperature sensor is optional, if RTU has added it, the temperature value will show in the daily report.

⚠ Attention: A standard RTU have not internal temperature sensor

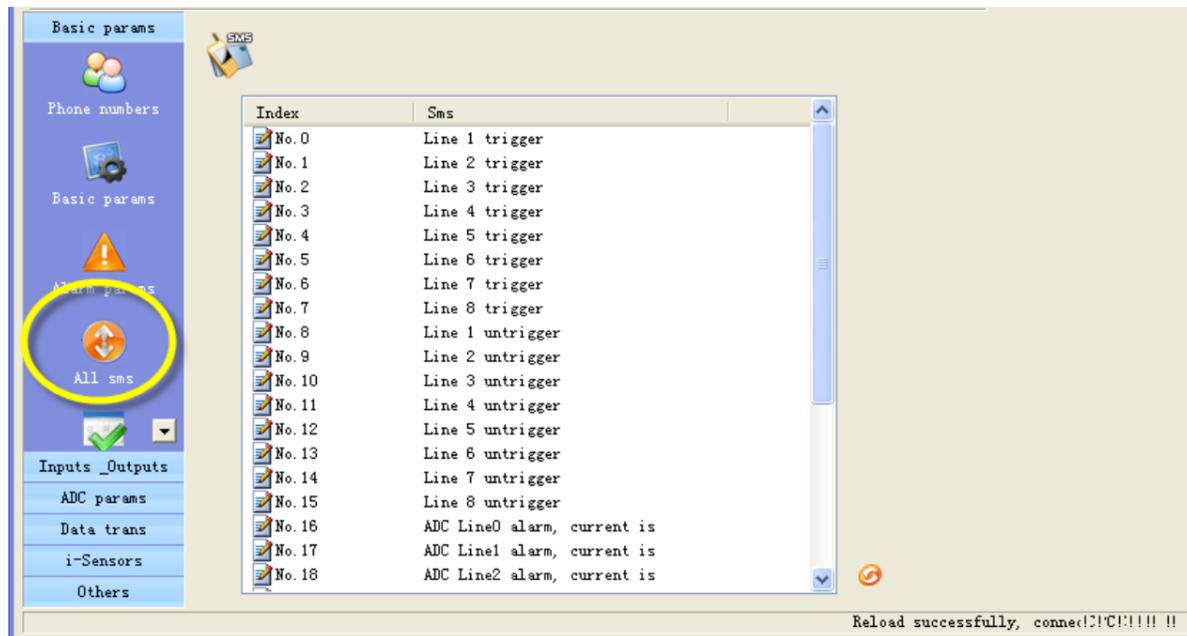
- **Device Id:** enable this option, ID will show in the daily report.
- **Arm status:** enable this option, arm or disarm status will show in the daily report.
- **Signal of gsm network:** enable this option, GSM signal value will show in the daily report.
- **Device's memo:** enable this option, Device description will show in the daily report.
- **Power supply status:** enable this option, the daily report will show power supply status
- **Ex-temperature:**

⚠ Attention: This option is valid for the RTU models that have temperature inputs (DS18B20 inputs).

Enable this option, all the value of extend temperature sensor will show in the daily report.

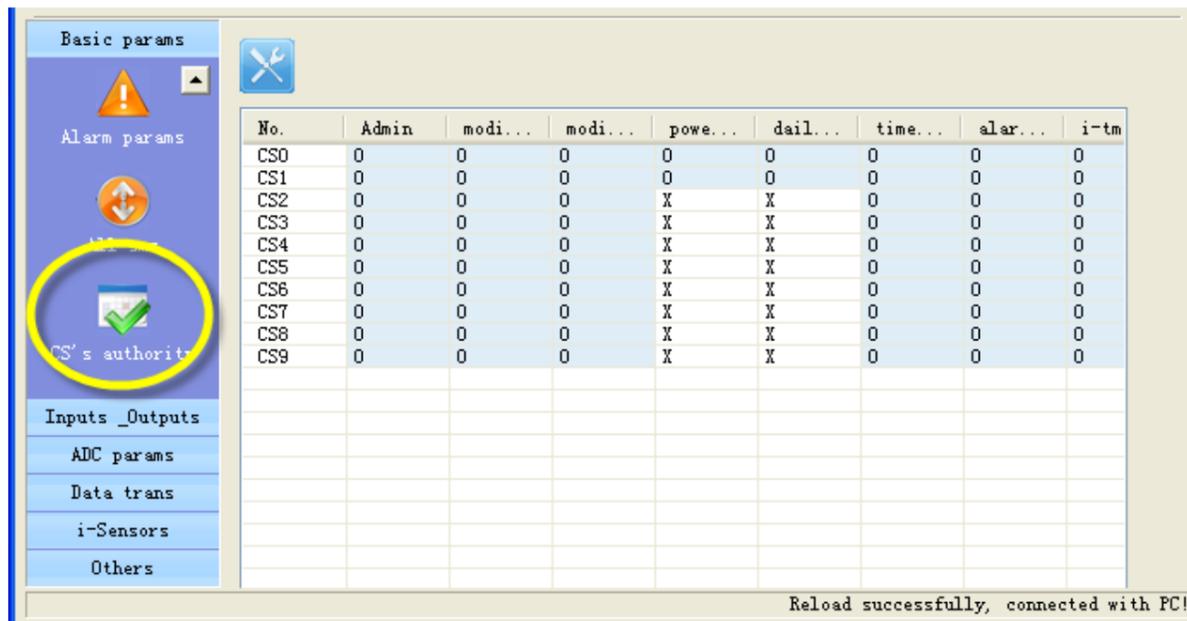
- **Alarm inputs:** enable this option, the inputs that are in alarm status will show in the daily report.
- **AD0~AD3:** enable those options, all the value of AD input will show in the daily report.

#### 4.2.4 ALL SMS



In this page, you can see all sms contents that you have defined, include digital inputs alarm/recover sms, AD inputs alarm/recover sms etc. you can Double-click it to modify.

#### 4.2.5 System Prio



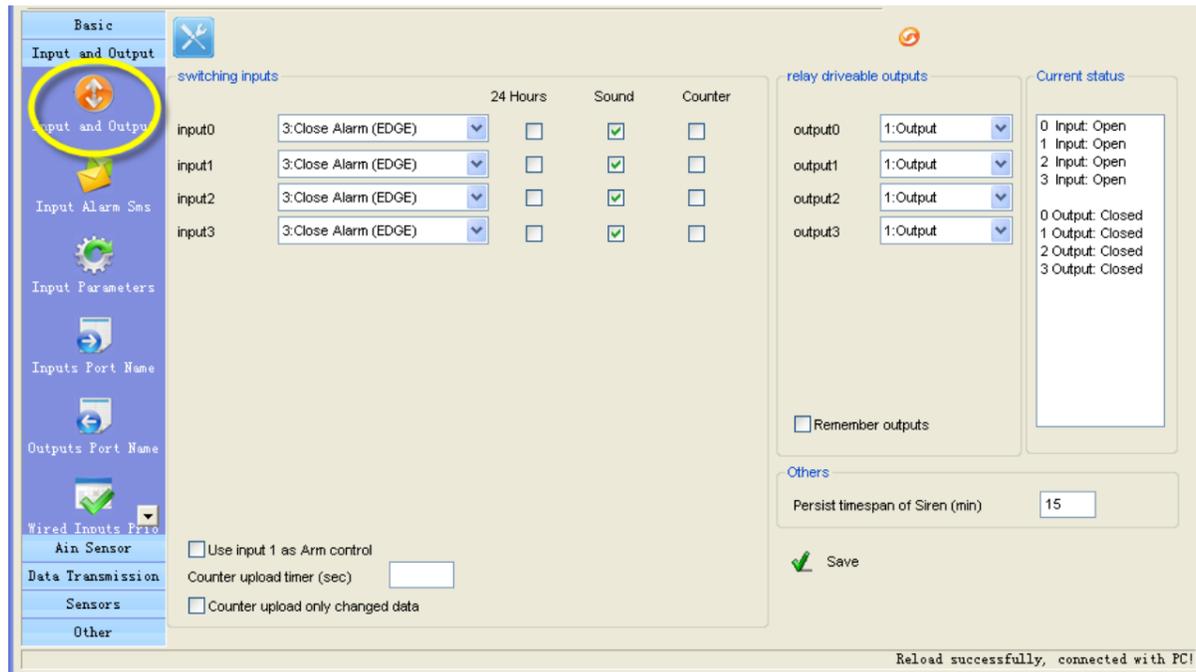
In this page, you can set authorization for CS numbers

“O” means enable authorization; “X” means disable authorization.

Authority	Explanation
admin	Can Arm/disarm or not
Modify by sms	This CS number can be modify by sms command or not
Change cs phones	This CS number can modify other CS number by sms command or not
Powerup sms	Can receive the status sms or not when RTU is restarted by sms command
Daily report sms	Can receive the daily report or not
Timer mms	Null
Alarm mms	Null
I-tmp alarm sms	Can receive the alarm sms or not when internal temperature sensor alarm
I-tmp alarm ring	Can receive the alarm phone call or not when internal temperature sensor alarm
Power fail sms	Can receive the alarm sms of power failure or not
Power fail ring	Can receive the alarm phone call of power failure or not
Signal low alarm	Null
Sample sms	Null
M2M svr	RTU send sms to the CS number with CWT_IO protocol
Arm notify	Can receive sms when RTU arm or disarm

### 4.3 Input and Output

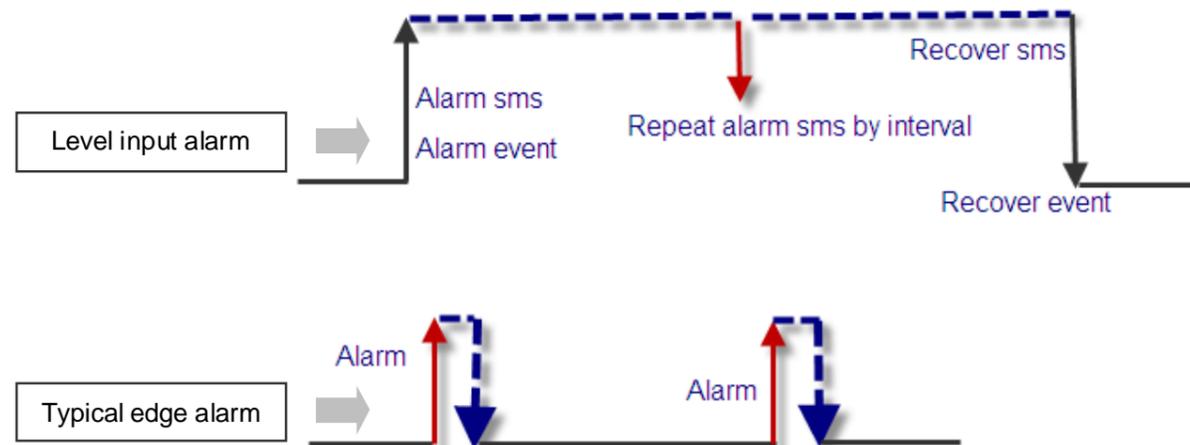
#### 4.3.1 Setup input and output types



#### Digital inputs types

Input signals have two types, EDGE\_IN (edge triggering) and LEVEL\_IN (state triggering).

**ATTENTION:** The key difference between Level and Edge is Level input has recovery sms message and Level input can repeat alarm status sms notify by an interval.



#### 24 Hours

If enable this option, the digital input will execute alarm action (send alarm sms, interlock etc) when it is triggered, even RTU is in disarm status.

#### Sound

Means this channel input alarm event can cause internal buzzer and extend buzzer or siren action.

#### Use digital input 1 as arm control

Enable this option, RTU is in arm mode if digital input 1 is opened, RTU is in disarm mode if digital input 1 is closed, so user can connect a button to switch mode for arm or disarm

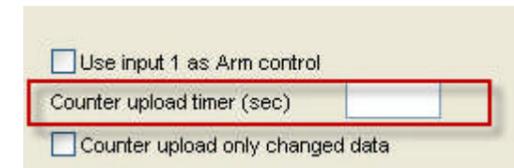
**ATTENTION:** Use digital input1 as arm control you need select the type of input1 is "TO CLOSE ALARM (LEVEL)" and delete the alarm/recover sms of input 1

#### Counter

Enable or disable this channel input as counter input which catch greater than 100ms plus.

#### Counter upload timer

Setup the counter GPRS upload interval



#### Counter upload only changed data

Automatic counter upload mode is a mode to Save GPRS, not report data if value not changed.

**Attention:** This option is valid for the RTU models that have GPRS function.

#### Output types

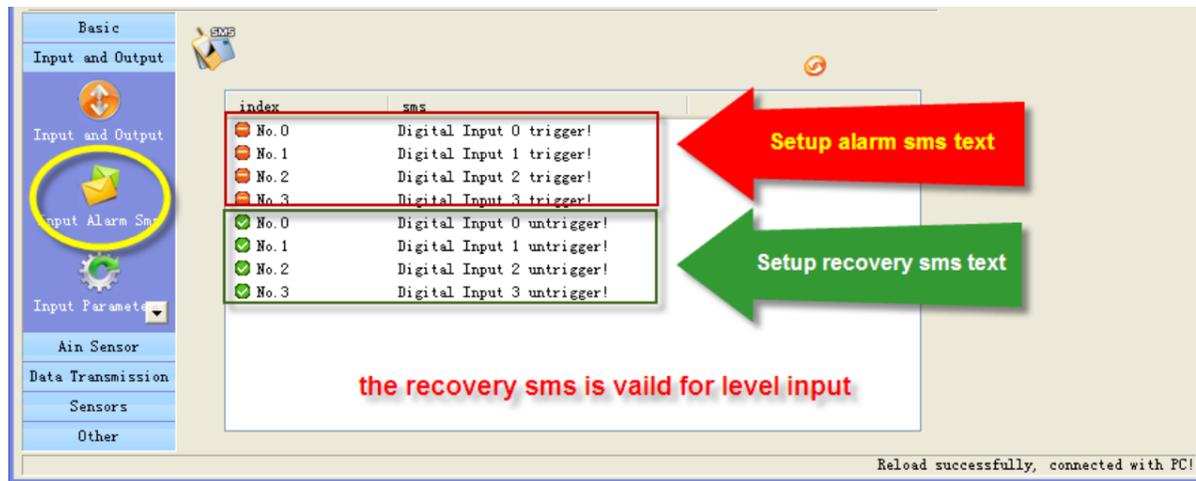
0	disable	
1	relay drivable output	Drive relay, drive electricity <0.2A Output drive relay voltage Equal to input DC voltage Output power: Drive voltage ≤35V, drive current ≤200mA
2	Buzzer	This line's actions will synchronize with internal buzzer.
3	SNAPSHOT	This line wills shortly action when any alarm happens.
4	SIREN	This line continuous drives for 1 minute by default. And the interval can be user define.

#### Remember outputs status

RTU's outputs default status is open; it is possible closed during working. After restart, the outputs will be reset, status is open. If enable the option, output can recover the status that before restart.

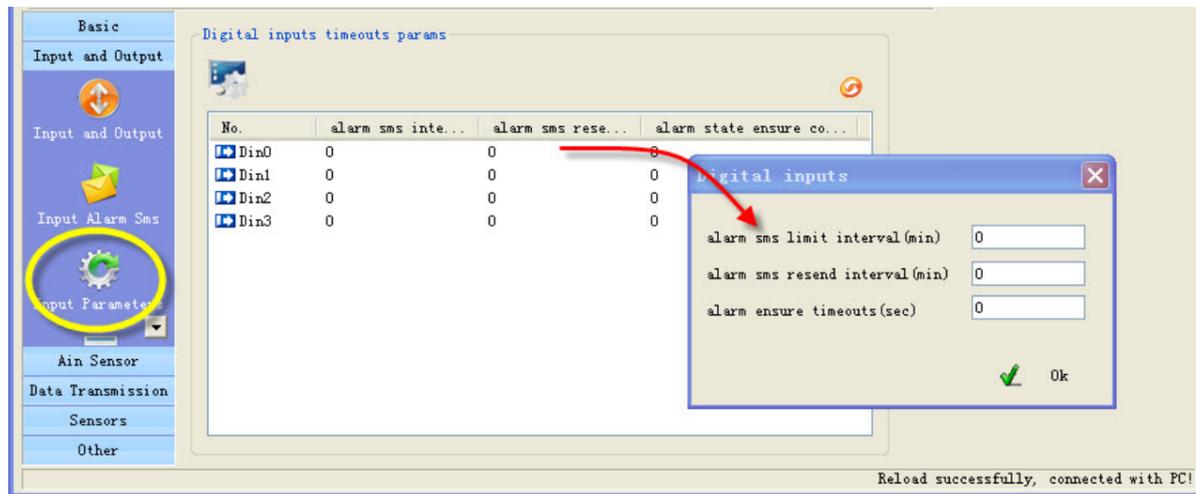


4.3.2 Define alarm and recover sms of digital input



All of the input lines sms can be modify. A SMS composed of not more than 60 characters

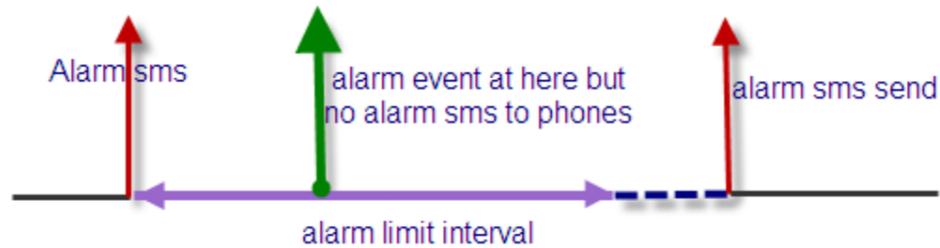
4.3.3 Setup inputs timeouts



This page designed to setup input timeouts property. There are 3 interval related with inputs.

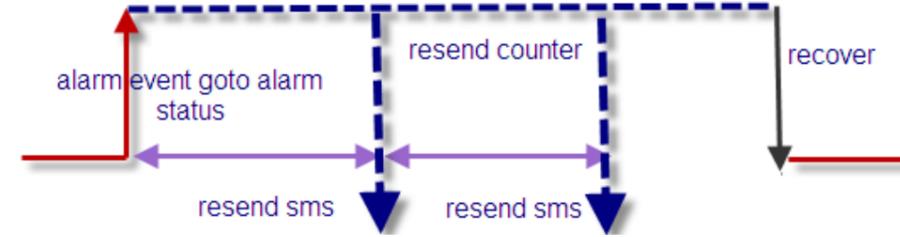
1. Alarm sms limit interval

It is designed to avoid amounts of alarm/recover sms in a short time.



2. Alarm sms resend interval

It is designed for repeat alarm status notifies to phones, 0 means disable repeat notification.

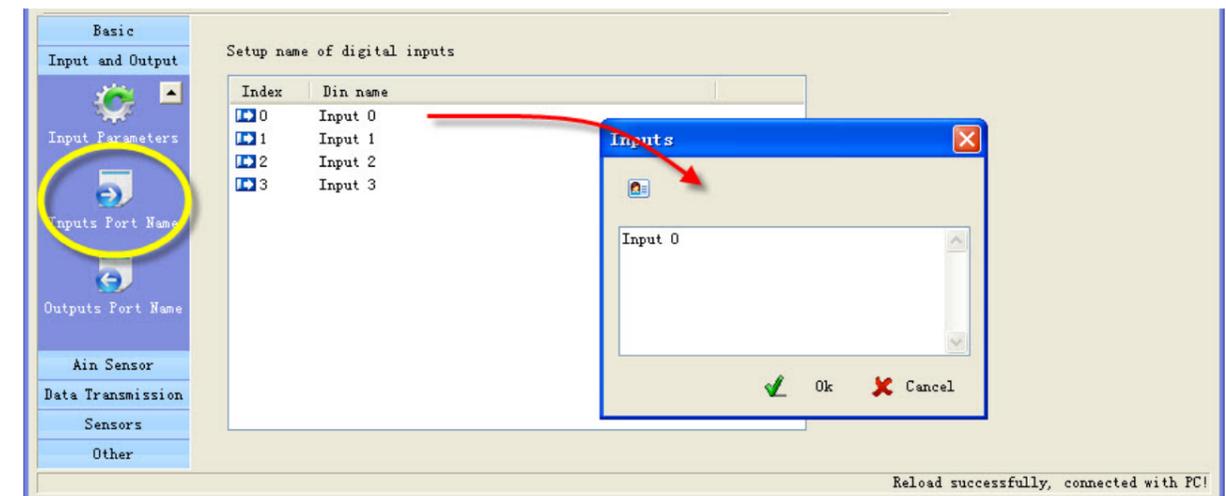


3. Alarms ensure timeouts

It is a counter of alarm status ensure timer, designed to avoid shake mistakes. 0 means no counter.



4.3.4 Setup digital inputs/outputs port name



If you send sms command to require inputs status, there is a contrast of returning

from: +8613480165874  
 High voltage: normal  
 Low voltage: alarm  
 High water level: normal  
 Low water level: normal

Have setup input name

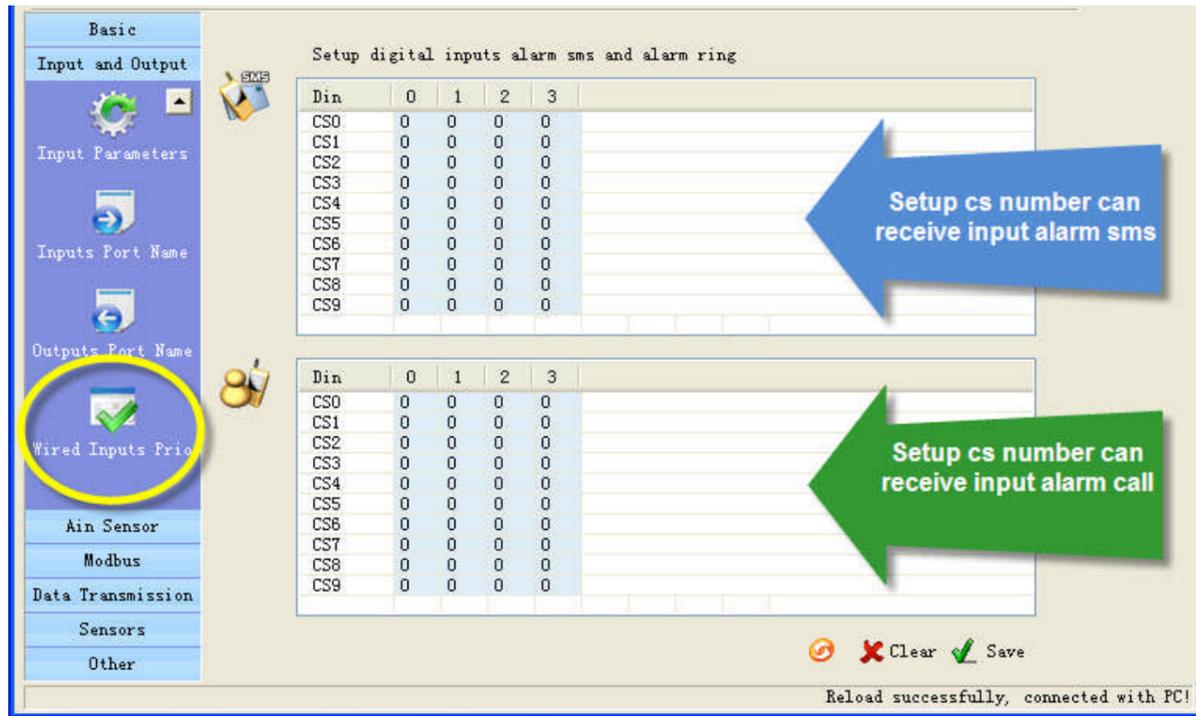
from: +8613480165874  
 Input 0 : normal  
 Input 1 : alarm  
 Input 2 : normal  
 Input 3 : normal

Have not setup input name

Setup outputs name is same

### 4.3.5 CS's DIN authority

This page can setup the authority of CS phone receive digital input alarm sms and alarm call  
 "O" means this cs phone will receive related line in sms, "X" means not.



**Example:**

Din	0	1	2	3
CS0	X	0	0	0
CS1	0	X	0	0
CS2	X	0	0	0
CS3	0	0	0	0
CS4	0	0	0	0
CS5	0	0	0	0
CS6	0	0	0	0
CS7	0	0	0	0
CS8	0	0	0	0
CS9	0	0	0	0

This settings means CS0 don't receive input 0 alarm  
 CS1 don't receive input1 alarm sms.  
 CS3 don't receive input0 alarm sms.

## 4.4 Setup Ain parameters

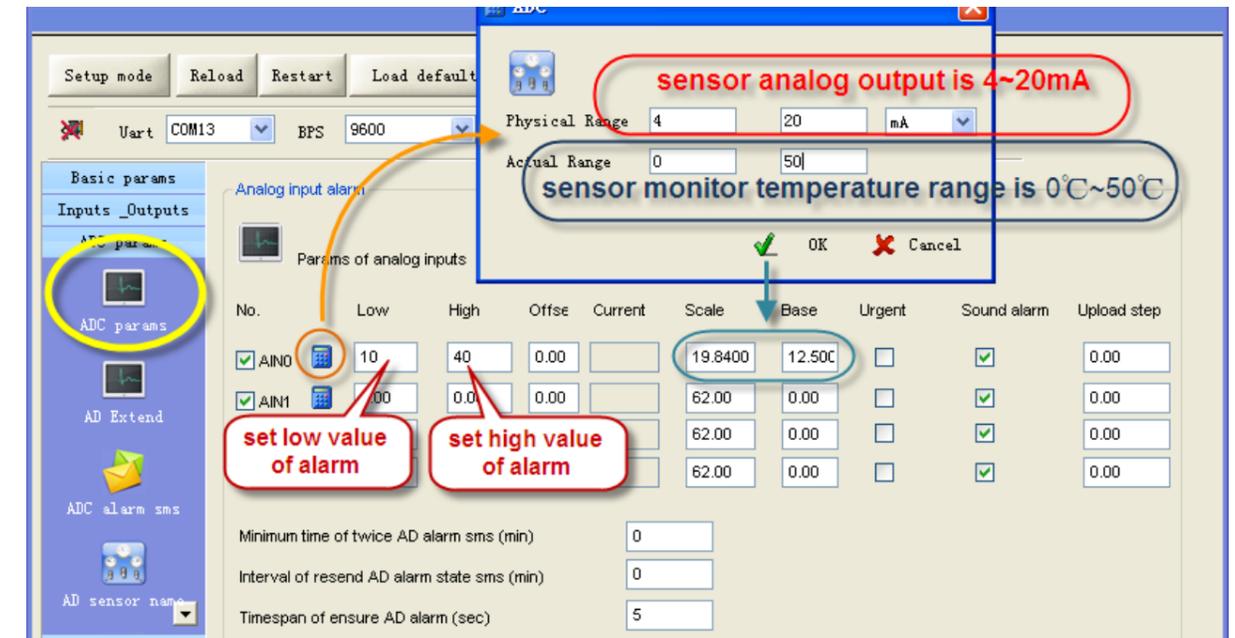
### 4.4.1 Setup Ain parameters

The analog input is designed to receive 0~20mA or 0~5V signal from an analog sensor

You can preset a high and a low level for every AD input, if current value is above the high level or below the low level, RTU alarm. You also can send sms command to RTU to get current value.

**Example:**

RTU connect a temperature transmitter, it analog output range is 4-20 ma for monitor temperature range is 0°C-50°C, you want to get alarm and current temperature value when temperature is above 40°C or below 10°C.



**Urgent**

If checked, in any case, the RTU will execute alarm action (send alarm sms, interlock etc) when the AD input is over normal range, even RTU is in disarm status.

**Sound alarm**

Means this line alarm event will cause internal buzzer and extend buzzer or siren action.

**Upload step**

⚠ Attention: This option is valid for the RTU models that have GPRS function.

If the change of AD input is more than "upload step", RTU upload current value to server by GPRS.

**Minimum time of twice AD alarm sms (AINAS time)**

After executed an alarm action (send alarm sms, interlock etc.) When AD inputs over normal range, in the AINAS time RTU will not execute any alarm action (send alarm sms, interlock etc.) even AD inputs are over normal range frequently. The purpose of setting AINAS time is user will not receive many alarm



sms in the time when the AIN value is fluctuates at low value or high value. "0" means disable the function. "0" means disable the function.

**Interval of resend AD alarm state sms (AINLS time)**

After executed a alarm action(send alarm sms, interlock etc.) when AD inputs over normal range, if the duration of the alarm signal overrun the AINLS time, RTU will execute a alarm action(send alarm sms, interlock etc.) again. The purpose of setting AINLS time is alarm to user repeatedly at regular intervals during the AD input is in state of over normal range. "0" means disable the function.

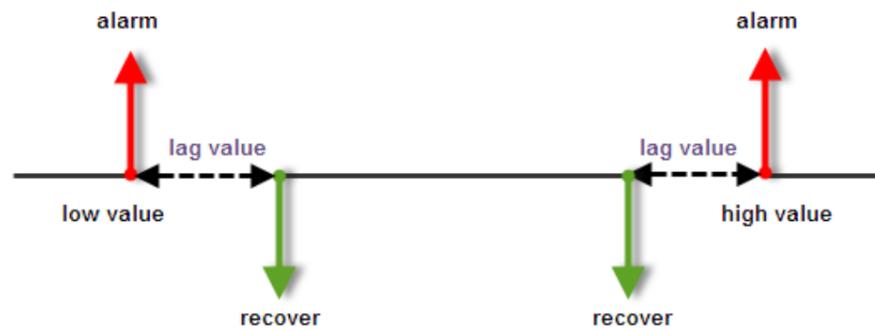
**Timespan of ensure AD alarm (AINDLY time)**

RTU will not execute any alarm action(send alarm sms, interlock etc.) in the AINDLY time even AD inputs over normal range, if the duration of the alarm signal overrun the AINDLY time, RTU will execute a alarm action(send alarm sms, interlock etc.). "0" means disable the function.

**Setup lag**

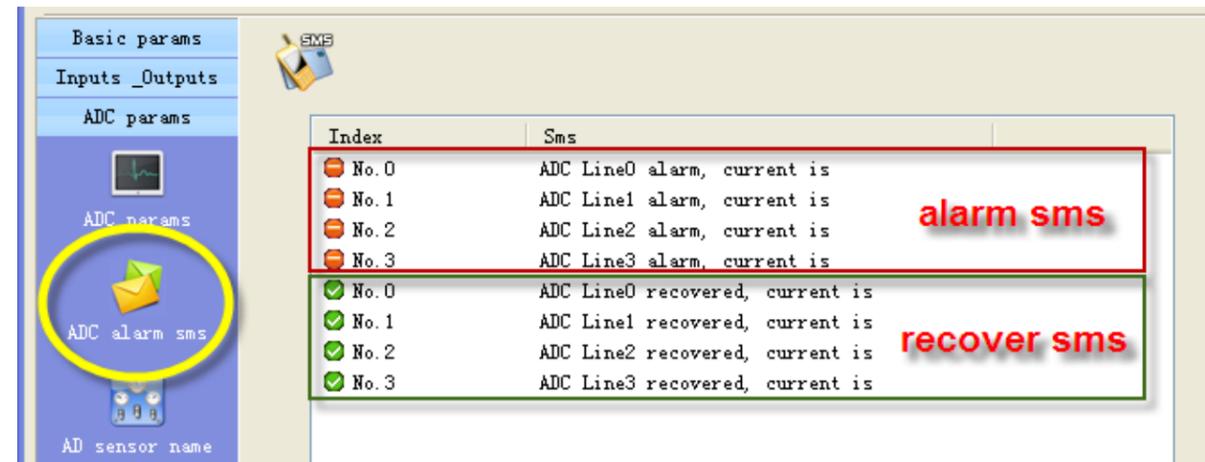
When AD inputs over normal range, RTU will alarm. But will not return to normal state before AIN return into range high value-lag and low value+lag.

For example: normal range is 10~40, lag is 5, RTU send alarm sms when AIN value is 10 or 40. But RTU send recover sms when AIN value is 35(40-5) or 15(10+5)



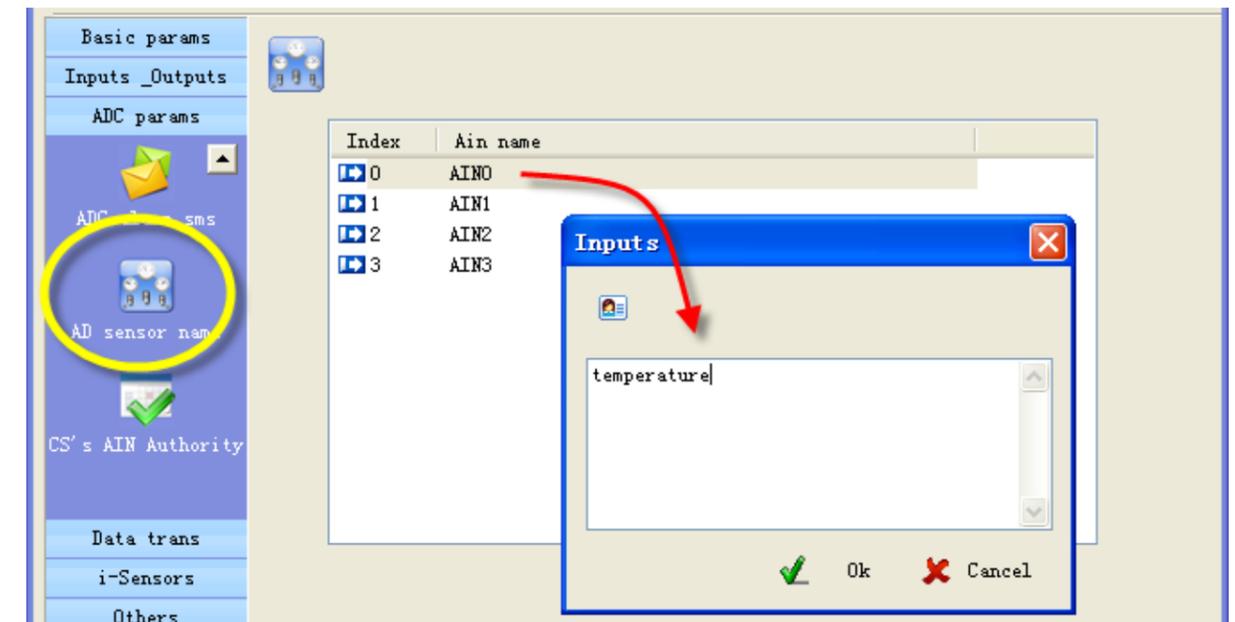
The purpose of setting lag is user will not receive many alarm when the AIN value is fluctuates at low value or high value. "0" means disable the function.

**4.4.2 Setup AIN alarm and recover sms**



The current value is showed in end of alarm or recovers sms. A SMS composed of not more than 60 characters.

**4.4.3 Setup AD inputs name**



If you send sms command to query AD inputs value, the AD inputs name show in the sms

For example, set the AD input 0 channel name is "temperature", the sms is:

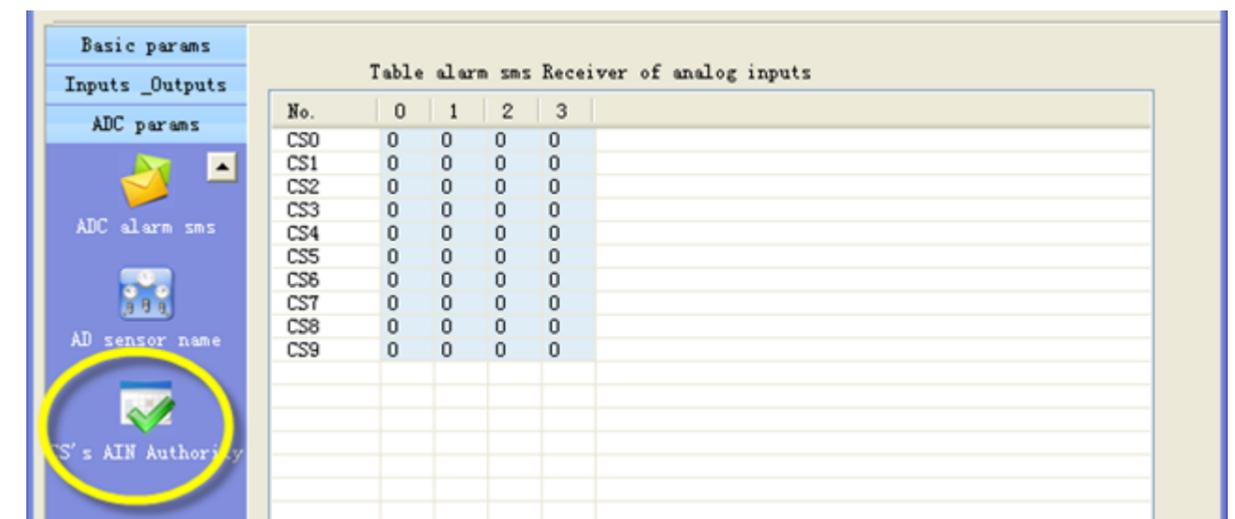
```
From: +8613480165874
Temperature current value : 21.33
AD input 1 current value: 60
AD input 2 current value: 0
AD input 3 current value: 0
```

**ATTENTION:** a name composed of not more than 24 characters

**4.4.4 CS's AIN Authority**

This page can setup the table of CS phone receive AD input line in alarm property.

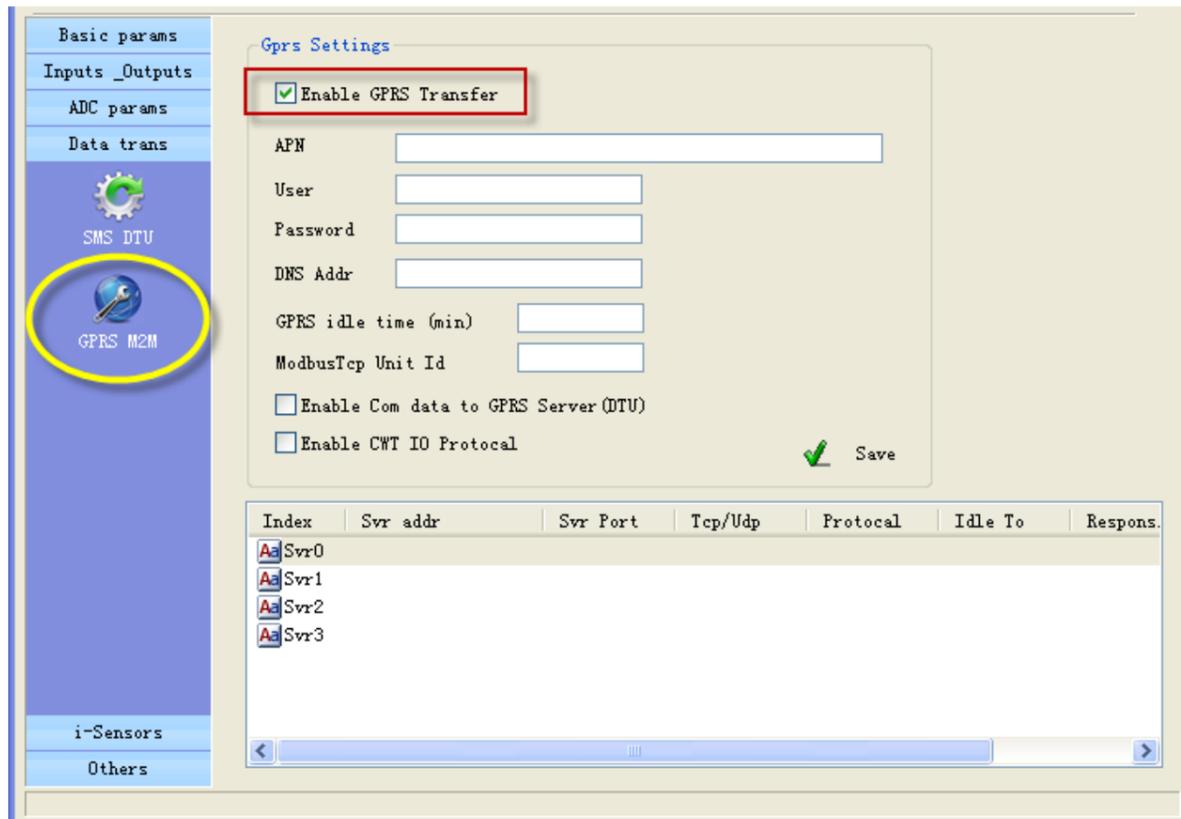
"O" means this cs phone will receive related line in sms, "X" means not.



## 4.5 GPRS parameters

### 4.5.1 GPRS parameters

In this page, you can set GPRS parameters.



“APN, user, password, DNS addr”, you can consult the GSM operation

#### ❑ GPRS idle time

Means if GPRS RTU has no data transferred in the time, GPRS will off line, set the time to 0, means GPRS always on line.

#### ❑ Modbus TCP unit ID:

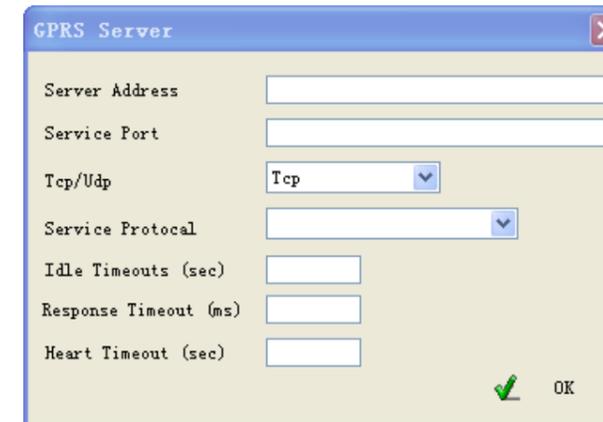
It is valid if data transfer with Modbus TCP protocol

#### ❑ Enable com data to GPRS server

GPRS RTU support RS232 Transparent Transmission

#### ❑ Set parameters of server:

4 servers can be add, they can receive data from GPRS RTU at the same time  
You can set parameters for every server



#### ❑ Server address

It is an IP of server or domain names, IP must be a static and public IP address

#### ❑ Service port

It is a TCP/IP port of applications on server

#### ❑ TCP/UDP

You can select TCP/UDP transport protocols for sever

#### ❑ Service Protocol

You can select communication protocols between GPRS RTU and server

They are Modbus TCP, CWT\_IO and RS232 bidirectional transparent transmission

**Important:** CWT\_IO and GRPS DTU protocols can support TCP or UDP; but MODBUS TCP protocol only support TCP; so if you use the CWT5002, the transport protocol must be TCP

#### ❑ Idle timeout

It is valid for TCP server; it means if there is no data transferred in the time, the server is disconnected.  
Set to 0 to disable the function

#### ❑ Response timeout

It is valid for CWT\_IO and Modbus TCP communication protocols, it means after GPRS RTU send data messages to server if GPRS RTU have not received response data from server in the time, the GPRS RTU will send data again. Set to 0 to disable the function.

#### ❑ Heart timeout

Reserve

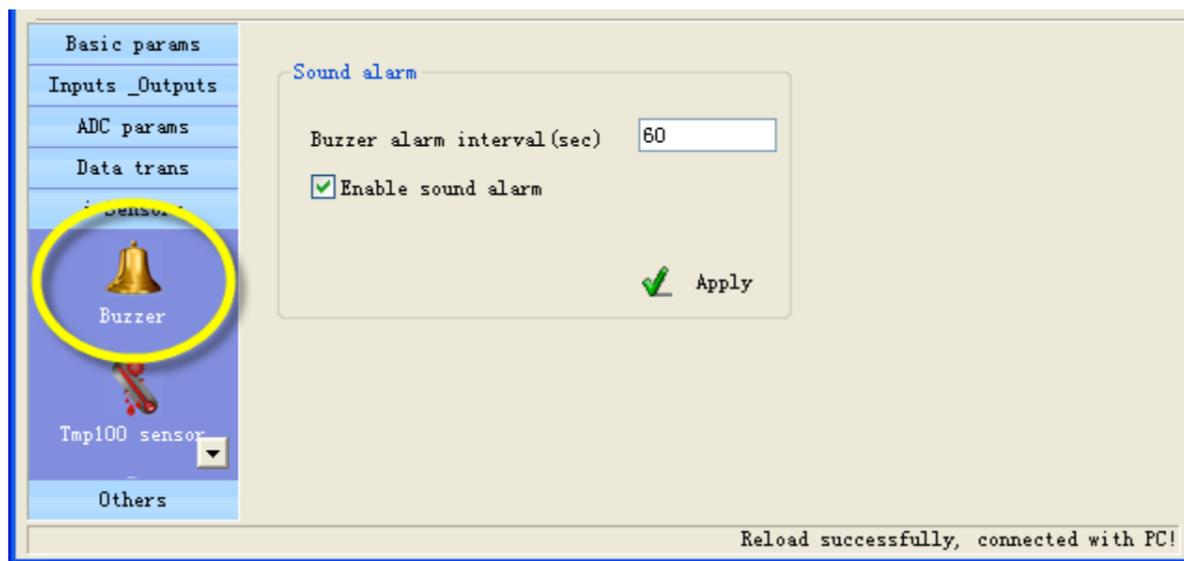
## 4.6 Setup I-sensors

### 4.6.1 Buzzer

⚠ Attention: This setting is valid for the RTU models that have buzzer.

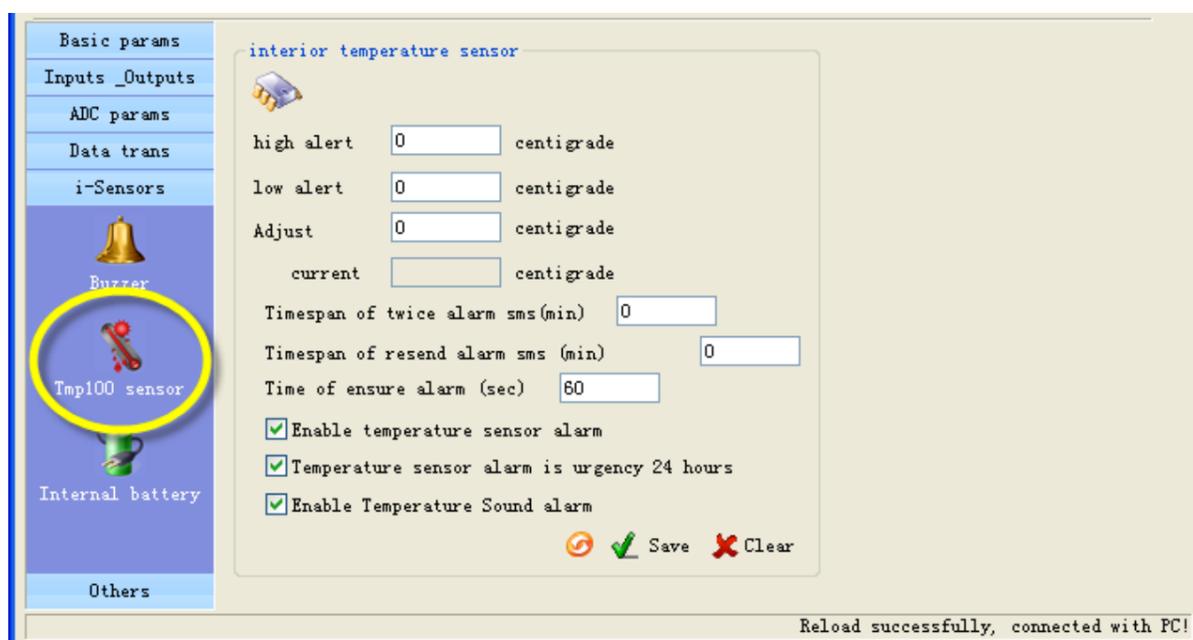
The buzzer can be activated when alarm.

In this page, you can enable or disable the buzzer and set interval time of alarm



### 4.6.2 Tmp100 sensor (optional)

⚠ Attention: This setting is valid for the RTU models that are added interior temperature sensor, the tmp100 temperature is optional, a standard RTU have not internal temperature sensor.



You can preset a high and a low temperature value, if temperature is over normal range, RTU alarm. You also can send sms command to RTU to get current temperature.

User can set "Adjust" value to calibrating temperature value

#### ❑ Timespan of twice alarm sms

It is designed to avoid amounts of alarm/recover sms in a short time.

#### ❑ Tmprs time: timespan of resend alarm sms

It is designed for repeat alarm status notifies to phones, 0 means disable repeat notification.

#### ❑ time of ensure alarm

It is a counter of alarm status ensure timer, designed to avoid shake mistakes. 0 means no counter.

### 4.6.3 Internal battery (optional)

⚠ Attention: This setting is valid for the RTU models that are internal battery.

It is designed to realize power lost alarm

When external power cut off, RTU Powered by internal battery and alarm to cs numbers



#### ❑ time of ensure power alarm

When the time of external power lost is over the time, RTU alarm, "0" means disable the function.

Battery parameter:

- Lithium battery
- Voltage: 3.7V
- Capacity: 800mAh
- Limited voltage for charging 4.2V
- Implementation standard GB/T 18287-2000

## 4.7 Setup extend temperature sensor

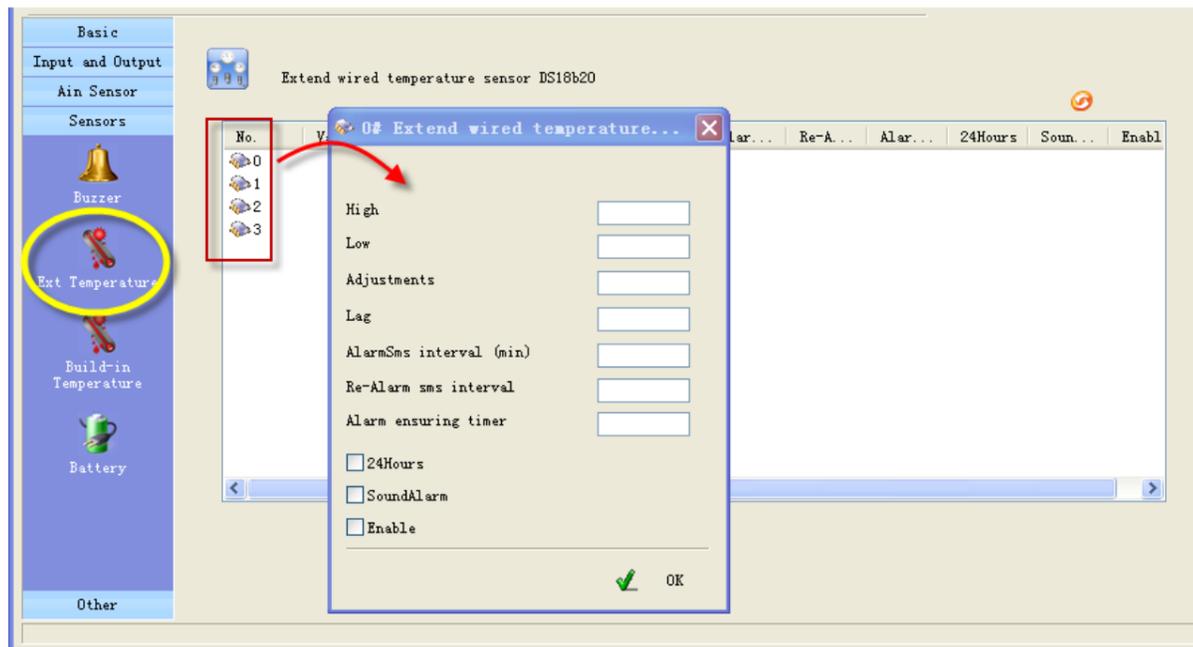
### 4.7.1 Setup extend temperature

CWT5016 can connect 4 extend wired temperature sensors DS18B20.

You can preset a high and a low level for every channel, if the current temperature is above the high level or below the low level, CWT5016 alarm. You can also send sms command to get current temperature.

DS18B20 temperature probes

temperature range:  $-55^{\circ}\text{C}\sim+125^{\circ}\text{C}$ ; precision:  $\pm 0.5^{\circ}\text{C}$



#### Adjustments

You can set the value to reduce error.

#### Alarm sms interval

The time is designed to avoid amounts of alarm/recover sms in a short time.

#### Re-alarm sms interval

Designed for repeat alarm status notifies to phones, 0 means disable repeat notification.

#### Alarm ensuring timer

It is a counter of alarm status ensure timer, designed to avoid shake mistakes. 0 means no counter.

#### “24 Hours” property

If checked, the channel will execute alarm action (send alarm sms, interlock etc) when it is triggered, even CWT5016 is in disarm status.

#### “Sound” property

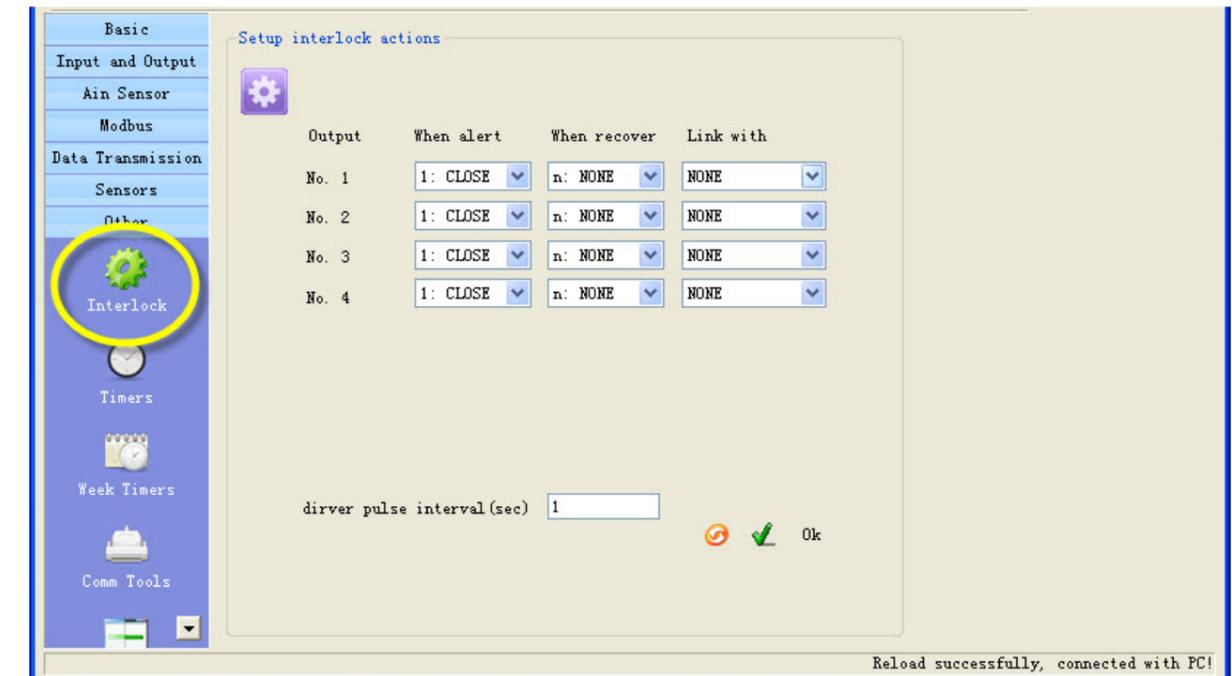
Means this line alarm event will cause internal buzzer and extend buzzer or siren action.

#### “Enable” property

Enable or disable this channel's alarm

## 4.8 Others setting

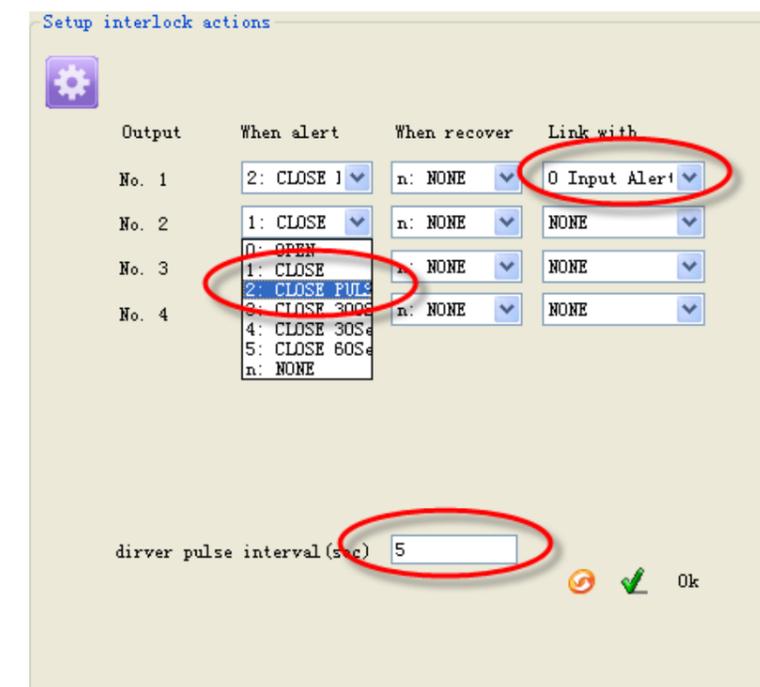
### 4.8.1 Realtime Interlock



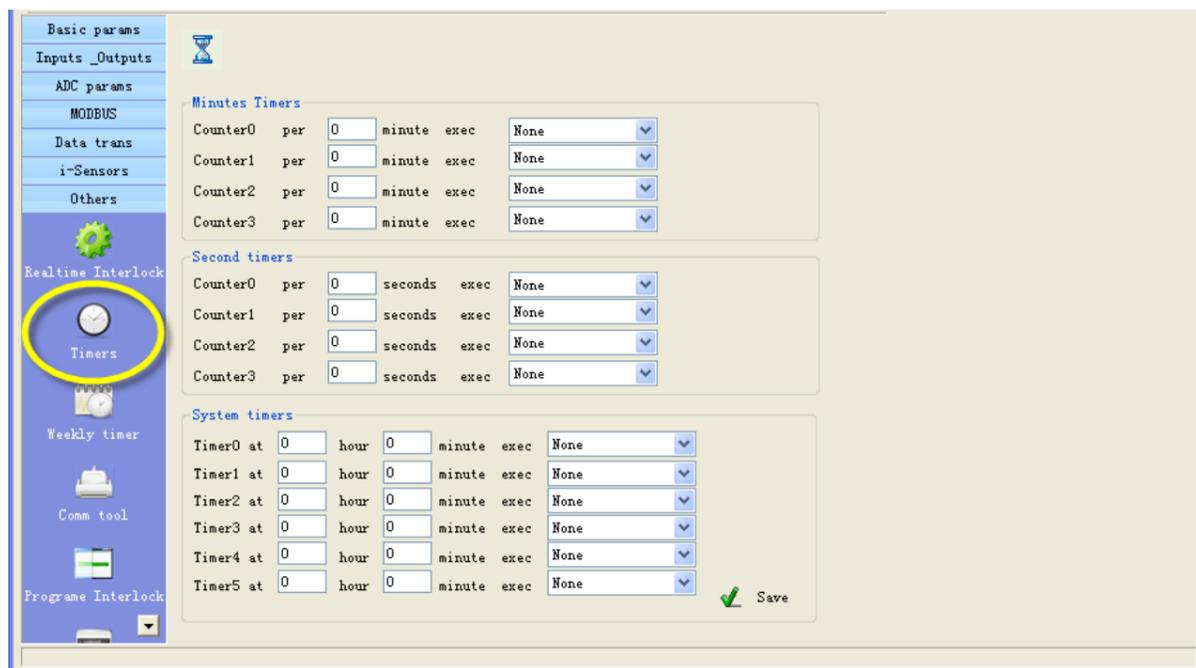
Realtime interlock is a local strategy, it is designed to outputs automatically execute action under some internal triggering conditions.

#### For example

If digital input 0 alert, output 0 close pulse 5 seconds.



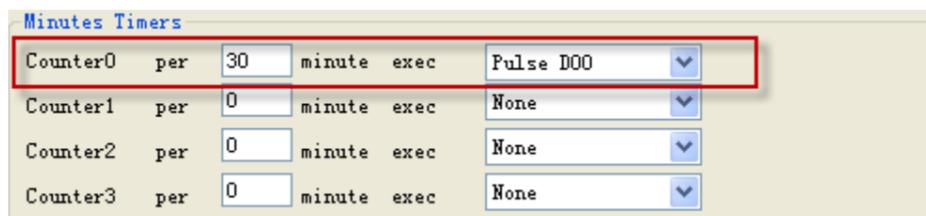
## 4.8.2 Timers



Timers is designed to time execute task, task include arm, disarm, open/close output etc.

### □ Minutes timers

4 minute counters can be set, RTU execute a task every the minute interval.  
For example, RTU execute output 0 pulse every 30 minutes

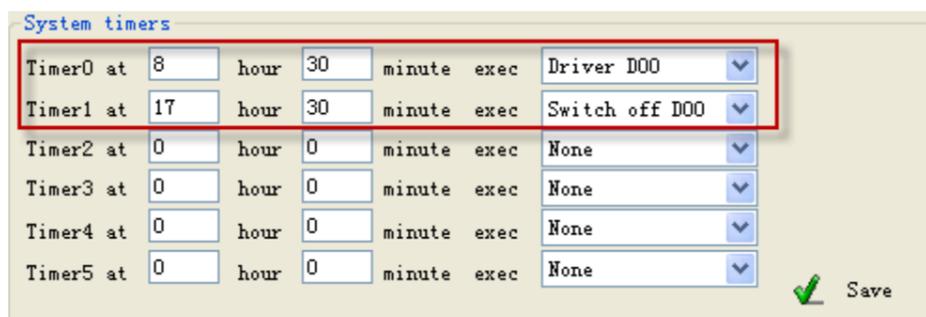


### □ Second timers

4 second counters can be set, RTU execute a task every the second interval.

### □ System timers

6 times can be set in a day, RTU execute a task in each time.  
For example, at 8:30 execute output 0 on, at 17:00 execute output 0 off.



## 4.8.3 Weekly timers



7 times can be set in a week, RTU execute a task in each time.  
For example, execute send daily report at Monday 10:30 RTU

## 4.8.4 Define users commands

Users can define 6 commands instead of system commands.

For example, user set "close" instead of system command "IOOH", so user can send "close" to close output

